3

MEMO RAD

JAARGANG 13 - NUMMER 3 - HERFST 2008

13E NEDERLANDSE RADIOLOGENDAGEN
9 EN 10 OKTOBER 2008
DE DOELEN, ROTTERDAM

SUPPLEMENT

Nederlandse Vereniging voor Radiologie
Radiological Society of the Netherlands

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VOORWOORD

Dames en heren leden van de NVvR,

Voor u ligt het Memorad supplement, met het programma en de abstracts van de Radiologendagen 2008. Dit jaar is in verband met de goede bereikbaarheid, met zowel de auto als met het openbaar vervoer, en de uitstekende kritieken betreffende de accommodatie wederom gekozen voor 'de Doelen' in Rotterdam. Ook wegens succes geprolongeerd is de samenwerking met Congress Care. Het Organiserend Comité verwacht dat ook dit jaar de goede service voor de deelnemers van de Radiologendagen weer zal bijdragen aan het succes van onze belangrijkste bijeenkomst van het jaar.
De Radiologendagen worden geopend met een sessie over straling. Om dit belangrijke onderwerp voor iedereen boeiend te maken zijn we verheugd dat we hiervoor een zeer gerenommeerde spreker bereid hebben gevonden naar Rotterdam af te reizen. Sommigen van u kennen hem vast van de RSNA!
Er zijn dit jaar maar liefst tien Refresher Courses, verdeeld over twee dagen, met een breed scala aan interessante onderwerpen en boeiende sprekers. Verder worden de tien wetenschappelijke parallelsessies weer ingeluid door key-note speakers met actuele voordrachten over het onderhavige onderwerp. De beste wetenschappelijke presentatie zal op vrijdag worden bekroond met de Radiologendagenprijs! Nieuw dit jaar zijn de posters waarin collegae hun wetenschappelijke bevindingen aan u presenteren.
Tijdens enkele refreshercourses en een wetenschappelijke sessie zullen meerdere recent opgerichte secties zichzelf aan u voorstellen met een korte presentatie.
De steeds hoog gewaardeerde quiz heeft een nieuw jasje en een nieuwe quizmaster gekregen. Op donderdag middag zullen prijzen worden uitgereikt en zullen de radiologen die het afgelopen jaar hun NVvR fellowship succesvol hebben afgerond in het zonnetje worden gezet.
Op vrijdag zijn er 2 plenaire sessies over respectievelijk stroke en communicatie. Beiden worden verzorgd door internationaal zeer hoog aangeschreven sprekers! Daarnaast zijn er een aantal richtlijnsessies gepland, met belangrijke aanwijzingen voor de praktijk van elke dag.

Al met al denken we een uiterst boeiend vakinhoudelijk programma te hebben samengesteld, waarbij er tevens uitgebreid gelegenheid is om u in de expositieruimte op de hoogte te stellen van allerlei wetenswaardigheden, die onze relaties van de industrie u te bieden hebben.
Graag zou ik bij dezen alle sponsoren, en in het bijzonder het drietal hoofdsponsoren Philips Medical Systems, Sectra ImaXperts en Siemens Medical Solutions willen bedanken voor hun ondersteuning.

Om het nuttige met het aangename te verenigen hebben wij voor het feest een heerlijk diner en een geweldige band voor u geregeld. De ideale gelegenheid om gezellig bij te praten met oude vrienden en nieuwe bekenden te ontmoeten!

Rest ons nog u een buitengewoon leerzaam, gezellig en aangenaam verblijf in Rotterdam toe te wensen!

Het Organiserend Comité van de Radiologendagen 2008

Digna Kool, voorzitter
Saskia Kolkman
Jan Albert Vos
Henk-Jan van der Woude

Donderdag 9 oktober 2008

Tijdstip	Onderwerp	
09.00-09.45	Inschrijving en koffie	
09.45-10.00	**Opening door voorzitter**	
	D.R. Kool, UMC St Radboud, Nijmegen	
10.00-11.00	**Plenaire sessie**	
	Voorzitter:	J.G. Blickman, UMC St Radboud, Nijmegen
	Where we stand on CT radiation management	
	Spreker:	D.P. Frush, Duke University Medical Center, Durham, North Carolina, USA
11.00-11.30	Koffiepauze	
11.30-13.00	**Parallel sessies Wetenschappelijke voordrachten**	
	I Abdominale radiologie - oncologisch	
	Voorzitters:	J. Stoker, Academisch Medisch Centrum, Amsterdam
		S. Dwarkasing, Erasmus MC, Rotterdam
	Key-note speaker:	J. Stoker, Academisch Medisch Centrum, Amsterdam
	II Abdominale radiologie - niet-oncologisch	
	Voorzitters:	J.H.T.M. van Waesberghe, VU Medisch Centrum, Amsterdam
		V.C. Cappendijk, academisch ziekenhuis Maastricht, Maastricht
	Key-note speaker:	J.H.T.M. van Waesberghe, VU Medisch Centrum, Amsterdam
	III Cardiovasculaire- en neuroradiologie	
	Voorzitters:	H.J. Lamb, Leids Universitair Medisch Centrum, Leiden
		H.C.M. van den Bosch, Catharina-Ziekenhuis, Eindhoven
	Key-note speaker:	H.J. Lamb, Leids Universitair Medisch Centrum, Leiden
	IV Interventieradiologie	
	Voorzitters:	L.C. van Dijk, HagaZiekenhuis, Den Haag
		M. van den Bosch, UMC Utrecht, Utrecht
	Key-note speaker:	L.C. van Dijk, HagaZiekenhuis, Den Haag
	V Kinder- onderwijs- acute- en thoraxradiologie	
	Voorzitters:	I.J.C. Hartmann, Erasmus MC, Rotterdam
		H.L.S. Go, Medisch Centrum Alkmaar, Alkmaar
	Key-note speaker:	I.J.C. Hartmann, Erasmus MC, Rotterdam
13.00-14.15	Lunch en postersessie	
14.15-15.30	**Parallel Refresher Courses**	
	I: BEELDVORMING VAN HET HOOFDHALS GEBIED:	
	INTERACTIE MET KLINIEK IS ESSENTIEEL	
	Voorzitter:	R.B.J. de Bondt, academisch ziekenhuis Maastricht, Maastricht
	Spreker:	R.B.J. de Bondt, academisch ziekenhuis Maastricht, Maastricht
	Hoofdhals oncologie: interactie tussen radioloog en KNO-arts bepaalt het succes van de therapie	
	Belangrijke vragen aan de radioloog	
	Spreker:	B. Kremer, academisch ziekenhuis Maastricht, Maastricht
	Radiologische stagering in het hoofdhals gebied	
	Spreker:	F.A. Pameijer, NKI-AvL, Amsterdam

Donderdag 9 oktober 2008

Tijdstip	Onderwerp	
	II: KINDERRADIOLOGIE	
	Voorzitter:	R.R. van Rijn, Academisch Medisch Centrum, Amsterdam
	Congenital lung abnormalities	
	Spreker:	D.P. Frush, Duke University Medical Center, Durham, North Carolina, USA
	Congenital anomalies of the gastrointestinal tract	
	Spreker:	F.J.A. Beek, UMC Utrecht, Utrecht
	Congenital anomalies of the urogenital tract	
	Spreker:	J.G. Blickman, UMC St Radboud, Nijmgen
	III: MRI EN MAMMADIAGNOSTIEK	
	Voorzitter:	H.N. van Hall, Ziekenhuis Rijnstate, Arnhem
	State of the art MRI of the breast	
	Spreker:	F. Sardanelli, I.R.C.C.S. Policlinico San Donato, Milan, Italy
	Mamma screening met MRI	
	Spreker:	C. Boetes, UMC St Radboud, Nijmegen
	IV: MSK	
	Voorzitter:	M. Maas, Academisch Medisch Centrum, Amsterdam
	New aspects of radiology in rheumatoid arthritis	
	Spreker:	F. Kainberger, Medical University of Vienna, Vienna, Austria
	MRI bij inflammatoire rugpijn: state of the art	
	Spreker:	M. Reijnierse, Leids Universitair Medisch Centrum, Leiden
	Wat kan de radioloog voor de reumatoloog betekenen?	
	Spreker:	R.E. Weijers, academisch ziekenhuis Maastricht, Maastricht
	V: PET-CT	
	Voorzitter:	S. Jap-a-Joe, Onze Lieve Vrouwe Gasthuis, Amsterdam
	PET-CT abdomen: protocollen, normale bevindingen en pitfalls	
	Spreker:	B. Mearadji, Academisch Medisch Centrum, Amsterdam
	PET-CT bij gemetastaseerd colorectaal carcinoom	
	Spreker:	W. Oyen, UMC St Radboud, Nijmegen
	Spreker:	E. Comans, VU Medisch Centrum, Amsterdam
15.30-16.00	Theepauze	
16.00-16.45	**Diploma en prijsuitreiking**	
16.45-17.45	**Quiz**	
	Quizmaster:	J.A. Vos, St. Antonius ziekenhuis, Nieuwegein
17.45-18.00	**Philipsprijs**	
18.00-19.30	Borrel	
19.30-01.00	Diner & feest	

Nb.: meer praktische informatie vindt u op www.radiologen.nl

Vrijdag 10 oktober 2008

Tijdstip	Onderwerp	
08.15-08.45	Inschrijving en koffie	
08.45-09.45	**Plenaire sessie**	
	Voorzitter:	G.J. Lycklama à Nijeholt, MC Haaglanden, Den Haag
08.45	**Logistiek en diagnostiek bij acute stroke**	
	Spreker:	C.B.L.M. Majoie, Academisch Medisch Centrum, Amsterdam
09.10	**Endovascular treatment of acute stroke**	
	Spreker:	K.G. Terbrugge, Toronto Western Hospital, Toronto, Canada
09.45 - 10.30	**Richtlijn sessies**	
	Darmkanker; erfelijke darmkanker, coloncarcinoom en rectumcarcinoom	
	Spreker:	J. Stoker, Academisch Medisch Centrum, Amsterdam
	Gliomen en diagnostiek bij stroke	
	Sprekers:	H.Z. Flach, Erasmus MC, Rotterdam
		B. Velthuis, UMC Utrecht, Utrecht
	Revisie larynx, idiopatische perifere aangezichtsverlammingen, chronische rhinosinusitis en nasale poliepen	
	Sprekers:	R.B.J. de Bondt, academisch ziekenhuis Maastricht, Maastricht
		J. Bot, VU Medisch Centrum, Amsterdam
10.30-11.00	Koffiepauze	
11.00-12.30	**Parallel sessies Wetenschappelijke voordrachten**	
	VI Abdominale radiologie	
	Voorzitters:	J.B.C.M. Puylaert, MC Haaglanden, Den Haag
		J.W.C. Gratama, Gelre Ziekenhuizen, Apeldoorn
	Key-note speaker:	J.B.C.M. Puylaert, MC Haaglanden, Den Haag
	VII Cardiovasculaire radiologie	
	Voorzitters:	T.P. Willems, UMC Groningen, Groningen
		K. Koster, Deventer Ziekenhuis, Deventer
	Key-note speaker:	T.P. Willems
	VIII Interventieradiologie	
	Voorzitters:	J.A. Reekers, Academisch Medisch Centrum, Amsterdam
		J.H.D. de Bruine, VU Medisch Centrum, Amsterdam
	Key-note speaker:	J.A. Reekers, Academisch Medisch Centrum, Amsterdam
	IX Neuro- en hoofdhals radiologie	
	Voorzitters:	B. Góraj, UMC St Radboud, Nijmegen
		J. Bakker, Albert Schweitzer Ziekenhuis, Dordrecht
	Key-note speaker:	B. Góraj, UMC St Radboud, Nijmegen
	X Mammadiagnostiek en skeletradiologie	
	Voorzitter:	
		P.R. Kornaat, LUMC, Leiden
	Key-note speaker:	A.H. Westenberg, ARTI, Arnhem
12.30-13.45	Lunch	
13.45-14.00	**Uitreiking Radiologendagen prijs**	
14.00-14.45	**Plenaire sessie**	
	Voorzitter:	J.S. Laméris, Academisch Medisch Centrum, Amsterdam
	Radiologists-detectors or detectives?	
	Spreker:	J. Adam, United Kingdom

Vrijdag 10 oktober 2008

Tijdstip	Onderwerp	
14.45 - 16.00	**Parallel Refresher Courses**	
	VI: ACUTE RADIOLOGIE	
	Voorzitters:	D.R. Kool, UMC St Radboud, Nijmegen
		F.H. Berger, Academisch Medisch Centrum, Amsterdam
	Introductie sectie acute radiologie	
	Sprekers:	D.R. Kool, UMC St Radboud, Nijmegen
		F.H. Berger, Academisch Medisch Centrum, Amsterdam
	Pediatric Emergency Imaging: doing it right	
	Spreker:	D.P. Frush, Duke University Medical Center, Durham, North Carolina, USA
	Forensische radiologie: logistiek en casuïstiek	
	Spreker:	H.M. de Bakker, Groene Hart Ziekenhuis, Gouda
	Forensische radiologie: blik op de toekomst	
	Spreker:	R.F.E. Wolf, UMC Groningen, Groningen
	Introductie subcommissie postmortale en forensische radiologie	
	Spreker:	R.R. van Rijn, Academisch Medisch Centrum, Amsterdam
	VII: ANATOMIE EN VERSPREIDING ZIEKTEN IN DE BUIK	
	Voorzitter:	A.M. Spijkerboer, Academisch Medisch Centrum, Amsterdam
	Anatomie peritoneale ruimte	
	Spreker:	G. Maat, LUMC, Leiden
	Radiologie peritoneale ruimte	
	Spreker:	M. van Leeuwen, UMC Utrecht, Utrecht
	Interactieve casus - rad/path-correlatie	
	VIII: HRCT	
	Voorzitter:	C.M. Schaefer-Prokop, Academisch Medisch Centrum, Amsterdam
	De vele gezichten van Sarcoidosis	
	Spreker:	J. Peringa, OLVG, Amsterdam
	Luchtwegziekte: niet altijd infectie	
	Spreker:	I.J.C. Hartmann, Erasmus MC, Rotterdam
	UIP, NSIP and AIP: de alfabetsoep	
	Spreker:	C.M. Schaefer-Prokop, Academisch Medisch Centrum, Amsterdam
	IX: ONCOLOGISCHE INTERVENTIERADIOLOGIE	
	Voorzitter:	E. van der Linden, MC Haaglanden, Den Haag
	Interventional oncology today and the future	
	Spreker:	T. De Baère, Institut de Cancérologie Gustave Roussy, Villejuif, France
	Interventies bij het hepatocellulair carcinoom	
	Spreker:	O.M. van Delden, Academisch Medisch Centrum, Amsterdam
	X: ONDERWIJS/OPLEIDING	
	Voorzitter:	H.J. Baarslag, Meander Medisch Centrum, Amersfoort
	Implementatie Can Meds competenties in de dagelijkse praktijk van de medisch specialist	
	Spreker:	M.J. Heineman, Universiteit van Amsterdam, Amsterdam
	Modern opleiden in de dagelijkse praktijk van de medisch specialist	
	Spreker:	H.J. Baarslag, Meander Medisch Centrum, Amersfoort
	Mentoring medical students: ook voor radiologen	
	Spreker:	M. Maas, Academisch Medisch Centrum, Amsterdam
16.00-17.00	Afscheidsborrel	

Nb.: meer praktische informatie vindt u op www.radiologen.nl

Organisatie

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Genomineerde abstracts voor de Radiologendagen prijs 2008

NR. O2.8 **PREVALENCE OF MESENTERIC PANNICULITIS IN A LARGE HOSPITAL-BASED POPULATION**

N. van Putte-Katier, O.E. Elgersma, T.R. Hendriksz

NR. O3.5 **THE DIABETIC HEART: MYOCARDIAL LIPID ACCUMULATION AS INDEPENDENT PREDICTOR OF DIASTOLIC DYSFUNCTION**

R.W. van der Meer, L.J. Rijzewijk, M. Diamant, J.J. Bax, J.A. Romijn, J.W.A. Smit, A. de Roos, H. Lamb

NR. O5.1 **VOLUMETRIC ULTRA LOW DOSE EXPIRATORY COMPUTED TOMOGRAPHY (CT) PROTOCOLS FOR THE MONITORING OF MILD CYSTIC FIBROSIS (CF) LUNG DISEASE COULD BE SUFFICIENT**

M. Loeve, M.H. Lequin, M. de Bruijne, I.J.C. Hartmann, W.C.J. Hop, H.A.W.M. Tiddens

NR. O5.2 **VARIABILITY OF SEMI-AUTOMATED PULMONARY NODULE VOLUME MEASUREMENTS: A COMPARISON OF 6 LUNG NODULE EVALUATION SOFTWARE PACKAGES**

B.J. de Hoop, H. Gietema, B. van Ginneken, P. Zanen, M. Prokop

NR. O5.3 **DOES COMPUTER-AIDED DETECTION INCREASE THE DETECTABILITY OF SOLID PULMONARY LESIONS IN DIGITAL CHEST RADIOGRAPHS OF OLDER PATIENTS**

D.W. de Boo, M.J. Scheerder, E. Boorsma, N.F. Freling, S. Bipat, C.M. Schaefer-Prokop

NR. O10.6 **IS A SINGLE MR ARTHROGRAPHY SERIES IN ABER POSITION AS ACCURATE IN DETECTING LABROLIGAMENTOUS LESIONS AS CONVENTIONAL MR ARTHROGRAPHY?**

S.A. Schreinemachers, V.P.M. van der Hulst, W.J. Willems, S. Bipat, H.J. van der Woude

Auteursindex

Sessie 1

Abdominale radiologie (oncologisch)

Donderdag 9 oktober 2008, 11.30 - 13.00 uur

O1.1

TAILORED TREATMENT OF PRIMARY RECTAL CANCER BASED ON MRI: DOES IT REDUCE THE NUMBER OF INCOMPLETE RESECTIONS?

S.M.E. Engelen[1], D.J.M. Lambregts[1], M.J. Lahaye[1], R.L.H. Jansen[1], G. Lammering[2], A.P. de Bruïne[1], J. Konsten[3], J.W.A. Leijtens[4], H.C.M. Verkooyen[5], M.F. von Meyenfeldt[1], C.J.H. van de Velde[6], G.L. Beets[1], R.G.H. Beets - Tan[1]
[1]academisch ziekenhuis Maastricht, Maastricht, [2]Universiteit Maastricht, Maastricht, [3]Viecuri Medisch Centrum, Venlo, [4]Laurentius Ziekenhuis, Roermond, [5]St. Jans Gasthuis, Weert, [6]Leids Universitair Medisch Centrum, Leiden

The purpose of this study is to evaluate whether tailor-made treatment of primary rectal cancer based on MRI can reduce the number of incomplete resections. This study cohort will be compared with a historical control, the Dutch TME trial (84% complete resections), in which no standardized preoperative imaging was used.

Methods: From February 2003-August 2007 277 patients were enrolled in this prospective multicenter study. All underwent preoperative MRI with lymph node specific contrast agent (USPIO), to predict CRM, T- and N-stage. Based on expert reading of the MRI, 230 patients were stratified in different treatment groups: (a)early tumours (wide CRM and N0 status), (b)non-locally advanced tumours and (c)locally advanced tumours (close/involved CRM, N2 status or distal tumours). Early tumours were treated with TME alone, or local excision. Non-locally advanced tumours were treated with preoperative 5x5 Gy+TME and locally advanced tumours received long course chemoradiation therapy followed by surgery. The number of complete resections (CRM>1 mm) was determined by histopathological evaluation of the resection specimen.

Results: Histopathological evaluation of 228 patients (49 early tumours (21 local excisions), 86 non-locally advanced and 93 locally advanced tumours) is completed. The number of complete resections was 218 (95.6%). In retrospect, some incomplete resections were avoidable, when thorough evaluation of the MRI scan would have been involved in surgical planning.

Conclusion: Tailor-made treatment of primary rectal cancer based on USPIO MRI leads to 95.6% complete resections. To evaluate whether this tailored treatment will also reduce the local recurrence rate, a longer follow up is necessary.

O1.2

PREDICTION OF NODAL STATUS ON USPIO MRI IN PRIMARY RECTAL CANCER AND RECTAL CANCER AFTER NEOADJUVANT CHEMORADIOTHERAPY

M.J. Lahaye[1], D.M.J. Lambregts[1], S.M.E. Engelen[1], R.L.H. Jansen[1], G. Lammering[2], A.P. de Bruïne[1], P.J.M. Post[3], G. Opdenakker[4], J. Dohmen[5], J.M.A. van Engelshoven[1], M.F. von Meyenfeldt[1], C.J.H. van de Velde[6], G.L. Beets[1], R.G.H. Beets - Tan[1]
[1]academisch ziekenhuis Maastricht, Maastricht, [2]Universiteit Maastricht, Maastricht, [3]Viecuri Medisch Centrum, Venlo, [4]Laurentius Ziekenhuis, Roermond, [5]St. Jans Gasthuis, Weert, [6]Leids Universitair Medisch Centrum, Leiden

The purpose of this study was to determine the accuracy of MRI with and without USPIO for predicting N-stage in non-locally advanced rectal cancer and after chemoradiation (CRT) in locally advanced rectal cancer.

Methods: From February 2003 until October 2007, 327 patients were enrolled in a prospective multicenter study to evaluate MRI-based tailored treatment of primary rectal cancer. Patients were stratified into three treatment groups based on expert reading of USPIO-enhanced MRI (1.0/1.5T): (a) early tumours (wide CRM and N0), (b) non-locally advanced tumours and (c) locally advanced tumours (close/involved CRM, N2 or distal tumours).
Local radiologists (non-experts) and an expert MR radiologist prospectively predicted N-stage, on initial MRI for early/non-locally advanced and postCRT MRI for locally advanced patients, both on T2WTSE MR sequence (conventional MRI), and combined reading of T2WTSE and 3DT2* (USPIO-enhanced MRI), blinded for each other's results. Gold standard was histology.

Results: *Table 1* shows the results for prediction of nodal status on initial MRI (early/non-locally advanced tumours, n=127). *Table 2* shows the results for prediction of nodal status on postCRT MRI (locally advanced tumours, n=62).

Conclusion: 1) USPIO MRI at 1.5T can accurately select pN0 patients with a high NPV for the prediction of malignant nodes. 2) This study also shows a high NPV for the detection of malignant nodes on post CRT (USPIO-enhanced) MRI, for expert as well as general radiologists.

Detection of N+	USPIO MRI		Non-enhanced MRI	
1.5T MRI	*Referral Setting*	*General Setting*	*Referral Setting*	*General Setting*
AUC	0.92	0.87	0.84	0.81
Sens	0.95	0.92	0.90	0.62
Spec	0.81	0.69	0.53	0.83
PPV	0.70	0.57	0.47	0.62
NPV	0.97	0.95	0.92	0.83

Table 1

Detection of N+ post CRT	USPIO MRI		Non-enhanced MRI	
1.0/1.5T MRI	*Referral Setting*	*General Setting*	*Referral Setting*	*General Setting*
AUC	0.90	0.72	0.81	0.67
Sens	0.89	0.73	0.67	0.64
Spec	0.80	0.55	0.84	0.69
PPV	0.64	0.37	0.63	0.45
NPV	0.95	0.85	0.86	0.83

Table 2

O1.3

CORRELATION BETWEEN 3T MRI APPARENT DIFFUSION COEFFICIENT AND PROSTATE CANCER GLEASON SCORE IN RADICAL PROSTATECTOMY SPECIMENS

T. Hambrock, R. Somford, H.J. Huisman, P. Vos, C. Hulsbergen-van de Kaa, I. Oort, J.A. Witjes, J.O. Barentsz
UMC St Radboud, Nijmegen

Purpose: Correlate 3T MRI Apparent Diffusion Coefficient (ADC) values and prostate tumor Gleason score (GS).
Materials and methods: 20 Patients with prostate cancer received a Diffusion-Weighted (b-values: 0, 50, 500, 800) 3T MRI. ADC maps were aligned to step-section prostatectomy specimens. Regions of Interest (ROI) were drawn on ADC maps over tumor. Additional ROIs were drawn in adjacent normal prostate. Prostatectomy determined GS was correlated to a) mean tumor ADC values b) contrast-to-noise (CNR) estimations of mean ADC of tumor to directly surrounding normal prostate. Pearson correlation coefficients were determined.
Results: 60 Tumor lesions were annotated. Tumors were stratified into GS 5,6,7,8,9. Distribution of tumors were: Gleason 5 (3 tumors), Gleason 6 (25), Gleason 7 (20), Gleason 8 (7) and Gleason 9 (5). Mean ADC values (x10-3 mm2/s) of tumors were: Gleason 5 - 1.15 (± 0.08), Gleason 6 - 1.38 (±0.18), Gleason 7 - 1.00 (± 0.28), Gleason 8 - 0.77 (± 0.09) and Gleason Score 9 - 0.87 (± 0.23). The CNR estimations revealed a CNR of 1.2 (± 0.38) for Gleason 5, 1.5 (± 0.96) for Gleason 6, 3.2 (± 1.10) for Gleason 7, Gleason 8 - 3.7 (± 0.85) and Gleason 9, 4.9 (± 1.41). Correlation coefficients were significant between mean tumor ADC values and GS (r 0.62, p-value < 0.001) as well as CNR estimates and GS (r 0.73, p-value < 0.001) .
Conclusions: 3T MR ADC of prostate tumors correlates well to GS. This correlation appears to be strongest for CNR of mean ADC.

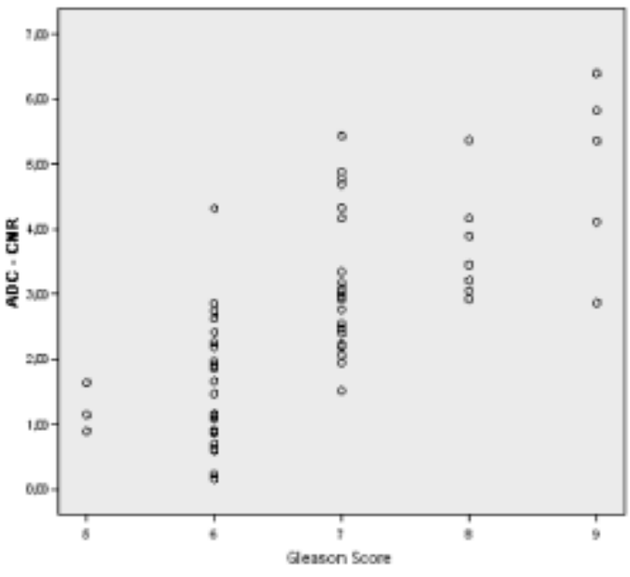

Figure 1: Correlation between ADC-CNR and Gleason Score

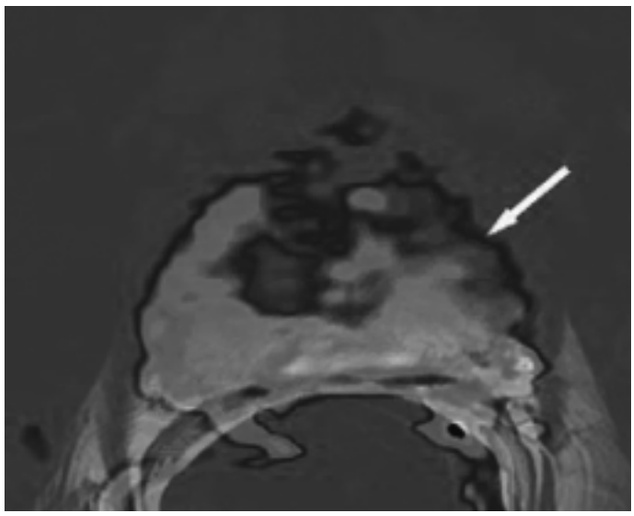

Image 1: ADC Map of prostate with Gleason 6 tumor

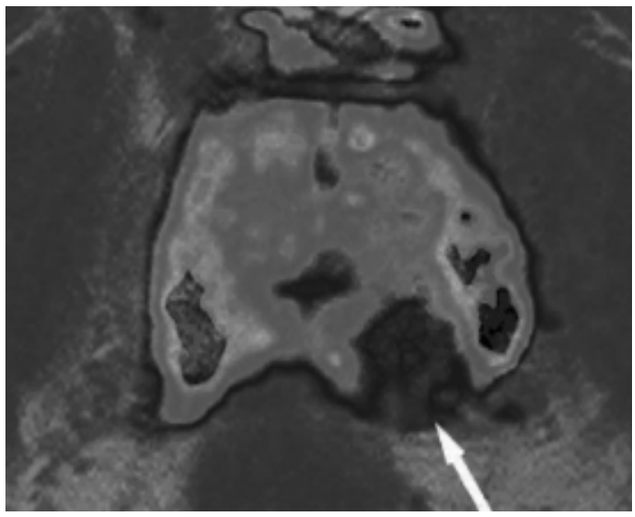

Image 2: ADC Map of prostate with Gleason 8 tumor

O1.4

EFFECT OF COMPUTER ASSISTED DIAGNOSIS ON CHARACTERIZATION OF PROSTATE LESIONS ON DYNAMIC CONTRAST ENHANCED MR IMAGING

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UMC St Radboud, Nijmegen

Purpose: Determine the effect of a Computer Assisted Diagnostic (CAD) method to aid radiologists in differentiating benign from malignant prostatic lesions on Dynamic Contrast Enhanced MR images (DCE-MRI)
Materials and methods: 34 Patients with prostate cancer received a 1.5 T DCE-MRI prior to prostatectomy. Prostatectomy step sections were used as ground truth. Regions of interest (ROI) were placed on MR images in normal, benign (but tumor suspicious) as well as tumor regions of the peripheral zone. R1 relaxation and pharmacokinetic features were extracted from these ROI's and used to train a support vector machine as classifier. Output of the classifier was used as a measure of malignancy likelihood. A multi-reader observer study was performed and readers received 5 training cases on prostate evaluation. Three readers indicated a malignancy likelihood of predetermined ROI's on a hanging protocol before and after CAD malignancy likelihood results were presented to them. Receiver operating characteristic (ROC) analysis was

performed to determine if CAD resulted in a significant improvement of lesion characterization accuracy.

Results: The diagnostic accuracy (Az) of differentiating benign from malignant areas in the prostate on DCE-MR images were 0.83, 0.67 and 0.73 for the different readers before CAD support (combined Az 0.74) while addition of CAD predicted malignancy likelihood resulted in an improved lesion differentiation ability with accuracies of 0.88, 0.88 and 0.78 respectively (combined Az of 0.84) ($p < 0.05$)

Conclusions: The addition of CAD support for DCE-MRI in the differentiation between benign and malig-nant lesions in the prostate improves reader accuracy.

O1.5

ACCURACY OF MS-325 ENHANCED MRI FOR PREDICTING NODAL STATUS IN PRIMARY RECTAL CANCER

D.M.J. Lambregts, G.L. Beets, M.J. Lahaye, S.M.E. Engelen, A.P. de Bruïne, A.G.H. Kessels, J.E. Wildberger, R.G.H. Beets - Tan
academisch ziekenhuis Maastricht, Maastricht

Purpose: To evaluate the accuracy of gadolinium based contrast (MS-325) enhanced MRI for prediction of nodal status in patients with primary rectal cancer using histopathology as the standard reference.

Materials and methods: 22 patients with primary rectal cancer underwent MR imaging including MS-325 enhanced imaging. Patients were stratified into 3 treatment groups; total mesorectal excision (TME) (n=5), TME with neoadjuvant radiation therapy (n=6) and TME with neoadjuvant chemoradiation therapy (CRT) (n=11). The latter underwent a second MRI post-CRT. An experienced reader predicted each node for benign or malignant using a confidence level score (0=definitely benign, 1=probably benign, 2=possibly malignant, 3=probably malignant, 4=definitely malignant). For the third group, nodes were assessed on post-CRT MRI. Nodes were recorded on an anatomic map, used as a template for lesion by lesion comparison with histology. Receiver operator characteristics (ROC) curve analyses were performed to determine diagnostic accuracy.

Results: In 22 patients, 132 nodes were harvested, of which 15 positive nodes in 5 patients. 14 of 15 positive nodes were predicted correctly on MS-325 enhanced MRI. Per lesion sensitivity was 93%, specificity 97 %, PPV 78 % and NPV 99%. Area under the ROC-curve (AUC) was 0.992. Per patient sensitivity was 80%, specificity 82%, PPV 57%, NPV 93% and AUC 0.924.

Conclusion: MS-325 enhanced MRI is highly accurate for prediction of metastatic nodes in rectal cancer patients. High NPV suggests that patients with N0 status can accurately be selected, enabling better selection of small tumors that can be treated with local excision or TME only.

O1.6

TOTAL LIVER VOLUME PERFUSION CT USING 3D IMAGE FUSION TO IMPROVE DETECTION AND CHARACTERIZATION OF LIVER METASTASES

M.R. Meijerink, J.H.T.M. van Waesberghe, L. van der Weide, M.P. van den Tol, S. Meijer, C. van Kuijk
VU Medisch Centrum, Amsterdam

The purpose of this study was to evaluate the feasibility of a novel total liver volume perfusion CT technique for the detection and characterization of liver metastases. Twenty patients underwent helical-CT of the total-liver-volume before and 11-times after intravenous contrast-material injection. To decrease distortion artefacts all phases were co-registered using 3D-image-fusion before creating blood-flow-maps. Lesion based sensitivity and specificity for liver metastases of first the conventional 4-phases (unenhanced, arterial, portal-venous and equilibrium) and later all 12-phases including blood-flow-maps was determined as compared to intraoperative ultrasound and surgical exploration. Arterial and portal-venous perfusion was calculated for normal appearing and metastatic liver tissue. Total-liver-volume perfusion values were comparable to studies using single-level CTP. Compared to 4-phase-CT, total-liver-volume CTP increased sensitivity from 78.4% to 89.2% (p=0.046) and specificity from 78.3% to 82.6% (p=0.074). Total-liver-volume CTP is a non-invasive, quantitative and feasible technique. Preliminary results suggest an improved detection of liver metastases for CTP compared to 4-phase-CT.

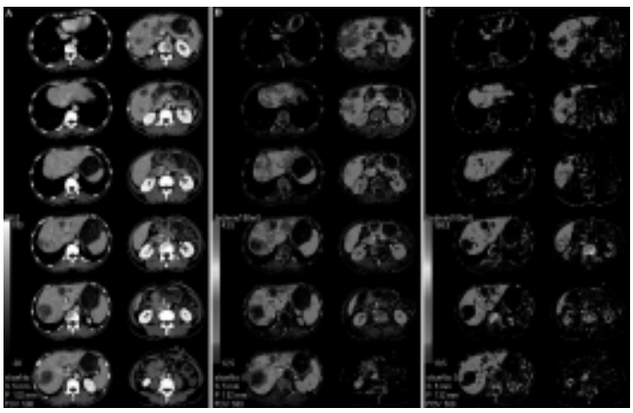

Image 1: Total liver volume perfusion CT

O1.7

A PRIMARY 2D VERSUS A PRIMARY - ELECTRONICALLY CLEANSED - 3D REVIEW METHOD IN CT-COLONOGRAPHY (CTC): IS THERE A DIFFERENCE IN PERFORMANCE FOR TWO DIFFERENT LEVELS OF EXPERIENCE?

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[1]Academisch Medisch Centrum, Amsterdam, [2]Philips Medical Systems, Best

Purpose: To compare the performance of novices and experts using a 2D and a - electronically cleansed - 3D CTC review method in 75 consecutive Fecal Occult Blood Test positives.

Methods: Patients received a low-fiber diet and oral iodine prior to CTC. Six trained novices and two experts used both CTC review methods in randomized order. Per-polyp and per-patient sensitivity and specificity were calculated. Sensitivities and specificity of 2D and 3D were compared using the mcNemar-test. Results were stratified for size and experience groups.

Results: 75 patients contained 41 polyps 6-9mm and 53 polyps ≥10mm.
6mm: mean per-polyp sensitivity for novices was 49% in 2D and 63% in 3D (5/6 novices $p<0.05$). For experts this was 76% and 77%*. Mean per-patient sensitivity for novices was 62% in 2D and 72% in 3D (2/6 novices $p<0.05$). For experts this was 84% and 80%*. Mean specificity for novices was 96% in 2D and 91% in 3D*. For experts this was 93% and 91%*.
10mm: mean per-polyp sensitivity for novices was 69% in 2D and 78% in 3D (1/6 novices $p<0.05$). For experts this was 92% and 87%*. Mean per-patient sensitivity for novices was 80% in 2D and 86% in 3D (1/6 novices $p<0.05$). For experts this was 97% and 91%*. Mean specificity for novices was 96% in 2D

and 94% in 3D*. For experts this was 99% and 97%*.
Conclusion: In novices sensitivity is significantly increased when using cleansed 3D as compared to 2D, therefore we recommend this CTC method for novices.
**for all observers p>0.05*

O1.8

CT COLONOGRAPHY WITH A LIMITED BOWEL PREPARATION: PROSPECTIVE ASSESSMENT OF PATIENT EXPERIENCE AND PREFERENCE IN COMPARISON TO FULL-PREPARATION COLONOSCOPY

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[1]Onze Lieve Vrouwe Gasthuis, Amsterdam, [2]Academisch Medisch Centrum, Amsterdam

Purpose: To prospectively compare participants' experience and preference of limited preparation CT colonography to full-preparation optical colonoscopy in a consecutive series at increased risk for colorectal cancer.
Material and methods: Institutional review board approval and written consent from all participants were obtained. For CT colonography, a 2-day low-fiber diet with 180 ml diatrizoate meglumine and 80ml barium and 30mg Bisacodyl was prescribed. Before imaging, spasmolytics were administered and the colon was automatically insufflated with CO2 (mean 3.9L). For colonoscopy, participants ingested 4 L polyethylene glycol electrolyte solution. At colonoscopy participants received sedation and/or analgesics on request. Participant experience (e.g. pain, embarrassment, discomfort) was determined by using a five-point scale and was evaluated with Wilcoxon test; participant preference was determined by using a seven-point scale and was evaluated with the X2 statistic after dichotomizing.
Results: 173 participants (107 men / 66 women; mean age 56) were included. 82% of participants (139/169) received sedation and/or analgesics during colonoscopy. 87% (144/165) of participants indicated that the bowel preparation for colonoscopy was more burdensome than for CTC (P<.001). Participants experienced significantly more pain, discomfort and overall burden during the colonoscopy procedure compared to CTC (P<0.001). Five weeks after both examinations; 69% (115/166) preferred CT colonography with limited bowel preparation as future examination, 8% (14/166) of participants were indifferent and 22% (37/166) preferred colonoscopy (P<0.001).
Conclusion: Participants' experience and preference was rated in favor of CTC with a limited bowel preparation compared to full-preparation colonoscopy in a population at increased risk for colorectal cancer.

Sessie 2

Abdominale radiologie (niet-oncologisch)

Donderdag 9 oktober 2008, 11.30 - 13.00 uur

O2.1

NON-INVASIVE QUANTIFICATION OF HEPATIC STEATOSIS WITH 3.0 TESLA MAGNETIC RESONANCE SPECTROSCOPY IN PATIENTS UNDERGOING LIVER RESECTION

J.R. van Werven, H.A. Marsman, A.J. Nederveen, F.J.W. ten Kate, T.M. van Gulik, J. Stoker

Academisch Medisch Centrum, Amsterdam

Purpose: Hepatic steatosis has been identified as a risk factor in liver surgery. Liver biopsy is the gold standard for assessment of hepatic steatosis. Proton Magnetic Resonance Spectroscopy (1H-MRS) could be a non-invasive alternative to liver biopsy. Therefore, the purpose of this study was to quantify hepatic steatosis with 1H-MRS in patients undergoing liver resection.

Materials and methods: 3.0 Tesla 1H-MRS was performed preoperatively in 27 patients undergoing liver resection. Intraoperatively liver biopsies were taken for histopathological and biochemical analysis. A ratio representing hepatic fat was calculated from lipid peak versus the reference water peak, and correlated (Spearman correlation coefficient) with histopathological steatosis and biochemical fatty acid concentration. 1H-MRS measurements were compared in a spectrum of patients with hepatic steatosis to investigate discriminative power (Mann-Whitney U analysis).

Results: At histopathology 16 patients had mild (0-33%), 7 had moderate (33-66%) and 4 had severe (>66%) hepatic steatosis. 1H-MRS measurements of hepatic fat showed strong correlation with histopathological steatosis assessment ($r= 0.81$, $p< 0.001$). 1H-MRS also correlated with biochemical fatty acid concentration ($r= 0.85$, $p<0.001$). Comparison of 1H-MRS measurements between patients with different steatosis grades showed significant differences: mild versus moderate ($p= 0.001$), moderate versus servere ($p=0.024$), and mild versus severe steatosis ($p=0.001$).

Conclusions: 1H-MRS is able to accurately measure hepatic steatosis and strongly correlates with histopathological and biochemical hepatic fat analysis. 1H-MRS is also able to discriminate between different grades of hepatic steatosis. Therefore, 1H-MRS is a promising modality for non-invasive preoperative assessment of hepatic steatosis in patients undergoing liver surgery.

O2.2

REPRODUCIBILITY OF 3.0 TESLA MAGNETIC RESONANCE SPECTROSCOPY TO MEASURE HEPATIC FAT CONTENT

J.R. van Werven[1], J.M. Hoogduin[2], A.J. Nederveen[1], A.A. van Vliet[3], D. Kappers[3], E. Wajs[4], P. Vandenberk[4], J. Stoker[1]

[1]Academisch Medisch Centrum, Amsterdam, [2]UMC Groningen, Groningen, [3]PRA International, Zuidlaren, [4]Johnson & Johnson Medical BV, Beerse, België

Purpose: Proton magnetic resonance spectroscopy (H-MRS) is a non-invasive alternative to liver biopsy in assessment of hepatic steatosis. Despite the increasing use of H-MRS in determining hepatic fat content, there is sparse literature addressing the reproducibility of this technique. The purpose of this study was to investigate reproducibility of H-MRS to measure hepatic fat content.

Materials and methods: H-MRS was performed in twelve subjects at a 3.0T scanner. Each subject underwent four H-MRS measurements: two in fasting condition on the same day (I and II), and two H-MRS measurements one week later, before (in fasting condition, III) and after a high fat breakfast (IV) to investigate a food ingestion effect. From the spectra a ratio representing hepatic fat content (mg fat per gram liver tissue) was calculated and used to compare the H-MRS scans to assess reproducibility (Wilcoxon signed rank test and Intra Class Correlation coefficient).

Results: Mean hepatic fat content in H-MRS measurement I and II was 37.1 and 37.0 mg/g liver tissue, and for H-MRS measurement III and IV 40.1 and 42.4 mg/g liver tissue. We found no significant difference in hepatic fat content between H-MRS measurement I-II ($p=0.62$), H-MRS measurement I-III ($p=0.20$) and H-MRS measurement III-IV ($p=0.11$). The Intra Class Correlation coefficient between all four H-MRS measurements was 0.98 ($p<0.001$).

Conclusion: H-MRS is highly reproducible in non-invasive measurement of hepatic fat content. There is excellent agreement between the different H-MRS measurements. There is no significant effect of food ingestion on hepatic fat content measured by H-MRS.

O2.3

THE VALUE OF COMPUTED TOMOGRAPHY IN FEMALE PATIENTS WITH SUSPECTED APPENDICITIS AND AN ULTRASONOGRAPHY NEGATIVE FOR APPENDICITIS

W. Laméris[1], A. van Randen[1], E.M. van Keulen[2], M.J. Wiezer[3], M.P. Simons[4], O.R.C. Busch[1], T.M. van Gulik[1], P.M.M. Bossuyt[1], M.A. Boermeester[1], J. Stoker[1]

[1]Academisch Medisch Centrum, Amsterdam, [2]Tergooiziekenhuizen, Hilversum [3]St. Antonius ziekenhuis, Nieuwegein, [4]Onze Lieve Vrouwe Gasthuis, Amsterdam

Background: We investigate the effect of secondary CT usage in females with suspected appendicitis and negative US on the percentage of missed appendicitis and negative appendectomy rate.

Methods: Consecutive adult (>18 years) patients presenting at the Emergency Department with non-traumatic acute abdominal pain were included. All patients were given a most likely diagnosis based on clinical assessment and underwent abdominal US and CT. The percentage of missed appendicitis and the negative appendectomy rate (false positives (FP)/ all positives) were calculated for the use of US only, for CT only in patients with an inconclusive US, and for CT only in patients with an inconclusive or negative US.

Results: We included 1021 patients, 55% female, with a mean age of 47 year (19-94). Acute appendicitis was clinically suspected in 226 females and was present in 104 (pre-test probability: 46%). The use of CT in females with an inconclusive US (85/226=38%) compared to the use of US only would reduce the percentage of missed appendicitis from 24% (25/104) to 8.7% (9/104), but increase the negative appendectomy rate from 15.9% to 20.8%. CT in all female patients with a negative US (including inconclusives; 132/226=58%) would further reduce the missed appendicitis percentage to 4.8% (5/104), but increase the negative appendectomy rate to 21.4%.
Conclusion: Additional (secondary) CT in female patients with suspected appendicitis and a negative or inconclusive US would reduce the percentage of missed appendicitis but the cumulative false positive rates of the two modalities would increase the negative appendectomy rate.

O2.4

ACCURACY OF THE CLINICAL DIAGNOSIS AND IMAGING FOR THE DIAGNOSIS OF ACUTE DIVERTICULITIS IN PATIENTS WITH ABDOMINAL PAIN

W. Laméris[1], A. van Randen[1], B. van Ramshorst[2], H.G. Gooszen[3], E.M. van Keulen[4], E.J. Hesselink[5], P.M.M. Bossuyt[1], M.A. Boermeester[1], J. Stoker[1]
[1]Academisch Medisch Centrum, Amsterdam, [2]St. Antonius ziekenhuis, Nieuwegein, [3]UMC Utrecht, Utrecht, [4]Tergooiziekenhuizen, Hilversum, [5]Gelre Ziekenhuizen, Apeldoorn

Purpose: To asses and compare the accuracy of the clinical diagnosis of acute diverticulitis with the performance of radiological imaging.
Methods: Consecutive patients with acute abdominal pain presenting at the Emergency Department were included and underwent clinical evaluation, abdominal US and CT. Findings of medical history and physical examination gave a prospectively recorded, most likely clinical diagnosis. The reference diagnosis was defined by an expert panel. Sensitivity and specificity of the clinical diagnosis was compared with that of US and CT imaging.
Results: This study included 1021 patients (55% female;mean age 47 years (19-94)). The most likely clinical diagnosis was acute diverticulitis in 126 patients and diverticulitis was present in 119 (prevalence: 12%), yielding a sensitivity of 67% (95%CI:59%-76%) and a specificity of 95% (95%CI:93%-96%). The sensitivity was 63% (95%CI: 54%-72%) for US and 93% (95%CI: 89%-98%) for CT, being statistically significant (p<0.001). The specificity was 99% (95%CI: 98%-100%) for US and 98% (95%CI: 98%-99%) for CT, being not significantly different. The specificities of US and CT were significantly higher compared to the specificity of the clinical diagnosis.
Conclusion: The accuracy of the clinical diagnosis of acute diverticulitis is moderate. The sensitivity of CT is significantly higher compared to US. Therefore, CT imaging is warranted when acute diverticulitis is considered as a clinical diagnosis.

O2.5

SMALL BOWEL IMAGING COMPARING MR ENTEROCLYSIS (MRE), CAPSULE ENDOSCOPY (CE) AND DOUBLE-BALLOON ENDOSCOPY (DBE) IN PATIENTS WITH (SUSPECTED) CROHN'S DISEASE; THE COMRADE STUDY

B.M. Wiarda[1], P.B.F. Mensink[2], D.G.N. Heine[1], M. Stolk[3], J. Stoker[4], E.J. Kuipers[2]
[1]Medisch Centrum Alkmaar, Alkmaar, [2]Erasmus MC, Rotterdam, [3]St. Antonius ziekenhuis, Nieuwegein, [4]Academisch Medisch Centrum, Amsterdam

The purpose was to compare MRE and CE with DBE with respect to diagnostic accuracy in patients with (suspected) known Crohn's disease.
Methods: Consecutive, consenting patients first underwent MRE followed by CE and DBE. Patients with high grade stenosis at MRE had no CE, but only MRE and DBE. MRE and CE were analyzed with DBE as reference standard.
Results: 23 pts (13 women; mean 36.2 y) with (suspected) known Crohn's disease were included. Nine patients (39%) with high grade stenosis at MRE had no CE. The preferential DBE route was proximal in 5, distal in 13 and both in 5. The mean maximal visualized distance at DBE was 133 cm. One DBE was non-conclusive.
The MRE diagnosis was accurate in 18 of 22 cases (82%) (10 no abnormalities, 8 small bowel Crohn's disease (1 mild, 4 moderate, 3 severe)). In the other 4 patients DBE revealed no abnormalities (n=2) and mild Crohn's disease (n=2), while at MRE no abnormalities (n=2), inflammatory diverticula (n=1) and moderate Crohn's disease (n=1) was diagnosed.
CE was correct in 8 of 13 cases (62%) (no abnormalities (n=7), mild Crohn's disease (n=1)). In the other 5 patients DBE revealed no abnormalities (n=4) and mild Crohn's disease (n=1), while at CE no abnormalities (n=1) and mild Crohn's disease (n=3), submucosal swelling (n=1) and polyp (n=1).
Conclusion: MRE has a good accuracy in patients with suspected or known Crohn's disease. High grade small bowel stenosis in this patient group is a substantial problem for CE.

O2.6

SMALL BOWEL IMAGING COMPARING MR ENTEROCLYSIS, CAPSULE ENDOSCOPY AND DOUBLE-BALLOON ENDOSCOPY IN PATIENTS WITH OBSCURE GASTRO-INTESTINAL BLEEDING; THE COMRADE STUDY

B.M. Wiarda[1], D.G.N. Heine[1], P.B.F. Mensink[2], M. Stolk[3], J. Stoker[4], E.J. Kuipers[2]
[1]Medisch Centrum Alkmaar, Alkmaar, [2]Erasmus MC, Rotterdam, [3]St. Antonius ziekenhuis, Nieuwegein, [4]Academisch Medisch Centrum, Amsterdam

The purpose was to compare MR Enteroclysis (MRE) and Capsule Endoscopy (CE) with Double-Balloon Endoscopy (DBE) with respect to diagnostic accuracy in patients with Obscure Gastrointestinal Bleeding (OGIB).
Methods: Consecutive, consenting patients had first MRE to rule out high grade stenosis, and subsequently CE and DBE. Findings at MRE and CE were compared to DBE. Patients with high grade stenosis at MRE had no CE, in these pts only comparison of MRE with DBE was made. MRE and CE were analyzed with DBE as reference standard.
Results: 26 pts (13 women; mean 58.4 y) with OGIB were included. Three patients with high grade stenosis at MRE had no CE. The preferential DBE route was proximal in 24, distal in 2. The mean maximal visualized distance at DBE was 290 cm. One CE was evaluated as not diagnostic.
The MRE diagnosis was accurate in 14 of 26 cases (54%) (11 no abnormalities, 1 with Crohn's disease, 1 with melanoma metastasis, 1 with polyps). In the

other 12 patients DBE revealed angiodysplasia (n=11) and bleeding duodenal ulcer (n=1), while at MRE no abnormalities (n=11) and celiac disease (n=1) was diagnosed.
CE was correct in 16 of 22 cases (73%) (no abnormalities (n=9), angiodysplasia (n=7)). In the other 6 patients DBE revealed no abnormalities (n=2), angiodysplasia (n=3), bleeding duodenal ulcer (n=1), while at CE no abnormalities (n=3), submucosal swelling (n=2) and irregular folds (n=1) was diagnosed.
Conclusion: CE has a good accuracy in patients with OGIB. The accuracy is superior to MRE.

O2.7

MR ENTEROCLYSIS (MRE) OF THE SMALL BOWEL: CORRELATION BETWEEN THE SMALL BOWEL WALL ENHANCEMENT AND DIFFUSION-WEIGHTED IMAGING (DWI) IN PATIENTS WITH (SUSPECTED) CROHN'S DISEASE

J.W. Bradshaw[1], B.M. Wiarda[1], T. van der Ploeg[1], E.J. Kuipers[2], J. Stoker[3]
[1]Medisch Centrum Alkmaar, Alkmaar [2]Erasmus MC, Rotterdam [3]Academisch Medisch Centrum, Amsterdam

Purpose: To determine the correlation between the small bowel wall enhancement and DWI in MRE in patients with (suspected) Crohn's disease.
Subjects and methods: All patients with (suspected) Crohn's disease with abnormal thickened small bowel wall (>3mm) at MRE were prospectively included. Contrast enhancement of the thickened small bowel wall was graded (normal/mild, moderate or severe) on a visual ranking score. DWI was performed using b-values 50, 400 and 800 sec/mm2. B-values and ADC-maps were measured by 3 ROI-calculations of thickened bowel wall in segments with pathologic contrast enhancement. If different grades of contrast enhancement were present, all segments were evaluated separately.
Results: Of 49 patients with (suspected) Crohn's disease, 24 (17 women; mean age 34.5 yrs) had thickened small bowel wall and were included. 4 of 24 patients had two different contrast enhancement grades of thickened small bowel wall. In total 28 segments were measured. Normal/mild contrast enhancement of thickened small bowel wall, was present in 4, 8 moderate and 16 severe. There was no significant correlation between small bowel contrast enhancement scoring rank and measured b values for all B values. The mean ADC values were 1609 (range 1166-1875) for normal/mild contrast enhancement, moderate 1538 (range 1234-1703) and severe 1158 (range 920-1341). The correlation between thickened small bowel wall enhancement and ADC values were significant (-0.699, $p<0.0001$).
Conclusion: The ADC values of the DWI have a significant correlation with small bowel wall enhancement in MRE in pts with (suspected) Crohn's disease.

GENOMINEERD

Radiologendagen Prijs 2008

O2.8

PREVALENCE OF MESENTERIC PANNICULITIS IN A LARGE HOSPITAL-BASED POPULATION

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Albert Schweitzer Ziekenhuis, locatie Dordwijk, Dordrecht

Purpose: Mesenteric panniculitis is an uncommon idiopathic disorder characterised by chronic inflammation of the intestinal mesentery. When symptomatic, patients may present with continuous vague abdominal pain, weight loss or bowel disturbances. The specific aetiology is unknown, although various causes have been suggested. The purpose of this study was to assess the prevalence of mesenteric panniculitis as an isolated finding as well as its association with other diseases.
Material and methods: Between January 2006 and January 2007 consecutive abdominal CT examinations of in total 3820 patients were retrospectively evaluated for mesenteric panniculitis. CT criteria for the diagnosis of mesenteric panniculitis were a well-defined hyperattenuating fatty mass at the mesenteric root, engulfment of superior mesenteric vessels and displacement of bowel loops without evidence of invasion.
Results: CT findings of mesenteric panniculitis were found in 94 patients (2.5%). We found a male predominance (70,2%). In 14 patients (14,7%) mesenteric panniculitis was the only diagnosed abnormality despite thorough clinical and imaging investigation. It was therefore considered to be responsible for the patients' clinical symptoms. In 45 (47,4%) patients a coexisting malignancy was present. In the remaining 35 (37,9%) patients mesenteric panniculitis coexisted with a benign disorder, which could explain the patients' clinical symptoms.
Conclusion: Compared with the only previously published prevalence study by Daskalogiannaki et al, we found a substantially higher prevalence (2,5% versus 0,6%) of mesenteric panniculitis in our large hospital-based population undergoing abdominal CT examinations. In 14,7% of the patients mesenteric panniculitis was considered to be responsible for the patients' clinical manifestations

Sessie 3

Cardiovasculaire radiologie/ Neuroradiologie

Donderdag 9 oktober 2008, 11.30 - 13.00 uur

O3.1

AORTIC VESSEL WALL MAGNETIC RESONANCE IMAGING AT 3.0 TESLA: A REPRODUCIBILITY STUDY OF RESPIRATORY NAVIGATOR GATED FREE-BREATHING 3D BLACK-BLOOD MAGNETIC RESONANCE IMAGING

S.D. Roes[1], J.J.M. Westenberg[1], J. Doornbos[1], R.J. van der Geest[1], E. Angelie[1], A. de Roos[1], M. Stuber[2]

[1]Leids Universitair Medisch Centrum, Leiden, [2]John Hopkins University, Baltimore, USA

Purpose: To evaluate a free-breathing three-dimensional (3D) dual inversion recovery (DIR) segmented k-space gradient-echo (TFE) imaging sequence at 3.0 Tesla for the quantification of aortic vessel wall dimensions. The effect of respiratory motion suppression on image quality was tested. Furthermore, the reproducibility of the aortic vessel wall measurements was investigated.

Methods: Seven healthy subjects (3 males, mean age 26 ± 7 years) underwent 3D DIR TFE imaging of the aortic vessel wall with and without respiratory navigator. Subsequently, this sequence with respiratory navigator was performed twice in 10 healthy subjects (7 males, mean age 23 ± 4 years) to test its reproducibility. Signal-to-noise (SNR), contrast-to-noise ratio (CNR), vessel wall sharpness and vessel wall volume (VWV) were assessed. Data were compared using the paired t-test and the reproducibility of VWV measurements was evaluated using intra-class correlation coefficients (ICC).

Results: SNR, CNR, and vessel wall sharpness were superior in scans performed with respiratory navigator compared to scans performed without (resp. 15.0 ± 4.6 vs. 12.3 ± 4.0, 9.8 ± 3.2 vs. 6.7 ± 1.8 and 67 ± 8% vs. 57 ± 7%, $p< 0.05$). The ICC's concerning intra-, inter-observer and interscan reproducibility were excellent (resp.0.99, 0.94, 0.95).

Conclusions: Respiratory motion suppression substantially improves image quality of 3D DIR TFE imaging of the aortic vessel wall at 3.0 Tesla. Furthermore, this optimized technique with respiratory motion suppression enables assessment of aortic vessel wall dimensions with high reproducibility.

O3.2

MRI ASSESSMENT OF CARDIOVASCULAR AND CEREBRAL DAMAGE IN DIABETES MELLITUS PATIENTS

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Leids Universitair Medisch Centrum, Leiden

The purpose of this study is to examine whether aortic pulse wave velocity (PWV), as a marker of aortic stiffness, is associated with the presence of cardiac left ventricular (LV) failure and white matter lesions on MRI in Diabetes Mellitus (DM) patients.

Methods: MRI of the heart, the aorta and the brain was performed in 26 consecutively included subjects with DM (14 men; mean age 51 ± 13 years). Transmitral flow measurements were performed by means of velocity-encoded MRI for the evaluation of LV diastolic function. PWV in the aortic tract were assessed using velocity-encoded MRI. White matter hyperintensities on FLAIR sequences were quantified according to the Fazekas classification.

Results: PWV in the aortic arch, descending and total aorta correlated inversely with LV diastolic function (E/A peak ratio: resp. Spearman's rho = -0.730, $p<0.001$; r = -0.684, $p<0.001$; r = -0.779, $p<0.001$). PWV in the aortic arch and total aorta correlated with periventricular (pv) and subcortical (sc) white matter lesions (pv Fazekas score: resp. r=0.556, p=0.003 and r=0.414, p=0.040; sc Fazekas score: resp. r=0.470, p=0.015 and r=0.453, p=0.023). Furthermore, in multiple linear regression analysis, PWV in the aortic arch was an independent predictor of periventricular Fazekas score (R=0.744, $p<0.001$) after adjusting for systolic blood pressure and age.

Conclusion: Stiffening of the aorta is associated with left ventricular relaxation impairment and lesions of the cerebral white matter in DM patients. Moreover PWV of the aortic arch is an independent predictor of periventricular white matter lesions.

O3.3

ARRHYTMIC RIGHT VENTRICULAR CARDIOMYOPATHY: FEATURES ON 3 TESLA MRI IN PATIENTS WITH PROVEN OR EXCLUDED DESMOSOME MUTATIONS

F. van Hoorn, A.M. Spijkerboer, N. Hofman, A.A.M. Wilde, M. Groenink

Academisch Medisch Centrum, Amsterdam

Pupose: To determine the diagnostic value of high resolution MRI in patients suspected of Arrhytmogenic Right Ventricular Cardiomyopathy (ARVC) using genetic analysis as a gold standard.

Method and materials: In ARVC, a degenerative hereditary disorder of the myocardium associated with sudden death at relatively young age, typical MRI features have been described; morphological abnormalities, functional abnormalities and right ventricular dilatation. Desmosome mutations of the Plakophilin II (PKP2), Desmoplakin (DSP), Desmoglein II (DSG2) and Desmocollin II (DSC2) gene have been associated with ARVC.

Twenty-three individuals suspected of ARVC based on clinical and/or family history, underwent 3T MR imaging and genetic analysis of above mentioned mutations. Three groups were defined: High propability (2 or more of the features described above), Intermediate propability (1 feature) and Low propability (no abnormalities) of ARVC. Images were evaluated blinded to the results of genetic analysis.

Results: Eleven (48%) patients were categorized in the high probability group. In 10 of these 11 patients a DSP (5), PKP2 (4) or DSG2 (1) mutation was found. Eight patients (35%) were categorized in the intermediate probability group. None of these 8 patients were desmosome mutation carriers. Two patients (9%) showed no abnormalities on MRI and did not have a genetic mutation. In 2 patients (9%) the scan failed due to ventricular arrhytmia, they both showed a desmosome mutation.

Conclusion: High resolution MRI has a high sensitivity in patients with a desmosome mutation and may guide genetic screening for both known and new candidate mutations in genes coding for the desmosome.

O3.4

GATED THORACO-ABDOMINAL MULTIDETECTOR CT ANGIOGRAPHY FOR AORTIC EVALUATION AND SIMULTANEOUS CORONARY ARTERY ASSESSMENT

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Purpose: To evaluate coronary image quality and stenosis frequency in patients suspected of aortic pathology using a limited dose gated thoraco-abdominal multidetector CT angiography (CTA) protocol.

Methods: Thirty-seven consecutive patients underwent retrospectively ECG-gated thoraco-abdominal CTA (64-detector row scanner, 120 kVp, CTDIvol 17.6 mGy). No Beta-blockers were given. Reconstructions at each 12.5% of the R-R interval were generated. Two observers in consensus scored the coronary arteries on a per segment basis (15 segment AHA model) for image quality (absent, non-diagnostic, limited diagnostic, acceptable, good, excellent), stenosis (0, ≤50%, >50%) and confidence (poor, moderate, high).

Results: Mean patient age was 68 years (range 19-85). CT indications were aneurysm evaluation (n=25), suspected dissection or rupture (n=7) or other (n=5). Mean heart rate was 74 bpm (range 52-133). No sufficient coronary evaluation was possible in 8 patients. In the remaining 29 patients (78%), out of a theoretical total 435 segments (15 segments x 29 patients) 13 were scored absent, 167 non-diagnostic or diagnostically limited (38%) and 255 as at least acceptable (59%). At least acceptable image quality was seen in 153/203 (75%) proximal and middle segments.

Reasons for non-diagnostic and diagnostically limited segments were motion (n=59), vessel size (n=69) or other (n=39).

Significant stenosis (>50%) was seen in 50 segments. Scoring confidence was moderate to high in 79% of assessable segments.

Conclusion: Limited dose gated thoraco-abdominal CTA allows assessment of the proximal and middle coronary arteries in over 75% of patients and may serve as a combined tool for the workup of aortic disease.

GENOMINEERD

Radiologendagen Prijs 2008

O3.5

THE DIABETIC HEART: MYOCARDIAL LIPID ACCUMULATION AS INDEPENDENT PREDICTOR OF DIASTOLIC DYSFUNCTION

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[1]Leids Universitair Medisch Centrum, Leiden, [2]VU Medisch Centrum, Amsterdam

Type 2 diabetes mellitus (T2DM) is a major risk factor for cardiovascular disease. Increasing evidence is emerging indicating that lipid oversupply to cardiomyocytes, plays a role in the development of diabetic cardiomyopathy by causing lipotoxic injury and myocardial steatosis. Therefore, the purpose of the present study was to compare myocardial triglyceride content and function in patients with uncomplicated T2DM and age-and BMI matched healthy subjects and to study the associations between myocardial triglyceride content and heart function.

Thirty-eight male patients with uncomplicated, well-controlled T2DM (mean±SE age: 57±1 years, BMI: 28.1±0.6, and HbA1c 7.2±0.2), and verified absence of cardiac ischaemia and 28 healthy age- and BMI matched males underwent proton magnetic resonance (MR) spectroscopy of the interventricular septum for the assessment of myocardial triglyceride content and MR imaging for assessing myocardial function.

Myocardial triglyceride content was significantly higher in T2DM patients as compared to healthy volunteers (0.96±0.07 vs. 0.65±0.05%, $p<0.05$). Systolic function did not significantly differ between healthy subjects and patients (Ejection fraction: 58±1 vs. 60±1%), whereas indices of diastolic function, including left ventricular E/A ratio and E peak deceleration, were significantly impaired in T2DM (1.24±0.06 vs. 1.08±0.04 and 4.4±0.3 vs. 3.6±0.2 ml/s2 * 10-3 respectively, $p<0.05$) . Multivariate analysis indicated that myocardial triglyceride content was associated with E/A and E peak deceleration, independently of diabetic state, age, BMI, heart rate, and diastolic blood pressure.

We conclude that myocardial triglyceride content is increased in T2DM, relative to age- and BMI-matched controls and is independently associated with decreased left ventricular diastolic function.

O3.6

FATTY LIVER IN UNCOMPLICATED TYPE 2 DIABETES MELLITUS IS ASSOCIATED WITH IMPAIRED MYOCARDIAL HIGH-ENERGY-PHOSPHATE METABOLISM

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[1]Leids Universitair Medisch Centrum, Leiden, [2]VU Medisch Centrum, Amsterdam

Purpose: To study the associations between fatty liver (FL), insulin resistance, myocardial high-energy-phosphate (HEP) and glucose metabolism, and heart function in patients with uncomplicated type 2 diabetes mellitus (T2DM).
Materials and methods: We studied 35 T2DM patients (Mean±SD Hba1c = 7.0±0.8%) without coronary artery disease or heart failure, as determined by echocardiography. 1H-MRS of the liver for the assessment of liver fat, myocardial 31P-MRS for assessment of myocardial HEP metabolism and MRI to determine left ventricular function were performed. Furthermore, a hyper-insulinemic, euglycemic clamp was performed to establish whole body insulin sensitivity. Moreover, PET with H2150 (fasting conditions) and [18F]-2-fluoro-2-deoxy-D-glucose (clamp conditions) were used to determine myocardial blood flow (MBF) and myocardial metabolic rate of glucose uptake (MMRglu) in a subgroup of 28 patients.
Results: Patients with FL (fat/water ratio> %, n=17) showed increased body mass index (29.5±3.2 vs 27.2±2.8 kg/m2, p<0.05), reduced whole body insulin sensitivity (0.45±0.48 vs 0.74±0.44 (mg/kg"min)/(pmol/L), p<0.05), and reduced MMRglu (0.21±0.13 vs 0.34±0.14 mmol/mL/min, p<0.05), as compared with patients without FL, while MBF was not different. The ratio of phosphocreatine over adenosine triphosphate, a marker of myocardial HEP metabolism, was reduced in patients with FL (1.90±0.35 versus 2.27±0.29; p<0.05), also after adjustment for BMI, and correlated to MMRglu (r=0.43, p<0.05). LV systolic and diastolic function were not statistically significantly different.
Conclusion: Fatty liver in patients with uncomplicated T2DM is associated with decreased myocardial HEP metabolism. In addition myocardial HEP metabolism is modulated by myocardial glucose uptake.

O3.7

ASSESSMENT OF ATHEROSCLEROTIC PLAQUES ULCERATION IN THE CAROTID ARTERY WITH MULTIDETECTOR CT: THE RELATIONSHIP BETWEEN PLAQUE ULCERATION AND CLINICAL ISCHEMIC STROKE SYNDROMES

P.J. Homburg, T. Jansen, S. Rozie, T.T. de Weert, H.L.J. Tanghe, A. van der Lugt
Erasmus MC, Rotterdam

Purpose: Atherosclerotic plaque ulceration is a marker of previous plaque rupture and subsequent tromboembolism, and can be assessed by multidetector computed tomography angiography (MDCTA). We hypothesized that presence of plaque ulceration is more frequent in cortical ischemic stroke than in other stroke types.
Methods and materials: We retrospectively studied 351 consecutive patients (59.5 male; mean age 62.4±13.1 years), with cerebrovascular symptoms in the carotid artery territory with MDCTA. Plaque ulceration was defined as extension of contrast material beyond the vascular lumen into the surrounding plaque. Patients with a likely cardioembolic stroke etiology (n=30) or occluded internal carotid artery (n=20) were excluded. Strokes were classified clinically as cortical stroke, lacunar stroke, or amaurosis fugax (AF). The Chi-Square test was used for statistical analysis.
Results: Atherosclerotic disease was present in the symptomatic carotid artery in 59% of patients. Plaques were present in 62%, 58% and 56% of patients with cortical strokes, lacunar strokes and AF, respectively. The presence of plaque ulceration was significantly higher in the symptomatic carotid artery in patients with cortical strokes than in patients with AF (16% vs. 6%; p=0.035). The presence of plaque ulceration was not significantly higher in cortical strokes in comparison to lacunar strokes (16% vs. 14% p=0.595).
Conclusions: Plaque ulceration was significantly higher in the symptomatic carotid artery in patients with cortical strokes than in patients with AF. The absence of a difference in plaque ulceration between cortical or lacunar strokes raises the question whether these two types of stroke have different pathofysiological mechanisms.

O3.8

THE RELATIONSHIP BETWEEN CALCIFICATIONS OF THE INTRACRANIAL SEGMENT OF THE SYMPTOMATIC INTERNAL CAROTID ARTERY AND INFARCTS IN THE SYMPTOMATIC HEMISPHERE ASSESSED WITH MULTI-DETECTOR CT

P.J. Homburg, Z.F. Fanyar, S. Rozie, T.T. de Weert, H.L.J. Tanghe, D.W.J. Dippel
Erasmus MC, Rotterdam

Purpose: Intracranial calcification of the internal carotid artery is a marker of intracranial atherosclerosis and can be assessed by and quantified with multidetector computed tomography angiography (MDCTA). We hypothesize that presence of intracranial calcification in the symptomatic artery is related to the presence of infarct on CT in the symptomatic hemisphere.
Methods and materials: We retrospectively studied 351 consecutive patients (59.5 male; mean age 62.4±13.1 years), who had cerebrovascular symptoms in the carotid artery territory with MDCTA. Patients with a likely cardioembolic stroke etiology (n=30) or occluded internal carotid artery (n=20) were excluded. CT brain images were reviewed for the presence of recent and old infarcts. We quantified intracranial calcification by manually drawing contours on axial images with a custom-made software tool. The Mann-Whitney U test and Logistic Regression were applied for statistical analysis.
Results: The quantity of intracranial calcification was significantly higher in the symptomatic carotid artery of patients with infarcts in the symptomatic hemisphere (36mm3±78mm3) than in patients without infarcts in the symptomatic hemisphere (21mm3±47mm3) p<0.001). In multivariate analysis after adjustment for age and sex, no independent relationship was found between the quantity of intracranial calcification in the symptomatic artery and infarcts in the symptomatic hemisphere.
Conclusions: The quantity of intracranial calcification was significantly higher in the symptomatic carotid artery of patients with infarcts in the symptomatic hemisphere than in patients without infarcts. However, after adjustment for age and sex, intracranial calcification in the symptomatic internal carotid artery was not independently associated with infarcts in the symptomatic hemisphere.

Sessie 4

Interventieradiologie

Donderdag 9 oktober 2008, 11.30 - 13.00 uur

04.1

NEPHRON-SPARING RADIOFREQUENCY ABLATION OF RENAL CELL CARCINOMA IN PATIENTS WITH A HISTORY OF CONTRA-LATERAL NEPHRECTOMY: INITIAL CLINICAL EXPERIENCE

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Purpose: To evaluate the efficacy of percutaneous CT-guided radiofrequency ablation (RFA) for nephron-sparing treatment of renal cell carcinoma (RCC) in patients with a history of contra-lateral nephrectomy.
Materials and methods: Eleven consecutive patients (35 to 89 years of age, mean 69 years) with 13 biopsy proven RCCs in a solitary kidney were treated with percutaneous CT-guided RFA at our Institution between January 2006 to December 2007. The RFA procedure was performed with a cool-tip RF ablation system (n=7) or a RF 3000 system connected to a LeVeen monopolar multi-array electrode (n=6). Ablation procedures were performed with epidural anaesthesia. Follow-up ranged from 2 to 24 months, and included clinical examinations by the urologist and image surveillance with CT performed at 1, 3, 6 and 12 months post-procedure.
Results: Median tumor size was 3.4cm. CT-guided RFA of the RCCs was technically successful in all 13 tumors (100%). The overall early complication rate in 11 patients was 36% (4/11), including contrast-nephropathy (n=1), urinary leak (n=1), and hematuria (n=2). Mean hospital stay was 1.1 day (range 1-7 days). At a median post-operative follow-up of 12 months (range, 2-24 months) 2 patients (18%) had radiographic evidence of local recurrence and were successfully treated with a second RFA procedure. No late complications or death occurred.

Image 1: CT-guided RFA of RCC in left kidney

Conclusion: CT-guided RFA for treatment of RCC in patients with a solitary kidney is technically feasible, has an acceptable early complication rate, and results in successful tumor ablation (100%), with a 18% recurrence rate at a median 12 months follow-up period.

04.2

MANAGEMENT OF CHYLOTHORAX BY PERCUTANEOUS CATHETERIZATION AND EMBOLIZATION OF THE THORACIC DUCT

M.A.A.J. van den Bosch, W. Prevoo, H.J. Teertstra, R. Kröger
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Introduction: High-output chylothorax (>1000 mL/d) is a rare but serious complication of thoracic and head/neck surgery. We used percutaneous catheterization and embolizaton of the thoracic duct as a minimally invasive treatment alternative of patients referred with uncontrollable chylothorax.
Materials and methods: Seventeen patients (7 men, 10 women; mean age, 58 years) who either failed conservative or surgical management for chylothorax were included. The chylothorax was secondary to modified radical neck dissection (n=5), esophagectomy (n=4), lobectomy (n=3), pleuropneumonectomy (n=2), Non-Hodgkin Lymphoma (n=2), and lymphangiomatosis (n=1). By using a transabdominal puncture technique of lymph trunks after visualization by lymphangiography, the thoracic duct was catheterized and embolization with microcoils was attempted.
Results: Lymphangiography was performed in 17 patients. In two patients a second attempt was required, resulting in a total of 19 procedures. The thoracic duct was successfully punctured in 15/17 patients (88%), followed by successful catheterization and embolization in 12/17 (71%) patients. Chyle leakage resolved completely in 9 patients, 7 after successful embolization and 2 due to lymph trunk disruption during puncture. A partial stop was achieved in another 4 patients. Resulting in an overall cure rate of 13/17 (76%). Minor complications included lipiodol leakage to the pleural cavity (n=1), and pain (n=1), no major complications or mortality were observed.
Conclusion: Percutaneous catherizaton and embolization of the thoracic duct is a safe and effective minimal invasive procedure for treatment of high-output chylothorax. The overall cure rate was 76%.

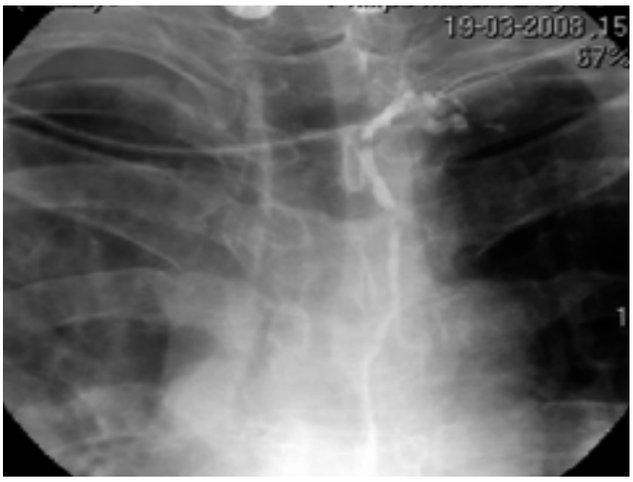

Image 1: Conventional lymphogram shows the Thoracic Duct

O4.3

PERCUTANEOUS LASER DISC DECOMPRESSION (PLDD): PAIN RESPONSE AND PREDICTING FACTORS

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Kennemer Gasthuis, Haarlem

Purpose: To evaluate the clinical outcome of CT-guided PLDD for lumbar disc herniation and to identify factors affecting favorable outcome.
Methods: Data of 137 patients who underwent PLDD in our hospital between January 2003 and October 2007 were retrospectively reviewed and analyzed. Potential favorable factors were statistically determined by the Student's T Test.
Results: Sixty-one percent of the patients was male, mean age 45.1 years (18-82 years). L3-L4 disc was treated in 6%, L4-L5 disc in 54% and L5-S1 disc in 40%. A questionnaire evaluating symptom duration and pain response was sent to 134 patients of whom 100 responded. Symptom duration was more than six months in 73%. Mean pain score (scale 1-10) decreased from 7.8 before treatment, to 4.8 after two weeks ($p<0.001$) and 3.6 after eight weeks ($p<0.001$). After two and eight weeks respectively 72% and 83% of the patients had a lower pain score than before treatment. PLDD performed in older patients (≥45 years) had a significant better outcome at two ($p<0.001$) and eight weeks ($p=0.002$) compared to PLDD in younger patients (<45 years). Treatment at L4-L5 showed better results after two ($p=0.030$) and eight weeks ($p=0.049$) compared to treatment at L5-S1. Symptom duration and the amount of energy delivered (756-2010 Joule) were not related to outcome.
Conclusion: In this retrospective follow-up study PLDD proved to be effective in pain relief two and eight weeks after PLDD. Age ≥45 years and treatment at L4-L5 predicted a better outcome.

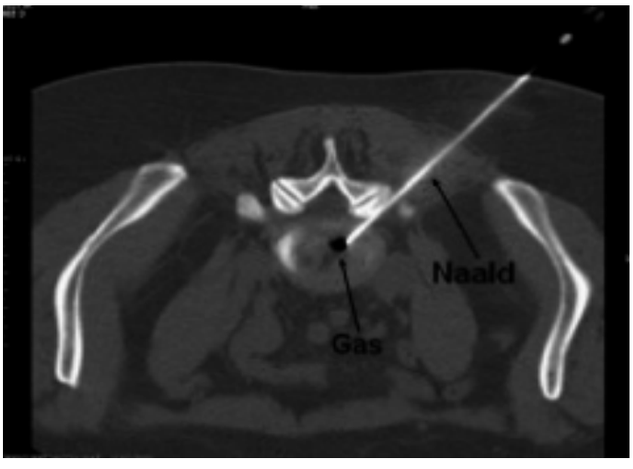

Image 1: PLDD-treatment

O4.4

INTRA-ARTERIËLE BEHANDELING VAN ACUTE CEREBRALE ISCHEMIE: EERSTE ERVARINGEN

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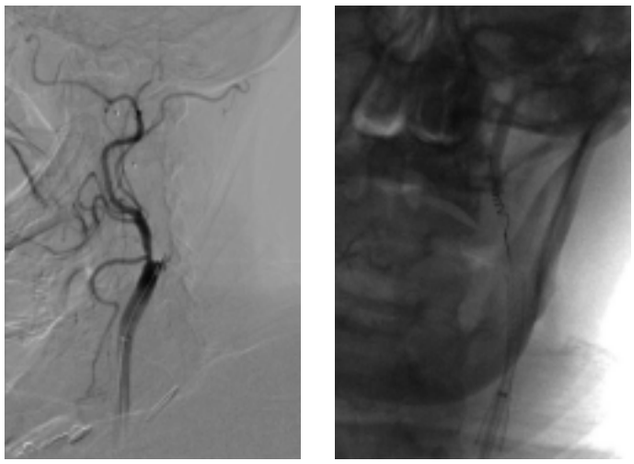
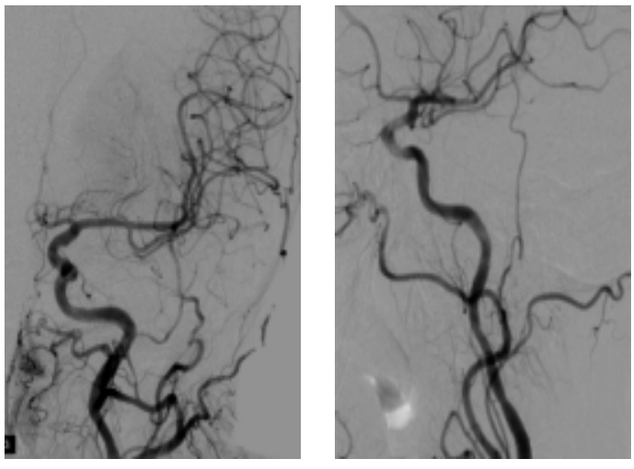
MC Haaglanden, Den Haag

Inleiding: Bij acute ernstige hersenischemie is intra-arteriële therapie mogelijk effectiever dan standaard behandeling met intraveneuze thrombolyse. Met de komst van mechanische thrombectomie devices en de mogelijkheid tot acute carotisstenting lijken de resultaten verder te verbeteren.
Patiënten: Sinds juni 2006 werden in onze instelling 20 patiënten intra-arteriëel behandeld (IAT) voor acute cerebrale ischemie. In 5 gevallen ging het om basilaris occlusie; in de overige 15 was er media ischemie, waarbij er in 6 gevallen tevens een origo occlusie was van de arteria carotis interna. Alle patiënten hadden ernstige neurologische uitval. Behandeling bestond uit alleen IA thrombolyse (n=8), IAT met mechanische thrombectomie (MERCI device of gelijksoortig, n=9), of acute carotisstenting gevolgd door thrombolyse/thrombectomie (n=6).
Resultaten: Bij 16 van de 20 patiënten werd volledige of partiële recanalisatie bereikt (80%). Neurologisch herstel (volledig of partieel) trad op bij 12 patiënten (60%), allen na geslaagde recanalisatie. Drie patiënten overleden, allen na mislukte behandeling van basilaris occlusie. Bij 3 patiënten trad een behandeling



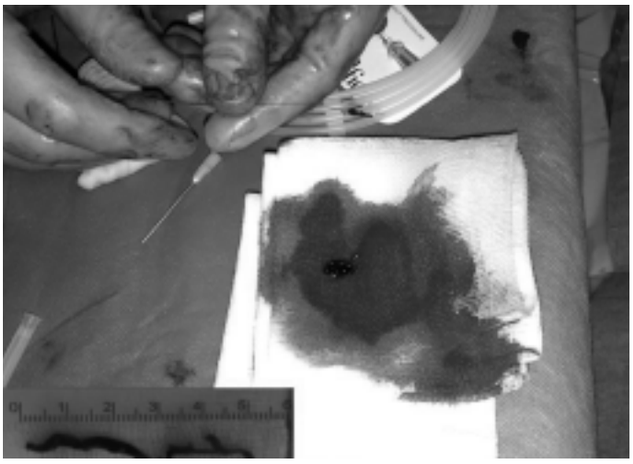
Afbeelding 1: Recanalisatie van ACI occlusie en thrombectomie



Afbeelding 2: Situatie na behandeling: doorgankelijke ACM

gerelateerde complicatie op. Eén van de patiënten werd 20 uur na de eerste symptomen alsnog succesvol behandeld op basis van CT perfusie bevindingen. Acute carotisstenting was succesvol bij 4 van 6 patiënten, allen met goede klinische uitkomst.

Conclusie: Intra-arteriële behandeling van acute hersenischemie is veelbelovend. Met name de combinatie van thrombolyse met mechanische thrombectomie leidt tot hoge recanalisatie percentages, en vaak goed klinisch herstel. Ook in de setting van onderliggende acute origo occlusie van de arteria carotis interna zijn er intra-arteriële behandelmogelijkheden.



Afbeelding 3: Thrombus verkregen via aspiratie/thrombectomie

04.5

PERCUTANEOUS TRANSHEPATIC TREATMENT OF COMMON BILE DUCT STONES: TEN YEARS OF EXPERIENCE

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Academisch Medisch Centrum, Amsterdam

Background and purpose: The preferred treatment for common bile duct (CBD) stones is endoscopic stone removal. However, if endoscopic treatment fails, percutaneous treatment is a non surgical alternative. The purpose of this study was to retrospectively describe indications, technique, effectiveness and safety of percutaneous CBD stone removal.

Material and methods: From March 1998 to March 2008, 68 patients (39 men and 29 women, 14-96 yrs, mean 71,3 yrs) with CBD stones were seen by the intervention radiologist. All patients were referred because endoscopic treatment failed (39/68 patients, 57,4%) or wasn't feasible (29/68 patients, 42,6%). In 10 patients endoscopic stone removal succeeded after a rendez vous procedure or after percutaneous biliary drainage, which enabled subsequent endoscopic stone removal. In 58 patients the primary goal was percutaneous treatment. After percutaneous transhepatic access, balloon dilation (8 -12 mm) of the papilla and stone evacuation to the duodenum was done. Stones larger than 1 cm were fragmented by mechanical lithotripsy.

Results: One to five (mean 1,4) attempts were needed to remove all CBD stones in 55/58 patients, which results in an overall success of 94,8%. In 3/58 (5,2%) patients total stone clearance was not obtained. Complications, including fever, sepsis and reanimation during the procedure, were seen in 9/58 (15,5%) patients. During follow-up of 3-122 months (mean 37 months) no patients had recurrent stone disease.

Conclusion: Percutaneous removal of CBD stones is a safe and effective non surgical alternative, when endoscopic treatment fails or isn't feasible.

04.6

HEPATIC INTRA-ARTERIAL CHEMOINFUSION AS SALVAGE THERAPY FOR PATIENTS WITH UNRESECTABLE LIVER METASTASES FROM BREAST CANCER

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Abstract: Purpose: To assess the outcome of hepatic intra-arterial chemoinfusion as salvage therapy in patients with chemorefractory liver metastases from breast cancer.

Methods and materials: Between January 2005 and March 2008, 15 female breast cancer patients with unresectable, chemorefractory liver metastases (mean age 50yr, range 26-73yr) were treated at our Institution with intra-arterial chemoinfusion, performed by selective administration of Mitomycin C in the right and left hepatic artery. Follow-up included physical examination, tumor markers assessment, and Computed Tomography (CT) at regular intervals until death. Primary study endpoints were tumor response assessed on follow-up CT-scans according to RECIST, and overall post-interventional survival.

Results: Mean time-interval between diagnosis of liver metastases and first intra-arterial chemoinfusion was 76 weeks. In total, 25 intra-arterial chemoinfusion procedures were successfully performed in 15 patients (one procedure in 8 patients, two procedures in 4 patients, and three procedures in 3 patients). No intra-procedural complications occurred. According to RECIST, there was a 33% (n=5) partial response rate, 20% (n=3) stable disease, and 47% (n=7) progressive disease. Mean post-interventional survival for all patients was 26 weeks (range 4-100 weeks). Post-interventional survival was significantly increased to 52 weeks in patients that showed partial response (n=5), compared with 11 weeks in patients with stable or progressive disease (n=10), p=0.001.

Conclusion: Hepatic intra-arterial chemoinfusion is feasible and safe for the treatment of breast cancer patients with unresectable, chemorefractory liver metastases. Mean survival after intra-arterial treatment in responding patients was 52 weeks.

04.7

REAL TIME 3D-FLUOROSCOPY GUIDANCE DURING NEEDLE INTERVENTIONS: RESULTS OF THE FIRST 85 PATIENTS

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St. Antonius ziekenhuis, Nieuwegein

Purpose: Demonstrating the accuracy and feasibility of real time 3D-fluoroscopy guidance during needle interventions.

Materials and Methods: All procedures were performed using a flat panel detector system, capable of rotating around the patient (180°-240°) in 4-6 seconds (XperGuide system; Allura FD 20; Philips Medical Systems). This new technology uses fluoroscopy co-registered with a 3D-data set reconstructed from the acquired attenuation information. The needle path planning is performed in this 3D-data set *(image 1).* The calculated (parallax-corrected) trajectory is then projected on the real time fluoroscopy image, producing an accurate guiding path *(image 2).* In all patients there was at least a planning and control cone-beam CT to check for accuracy and complications.

Results: Between October 2006 and May 2008 we performed eighty-five

Image 1: The needle path planning in the 3D-data set

Image 2: The accurate guiding path merged with fluoroscopy

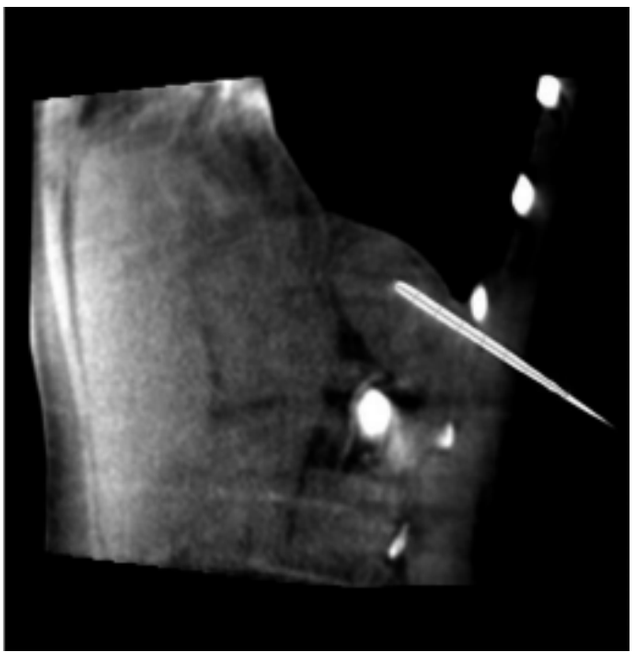


Image 3: Control cone-beam CT

needle interventions using real time 3D-fluoroscopy guidance. The procedures are divided into 5 groups: upper-thoracic 13 (15.5%); lower-thoracic 10 (11.9%); upper-abdominal 34 (40.5%); lower-abdominal 9 (10.7%) and musculoskeletal 18 (21.4%). 19 procedures were therapeutically. The remaining 66 were diagnostic biopsies. Technical success was achieved in 100% checked by a control cone-beam CT *(image 3)*. The acceptable safety margin of the needle target was less than 5 mm. The mean procedure time was 24:10 minutes and fluoroscopy time 3:46 min. There was a minor, self-limiting complication in 11 (12.9%) patients (small perirenal bleeding, pneumothorax & pain).

Conclusion: Real Time 3D-fluoroscopy guidance is a new, promising and simple technique used for needle interventions. Because of the C-arc architecture there is optimal accessibility. It is accurate, quick and has little complications.

O4.8

EFFICACY AND SAFETY OF STENT PLACEMENT IN PATIENTS WITH IMPAIRED RENAL FUNCTION AND ATHEROSCLEROTIC RENAL ARTERY STENOSIS: THE STAR STUDY

L. Bax[1], A.J.J. Woittiez[2], H.J. Kouwenberg[1], W.P.Th.M. Mali[1], E. Buskens[1], F.J.A. Beek[1], B.B. Braam[1], F.T.M. Huysmans[3], L.J. Schultze Kool[3], M.J.C.M. Rutten[4], C.J. Doorenbos[5], J.C.N.M. Aarts[5], T.J. Rabelink[1], P.F. Plouin[6], A. Raynaud[7], G.A. van Montfrans[8], J.A. Reekers[8], A.H. van den Meiracker[9], P.M.T. Pattynama[9], P.J.G. van de Ven[10], D. Vroegindeweij[10], A.A. Kroon[11], M.W. de Haan[11], C.T. Postma[3], J.J. Beutler[1]

[1]UMC Utrecht, Utrecht, [2]Twentoborg Ziekenhuis, Almelo, [3]UMC St Radboud, Nijmegen, [4]Jeroen Bosch Ziekenhuis, 's-Hertogenbosch, [5]Deventer Ziekenhuis, Deventer, [6]Hôpital Broussais, Paris, France, [7]Clinique Alleray–Labrouste, Paris, France, [8]Academisch Medisch Centrum, Amsterdam, [9]Erasmus MC, Rotterdam, [10]MCRZ, Rotterdam, [11]academisch ziekenhuis Maastricht, Maastricht

Purpose: Atherosclerotic renal artery stenosis (ARAS) is associated with progressive loss of renal function. Observational studies suggest this progressive loss can be prevented by renal artery stenting. There is however no evidence supporting a beneficial effect of stent placement, while it may potentially have serious complications.

Methods: We randomly assigned 140 patients with a creatinine clearance <80mL/min/1.73m2 and an ARAS ≥50% to medical treatment only (medication group, 76 patients) or medical treatment plus stent placement (stent group, 64 patients). Medical treatment consisted of antihypertensive agents, a statin and aspirin. The follow-up was 2 years. The primary end point was a ≥20% decrease in creatinine clearance from baseline. Secondary end points included safety and cardiovascular morbidity and mortality. Analyses were performed on intention-to-treat basis.

Results: In the stent group, 46 patients underwent stent placement. No stent was placed in eighteen for various reasons. In this group 10 patients (16%) reached the primary end point versus 16 patients (22%) in the medication group (hazard ratio 0.73 with 95% confidence interval 0.33-1.61). The stent group, however, demonstrated serious complications including two procedure-related deaths (3%), one late death secondary to an infected hematoma and one patient developing renal failure secondary to cholesterol embolism. The other secondary end points were equally distributed between the groups.

Conclusions: Stent placement in addition to medical treatment does not seem to delay progression of impaired renal function but exposes to procedure-related complications. Our findings favour a conservative therapeutic approach to patients with ARAS, focused on cardiovascular risk factor management.

Sessie 5

Kinderradiologie/Acute radiologie Thoraxradiologie/Onderwijs & opleiding

Donderdag 9 oktober 2008, 11.30 - 13.00 uur

GENOMINEERD

Radiologendagen Prijs 2008

05.1

VOLUMETRIC ULTRA LOW DOSE EXPIRATORY COMPUTED TOMOGRAPHY (CT) PROTOCOLS FOR THE MONITORING OF MILD CYSTIC FIBROSIS (CF) LUNG DISEASE COULD BE SUFFICIENT

M. Loeve, M.H. Lequin, M. de Bruijne, I.J.C. Hartmann, W.C.J. Hop, H.A.W.M. Tiddens
Erasmus MC, Rotterdam

Rationale: Chest Computed Tomography (CT) is the most sensitive method to monitor cystic fibrosis (CF) lung disease. CT protocols include low dose inspiratory scans (CTinsp) to detect structural abnormalities and ultra low dose expiratory scans (CTexp) for trapped air assessment. We hypothesized all relevant structural information could be obtained from CTexp, making CTinsp obsolete.

Aim: To compare CT scores from CTexp to CTinsp.

Materials and methods: Twenty children with CF contributed one CTexp and CTinsp. All scans were anonymised and scored in random order using the Brody-II CT scoring system to assess bronchiectasis, airway wall thickening, mucus plugging and opacities. Scoring was done by a single experienced observer blinded for clinical information. Intraobserver variability was established. Intraclass correlation coefficients (ICC) and Bland-Altman plots were used for analysis.

Results: Median (range) age was 12.6 (6.3 - 20.3) years, FEV1 100 (46 - 127) %-predicted and FVC 98.5 (61 - 123)%-predicted. Excellent agreement was shown between CTinsp and CTexp scores for Brody-II total score (ICC 0.96), bronchiectasis (0.95), airway wall thickening (0.90), mucus plugging (0.88) and opacities (0.84). Intraobserver variability was good (ICC range 0.77 - 0.92). Bland-Altman plots showed that differences in scores were not dependent on the magnitude of the scores.

Conclusions: This cross-sectional study shows that CT scores from CTexp and CTinsp match. This strongly suggests that ultra low dose CTexp could be sufficient to monitor CF lung disease. This would substantially reduce radiation dose to approximately 0.15 - 0.73 mSv.

GENOMINEERD

Radiologendagen Prijs 2008

05.2

VARIABILITY OF SEMI-AUTOMATED PULMONARY NODULE VOLUME MEASUREMENTS: A COMPARISON OF 6 LUNG NODULE EVALUATION SOFTWARE PACKAGES

B.J. de Hoop, H. Gietema, B. van Ginneken, P. Zanen, M. Prokop
UMC Utrecht, Utrecht

Purpose: To compare the interscan variability of pulmonary nodule volumetry with 6 currently available semi-automated software packages for computed tomography (CT) in a dataset containing nodules of varying size, morphology and contact to pulmonary structures.

Methods: Eleven patients (10 men, 1 woman, age 26-84yrs, mean 60yrs) referred for chest CT because of known pulmonary metastases received two additional low-dose non-contrast-enhanced scans. Between scans, patients got off and on the table to simulate a follow-up scan. Volumes of all solid pulmonary nodules were determined on both scans using 6 nodule evaluation software packages. The percentage of visually adequate segmented nodules was compared between packages using a binominal test. Interscan variability was expressed as the upper limit of the 95% confidence interval of the relative volume difference between measurements on both scans. Interscan variability was calculated per software package considering only nodules, for which segmentation was adequate. To detect systematic differences in measurements between packages, a mixed model variance analysis was used.

Results: We evaluated 292 nodules (diameter 3-30mm, mean 10mm). The software packages provided adequate segmentation in 204-286 (70-98%) of nodules ($p<0.001$). Interscan variability ranged between 18.5% and 22.0%. Systematic volume differences were detected in 13 of 15 possible pairs of packages.

Conclusion: Substantial variations in segmentation performance exist between current nodule volumetry software. In case of an adequate segmentation, an increase in measured nodule volume of more than 22% can be attributed to real growth for all packages tested. Systematic differences hamper comparison of nodule volumes between software packages.

GENOMINEERD

Radiologendagen Prijs 2008

05.3

DOES COMPUTER-AIDED DETECTION INCREASE THE DETECTABILITY OF SOLID PULMONARY LESIONS IN DIGITAL CHEST RADIOGRAPHS OF OLDER PATIENTS

D.W. de Boo, M.J. Scheerder, E. Boorsma, N.F. Freling, S. Bipat, C.M. Schaefer-Prokop
Academisch Medisch Centrum - Universiteit van Amsterdam, Amsterdam

Purpose: To evaluate the added value of a computer-aided detection system (CAD) for the detection of small solid pulmonary lesions in older patients with smoking related changes.
Method and materials: 114 patients (mean age 62y) were selected, smoking-related parenchymal changes were present in 66%. Sixty patients had 101 CT proven solid pulmonary lesions (size 5-15mm). Lesion conspicuity was generally low. Three inexperienced (<1,5y) and three experienced readers (>10y) evaluated the images with and without CAD (xLNA Enterprise, Philips) in two separate reading sessions. Presence and location of lesions and reading time per session were recorded. Sensitivity and false positive rate (FP/FP+TP) were calculated on per lesion basis. Statistical significance was tested by the McNemar test at a P-level of 0.05
Results: CAD had a stand-alone sensitivity of 47% (47/101), while producing 1.7 false-positive marks per image. Sensitivity was improved by CAD for inexperienced readers (45% vs. 38%, $p<0.05$) and remained unchanged for experienced readers (51% vs. 50%). 33% of the lesions correctly identified by CAD were not accepted by the readers as true positive. CAD did not lead to a significant increase of FPR, neither for experienced (31 vs. 25%) nor for inexperienced readers (41% vs. 38%). Averaged reading time per image increased by 24% using CAD (73sec vs. 59sec).
Conclusion: CAD improves the sensitivity of inexperienced readers for the detection of malignant lung lesions without detrimental effect on false positive rate. Given the high rate of rejected true-positive CAD marks, further improvement of reader performance with CAD is possible.

05.4

ANATOMY OF THE CIRCLE OF WILLIS AND BLOOD FLOW IN THE BRAIN FEEDING VASCULATURE IN PREMATURE BORN BABIES

B.J.M. van Kooij[1], J. Hendrikse[2], M.J.N.L. Benders[2], L.S. de Vries[1], F. Groenendaal[1]
[1]Wilhelmina Kinderziekenhuis, Utrecht, [2]UMC Utrecht, Utrecht

Background and purpose: The aim of this study was to assess the anatomy of the circle of Willis in preterm neonates (gestational age 25-31 weeks) at term equivalent age and to evaluate the relation between anatomic variations and blood flow through the internal carotid artery and basilar artery.
Methods: Flow measurements (ml/min) were obtained with 2D phase-contrast magnetic resonance imaging (MRA). Time-of-flight MRA was used to assess the anatomy of the circle of Willis for a dominant A1 segment of the anterior cerebral artery or a fetal-type posterior cerebral artery. Differences in flow were assessed with ANOVA.
Results: In our cohort, 74% showed a variant type of the anatomy of the circle of Willis. The flow in the internal carotid artery at the side of a dominant A1 segment (43.3 ml/min) was increased compared to both the flow in the contralateral internal carotid artery (33.0 ml/min) and the flow in the internal carotid artery in children with a normal anterior anatomy (38.4 ml/min). The flow in the basilar artery was highest in neonates with a normal configuration of the posterior part of the circle of Willis (32.6 ml/min) compared to children with a unilateral 25.3 (ml/min) or bilateral fetal-type posterior cerebral artery (18.6 ml/min).
Conclusion: Preterm neonates show a high prevalence of variant types of the circle of Willis at term equivalent. We demonstrated the relation between variations in the circle of Willis and the volume flow measurements in the internal carotid artery and basilar artery.

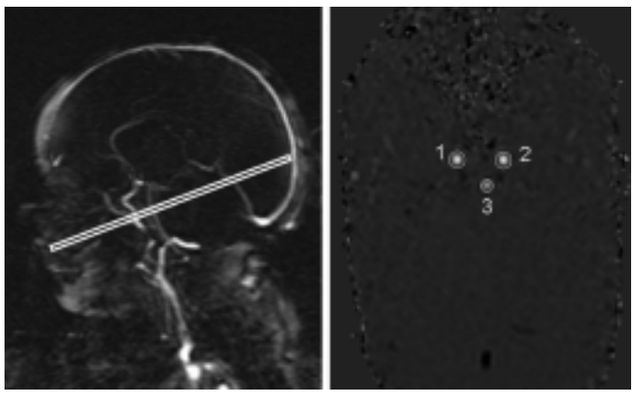


Image 1: 2D-PC position and ROI's to measure flow

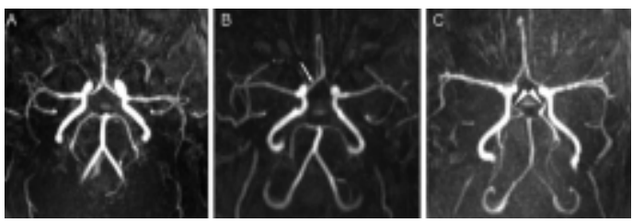


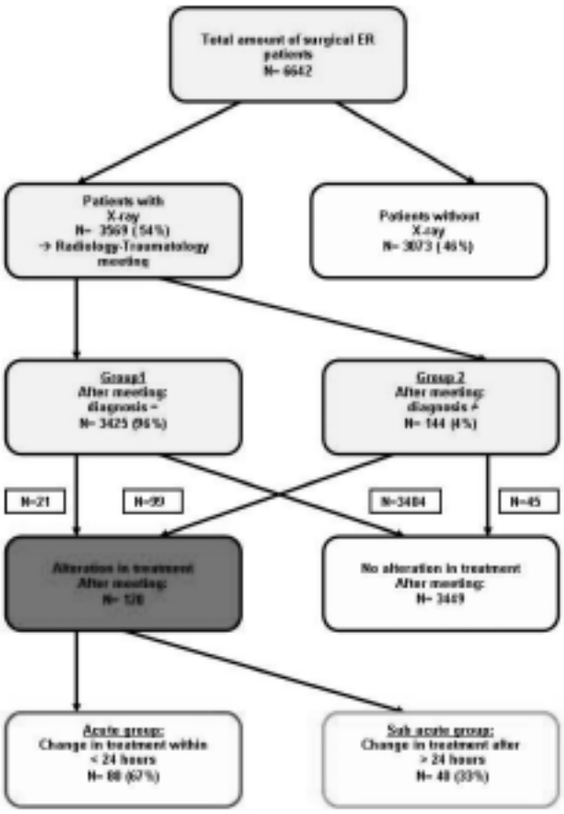
Image 2: Variations in the anatomy of the circle of Willis

05.5

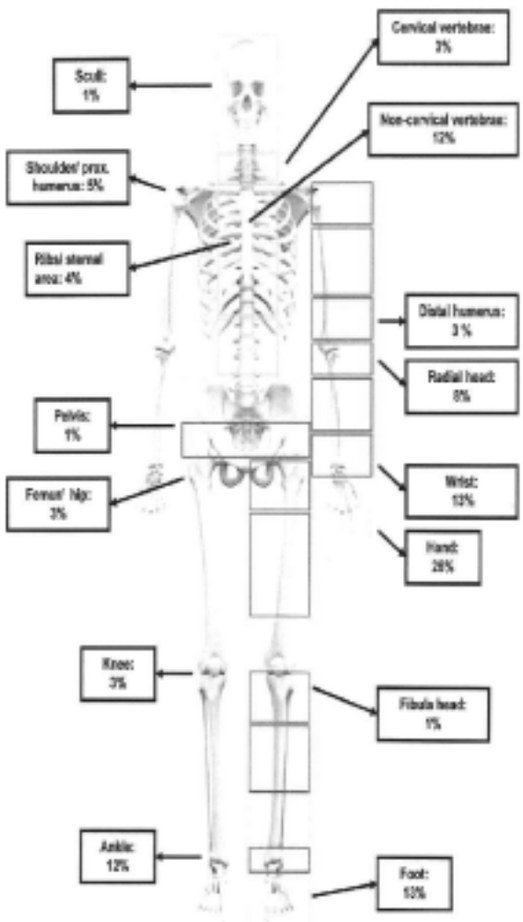
EVALUATIE VAN DE RADIOLOGISCH-CHIRURGISCHE SEH-BESPREKING; EEN VANGNET DAT WERKT?

J.J.J. de Vries, M.M. Michon, G.D.J. van Olden, H.J. Baarslag
Meander Medisch Centrum, Utrecht

Inleiding: Vanaf 2002 tot begin december 2007 zijn er in totaal 167 claims gemeld bij MediRisk waarbij de röntgenbeoordeling een rol heeft gespeeld. Per 1 januari 2007 zijn de "vangnetten SEH"ingevoerd bij alle bij MediRisk verzekerde ziekenhuizen. De gezamenlijke röntgenbespreking maakt daar deel van uit. Naast het scholingaspect dient een gezamenlijke bespreking ook als controle c.q. verificatie op een initieel beoordelingsresultaat, en maakt het een directe terugkoppeling tussen radioloog en behandelend arts mogelijk. Het doel van ons onderzoek was deze röntgenbespreking te evalueren.
Methode: In de periode van 1 augustus tot 1 december 2007 werden tijdens de röntgenbespreking dagelijks de gegevens genoteerd van de SEH-patiënten bij wie de diagnose of het beleid (of beiden) werden gewijzigd.
Resultaten: In 4 maanden tijd werden 6642 patiënten op de SEH van het Meander Medisch Centrum behandeld. Bij 3569 patiënten (54 %) werd een röntgenopname vervaardigd. Na de röntgenbespreking bleef bij 3425 (96 %) patiënten de diagnose hetzelfde. Bij 144 (4%) patiënten wijzigde de diagnose.

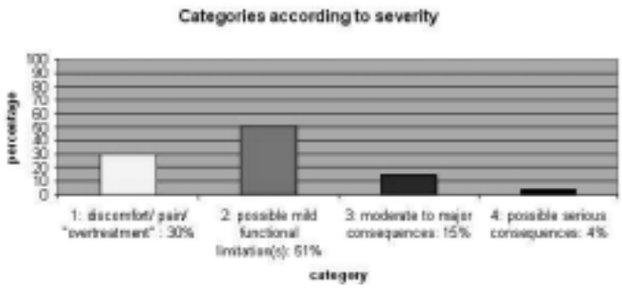


Figuur 1: Stroomdiagram SEH-patiënten van aug 2007 tot dec 2



Figuur 2: Indeling naar lokatie en aantal gemiste diagnosen

Bij 99 van de 144 (69%) patiënten werden de diagnose en het beleid veranderd. Bij 21 van de 3425 (1%) patiënten werd de diagnose niet gewijzigd, maar de behandeling wel.



Figuur 3: Indeling naar ernst van de gevolgen

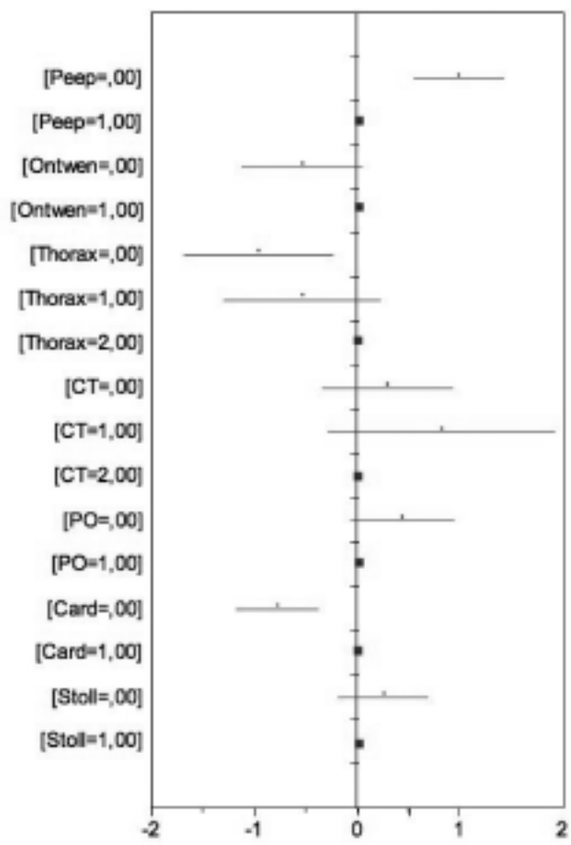
Conclusie: Na de dagelijkse röntgenbespreking werd in 4 maanden tijd bij 165 patiënten het beleid en/of de diagnose gewijzigd. De dagelijkse röntgenbespreking van alle SEH patiënten is van essentieel belang, en kan vele claims voorkomen.

05.6

WAARDE VAN X-THORAX BIJ BESLISSING OM PLEURAVOCHT TE DRAINEREN BIJ IC PATIËNTEN

I. Stobbe[1], J.W.C. Gratama[1], R. de Vos[2], W. ten Hove[1], P.E. Spronk[1]

[1]Gelre Ziekenhuizen, Apeldoorn, [2]Amsterdam School of Health Professions, Amsterdam



Figuur 1: Puntschattingen van B-coëfficiënten en betrouwbaarheidsintervallen voor 7 factoren die van invloed kunnen zijn op de beslissing om pleuravocht te draineren bij IC-patiënten die niet ontwennen van de beademing. De verticale lijn geeft aan "geen invloed"

Doel: Pleuravocht is een van de redenen dat ontwennen van de beademing niet lukt bij een IC patiënt. Overwegingen en criteria op basis waarvan pleuravocht gedraineerd zou moeten worden bij IC patiënten zijn nooit adequaat prospectief onderzocht. De hoeveelheid pleuravocht is vaak moeilijk te schatten op een X-thorax. Het doel van deze studie was het belang van de X-thorax ten opzichte

van CT thorax en klinische parameters te bepalen in de besluitvorming om pleuravocht te gaan draineren.

Methoden: In 2007 werd een anonieme enquête verstuurd aan alle Nederlandse IC afdelingen. De enquête bestond uit 16 zogenaamde case-vignetten. Elk vignet bestond uit zeven klinische factoren (PEEP [hoog/laag], moeilijk/gemakkelijk te ontwennen, X-thorax beeld met geen, weinig of veel pleuravocht, CT [idem], partiele arteriële zuurstofspanning [hoog/laag], cardiaal [goed/slecht], stollingstatus [normaal/gestoord]) die in verschillende combinaties voorkwamen. De respondent werd bij elke casus gevraagd of pleuravocht diende te worden gedraineerd. Respons data werden geanalyseerd met orthogonale factor analyse.

Resultaten: Van de IC afdelingen werden 108 enquêtes retour ontvangen. Er was geen verschil in uitkomst tussen intensivisten en niet-intensivisten (mn longartsen). Factoren die onafhankelijk geassocieerd waren met de wens te draineren waren: hoge PEEP, mate van pleuravocht geschat op X-thorax en slechte cardiale toestand (zie figuur).

Conclusie: De X-thorax speelt op de IC nog steeds een belangrijke rol bij de beslissing om pleuravocht te draineren. Prospectieve gerandomiseerde studies zijn nodig om het therapeutisch effect van pleuradrainage o.b.v. beeldvorming te beoordelen.

O5.7

INTERACTIEF RADIOLOGIE COLLEGE: GEBRUIK VAN AUDIENCE RESPONSE SYSTEM (STEMKASTJES)

M. Maas[1], G.J. Streekstra[1], N.R. Bos[1], P. de Jong[2], S. Kolkman[1], R. Sijstermans[1]
[1]Academisch Medisch Centrum, Amsterdam, [2]Leids Universitair Medisch Centrum, Leiden

Achtergrond: Plenair onderwijs is vaak uni-directioneel: de docent spreekt en de studenten consumeren. De docent heeft dientengevolge geen inzicht in het kennisniveau van de studenten. Er vindt geen aanpassing plaats van het onderwijs aan het kennisniveau van de student en daarmee is overdracht van kennis suboptimaal.

Methode: Stemkastjes zijn ingezet in het eerste jaar Curius. De Turning Point software maakt verschillende interactieve interventies mogelijk binnen bestaande powerpointpresentaties. Ondermeer kan de groep studenten in subgroepen worden ingedeeld . Ook kan getest worden of de leerdoelen van bijvoorbeeld ingewikkelde fysica gehaald zijn, middels pretest en posttest analyse; dezelfde vragen worden zowel bij aanvang van het college als bij afsluiting van het college aan de studenten voorgelegd. Tevens werden studenten gevraagd naar hun ervaringen tijdens het gebruik van stemkastjes.
Resultaten/Ervaringen: Na een training, gericht op zowel technische als didactische aspecten, is het respons systeem gebruikt in meerdere colleges radiologie/medische fysica. Er zijn geen technische beperkingen van het systeem geconstateerd. Het competitieve element van indeling in groepen werd als stimulerend ervaren. Het toevoegen van pretest en posttest vragen maakte de docent en student duidelijk welke stof goed en minder goed werd overgebracht. Het optimale aantal vragen in een college is 5-6. Het ontwikkelen van vragen kostte veel tijd.

Conclusie: Zowel studenten als docenten zijn enthousiast over dit nieuwe leermiddel. Vooraf training is noodzakelijk en optimale vragen maken kost veel tijd. Er is een duidelijke onderwijskundige meerwaarde in het gebruik van stemkastjes. Op dit moment worden de stemkastjes intensief gebruikt in het curriculum Curius

O5.8

CLINICALLY APPLICABLE CELL TRACKING USING SUPER PARAMAGNETIC IRON OXIDES (SPIO) IN AN OSTEO-ARHTITIS (OA) MODEL

G.M. van Buul, E. Farrell, P. Wielopolski, P. Bos, G. van Osch, H. Weinans, J. Verhaar, G. Krestin, M. Bernsen
Erasmus MC, Rotterdam

Introduction: Cell-based techniques for tissue engineering (TE) therapies are under extensive investigation in various fields. The fate of the implanted cells in such therapies is still not fully understood. Cell labelling using SPIOs provides the possibility for in vivo cell tracking. In this way, insight into the mechanisms of TE and the actual role of the implanted cells can be acquired, and the safety of the procedure in terms of cell migration and lack of carcinogenesis can be monitored.

Aim of this study: To design a method for clinically applicable cell labelling using SPIOs and in vivo cell tracking by MRI in an OA model.
Methods: Clinically approved agents suitable for cell labelling are used to label human chondrocytes and bone marrow stromal cells (BMSCs). Safety of this method is investigated by studying its effects on: cell morphology, cell proliferation and cell differentiation, and cell fate in vivo. In addition, protocols are being developed to adequately trace the cells in vivo using MRI after intra-articular administration. Clinical feasibility of these new techniques will be studied in patients suffering from OA, who are planned for total hip or knee arthroplasty, a few weeks prior to surgery.

Results: Human chondrocytes and BMSCs can be labelled with clinically approved iron oxide particles. Depending on the labelling conditions used some adverse effects on cell function can occur.

Conclusion: Optimal labelling conditions depend on the cell type and specific agents used. For optimalization of the procedure, the use of additional agents may be required.

Sessie 6

Abdominale radiologie

Vrijdag 10 oktober 2008, 11.00 - 12.30 uur

6.1

CT COLONOGRAPHY FOR DETECTION OF COLORECTAL NEOPLASIA IN A FOBT POSITIVE SCREENING POPULATION

M.H. Liedenbaum[1], A.F. van Rijn[1], A.H. de Vries[1], F.E.J.A. Willemssen[2], H.M. Dekker[3], P. Fockens[1], P.M.M. Bossuyt[1], E. Dekker[1], J. Stoker[1]
[1]Academisch Medisch Centrum, Amsterdam, [2]Erasmus MC, Rotterdam, [3]UMC St Radboud, Nijmegen

Purpose: To determine CT-colonography (CTC) accuracy in persons with a positive Fecal Occult Blood Test (FOBT) for all lesions and adenomas ≥10mm and ≥6mm.
Methods: In three different institutions, 270 consecutive FOBT positive screening individuals (55 guiac FOBT, 215 Fecal Immunochemical Test) underwent CTC with tagging only bowel preparation. Each CTC was read by two of seven independent, experienced observers. Colonoscopy with segmental unblinding was reference standard. For CTC and colonoscopy per polyp and per adenoma sensitivity and for CTC per patient sensitivity and specificity were calculated for both observers ('double reading') after polyp matching with two cut-off points: lesions ≥10mm and lesions ≥6mm.
Results: In total 20 (7%) of FOBT positives had a carcinoma; CTC sensitivity for carcinoma was 95% with a flat rectal carcinoma as FN finding. In all FOBT positives, 181 lesions ≥10mm were found in 127 (47%) patients and 338 lesions ≥6mm in 184 (68%) patients. Per polyp sensitivity for CTC was 93% for lesions ≥10mm and 88% for lesions ≥6mm. Per adenoma sensitivity was 94% for adenomas ≥10mm and 89% for adenomas ≥6mm. Per polyp sensitivity for colonoscopy was 97% for both size categories. Per patient sensitivity for CTC was 96% and 94% for lesions ≥10mm and ≥6mm respectively. The per patient specificity was 93% and 80% for lesions ≥10mm and ≥6mm respectively.
Conclusion: CTC with limited bowel preparation is an accurate technique for carcinoma and adenoma detection in a FOBT positive screening population and can be used to identify patients for referral to colonoscopy.

06.2

CT COLONOGRAPHY AS TRIAGE TECHNIQUE FOR COLORECTAL CANCER IN A FOBT POSITIVE SCREENING POPULATION

M.H. Liedenbaum[1], A.F. van Rijn[1], A.H. de Vries[1], H.M. Dekker[2], M.G.J. Thomeer[3], P. Fockens[1], P.M.M. Bossuyt[1], E. Dekker[1], J. Stoker[1]
[1]Academisch Medisch Centrum, Amsterdam, [2]UMC St Radboud, Nijmegen, [3]Erasmus MC, Rotterdam

Purpose: To determine whether CT-colonography (CTC) is an effective triage technique in Fecal Occult Blood Test (FOBT) positives in a population-screening setting.
Methods: 270 consecutive FOBT positive individuals (55 guiac FOBT, 215 Fecal Immunochemical Test) underwent CTC with iodine tagging bowel preparation in three different institutions. Each CTC was read by two independent, experienced observers. Reference standard was colonoscopy with segmental unblinding. Per patient positive and negative predictive values (PPV and NPV) were calculated for both observers ('double reading') with two cut-off points for triage: CTC measured lesions ≥10mm and lesions ≥6mm. The minimal cost ratio between CTC and colonoscopy to make CTC a cost-effective triage technique was calculated.
Results: 127 FOBT positives (47%) had a lesion ≥10mm and 184 (68%) a lesion ≥6mm. The PPV of CTC was 83% for lesions ≥10mm and 85% for lesions ≥6mm. The NPV was 86% for lesions ≥10mm and 79% for lesions ≥6mm. Using CTC as triage technique in 100 FOBT positive patients, with 10mm CTC cut-off size, would prevent colonoscopy in 53 patients, while missing lesions ≥10mm in 7 patients.
For CTC to be a cost-effective triage technique in detecting lesions ≥10mm in FOBT positives, CTC costs have to be lower than 0.53 of colonoscopy costs. For lesions ≥6mm CTC costs have to be lower than 0.29 of colonoscopy costs.
Conclusion: CTC shows high predictive values in a FOBT positive population. However, use of CTC as cost effective triage technique is questionable due to the high number of polyps in FOBT positives.

06.3

COMPARISON OF ACCURACY OF ULTRASONOGRAPHY AND COMPUTED TOMOGRAPHY IN PATIENTS WITH ACUTE ABDOMINAL PAIN AT THE EMERGENCY DEPARTMENT

A. van Randen[1], W. Laméris[1], W.H. van Es[2], J.P.M. van Heesewijk[2], B. van Ramshorst[2], W. ten Hove[3], W.H. Bouma[3], M.S. van Leeuwen[4], E.M. van Keulen[5], P.M. Bossuyt[1], M.A. Boermeester[1], J. Stoker[1]
[1]Academisch Medisch Centrum, Amsterdam, [2]St. Antonius ziekenhuis, Nieuwegein, [3]Gelre Ziekenhuizen, Apeldoorn, [4]UMC Utrecht, Utrecht, [5]Tergooiziekenhuizen, Hilversum

Purpose: Acute abdominal pain is a common complaint at the emergency department (ED). Both ultrasonography (US) and computed tomography (CT) are used in the diagnostic work-up of these patients. Accuracy is merely evaluated in selected patients suspected with a particular disease (e.g. appendicitis). With this study US and CT in non-selected patients with acute abdominal pain at the ED were compared.
Material and methods: Patients with abdominal pain >2 hours and <5 days presented at the ED were eligible. Excluded were patients to be discharged home from the ED without diagnostic imaging. Reference standard was final

diagnosis after 6 months. All patients underwent US and CT, evaluated by two blinded radiologists. Radiologists recorded general image findings and a (differental) diagnosis per patient. Sensitivity and specificity of US and CT were measured for urgent versus non-urgent diagnoses and specific diagnoses causing acute abdominal pain.

Results: In total 1021 consecutive patients were included; 55%(565) females, mean age 47. 65%(661) patients had an urgent diagnosis, including 28%(284) appendicitis and 12%(118) diverticulitis. Sensitivity of urgent diagnoses was 0.70 (95%CI 0.70-0.70) for US versus 0.89 (95%CI 0.89-0.89) for CT (p<0.01), while specificity was 0.85 (95%CI 0.81-0.88) and 0.77 (95%CI 0.72-0.81) (p<0.01), respectively. CT had more false positive urgent diagnoses (8.2%;84/1021) than US (5.4%;55/1021) (p<0.01). US had more false negative urgent diagnoses (11.3%;115/1021) than CT (7%;71/1021) (p<0.01).

Conclusion: In non-selected ED patients, CT was overall better in detecting (urgent) disease than US. US missed significantly more urgent diagnoses, while CT overestimated urgent disease.

O6.4

CT SCANNING IN PERITONEAL DIALYSIS PATIENTS WITH ENCAPSULATING PERITONEAL SCLEROSIS: A CASE-CONTROL STUDY

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Purpose: Long-term peritoneal dialysis (PD) may lead to encapsulating peritoneal sclerosis (EPS). CT scanning is used to confirm the diagnosis, but there is no consensus on specific CT abnormalities. The purpose of this study was to compare CT findings between EPS patients and long-term PD patients without EPS, to establish CT abnormalities specific for EPS.

Methods: We designed a retrospective (1996-2008) case-control study and included all patients (PD duration > 4 years) with an available CT scan *(Table 1).*

Patient characteristics	EPS (n=17)	Controls (n=18)
Age (years)	43 (18-73)	53 (32-78)
Male (%)	53	39
PD duration (months)	99 (60-158) *	62 (48-91)

* p < 0.001

Table 1

The CT scans were blindly and independently reviewed by 3 experienced radiologists: 2 radiologists from an academic center with a large PD population (observer 1 and 2) and 1 radiologist from a general hospital without PD patients (observer 3). Eight items were scored *(Table 2).*

	Observer 1		Observer 2		Observer 3	
	EPS	Controls	EPS	Controls	EPS	Controls
Peritoneal enhancement	11/12***	2/11	11/12***	2/11	7/10	4/11
Peritoneal thickening	16/17***	4/18	16/17***	4/18	16/16**	11/18
Peritoneal calcifications	12/17**	4/18	10/17*	4/18	9/16**	2/17
Large bowel wall thickening	0/17	2/18	1/17	2/17	3/14	5/18
Small bowel wall thickening	1/17	1/18	6/17	5/18	11/16*	6/18
Adhesions of bowel loops	15/17***	1/18	16/17***	2/18	9/15**	2/18
Signs of bowel obstruction	6/17*	1/18	10/17***	1/18	3/16	1/18
Fluid localisation	5/17*	3/18	5/17*	0/18	2/16	1/18

* p < 0.05 ** p < 0.01 *** p < 0.001

Table 2: The scores are expressed as the number of positive findings (for each specific item) followed by the number of scans that could be judged according to the radiologist

Significant differences between both groups were analyzed with chi square statistics. Sensitivity and specificity were calculated. Interobserver variability was determined by means of agreement.

Results: Observer 1 and 2 found 6 significant CT findings for EPS. Observer 3 scored differently (Table 2). Sensitivity and specificity were calculated by combining these 6 items (the cut off point for a positive test was 3 out of 6 items) and were respectively 100% and 89%. Agreement of scoring was 90% between observer 1 and 2, 76% between observer 1 and 3, and 75 % between observer 2 and 3.

Conclusion: Specific CT abnormalities are present in EPS patients. CT scanning can be used to confirm the diagnosis when using a combination of specific CT findings by experienced readers.

O6.5

CYCLIC HEMATOCHEZIA: A SIGN OF INTESTINAL ENDOMETRIOSIS? EVALUATION BY MRI AND RECTOSIGMOIDOSCOPY

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VU Medisch Centrum, Amsterdam

Purpose: To establish the prevalence of bowel involvement in endometriosis patients complaining of hematochezia and to compare the feasibility in the detection of intestinal endometriosis by MRI and rectosigmoidoscopy.

Methods: In 17 patients complaining of hematochezia both MR Imaging (using T2-weighted high resolution images and T1-weighted images with fat saturation) and rectosigmoidoscopy, including biopsy (during menstruation) were performed. Both diagnostic tools were compared regarding detection of intestinal endometriosis and degree of bowel wall involvement.

Results: MRI visualized in 15 cases (88%) intestinal endometriosis with certainty and and in 2 cases (12%) intestinal endometriosis was probably apparent. In all cases the intestinal endometriosis was limited to the rectum and sigmoid (7-20 cm ab ano) with in 65% visible involvement of the serosa and muscularis resulting in mural thickening (mean: 12,4 mm; range: 4-20 mm). In 35% only serosa was involved. Rectosigmoidoscopy revealed in 15 cases (88%) no abnormalities with available biopsies confirming normal mucosa. Two patients (12%) showed an area of luminal narrowing with otherwise normal mucosa. A subset of 5 patients underwent surgical resection. Localization and extent of intestinal endometriosis matched with preoperatively performed MRI. No mucosal involvement was found.

Conclusion: Intestinal endometriosis was only found in bowel serosa and muscularis. MRI was found to be much more reliable in detecting intestinal endometriosis compared to RSS, even combined with biopsy.

O6.6

MAGNETIC RESONANCE ENTEROCLYSIS IN THE DIAGNOSIS OF SMALL BOWEL NEOPLASMS. A RETROSPECTIVE DIAGNOSTIC ACCURACY STUDY

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VU Medisch Centrum, Amsterdam

Purpose: To evaluate the diagnostic accuracy and interobserver variance of magnetic resonance enteroclysis in diagnosing small bowel neoplasms, with small bowel endoscopy, surgery, histopathology and follow-up as standards of reference.

Materials and methods: Magnetic resonance enteroclysis studies of 91 patients (43 female; 48 male; mean age 53.1 years, range 18-83 years) were retrospectively evaluated by two radiologists blinded to clinical details. Radiological findings were compared with findings of double balloon endoscopy (n=45), surgery (n=18), esophagogastroduodenoscopy (n=3), ileocolonoscopy (n=2), autopsy (n=2), and clinical follow-up (n=21; mean 18.7 months; range 13-32 months). Efficacy parameters were calculated with 95% confidence intervals.

Results: The number of MRE-studies interpreted as depicting small bowel neoplasm was 31 (reader 1) and 33 (reader 2). The number of MRE-studies interpreted as depicting small bowel malignancy was 19 (reader 1) and 17 (reader 2). In 32 patients the presence of small bowel neoplasm was histopathological confirmed after surgery or endoscopy. In 19 of these patients the neoplasm was malignant. Sensitivity, specificity and weighted kappa values of MRE in diagnosing small bowel neoplasms were 0.91-0.94, 0.95-0.97 and 0.928 respectively. For diagnosis of small bowel malignancy these values were 0.79-0.90, 0.97 and 0.931 respectively.

Conclusion: Overall diagnostic accuracy of magnetic resonance in detecting small bowel neoplasms is 0.95. For small bowel malignancy diagnostic accuracy is 0.93-0.96. Interobserver variability was excellent.

O6.7

CLINICAL VALUE OF 18F-FDG PET IN THE DIAGNOSTIC AND THERAPEUTIC EVALUATION OF RETROPERITONEAL FIBROSIS: SHORT TERM RESULTS OF A PROSPECTIVE STUDY

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Purpose: Accurate determination of disease activity is important in assessing treatment response in idiopathic retroperitoneal fibrosis (IRPF).We evaluated prospectively whether use of 18F-fluorodeoxyglucose positron emission tomography (FDG-PET) is a reliable method for evaluating IRPF disease activity.

Materials and methods: Twenty-one patients (mean age 69 years, 15 males) with IRPF underwent FDG-PET and CT scanning at baseline and at 3 and 4 months after start of tamoxifen treatment, respectively. RPF diagnosis was based on characteristic CT findings and histological examination. Exclusion criteria were malignancy and a history of infection, drugs or radiation therapy possibly associated with IRPF. On CT maximal RPF thickness (in 3 different directions: AP, lateral, transversal) and length (craniocaudal) were measured. 18F-FDG uptake was semi-quantified using a visual 4-point scale. FDG-PET (activity and extensiveness) and CT scan follow-up data were correlated to clinical and laboratory follow-up data.

Results: Baseline FDG-PET was positive in 17 patients (81%). Visual PET score correlated with CRP ($r = 0.58$ [0.18-0.81]; $P < 0.01$) and CT thickness ($r = 0.50$ [0.07-0.78]; $P = 0.02$) at baseline. Following treatment both PET activity and extensiveness decreased significantly as compared to baseline ($P < 0.01$). There was also a continued decrease in maximal CT thickness ($P = 0.03$) and ESR and CRP levels ($P < 0.001$ for both) at follow-up.

Conclusion: FDG-PET scanning appears to be a reliable imaging modality in assessing IRPF disease activity. Upcoming results from this on-going study may further clarify its clinical value in predicting long term treatment response.

O6.8

APPENDICITIS MRI ALLEEN T2 GENOEG?

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MC Haaglanden, Den Haag

Doel: MRI van de appendicitis is met name van belang bij klinische verdenking appendicitis en inconclusieve echografie bij zwangere en/of jonge patiënten. Vaak worden uitgebreide, tijdrovende scanprotocollen toegepast. Dit onderzoek was opgezet om te onderzoeken of alleen een T2-gewogen sequentie genoeg is voor de diagnose.

Methoden: 69 MRI's van patiënten die een 1 T MRI hadden gehad i.v.m. klinische verdenking appendicitis zijn retrospectief bekeken door twee radiologen. 43 hadden appendicitis, 26 geen appendicitis. De radiologen beoordeelden in consensus de scans t.a.v. appendicitis: eerst alleen op T2, een maand later op zowel T2 als T1 en T2 met vetsaturatie. 'Appendix niet a vue' werd in de analyse gescoord als 'geen appendicitis'.

Resultaten: Bij beide scoringssessies werd een specificiteit behaald van 92% (24/26), en een positief en negatief voorspellende waarde van 98% (39/40) resp. 96% (24/25). Alleen de sensitiviteit nam toe bij meerdere sequenties, van 91% (39/43) naar 95% (41/43). Slechts twee gevallen werden anders gescoord bij de tweede sessie: in plaats van onzeker t.a.v. appendicitis de tweede keer terecht positief. De visualisatie van de normale en afwijkende appendix veranderde niet significant tussen beide sessies.

Conclusie: MRI is een zeer betrouwbare test voor vaststellen dan wel uitsluiten van appendicitis. In gevallen van zekerheid omtrent de diagnose, kan met een T2 volstaan worden. Bij twijfel helpt met name een T2 fatsat sequentie (evt. omgevend oedeem). Mede in combinatie met de klinische gegevens en bevindingen bij echografie, kan zo sneller een diagnose worden gesteld en kan het onderzoek gemakkelijker 'tussendoor' plaatsvinden.

Sessie 7

Cardiovasculaire radiologie

Vrijdag 10 oktober 2008, 11.00 - 12.30 uur

07.1

NON CONTRAST-ENHANCED MR ANGIOGRAPHY IN PATIENTS AT HIGH RISK FOR NEPHROGENIC SYSTEMIC FIBROSIS: REVIEW OF TECHNIQUES, INTERPRETATION AND CORRELATION WITH CONTRAST-ENHANCED MRA

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Purpose / aim: The purpose of this exhibit is: 1) To gain awareness that non contrast-enhanced MR imaging techniques can be used successfully to depict the vasculature in patients at high risk of developing NSF (grades 4 or 5 end stage renal disease) 2) To review different non contrast-enhanced MR imaging techniques that can be used to depict the vascular system.

Content organization:

1) Description of patient groups at risk for developing nephrogenic systemic fibrosis

2) Discussion of non contrast-enhanced MR angiography techniques:

a) Time-of-Flight imaging b) Phase contrast imaging c) Combined systolic and diastolic subtraction imaging

3) Appearance of stenoses and occlusions with these techniques

4) Discussion of artifacts and pitfalls

5) Correlation of non-enhanced MRA with contrast-enhanced MRA in >50 patients with normal renal function.

Summary: The major teaching points of this exhibit are: 1) It is possible to use non contrast-enhanced MR angiography techniques to depict the vascular system with high quality in patients in whom the use of contrast medium is contra-indicated. 2) Combined systolic and diastolic subtraction imaging is especially promising when compared to standard contrast-enhanced MR imaging and can avoid a false-positive diagnosis of stenosis or occlusion in most patients.

07.2

CORRELATION BETWEEN AORTIC STIFFNESS, LEFT VENTRIOCULAR MASS, SILENT BRAIN INFARCTS AND WHITE MATTER LESIONS IN HYPERTENSION ASSESSED BY MRI

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Purpose: To evaluate the correlation between aortic stiffness, left ventricular (LV) mass as well as silent brain infarcts (SBI) and white matter lesions (WMLS) in hypertensive patients using MRI.

Methods and materials: Approval from the local medical ethics committee was obtained and all patients gave informed consent. Thirty-six hypertensive patients (13 men; mean (μ) age 50.6 ± sd 13.8; μ blood pressure (BP) 157/92 ± sd 23/13) underwent cardiac MRI for evaluation of aortic and cardiac function and brain MRI for cerebral abnormalities. Pulse Wave Velocity (PWV), was used as the marker of aortic stiffness and was measured in the aortic arch and descending aorta. For assessment of cardiac damage we measured LV function and LVmass index (LVMI). Cerebral abnormalities were defined as SBI and WMLs. Correlation between variables was expressed with the Pearson and Spearman correlation coefficients (R).

Results: PWV in the aortic arch was the strongest predictor for LVMI, SBI and WMLs. Aortic arch PWV was significantly correlated with LVMI (R=0.484, p<0.01), SBI (R=0.517; p<0.01) and WMLs (R=0.525 (p<0.01)). Also after adjustment for confounding factors, i.e. age, gender and BP, aortic arch PWV was shown to be an independent predictor of LVMI (μ=0.591, p<0.01), SBI (μ=0.571, p<0.01) and WMLs (μ=0.525, p<0.01).

Conclusion: A significant correlation is found between aortic stiffness, left ventricular mass index, silent brain infarcts and white matter lesions in patients with hypertension. Aortic arch pulse wave velocity is an independent predictor for left ventricular mass, silent brain infarctions and white matter lesions in hypertension.

07.3

IMPACT OF HEART RATE ON THE DIAGNOSTIC PERFORMANCE OF DUAL SOURCE CT CORONARY ANGIOGRAPHY

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Erasmus MC, Rotterdam

Purpose: To evaluate the diagnostic performance of Dual Source Computed Tomography (DSCT) coronary angiography to detect significant stenoses (≥50% lumen reduction) in patients with various heart rates.

Method and materials: DSCT coronary angiography was performed in 373 symptomatic patients (mean heart rate 68.5±12.7). No ß-blockers were administered prior to the scan. Mean scan time was 8.8±1.7 seconds. Pitch varied between 0.2 (<40 beats/minute) and 0.53 for (>100 beats/minute), with individually adapted pitch values for heart rates >40 and <100 bpm. Quantitative coronary angiography was used as the standard of reference.

Results: Prevalence of disease on a per patient level was 76%. 5.578 coronary segments, containing 671 significant stenoses, were available for analysis. In low HR's (≤65 bpm), sensitivity, specificity, positive and negative predictive value of DSCT coronary angiography for the detection of significant lesions on a segment-by-segment analysis was 95% (95% CI: 95-96), 95% (95% CI: 95-96), 77% (95% CI: 75-78), 99% (95% CI: 99-100), respectively. In intermediate HR's (66-79 bpm), sensitivity, specificity, positive and negative predictive value were

92% (95% CI: 91-93), 97% (95% CI: 96-98), 78% (95% CI: 76-80), 99% (95% CI: 99-99), respectively. In high HR's (≥80 bpm), sensitivity, specificity, positive and negative predictive value were 95% (95% CI: 93-96), 94% (95% CI: 93-96), 65% (95% CI: 62-69), 99% (95% CI: 99-100), respectively.

Conclusion: Non-invasive DSCT coronary angiography is highly sensitive to detect and to reliably rule out the presence of a significant coronary stenosis in patients with various heart rates without the use of pre-scan ß-blockers.

O7.4

PLAQUE VOLUME AND PLAQUE COMPOSITION BETWEEN SYMPTOMATIC AND ASYMPTOMATIC ATHEROSCLEROTIC CAROTID ARTERY PLAQUES IN PATIENTS; AN ANALYSIS OF 200 PLAQUES WITH MDCTA

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Purpose: Atherosclerotic carotid plaque rupture leading to thrombo-embolisation occurs in a specific type of atherosclerotic plaque, the so-called vulnerable plaque.

We therefore hypothesize that symptomatic and asymptomatic plaques in the carotid artery have a different plaque volume (PV) and plaque composition.

Methods and materials: We studied 356 consecutive patients (64 male; mean age 68 ± 10.4 years, range 45 - 88 years) with TIA or minor ischemic stroke who underwent MDCT angiography.

Scanning was performed on a 16-slice MDCT scanner (Siemens, Sensation 16, Erlangen, Germany). We measured plaque volume (PV) manually by drawing the outer contour of the carotid artery with a custom-made software tool. Luminal boundary was assessed automatically based on a Hounsfield-Unit (HU) threshold. Plaque composition was measured with ranges of HU-values (calcification >130 HU, fibrous tissue 60-130 HU, lipid core <60 HU).

Results: Bilateral plaques were present in 174 patients and the mean PV of these 348 plaques was 876 ± 654mm3. The mean PV of the symptomatic artery was 882 ± 663 mm3 and the mean PV of the asymptomatic artery was 871 ± 648 mm3 and the differences were not significant. The difference in degree of stenosis between the symptomatic and asymptomatic side was not significant either and we found no significant difference in the proportion of lipid, fibrous tissue and calcifications.

Conclusion: Atherosclerosis is a bilaterally symmetric disease. In this cross sectional study no differences were found in plaque-volume and plaque-component measurements between the symptomatic and asymptomatic carotid plaque.

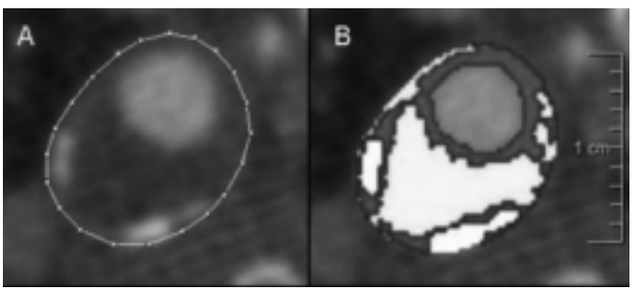

Image 1: Semi-automatic assessment of carotid plaque volume

Variable	Symptomatic Mean	Asymptomatic Mean	P-value
PV (mm³)	882	871	0.32
Lipid (mm³)	218	187	0.84
%	20	18	0.55
Fibrous tissue (mm³)	528	538	0.42
%	60	66	0.23
Calcium (mm³)	135	147	0.36
%	14	16	0.92
Plaque length (mm)	23	24	0.42
Degree stenosis %	23	18	0.08

Table 1: Symptomatic and asymptomatic plaque-measurements

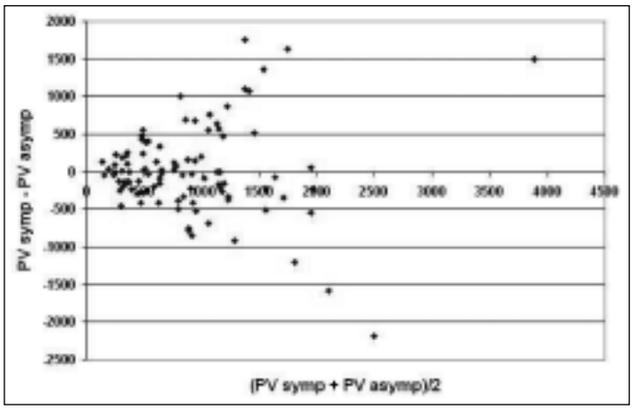

Figure 1: Relationship between mean PV and delta PV (n=174)

O7.5

THE VALUE OF A ZERO CALCIUM SCORE IN PREDICTING THE ABSENCE OF LUMINAL OBSTRUCTIVE DISEASE ON DUAL-SOURCE CT CORONARY ANGIOGRAPHY IN A HIGH PRE-TEST PROBABILITY POPULATION

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Purpose: To examine the value of a calcium score (CS) of zero in predicting the absence of stenoses on coronary CT angiography (CTA) in a high pre-test probability population.

Methods and material: 160 patients who underwent both calcium scoring and contrast-enhanced CTA (114 men, mean age 56±15 yrs) were included. Patients were referred because of chest pain (n=96) or cardiovascular risk factors (n=64). Examinations were performed on dual source CT (Somatom Definition, Siemens Medical Solutions, Germany) except for 7 calcium scores which were performed on electron-beam CT (E-speed, Imatron, USA). Examinations were evaluated on a Leonardo workstation (Siemens Medical Systems, Germany). Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of calcium scoring for stenoses >50% on CTA were determined.

Results: The mean CS was 621±1149 (range 0-9506). 71 out of all 160 patients had no stenoses on CTA; the mean CS was 109±270. 40 out of these 71 patients (56%) had a zero CS. 89 patients had stenoses; the mean CS was 1030±1387, which was significantly higher compared to the group without stenoses (p <0.001). Of all 43 patients who had a zero CS, 3 patients (7%) had a

stenosis >50%. Sensitivity, specificity, PPV and NPV of calcium scoring in demonstrating flow-limiting stenoses were 97%, 44%, 74% and 93% respectively.

Conclusion: Although a zero CS has a high NPV (93%) for predicting the absence of stenoses, it does not rule out obstructive CAD when the pre-test probability is high.

O7.6

INCIDENCE OF CONTRAST INDUCED NEFROPATHY (CIN) IN A GENERAL CT POPULATION: A RETROSPECTIVE COHORT STUDY

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1.To determine the incidence of CIN in patients undergoing contrast enhanced CT in a general teaching hospital.
2. To determine how many patients with a glomerular filtration rate (GFR) ≤60ml/min/1.73m2 experienced CIN.
All records from patients undergoing CT from December 2006 - February 2007 were retrospectively reviewed. Of the total of 3444 patients, 1325 (38.5%) underwent contrast enhanced CT with Iopromide 300mgI/ml (Ultravist® 300, Bayer-Schering Healthcare, Mijdrecht, Netherlands). Mean injected volume was 116ml, range 80-150ml. Patients were included when serum creatinine was established ≤7 days before contrast administration and within 3 days after administration. Patients on hemodialysis were excluded. A total of 276 patients (20.8%) met these criteria. CIN was diagnosed as a rise in serum creatinine after contrast administration of ≥44μmol/l (0.5mg/dL) or a rise of ≥25% from baseline. GFR was calculated using the 4-point MDRD formula.
Of the 276 eligible patients, 33 experienced CIN (12.0%). The study group consisted of 13 males, 20 females, mean age 69 years, range 28-88 years. Mean serum creatinine before contrast was 130μmol/l, range 42-331μmol/l. After contrast mean serum creatinine was 213μmol/l, range 56-564μmol/l.. Mean GFR before contrast administration was 61.4ml/min/1.73m^2, range 15.1-144.3ml/min/1.73m^2. Mean GFR decline was 23.8ml/min/1.73m^2, range 4-66 ml/min/1.73m^2. Before contrast 19 patients had a GFR≤60ml/min (57.6%).
A total of 33 eligible patients (12.0%) experienced a period of CIN. Mean GFR decline was 23.8ml/min/1.73m^2. Although GFR≤60ml/min/1.73m^2 is considered a risk factor for the development of CIN, 14 patients (42.4%) had a pre-contrast GFR >60ml/min/1.73m^2 and did develop CIN.

O7.7

RIGHT VENTRICULAR ABNORMALITIES ON MRI IN INHERITED CARDIAC ARRHYTHMIAS ASSOCIATED WITH SODIUM CHANNEL MUTATIONS

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Purpose: To assess whether patients with or without a mutation in the cardiac sodium channel encoding gene (SCN5A) show abnormalities in the right ventricle (RV) on 3T-MRI.

Method and materials: SCN5A mutations may be associated with inherited arrhythmia syndromes such as Brugada syndrome and progressive cardiac conduction disease, which may cause sudden cardiac death at a young age. Clinical observations suggest involvement of the right ventricle in these diseases. Structural abnormalities of RV (RV hypertrophy, fibrofatty replacement, and fibrosis) are found during histopathological analysis. The usefulness of MR imaging to detect such changes and/or functional derangements (hypokinesia/dyskinesia/dilation) is unresolved. We used high field MRI to study such abnormalities. All patients were screened for a SCN5A mutation. The images were evaluated blinded to the results of the genetic investigation.

Results: Fifty-one patients were included in our study. Twenty-eight (55%) had a SCN5A mutation, and 23 (45%) had not. Of the 28 mutation-positive patients, 15 showed RV abnormalities on MRI. Of the 23 mutation-negative patients, 5 showed RV abnormalities. The proportion of patients with RV abnormalities was significantly higher in the 28 SCN5A mutation carriers (15/13) than in the 23 non-carriers (5/18, p=0.02).

Conclusion: SCN5A mutation carriers have an increased likelihood of having structural/functional RV abnormalities that are detectable by high field MRI.

O7.8

OPTIMIZED ECG PULSING WITH REDUCED RADIATION EXPOSURE AND PRESERVED DIAGNOSTIC ACCURACY WITH DUAL SOURCE COMPUTED TOMOGRAPHY CORONARY ANGIOGRAPHY

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Purpose: To prospectively evaluate the effect of optimized ECG pulsing on the diagnostic performance and radiation exposure in retrospectively-gated Dual Source CT coronary angiography (DSCT-CA).

Method and materials: DSCT-CA was performed in 63 symptomatic patients (mean HR 69.7±11.5). Only patients in sinus rhythm were included. No ß-blockers were administered prior to the scan. Optimal ECG pulsing windows were 60-76%, 30-77%, 31-47% of the R-R-interval for low (≤65 bpm), intermediate (66-79 bpm) and high (≥80 bpm) HR's, respectively. Scan parameters: 120 kV, 412 mAs/rot, MinDose. Mean scan time was 8.2±1.8 s. Pitch varied between 0.2 (<40 bpm) and 0.53 for (>100 bpm), with individually adapted pitch values for heart rates >40 and <100 bpm. Quantitative coronary angiography was used as reference standard. The effective dose was estimated using Monte Carlo methods.

Results: 847 coronary segments, containing 114 significant stenoses, were available for analysis. Sensitivity, specificity, positive and negative predictive value of DSCT coronary angiography for the detection of significant lesions on a segment-by-segment analysis were 98% (95% CI: 97-99), 95% (95% CI: 94-97), 76% (95% CI: 73-79), 100% (95% CI: 99-100), respectively. On a patient-by-patient analysis, sensitivity, specificity, positive and negative predictive value were 100%, 75% (95% CI: 64-86), 94% (95% CI: 89-100), 100%, respectively. The mean effective dose was 8.8±1.8, 12.4±2.3 and 5.9±0.7 mSv for low, intermediate and high heart rates, respectively.

Conclusion: An optimized ECG pulsing strategy significantly reduces radiation exposure in DSCT coronary angiography, in particular in patients with low and high heart rates, while preserving diagnostic accuracy.

Sessie 8

Interventieradiologie

Vrijdag 10 oktober 2008, 11.00 - 12.30 uur

O8.1

FEASIBILITY OF INTRA-ARTERIAL CHEMOTHERAPY FOR RESECTABLE PERIAMPULLARY CANCER TO PREVENT HEPATIC METASTASES (ESPAC-II TRIAL)

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Purpose: To study the effect of intra-arterial chemotherapy (IAC) on the occurrence of hepatic metastases in patients with resectable UICC stage I-III periampullary cancer and to study feasibility and side effects of catheter placements.

Methods and materials: 120 patients were included in a prospective clinical trial and randomized to surgery, adjuvant IAC and radiotherapy (Arm A, 59 patients) or surgery alone (Arm B, 61 patients). IAC consisted of Mitoxantrone, Folinic Acid, 5-FU and Cis-Platinum at 4-weekly intervals. Six cycles were given unless toxicity or disease progression occurred. Development of liver metastases in Arm A and Arm B were compared. Technical aspects and complications of celiac artery catheter placement were recorded in patients who received at least 2 cycles of IAC.

Results: In Arm B 52 % of patients developed liver metastases, vs. 30% in Arm A. The percentage of liver metastases decreased from 78% to 11% with 2 vs. 6 IAC cycles. A total of 620 celiac artery catheterizations were performed in the 43 patients who received at least 2 cycles of IAC. Catheters used were a celiac (90%), Sidewinder (7%) or SOS omni catheter (3%). Catheter luxations occurred in 12% of placements. Four patients experienced major complications, i.e. subtotal celiac trunk stenosis (n = 2) and femoral or external iliac artery dissection (n =2).

Conclusion: Prolonged IAC decreases the occurrence of liver metastases. Catheter luxations occurred in 12% of catheter placements and major catheterization-related complications in 9% of patients, respectively.

O8.2

FREQUENCY AND OUTCOME OF PULMONARY POLYMETHYLMETHACRYLATE (PMMA) EMBOLISM DURING PERCUTANEOUS VERTEBROPLASTY

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[1]St. Elisabeth Ziekenhuis, Tilburg, [2]UMC Utrecht, Utrecht

Introduction: During Percutaneous Vertebroplasty (PV), PMMA cement may migrate into the venous system and subsequently transported to the pulmonary arteries. Frequency, outcome and imaging findings of PMMA pulmonary embolism are poorly understood. We retrospectively assessed occurrence and outcome of PMMA embolism during PV in a large patient cohort.

Patients and methods: Between October 2001 and June 2007, 502 PVs were performed for osteoporotic vertebral compression fractures in 299 consecutive patients. PMMA embolism was defined as venous cement migration visible on biplane fluoroscopy during PV. Frequency was assessed per treated vertebra. Native chest CT scan was performed immediately and one year after documented venous cement migration and patients were clinically followed.

Results: Venous cement migration was fluoroscopically documented during 11 PVs (2.2%, 95% CI 1.2-3.9%). In these patients, CT scan demonstrated multiple small peripheral pulmonary PMMA emboli with random distribution. All 11 patients remained asymptomatic during one year follow up. Repeat CT scan after one year demonstrated unchanged number, size and location of pulmonary PMMA emboli in all patients without late reactive pulmonary changes.

Conclusion: Pulmonary PMMA embolism during PV is an infrequent complication and has no short- and mid-term clinical sequelae. After one year, no pulmonary reaction is seen on CT.

O8.3

VALUE OF 3 TESLA MULTI-MODALITY DIRECTED MR GUIDED BIOPSY TO DETECT PROSTATE CANCER IN HIGH-RISK PATIENTS AFTER AT LEAST TWO PREVIOUS NEGATIVE BIOPSIES

T. Hambrock[1], R. Somford[1], J.J. Fütterer[1], H.J. Huisman[1], C. Hulsbergen-van de Kaa[1], I. Oort1, J.P. van Basten[2], J.A. Witjes[1], J.O. Barentsz[1]
[1]UMC St Radboud, Nijmegen, [2]Canisius Wilhelmina Ziekenhuis, Nijmegen

Purpose: Determine the tumor detection rate, Gleason score distribution and location of tumors detected with MR guided prostate biopsies of tumor suspicious regions (TSR) identified on T2-weighted, Diffusion Weighted and Dynamic Contrast Enhanced MR imaging in patients with high PSA (> 4 ng/ml) and multiple previous negative biopsies.

Materials and Methods: 63 Patients with high PSA and previous negative prostate biopsies received a multi-modality 3T MRI for prostate cancer detection. TSRs were determined using the multi-modality images. An MR biopsy device was used to perform prostate biopsies of TSRs.

Results: Patients had a median PSA value of 13 ng/ml (range 4-123) and median of 2 (range 2-7) previous biopsies. 106 TSRs in 63 patients were biopsied and 240 cores obtained. Tumor detection rate was 57% (36/63 patients). 42/106 (40%) TSRs contained tumor. Prevalence of Gleason 5 tumors was 5%; Gleason 6, 50%; Gleason 7, 29%; Gleason 8, 14% and Gleason 9 tumors, 2%. Location of tumors: transition zone 57%, peripheral zone 33% and central zone 10%. Median number of biopsies obtained was 4 (range 1-7) and

mean duration of MR biopsies was 31 min (range 14-75 min). One transient transurethral hemorrhage and one urinary tract infection were the only complications.

Conclusions: MR guided biopsies targeted towards multi-modality 3T MRI determined TSRs is an effective method for detecting prostate cancer in high risk patients with multiple previous negative biopsies. A large number (45%) of aggressive tumors (Gleason ≥ 7) were found and predominant location of tumor was the transition zone.

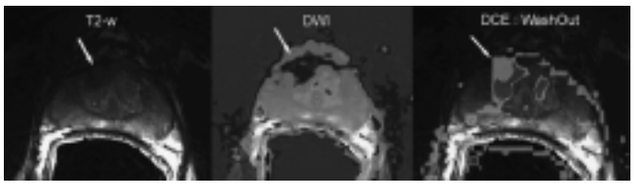

Image 1: Multi-modality MR images of prostate with TSR

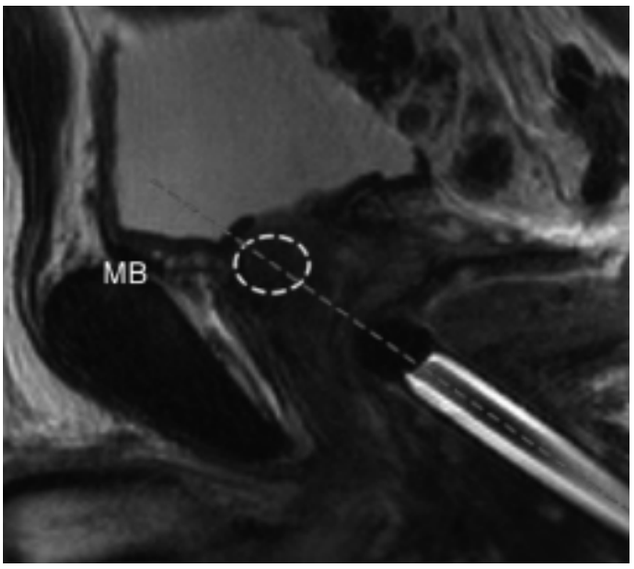

Image 2: Sagital images with MR guider directed to TSR

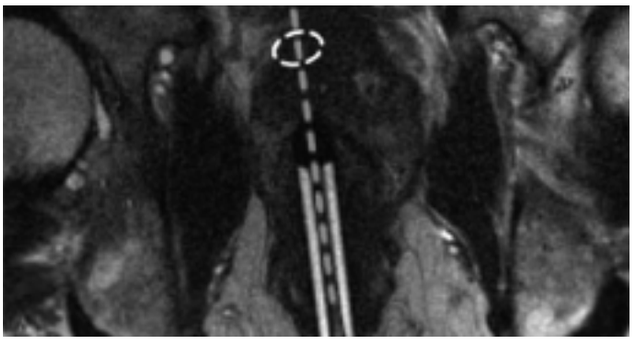

Image 3: Axial images with MR guider directed to TSR

O8.4

3 TESLA MR GUIDED BIOPSY TO DETECT PROSTATE CANCER RECURRENCE FOLLOWING RADIOTHERAPY

T. Hambrock, D. Yakar, J.J. Fütterer, E. van Lin, J.A. Witjes, J.O. Barentsz
UMC St Radboud, Nijmegen

Purpose: To assess the potential value of 3T MR guided prostate biopsy of tumor suspicious regions on Dynamic Contrast Enhanced (DCE) MRI to detect prostate cancer recurrence following radiotherapy.

Materials and methods: In this pilot study, 14 patients with prostate cancer previously treated with radiotherapy (> 1 year before) underwent an endorectal 3T MRI (Siemens, Germany) following 3 consecutive rises in PSA. Two radiologists in consensus determined tumor suspicious regions (TSR) from DCE-MR images. A prototype MR biopsy device (Invivo, Germany) was used in conjunction with a 32 channel phased array coil, to perform prostate biopsies under 3T MR guidance. Anatomical landmarks and features on T2-weighted Turbo Spin Echo and TRUE-FISP images were used to relocate prior determined TSRs. In total 13/14 patients had TSR's on DCE-MR images. 8 Patients received MR guided biopsies while 4 due to evidence metastatic disease, subsequently did not . One patient refused the MR guided biopsy.

Results: The average duration of MR guided biopsies was 30 min. In total 26/26 TSR representative biopsies were obtained. Prostate cancer was found in 7/8 patients. 21/26 (81%) of biopsies from TSR regions were positive for tumor. One biopsy showed normal tissue while 4/26 (1 patient) remaining biopsies showed radiotherapy induced reactive atypia. No complications occurred.

Conclusions: This pilot study shows, that 3T MR guided biopsy of DCE-MRI tumor suspicious regions has a potential value to improve detection of local prostate cancer recurrence following radiotherapy.

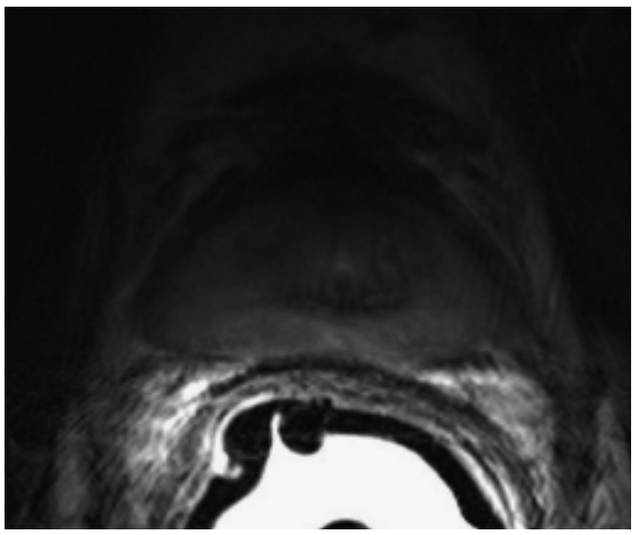

Image 1: T2-w images without evidence of tumor recurrence

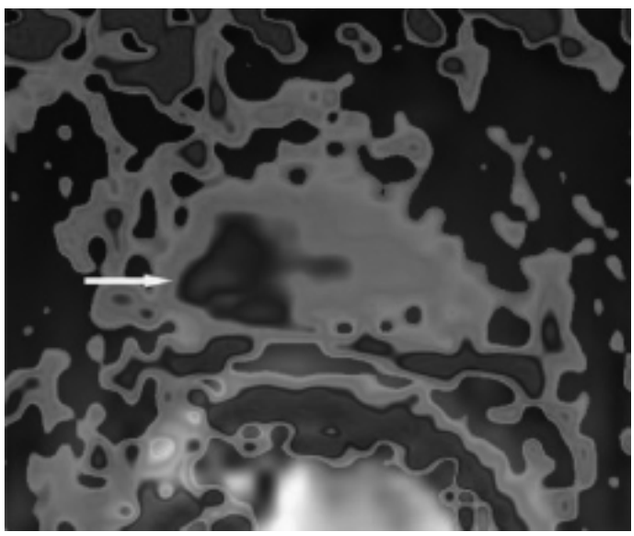

Image 2: DCE MR images with TSR regions visible

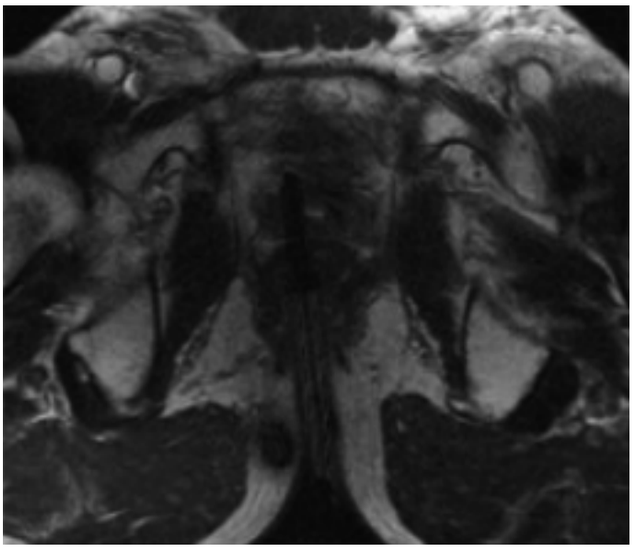

Image 3: Axial images with MR guider directed to TSR

O8.5

CONSIDERABLE REDUCTION OF THE EFFECTIVE DOSE DURING NEEDLE INTERVENTIONS: REAL TIME 3D FLUOROSCOPY GUIDANCE VERSUS CT FLUOROSCOPY

S.J. Braak, M.J. van Strijen, M. van Leersum, H.W. van Es, J.P.M. van Heesewijk
St. Antonius ziekenhuis, Nieuwegein

Purpose: Demonstrating effective dose reduction of needle interventions using real time 3D fluoroscopy (3D-Fluoroscopy) compared to CT (-fluoroscopy).
Materials and methods: 3D-Fluoroscopy guidance uses a flat panel detector system, capable of rotating around the patient in 4-6 seconds (XperGuide system by Philips Medical Systems). CT reconstruction of the acquired information is used for needle path planning in the 3D data set. Between October 2006 and May 2008 we performed eighty-five needle interventions using 3D-Fluoroscopy. From 81 we recorded the DAP value during and at the end of the procedure. Using PCXMC dosimetry software the effective dose could be measured during these procedures. The effective dose of CT (-fluoroscopy) needle interventions was calculated using the CTDosimetry sheet of impactscan. The procedures were divided into 4 anatomical groups: thorax, abdomen, pelvis, and kidneys.
Results: The effective dose value of 3D-Fluoroscopy was calculated using 2 acquired CT reconstruction summed with the effective dose during fluoroscopy. The CT (-fluoroscopy) dose was calculated of 1,6 times the total group dose summed with an average of 6 fluoroscopy-shots. The effective dose of the real time 3D-fluoroscopy varied between 21.5% - 79.1% that of CT (-fluoroscopy) *(table 1)*. All groups showed significant dose-reduction . The highest reduction was seen in pelvic procedures.

	Real Time 3D fluoroscopy[1]		CT[2]	
	Total	CT reconstruction only	**Total**	CT only
Thorax	**8,75 mSv**	3,9 mSv	**15,12 mSv**	8,7 mSv
Abdomen	**13,6 mSv**	3,9 mSv	**17,2 mSv**	10 mSv
Pelvis	**5,2 mSv**	2,1 mSv	**24,2 mSv**	14 mSv
Kidney	**10,8 mSv**	4,5 mSv	**14,8 mSv**	8,5 mSv

[1]total dose consists of 2 acquired reconstructed CT (planning & control) summed with fluoroscopy
[2]total dose consists of 1,6 times single CT dose summed with 6 fluoroscopy's.

Table 1

Conclusion: There was a very high, significant reduction of the effective radiation dose for the patient using Real Time 3D fluoroscopy instead of CT (-fluoroscopy) guided needle interventions. Collimation of the control CT reconstruction showed the largest decrease in effective dose.

O8.6

VENA PORTAE EMBOLISATIE VOORAFGAAND AAN UITGEBREIDE LEVERRESECTIE TER VERGROTING VAN HET RESTLEVERVOLUME

K.P. van Lienden, J.W. van den Esschert, W. de Graaf, O.M. van Delden, J.S. Laméris, T.M. van Gulik
Academisch Medisch Centrum, Amsterdam

Inleiding: Bij patiënten die een leverresectie moeten ondergaan, maar bij wie de restlever te klein is om te overleven, is het mogelijk om pre-operatief de groei van de restsegmenten te stimuleren middels vena portae embolisatie (VPE).
Doel: Deze studie beschrijft het effect van vena portae embolisatie (VPE) op het volume van de (toekomstige) restlever voor en na partiële leverresectie en beschrijft de klinische uitkomst in ons centrum.
Methode: Patiënten die een leverresectie ondergingen, voorafgegaan door VPE, in de periode van januari 2005 tot augustus 2007 in het Academisch Medisch Centrum Amsterdam werden geëvalueerd. (Toekomstig) restlevervolume werd bepaald door middel van CT volumetrie en uitgedrukt als percentage van het oorspronkelijke totale levervolume. Het gemiddelde percentage (toekomstig) restlevervolume werd berekend vóór en 3 weken na VPE en 3 maanden na leverresectie.
Resultaten: Zeventien patiënten werden geanalyseerd. Het gemiddelde percentage volume van de toekomstige restlever was toegenomen van 29,4±8,5 %SD vóór VPE naar 37,9±9,7 %SD drie weken na VPE. Postoperatieve complicaties waren gallekkage (n=1) en ascites (n=1). Eén patiënt overleed ruim een maand na leverresectie als gevolg van leverfalen. Bij 10 patiënten werd 3 maanden na leverresectie CT volumetrie herhaald. Het gemiddelde volume van de restlever was gestegen naar 82,6±8,2 %SD wat vergelijkbaar is met de toename in patiënten die geen VPE hebben ondergaan voorafgaand aan de leverresectie.
Conclusie: VPE is een effectieve methode om patiënten met irresectabele levertumoren wegens een te kleine restlever, in tweede instantie toch te kunnen opereren. De procedure lijkt de postoperatieve leverregeneratie niet te belemmeren.

O8.7

CLASSIFICATIE VAN IATROGENE GALWEGLETSELS; FACTOREN DIE BIJDRAGEN AAN EEN FOUTIEVE CLASSIFICATIE

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Academisch Medisch Centrum, Amsterdam

Doel: Het identificeren van de factoren die een rol spelen bij een foutieve classificatie van iatrogeen galwegletsel.
Methoden: In de periode 1991 - 2005 werden 470 patiënten (152 (Mannen), 318 (Vrouwen), gemiddelde leeftijd 50.6 range:15.8 - 89.3) met galwegletsel naar ons instituut verwezen. De initiële classificatie van galwegletsels (volgens de Amsterdam en Strassberg Classificatie) bleek in ongeveer 30% te verschillen met een retrospectieve classificatie door twee interventie radiologen in consensus. Er werd een groep met correcte en foutieve classificaties gemaakt, waarna de patiënten- en letselkarakteristieken van de beide groepen werden geanalyseerd door middel van chi2 testen en logistische regressie analyses.
Resultaten: Er werd geen relatie aangetoond tussen de complexiteit van het letsel en het foutief classificeren. Ook voor leeftijd, geslacht, operatietype en operatie-indicatie kon geen relatie worden aangetoond.
Patiënten met een geïsoleerde lekkage uit de cysticusstomp werden geëxcludeerd, omdat dit als een technisch falen werd beschouwd. Hierna bleven er 358 patiënten over met een geldige Amsterdam Classificatie en 281 met een geldige Strassberg Classificatie. Bij patiënten met gallekkage werd er, in beide classificatiemethoden, vaker een foutieve classificatie gezien, bij een transsectie van de galwegen of een letsel in de Common Bile Duct (CBD) worden juist minder foutieve classificaties gevonden.
Conclusie: Bij patiënten met iatrogeen galwegletsel met gallekkage wordt initieel vaker foutief geclassificeerd. Bij een transsectie van de galwegen of een letsel van de CBD worden minder foutieve initiële classificaties gezien.

O8.8

RADIOFREQUENTE ABLATIE VAN COLORECTALE LEVERMETASTASEN. INITIËLE RESULTATEN IN NEDERLAND

M.C. Jansen[1], F. van Duijnhoven[2], J. Huiskens[3], M. Blusse van Oud Alblas[4], A. Rijken[5], W. Prevoo[6], R. van Hillegersberg[4], T.M. van Gulik[3]
[1]Albert Schweizer Ziekenhuis, Dordrecht, [2]Bronovo Ziekenhuis, Den Haag, [3]Academisch Medisch Centrum, Amsterdam, [4]UMC Utrecht, Utrecht, [5]Amphia Ziekenhuis, Breda, [6]Antoni van Leeuwenhoek Ziekenhuis, Amsterdam

Achtergrond: Overzicht van morbiditeit, mortaliteit en overleving, na de introductie van radiofrequente ablatie (RFA) van colorectale levermetastasen in Nederland.
Opzet: Follow-up onderzoek binnen prospectieve database.
Methode: In 8 Nederlandse ziekenhuizen werden 87 patiënten geïncludeerd, waarbij tussen juni 1999 en december 2003 colorectale levermetastasen met RFA werden behandeld. Eindpunten waren morbiditeit en mortaliteit binnen 30 dagen, alsook het lokaal recidiefpercentage.
Resultaten: Middels 104 RFA behandelingen werden in totaal 199 metastasen behandeld. Eenendertig behandelingen werden percutaan en 73 behandelingen werden per laparotomie verricht. Bij 29 behandelingen werd RFA gecombineerd met een partiële leverresectie. De totale postoperatieve morbiditeit was 19% en de RFA-gerelateerde morbiditeit was 14%. Een patiënt overleed na een hemihepatectomie rechts en RFA in het resterende leverparenchym (mortaliteit 1%). De mediane overleving na behandeling met RFA betrof 25 maanden, met een mediane progressievrije overleving van 13 maanden. Het lokaal recidief percentage was 46%. Inmiddels is dit percentage gedaald tot rond de 6%. Diameter en centrale lokalisatie van de metastase waren onafhankelijke risicofactoren voor het ontstaan van een lokaal recidief.
Conclusie: RFA is een alternatief voor patiënten, die niet in aanmerking komen voor partiële leverresectie. Het hoge lokaal recidiefpercentage in deze serie reflecteert de beperkte ervaring met deze techniek tijdens de opstartfase in Nederland. De mogelijkheden van RFA dienen altijd in relatie tot de mogelijkheden van resectie en eventuele (neoadjuvante) chemotherapeutische behandeling te worden afgewogen. RFA wordt daarom bij voorkeur uitgevoerd in een centrum met expertise in de leverchirurgie.

Sessie 9

Neuroradiologie/ Hoofdhals radiologie

Vrijdag 10 oktober 2008, 11.00 - 12.30 uur

O9.1

DIAGNOSTIC ACCURACY OF DWI FOR DISCRIMINATION OF METASTATIC LYMPH NODES IN HEAD AND NECK SQUAMOUS CELL CARCINOMA

M.C. Hoeberigs, B. Kremer, P.J. Nelemans, J. Verwoerd, J.W. Casselman, C. Peutz-Kootstra, R.G.H. Beets-Tan, R.B.J. de Bondt
academisch ziekenhuis Maastricht, Maastricht

Aim: To determine the accuracy of diffusion weighted imaging (DWI) for discriminating malignant from normal cervical lymph nodes in head and neck squamous cell carcinoma (HNSCC).

Methods: A total of 219 lymph nodes (26/219 metastases) in16 consecutive patients with HNSCC were evaluated on MRI (1.5 Tesla). Apparent Diffusion Coefficient (ADC) values were calculated by using two b-values (0 and 1000 s/mm2). Two readers evaluated all lymph nodes for short axial diameter, morphological criteria (borders and heterogeneity on T2-WI) and ADC values. Lymph nodes were matched to the histopathological results based on location and size per neck level. The optimal threshold for ADC value was determined. Univariate and multivariate logistic regression analysis - sensitivities, specificities and diagnostic odds ratio's (DOR) and ROC with Area Under the Curve (AUC) and Confidence Interval (95%CI) - were performed.

Results: With an ADC threshold of 1000 x 10-6 mm2/sec, sensitivity and specificity were 92.3% and 83.9% (DOR=62.7), and NPV 98.7% (162/164). Sensitivity and specificity of border-criteria (61.5% and 98.3%) and T2-heterogeneity (50% and 94.8%) were significantly lower.
The AUC for ADC was 0.90 (95% CI 0.84-0.98) and for size and morphological criteria together 0.91 (95% CI 0.84-0.98). When taking all morphological and ADC together, the AUC was 0.98 (95% CI 0.97-0.99) *(Figure 1).*

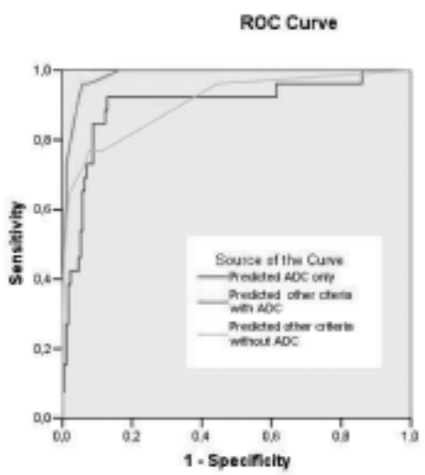


Figure 1: Diagonal segments are produced by ties

Conclusion: DWI alone is comparable to size and morphological criteria together in predicting malignant lymph nodes. The addition of ADC measurements to the conventionel criteria significantly improves the detection of malignant lymph nodes in patient with HNSCC.

O9.2

ADDITIONAL VALUE OF 3D ROTATIONAL ANGIOGRAPHY IN ANGIOGRAM NEGATIVE ANEURYSMAL SUBARACHNOID HEMORRHAGE: HOW NEGATIVE IS NEGATIVE?

W.J.J. van Rooij, G.N. Keeren, J.P. Peluso, M. Sluzewski
St. Elisabeth Ziekenhuis, Tilburg

Background and purpose: In some patients with non-perimesencephalic non-traumatic subarachnoid hemorrhage (aneurysmal SAH) no aneurysm can be found on digital subtraction angiography (DSA) and repeat DSA is advocated. 3D Rotational Angiography (3DRA) is considered superior to DSA in detection of small intracranial aneurysms. In this study, we assess the additional diagnostic value of 3DRA in detecting DSA occult aneurysms in 23 patients with aneurysmal SAH.

Patients and methods: Between January 2006 and September 2007, 298 patients with suspected ruptured intracranial aneurysm were referred for DSA and in 98 patients DSA was negative. Of these 98 patients, 28 had aneurysmal SAH and in 23 additional 3DRA was performed in the same or in a repeat angiographic procedure.

Results: In 18 of 23 patients (78%) a ruptured small aneurysm was diagnosed on additional 3DRA. Location of 18 aneurysms was anterior communicating artery 11, middle cerebral artery 3, posterior communicating artery 2, ophthalmic artery 1 and posterior inferior cerebellar artery 1. Aneurysm size was 3 mm in 4, 2mm in 9 and 1 mm in 5. Of 18 aneurysms, 9 were treated with coil placement, 7 with surgical clipping and 2 were not treated.

Conclusion: In this study, 18 of 23 (78%) patients with a negative DSA were found to have a small ruptured aneurysm when studied with 3D rotational angiography. These were most commonly located on the anterior communicating artery.

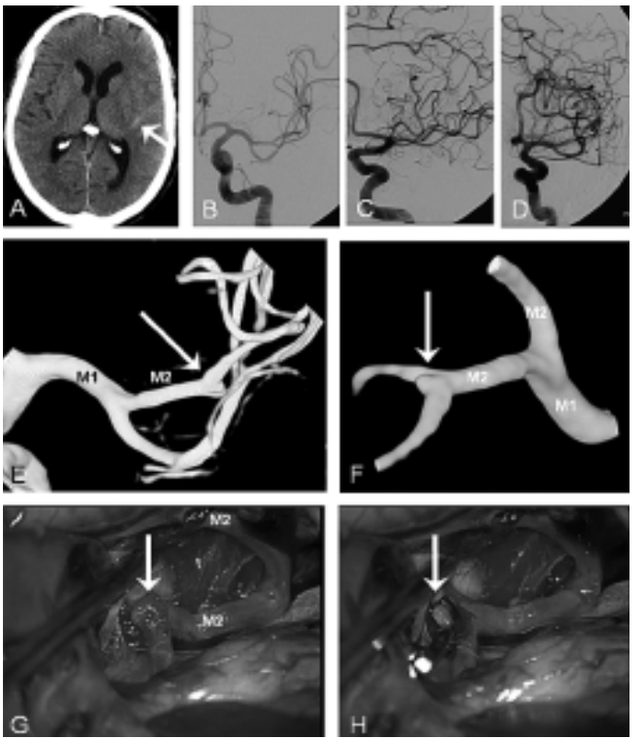


Image 1: Angiogram occult aneurysm detected with 3D

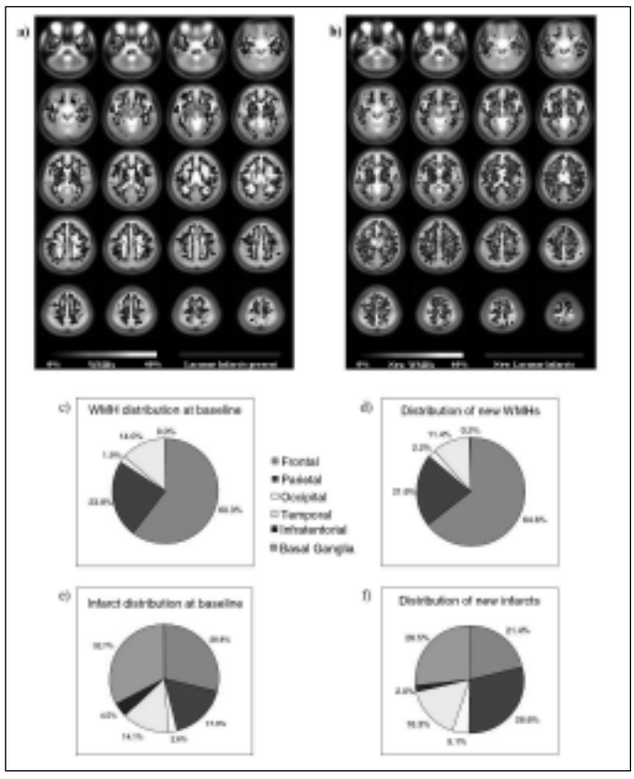


Image 1: Distribution of WMHs & lacunar infarcts in CADASIL

O9.3

PROGRESSION OF MRI ABNORMALITIES IN CADASIL: A PROSPECTIVE 7-YEAR FOLLOW-UP STUDY

M.K. Liem, S.A.J. Lesnik Oberstein, J. Haan, I.L. van der Neut, R. van den Boom, M.D. Ferrari, M.A. van Buchem, J. van der Grond

Leids Universitair Medisch Centrum, Leiden

Purpose: To prospectively investigate the pattern and rate of MRI abnormality progression in a well-documented CADASIL (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy) cohort 7 years after baseline, and to identify prognostic factors that determine the rate and pattern of this progression.

Material and methods: The local ethics committee approved the study and informed consent was obtained from all participants. Twenty-five NOTCH3 mutation carriers and 13 non-mutation carriers from 12 unrelated families were clinically investigated and had standardized MRI examinations at baseline and after 7 years. Progression of white matter hyperintensities, lacunar infarcts, microbleeds and loss of brain volume was measured semi-quantitatively. Correlation testing and group comparison testing were performed to identify risk factors for increased progression of MRI abnormalities.

Results: Mutation carriers showed a significant increase in lesion load of lacunar infarcts ($p < 0.01$), white matter hyperintensities ($p < 0.01$) and number of microbleeds ($p < 0.05$), but no increased loss of brain volume compared to non-mutation carriers. The distribution of new WMHs and lacunar infarcts was similar to that of WMHs and lacunar infarcts at baseline. High lesion loads of WMHs ($p < 0.05$), lacunar infarcts ($p < 0.01$) and microbleeds ($p < 0.01$) at baseline, but not cardiovascular risk factors, were associated with faster progression of these lesions.

Conclusion: CADASIL patients with a high MRI lesion load at baseline are at risk for faster progression of MRI abnormalities.

O9.4

SUBTRACTION MR IMAGES IN A MULTIPLE SCLEROSIS MULTI-CENTER CLINICAL TRIAL SETTING

B. Moraal[1], D.S. Meier[2], P.A. Poppe[1], J.J.G. Geurts[1], H. Vrenken[1], W.M.A. Jonker[1], D.L. Knol[1], R.A. van Schijndel[1], P.J.W. Pouwels[1], C. Pohl[3], L. Bauer[3], R. Sandbrink[3], C.R.G. Guttmann[2], F. Barkhof[1]

[1]VU Medisch Centrum, Amsterdam, [2]Center for Neurological Imaging, Brigham and Women's Hospital, Boston, USA, [3]Bayer Schering Pharma AG, Berlijn, Duitsland

Purpose: To explore the applicability of subtraction images to detect active T2 lesions, 2) to directly quantify lesion load change, 3) to assess the ability to detect treatment effects (distinguish treatment arms) in a placebo-controlled, multi-center, trial setting, comparing the subtraction scheme with a conventional pair-wise comparison of non-registered images.

Materials and methods: 46 pairs of scans, from 40 patients (31 women, mean age 31.9 years) from a multi-center, clinical trial (BENEFIT study), were used. The study protocol of the clinical trial was approved by local ethics review boards, and all subjects gave written informed consent. Active lesions were scored by two independent raters after which lesion load measurements were conducted. Lesion counts were evaluated using Wilcoxon signed ranks tests, interrater agreement was evaluated using the intraclass correlation coefficient (ICC) and treatment effect was evaluated using Mann-Whitney U tests.

Results: In general, both raters identified more active lesions with greater interobserver agreement when using subtraction images. Specifically, a 1.7-fold increase in the detection of positive active lesions was observed, compared to native image pairs, combined with a significantly higher ICC (0.98 vs. 0.91, $p<0.001$). Subtraction images also allowed direct quantification of positive disease activity, a measure that provided sufficient power to distinguish

treatment arms (p=0.012), compared to the standard measurement of total lesion load change on native images (p=0.455).

Conclusion: Subtraction images demonstrated increased sensitivity and greater interobserver agreement in the detection of active lesions and measurement of total lesion load change, combined with increased power to distinguish treatment arms.

O9.5

COMPARISON OF HIPPOCAMPAL AND WHOLE BRAIN VOLUME MEASUREMENTS ON MRI AS DIAGNOSTIC AND PROGNOSTIC MARKERS IN ALZHEIMER'S DISEASE

W.J.P. Henneman[1], J.D. Sluimer[1], H. Vrenken[1], J. Barnes[2], W.M. van der Flier[1], N.C. Fox[2], P. Scheltens[1], F. Barkhof[1]

[1]VU Medisch Centrum, Amsterdam, [2]Dementia Research Center, University College London, Londen, Groot-Brittannië

Purpose: To compare cross-sectional and longitudinal measurements of hippocampal and whole brain volume on MRI as diagnostic and prognostic markers in patients with Alzheimer's disease (AD), mild cognitive impairment (MCI) and controls.

Methods: Two 3DT1-weighted MRI sequences (voxel size 1x1x1.5mm.; mean scaninterval 1.8±0.7 yrs) were acquired from 65 AD patients, 43 MCI patients and 35 controls, using a 1.0 T scanner. Measurements consisted of manual delineation and regional non-linear fluid registration of hippocampus, and calculation of whole brain volume and atrophy rate using automated segmentation and registration tools (SIENA(X)). Differences between groups were assessed using ANOVA. The risk of progression to AD among non-demented subjects was calculated with Cox proportional hazard models.

Results: All MRI measures differed between diagnostic groups (p<0.005). Effect sizes, determined using standardized response means (SRM), were larger for hippocampal than whole brain measures when comparing controls and MCI, and both longitudinal measures had larger SRMs than baseline volumes. Comparing MCI and AD, SRMs of whole brain were larger than those of hippocampus. Baseline hippocampal volume (HR (95%CI): 3.9(1.2-13.0) and atrophy rates of hippocampus (12.0(2.7-53.8)) and whole brain (3.1(1.1-8.7)) predicted progression to AD in non-demented subjects, whereas baseline brain volume did not. Entering all measures simultaneously, only hippocampal atrophy rate remained a significant predictor.

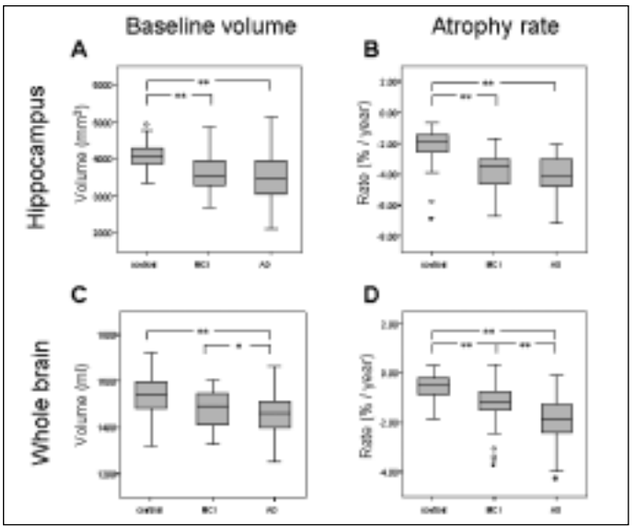


Figure 1: Mean baseline volumes and atrophy rates per group

	Controls vs. MCI	MCI vs. AD
hippocampus BL volume	3.3	1.8
hippocampus atrophy rate	5.1	1.4
brain BL volume	2.4	2.5
brain atrophy rate	3.9	3.5

Table 1: Effect size of MRI measures (standardized response mean)

Conclusions: Longitudinal markers are more sensitive than cross-sectional ones. Hippocampal measurements are more sensitive diagnostic markers in an early disease stage (MCI), whole brain measures in a later stage. Hippocampal atrophy rate is the strongest predictor of progression to AD in non-demented subjects.

O9.6

CEREBRAL VASOREACTIVITY IS THE MAIN DETERMINANT OF WHITE MATTER HYPERINTENSITY PROGRESSION IN CADASIL

M.K. Liem, S.A.J. Lesnik Oberstein, J. Haan, R. van den Boom, M.D. Ferrari, M.A. van Buchem, J. van der Grond

Leids Universitair Medisch Centrum, Leiden

Purpose: Basal total cerebral blood flow (TCBF) and cerebral vasoreactivity (CVR) are assumed to play an important role in the pathophysiology of small vessel disease. Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is a unique monogenetic model to study the pathophysiology of arterial small vessel disease. The aim of this study is to investigate the role of TCBF and CVR in the progression of MRI abnormalities in CADASIL.

Method and materials: Twenty-five NOTCH3 mutation carriers and 13 controls were examined using a uniform MRI protocol on the same 1.5T MR system at baseline and after 7 years. Increase of lacunar infarcts, white matter hyperintensities (WMHs) and microbleeds was measured. Basal TCBF (n=25) and CVR (n=14) were measured with a gradient-echo phase-contrast technique before and after administration of intravenous acetazolamide.

Results: At baseline, mutation carriers had significantly lower TCBF values (p=0.003) than controls, whereas CVR was identical between the two groups. Low TCBF was not associated with faster progression of MRI abnormalities. However, patients with low CVR values demonstrated a significantly larger increase in WMH volume than patients with high CVR values (p < 0.001). CVR was not associated with progression of either lacunar infarcts or microbleeds.

Conclusion: This study provides support that impaired CVR is an important predictor of development of WMHs in CADASIL. This finding may also hold true for WMHs in sporadic small vessel disease. Longitudinal studies in the general population should be performed to test this suggestion.

O9.7

PERFUSION TERRITORY IMAGING IN ACUTE STROKE

P.J. van Laar[1], A.M. Tiehuis[2], W.P.Th.M. Mali[2], J. Hendrikse[2]

[1]Meander MC, Amersfoort, [2]UMC Utrecht, Utrecht

Background and purpose: In acute stroke the delineation of individual perfusion territories of cerebral arteries may demonstrate the collateral contribution to the ischaemic penumbra. Recently, arterial spin labeling (ASL) MRI has been introduced as the first non-invasive method to visualize the perfusion territories of the individual cerebral arteries. The aim of the present

study was to prospectively investigate the contribution of cerebral arteries to the ischaemic penumbra in patients with acute stroke.

Methods: Ten consecutive patients (7 men and 3 women, mean age 58 ± 16 years) with acute ischemic stroke were included. The control group consisted of fifteen healthy subjects (10 men and 5 women, mean age 58 ± 16 years) matched for aged and sex. Perfusion territory imaging of the ipsilateral common carotid artery (CCA), contralateral CCA and basilar artery was achieved with selective ASL MRI (3.0 T). Differences in regional cerebral blood flow (rCBF) were analyzed with Student's t-test.

Results: Perfusion territory maps of patients with acute stroke showed a relatively large variation in perfusion territories. The rCBF in the ipsilateral hemisphere (57 ± 9 ml/min/100gr) was significantly lower than in the contralateral hemisphere (78 ± 9 ml/min/100gr; P <.05) and in control subjects (75 ± 11 ml/min/100gr; P <.05).

Conclusion: Patients with acute stroke have a large variation in contribution of individual cerebral arteries to the ischaemic penumbra. Selective ASL MRI may be used in acute stroke to demonstrate the sources of collateral blood supply and might guide stroke therapy targeted to these collateral arteries.

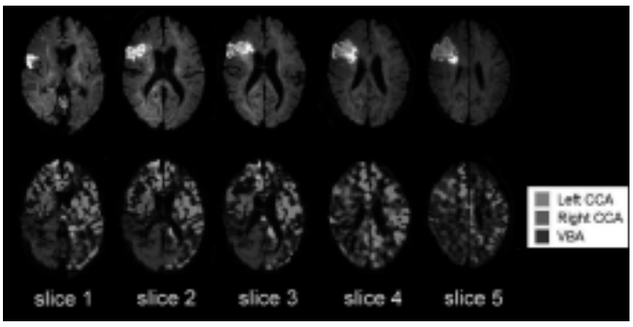


Image 1: DWI and ASL MRI in a patient with acute stroke

09.8

DIAGNOSTIEK BIJ VERDENKING MYELUM ISCHAEMIE: TYPISCH VERLOOP IN DE TIJD

K.E. Droogh - de Greve, G.J. Lycklama a Nijeholt, B.F.W. van der Kallen, J. Boiten

MC Haaglanden, locatie Westeinde, Den Haag

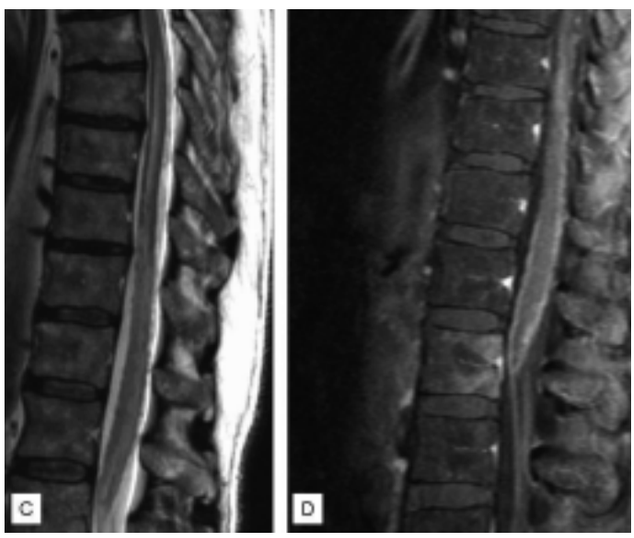
Inleiding: Bij verdenking acute myelopathie is MRI het onderzoek van eerste keuze. Met deze serie willen wij aantonen dat MRI afwijkingen bij acute myelum ischaemie een typisch verloop hebben.

Patiënten: In de periode januari 2005 t/m april 2008 werden 7 patiënten gezien (2 mannen, 5 vrouwen, leeftijd 31 tot 84 jaar), met acute myelum ischaemie. Op dag 1 na het ontstaan van de klachten werd (indien mogelijk) een MRI verricht. Indien er op dag 1 geen afwijkingen te zien waren werd op dag 2 de MRI herhaald. Vervolgens werd bij verdenking myelum ischaemie enkele dagen later weer een MRI verricht. Er werden sagittale en axiale T1 en T2 gewogen opnames gemaakt, alsmede opnames na iv gadolinium.

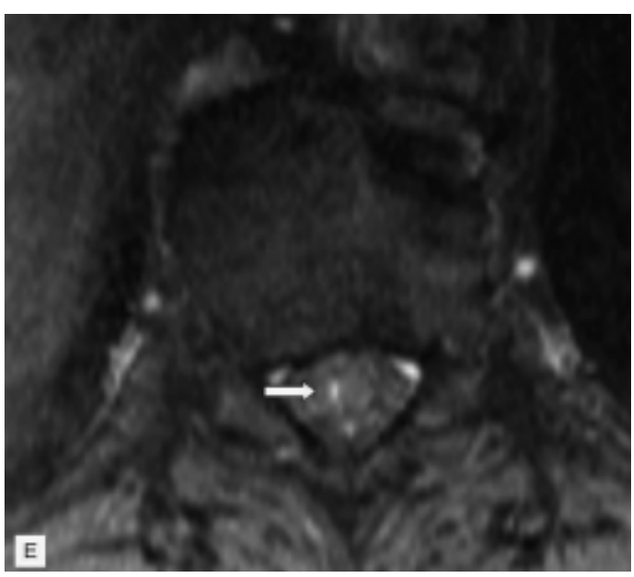
Resultaten: Bij alle patiënten werd op dag 1 of 2 een MRI verricht. De MRI's op dag 1 lieten geen afwijkingen zien. Bij MRI's op dag 2 werd steeds een verhoogd signaal gezien op de T2 gewogen opnames, met wat zwelling. Er was op deze MRI's nog geen aankleuring na iv contrast te zien. Na enkele dagen (>3) werd steeds aankleuring gezien van met name de grijze stof doch ook van de leptomeningen. Bij 1 patiënt was sprake van onderliggende vertebralis dissectie; bij 2 patiënten was sprake van ernstig atherosclerotisch lijden van de aorta terwijl bij de overige patiënten geen duidelijke oorzaak werd gevonden.

Conclusie: Bij acute myelum ischaemie bestaat een typisch verloop van MRI afwijkingen. Met name het ontbreken van afwijkingen op dag 1 ondersteunt de diagnose ischemie.

Afbeelding 1: Dag 2, alleen geringe zwelling op T2



Afbeelding 2: Dag 7, aankleuring en zwelling conus



Afbeelding 3: Aankleuring van centrale grijze stof

Sessie 10

Mammadiagnostiek/ Skeletradiologie

Vrijdag 10 oktober 2008, 11.00 - 12.30 uur

O10.1

COMPUTER-AIDED DETECTION (CAD) FOR BREAST MRI: EVALUATION OF EFFICACY AT 3.0T

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[1]Ziekenhuis Rijnstate, Arnhem, [2]Lucas MRI Center, Stanford, USA, [3]UMC Utrecht, Utrecht

Purpose: MRI of the breast is a promising diagnostic modality with a high sensitivity for breast cancer. The main drawback is its relatively low specificity. To address this limitation, computer-aided detection (CAD) systems have been developed that automate processing and kinetic analysis tasks usually performed manually by MRI technologists and radiologists. Automation may improve consistency and detection rate, but also provides new analysis methods, such as kinetic curve-thresholding, not available with manual interpretation. This study was performed to compare the consistency and accuracy of breast MRI interpretation, with manual and fully automated kinetic analysis.

Method and materials: Sixty five consecutive patients with 71 biopsy- or surgically-proven lesions were included. Initial MR interpretation was done on an Advantage Workstation (Philips Viewforum), which allows manual assessment of enhancement kinetics. Retrospectively, all MRI examinations were processed by CADstream (Confirma), a commercially available CADsystem. CADstream data were interpreted by two experienced breast radiologists and two residents, which were blinded to the pathology reports. Each lesion automated analysis of kinetic enhancement was evaluated separately at 50% and 100% thresholds.

Results: Forty nine malignant and 22 benign lesions were evaluated. The initial interpretation on the advantage workstation showed a sensitivity of 93,6% and a specificity of 81,8%. Using threshold-enhancement alone, the sensitivity and specificity of CAD were 97,9% and 86,4% at 50% threshold and 97,9% and 90% at 100% threshold.

Conclusion: For 3.0T breast MRI, the use of a CAD system significantly improved the sensitivity and specificity of interpretation compared with manual analysis of enhancement kinetics.

O10.2

DELAYED DIAGNOSIS OF BREAST CANCER IN WOMEN RECALLED FOR SUSPICIOUS SCREENING MAMMOGRAPHY

L.E.M. Duijm[1], J.H. Groenewoud[2], H.J. de Koning[3], J.W. Coebergh[3], M.J.H.H. Hooijen[4], L.V. van de Poll-Franse[5]

[1]Catharina-ziekenhuis, Eindhoven, [2]University of Applied Sciences, Rotterdam, [3]Erasmus MC, Rotterdam, [4]St Anna Hospital, Geldrop, [5]Comprehensive Cancer Center South (IKZ)/Eindhoven Cancer Registry, Eindhoven

Purpose: To prospectively determine frequency, pathology and causes of false negative assessment (FNA) in women recalled for suspicious screening mammography.

Patients and methods: We included all 290943 women who underwent biennial screening mammography in the southern region of the Netherlands between January 1, 1995 and January 1, 2006. Radiologic, pathologic and surgical data were collected of all 3513 recalled women, with a minimum of 2-year follow-up. Tumor stages of false negatively assessed breast cancers, defined as cancers diagnosed more than 3 months following recall, were compared with those of cancers diagnosed within 3 months following recall and with interval cancers.

Results: FNA occurred in 6.5% (97/1503) of all screen-detected cancers. FNA cases comprised more ductal cancers in situ (26.8%) than did cancers diagnosed <3 months after recall (15.5%, p=0.004) or interval cancers (3.7%, p<0.001). Invasive FNA cancers were smaller than interval cancers (T1a-c, 87.3% vs. 46.4%; p<0.001) and less often showed axillary lymph node metastases (22.5% vs 48.2%; p<0.001). FNA percentages significantly varied between hospitals that had evaluated at least 500 recalled women each (range: 5.0% (20/401 cancers) to 9.1% (29/320 cancers; p=0.03). Improper classification of cancers at diagnostic mammography was the major determinant of FNA in these hospitals and comprised 64.4% of false negative assessments.

Conclusion: A considerable number of recalled women experience a false negative assessment, with significant performance variations between hospitals. Although tumor stages of FNA cases are more favourable than those of cancers without diagnostic delay or interval cancers, FNA may negatively affect long-term outcome.

O10.3

SONOGRAPHIC FEATURES IN DETERMINING THE PRESENCE OF MALIGNANCY IN WOMEN WITH SOLID BREAST MASSES. SYSTEMATIC REVIEW AND META-ANALYSIS

L.J. Schijf[1], S.M.W.Y. van de Ven[1], W.P.Th.M. Mali[1], S.G. Elias[2]

[1]UMC Utrecht, Utrecht, [2]Julius Center, Utrecht

Background: In 2003, the BI-RADS sonographic lexicon was developed for standardized reporting and interpretation of breast ultrasound findings.

Purpose: To identify the value of individual sonographic BI-RADS features in distinguishing malignant from benign solid breast masses.

Materials and methods: A structured PUBMED/MEDLINE and EMBASE

search was performed for papers on sonographic BI-RADS features in women with benign or malignant solid breast masses as ascertained after histology or cytology. After data extraction into contingency tables, areas under the summary receiver operating characteristic curve (sAUC) for the sonographic features were estimated, using random-effect meta-analysis models. Features with a sAUC > 0.70 were defined as a good diagnostic performance, a sAUC ⩾ 0.85 as excellent and a poor diagnostic performance was considered with a sAUC ⩽ 0.65.

Results: Of 151 relevant articles, 22 articles met our inclusion criteria. The ranges of the sAUC and percentages poor/excellent diagnostic performances (brackets) of 26 individual features within each of the 8 BI-RADS categories were: shape: 0.54-0.85 (25%,25%), orientation: 0.63-0.67 (50%,0%), margin: 0.60-0.94 (16.6%,66.6%), boundary: 0.74-0.74 (0%,0%), pattern: 0.65-0.75 (25%,0%) texture: 0.78-0.80 (0%,0%), posterior features: 0.56-0.76 (25%,0%). Presence of calcifications showed a sAUC of 0.76. An excellent performance was seen for irregular shape and (non)circumscribed, angular or spiculated margin. Poor diagnostic performance was seen for round shape, parallel orientation, indistinct margin, anechoic areas and no posterior enhancement.

Conclusion: Our study showed that several individual sonographic BI-RADS features are useful to distinguish malignant from benign solid breast masses, but not all.

O10.4

DIAGNOSTISCHE OPBRENGST BIJ SIM-CT ONDERZOEKEN T.B.V. RADIOTHERAPIE VAN DE MAMMA

C.F.M. Klok, E.G. Coerkamp, R.A. Nout
MC Haaglanden, locatie Westeinde, Den Haag

Inleiding: In weinig klinieken worden planning-CT onderzoeken t.b.v. radiotherapie routinematig beoordeeld door een radioloog. De indruk bestaat dat er bij de work-up van mammacarcinoom relevante toevalsbevindingen worden aangetroffen, welke kunnen leiden tot beleidswijzingen.

Doel van de studie: Te onderzoeken in welk percentage er relevante dan wel irrelevante bevindingen bij planning-CT worden gevonden en hoe vaak dit tot beleidwijzigingen heeft geleid.

Methode: Hiervoor zijn retrospectief over een periode vanaf februari 2006 tot en met februari 2008 alle door de radioloog gemaakte verslagen van de planning-CT onderzoeken t.b.v. radiotherapie van de mamma beoordeeld en waar nodig is het gehele CT-onderzoek herbeoordeeld.

Resultaten: Dit heeft geresulteerd in 420 onderzoeken. Hiervan betrof 0.2% gelimiteerd onderzoek (categorie 0), 5.5% geen afwijkende bevindingen (categorie 1), 72.6% irrelevante bevindingen (categorie 2), 9.8% waarschijnlijk irrelevante bevindingen (categorie 3), 8.8% potentieel relevante bevindingen (categorie 4) en 3.1% reeds bekende metastasen dan wel nieuwe metastatische localisaties van reeds bekend gemetastaseerde tumoren (categorie 5). In categorie 2 en 3 heeft dit bij 3.1% van het totaal aantal onderzoeken geleid tot extra onderzoek. In categorie 4 bleek het in het merendeel van de gevallen maligne aandoeningen te betreffen, wat geleid heeft tot beleidswijzingen bij 3.3% van het totaal aantal onderzoeken.

Conclusies: Routinematig diagnostisch beoordelen en verslaan door de radioloog van planning-CT onderzoek t.b.v. radiotherapie van de mamma is zinvol, om onderscheid te maken tussen klinisch irrelevante, waarschijnlijk irrelevante en potentieel relevante toevalsbevindingen, welke kunnen leiden tot therapiewijzigingen.

O10.5

VALIDATION OF A MODEL FOR BENEFIT/RISK ASSESSMENT OF BREAST CANCER SCREENING AMONG BRCA1/2 CARRIERS AND WOMEN WITH A FAMILY HISTORY OF BREAST CANCER (BRCAU)

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UMC Groningen, Groningen

Background: Increased tumor induction sensitivity is expected in young Women at Increased Risk of Breast Cancer (WIRBC). MRI-screening protocols are often used at younger ages, a combination of MRI and mammography at increasing age. Validation of a Simulation Model on Radiation Risk and breast cancer Screening is presented using published data on WIRBC. The purpose is to simulate benefit/risk-ratios of the screening techniques.

Materials and methods: A screening model was developed using simulated populations of WIRBC. The model parameters (tumor induction model, sensitivity and specificity parameters, life-time-risk curves, preclinical tumor grow models, dose) were derived from published estimates of population incidence and relative risks. The model was validated by comparing the outcome data with three published cohorts (Cortesi,2006; Kriege,2004; Maribs,2005). Confidence Intervals were estimated using sensitivity analyses of the model parameters.

Results: The model predicts 2.3(1.4-3.4) and 36(18-54) tumors for the Cortesi-cohort, 10.1(6.2-11.9) and 26(13-39) for the Kriege-cohort for BRCA1/2 combined and BRCAu, respectively, and 2.8(1.7-3.3), 1.0(0.5-1.4) and 11.2(5.6-16.8) for the Maribs-cohort for BRCA1, BRCA2 and BRCAu, respectively.
In the published cohorts 5(0.9-9.2) and 34(22-44) tumors were observed for the Cortesi-cohort, 23(14-32) and 27(15-34) for the Kriege-cohort for BRCA1/2 combined and BRCAu, respectively, and 13(7-20), 7(2-12) and 15(8-23) for the Maribs-cohort for BRCA1, BRCA2 and BRCAu, respectively. Except for the Kriege and Maribs BRCA1/2 carriers, no significant differences between the outcome of the model and the published data were observed.

Conclusion: Our model is suitable to provide accurate benefit/risk-ratios and useful for refinement of screening guidelines for WIRBC.

GENOMINEERD

Radiologendagen Prijs 2008

O10.6

IS A SINGLE MR ARTHROGRAPHY SERIES IN ABER POSITION AS ACCURATE IN DETECTING LABROLIGAMENTOUS LESIONS AS CONVENTIONAL MR ARTHROGRAPHY?

S.A. Schreinemachers[1], V.P.M. van der Hulst[1], W.J. Willems[1], S. Bipat[2], H.J. van der Woude[1]
[1]Onze Lieve Vrouwe Gasthuis, Amsterdam, [2]Academisch Medisch Centrum, Amsterdam

Purpose: To retrospectively compare accuracy of single MR Arthrography series in Abduction External Rotation (ABER) with conventional MR Arthrography for the detection of anterior labroligamentous lesions, with arthroscopy as reference standard. In addition, interobserver variability of both protocols was determined.

Materials and methods: 250 MR Arthrograms, including oblique axial fat

suppressed T1-weighted images in ABER position and conventional orthogonal imaging directions in neutral position (SET), were retrospectively and independently evaluated by three reviewers. Reviewers were blinded to clinical information and, if any, the arthroscopic results. Labroligamentous lesions were registered as absent or present in both ABER and SET. Lesions were subclassified (Bankart, Perthes, ALPSA or lesions not otherwise specified (NOS)). Interobserver agreement was assessed by kappa statistics for all 250 patients. 92 of 250 patients underwent arthroscopy. Sensitivity, specificity and accuracy of ABER versus SET were calculated and compared using the paired McNemar test.

Results: Kappa-values of the ABER and SET ranged from 0.44-0.56 and from 0.44-0.62 respectively. According to arthroscopy 45 of 92 patients had an intact labrum and in 44 patients a labroligamentous lesion (eight Bankart, seven Perthes, 29 ALPSA and 3 lesions NOS) was diagnosed. There were no statistically significant differences between ABER and SET regarding sensitivity (83%-91% and 88%-98%, respectively), specificity (82%-95% and 84%-91%) and overall accuracy (52%- 63% and 55%-69%).

Conclusion: The results of a single MR Arthrography series in ABER position are comparable with those of conventional MR Arthrography and therefore ABER can effectively replace conventional MR Arthrography for assessment of labroligamentous lesions.

DETECTION OF (PARTIAL) ROTATOR CUFF TEARS: CAN A SINGLE MR ARTHROGRAPHY SERIES IN ABER POSITION REPLACE CONVENTIONAL MR ARTHROGRAPHY?

S.A. Schreinemachers[1], V.P.M. van der Hulst[1], W.J. Willems[1], S. Bipat[2], H.J. van der Woude[1]

[1]Onze Lieve Vrouwe Gasthuis, Amsterdam, [2]Academisch Medisch Centrum, Amsterdam

Purpose: To retrospectively assess sensitivity and specificity of single MR Arthrography series in abduction-exorotation (ABER) position compared with conventional MR Arthrography for detection of (partial) supraspinatus tendon tears, with arthroscopy as gold standard, and to assess interobserver variability for both protocols.

Patients and methods: 250 MR Arthrograms were retrospectively and independently evaluated by three observers. Oblique coronal proton-density and T2-weighted images, axial T1-weighted gradient echo and oblique coronal and sagittal T1-weighted fat-suppressed images (SET) were analyzed to detect cuff lesions. Separately, single T1-weighted fat-suppressed oblique axial series in ABER position was evaluated. Both protocols were scored randomly without knowledge of clinical information and arthroscopy results, if present. Supraspinatus tendons tears were scored as type I, II or III based on articular surface integrity and extension (LEE classification). Interobserver agreement was assessed by kappa statistics for all 250 patients. 92 of 250 patients underwent arthroscopy. Sensitivity and specificity of ABER and SET were calculated and compared using the paired McNemar test.

Results: Weighted kappa values ranged from 0.48-0.65 (ABER) and 0.60-0.67 (SET). According to arthroscopy 69 of 92 patients had an intact cuff and in 23 patients a cuff tear (16 partial-thickness, 7 full-thickness) was diagnosed. There were no statistically significant differences between ABER and SET regarding sensitivity (58-62% and 52-70%, respectively) and specificity (83-96% and 91-95%).

Conclusion: Sensitivity and specificity values of a single series in ABER position are comparable with conventional MR Arthrography and therefore ABER can effectively replace conventional MR Arthrography for assessment of (partial) rotator cuff tears.

O10.7

PER-PIXEL SIGNAALINTENSITEITSCURVE-ANALYSE IN VROEGE ARTRITIS PATIËNTEN

C. van der Leij, C. Lavini, M.G.H. van de Sande, C.A. Wijbrandts, W. van Lieshout, P.P. Tak, M. Maas

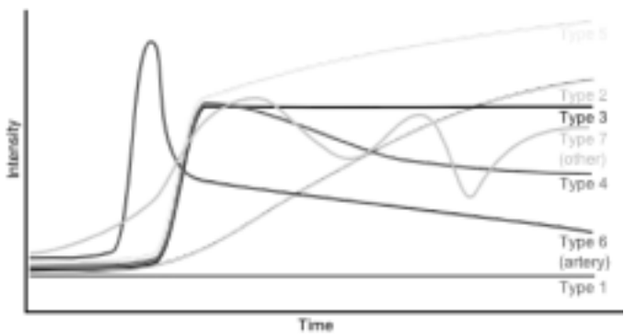
Academisch Medisch Centrum, Amsterdam

Doel: Het aantonen van verschillen in distributie van typen signaalintensiteits-curven (TIC) in vroege artritispatiënten na 2 jaar gediagnosticeerd als RA en non-RA.

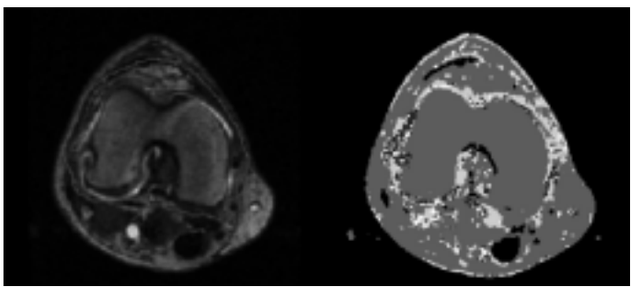
Materiaal en methoden: Van 44 vroege artritis patiënten (ziekteduur <1 jaar, leeftijd 51 (20-70), 28 vrouwelijk) werd een dynamische contrastverrijkte MRI van de aangedane knie (29) of enkel verricht. Het MRI protocol bestond uit 20 opeenvolgende scans van 20 slices (1.5 T, GRE, TR/TE/flip 8.1/3.5/30, temporele resolutie 21 seconden). 2-dimensionale TIC-distributiepatronen van de 7 vooraf gedefinieerde typen curven werden gecreëerd. Relatief aandeel aan voxels per type curve werd berekend in een driedimensionale ROI. Hiernaast werden medicatie en ziekteactiviteitsparameters (68 tender en swollen joint count (TJC en SJC), ochtendstijfheid, BSE en CRP) verzameld. Na 2 jaar follow-up werd de definitieve diagnose gesteld volgens de criteria (ACR).

Resultaten: Na twee jaar werden 13 patiënten gediagnosticeerd als RA. Een significant hoger relatief aandeel van alleen type 4 curven werd gezien in de RA patiëntengroep (MW-U: 7.9 vs 13.5 %, p=0.005). Een significante correlatie werd gezien tussen type 4 curve en BSE (Spearman, r=0.303, p=0.046), CRP (r=0.343, p=0.022) en SJC (r=0.316 p=0.037) in de totale patiëntengroep en tussen type 4 en TJC (r=0.621, p=0.024) in de groep patiënten na 2 jaar geclassificeerd als RA.

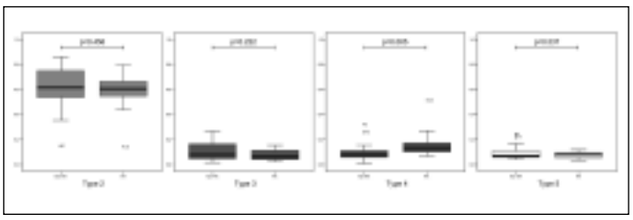
Conclusie: een groter relatief aandeel type 4 signaalintensiteitcurven wordt gezien in vroege artritispatiënten die na 2 jaar gediagnosticeerd werden als RA. TIC-analyse kan in de toekomst mogelijk worden gebruikt bij het voorspellen van RA in vroege artritispatiënten.



Figuur 1: 7 verschillende typen signaalintensiteitscurven



Afbeelding 1: T1-w opname met ROI en TIC-map van 1 (RA) patiënt



Figuur 2: Rel. aandeel type 2-5 TIC bij RA en non-RA pat.

O10.8

MR DIFFUSIE TENSOR IMAGING EN FIBERTRACKING IN DE ONDERARM: EERSTE ERVARINGEN

J. Oudeman[1], M. Froeling[2], A.J. Nederveen[1], S. van den Berg[1], M. Maas[1], M. Drost[3], M. Smeulders[1], M. Kreulen[1]

[1]Academisch Medisch Centrum, Amsterdam, [2]TU Eindhoven, Eindhoven
[3]Universiteit van Maastricht, Maastricht

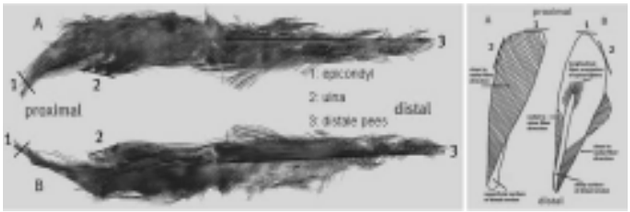
Introductie: Non-invasieve spier evaluatie is niet goed mogelijk met behulp van imaging. Echter vanuit klinisch perspectief is het verkrijgen van morfologische en functionele informatie noodzakelijk. Diffusie tensor MRI lijkt hierbij potentie te hebben.

Doel van dit onderzoek: Het aantonen van de haalbaarheid van fibertracking in spieren van de onderarm gebruikmakend van een standaard klinische DTI sequentie.

Methoden: De rechteronderarm wordt gemeten gebruikmakend van 2 oppervlakte spoelen in een 3T MRI scanner (Philips Intera). Het gebruikte MRI-protocol bevat een T1-gewogen TSE sequentie en een diffusiegewogen EPI-sequentie. De gebruikte sequentie parameters voor de T1-gewogen scan zijn: FOV 200x200 mm2, matrix size 400x400, plakdikte 6 mm, 50 plakken, TR 550 ms, TE 12 ms en voor de diffusie gewogen scan: matrix size: 79x79, 16 gradiënt richtingen, TR 8 s, TE 48 ms, number of averages 2, b=400 s/mm2 (FOV, aantal plakken, plakdikte identiek aan T1-gewogen scan). De gewenste spier wordt geïsoleerd door een ROI aan te geven in de T1-gewogen beelden. Reconstructie van spiervezels binnen deze ROI vindt vervolgens plaats gebruikmakend van een fibertrack algoritme.

Resultaten: Anatomische correcte reconstructie van de spiervezels van de Musculus Flexor Carpi Ulnaris is goed mogelijk gebleken.

Conclusie: Aangetoond is dat DTI in de toekomst gebruikt kan worden als hulpmiddel bij het bestuderen van spier morfologie en functionele parameters. Voor zover bekend is DTI de enige techniek waarmee een spier in zijn geheel non-invasief geanalyseerd kan worden.



Afbeelding 1: FCU aanzicht; A lateraal , B mediaal

O10.9

MR GUIDED NEEDLE POSITIONING AND GADOLINIUM INJECTION FOR SCHOULDER ARTHROGRAPHY WITHIN AN OPEN 1 TESLA MRI SCANNER AND A POSTERIOR APPROACH

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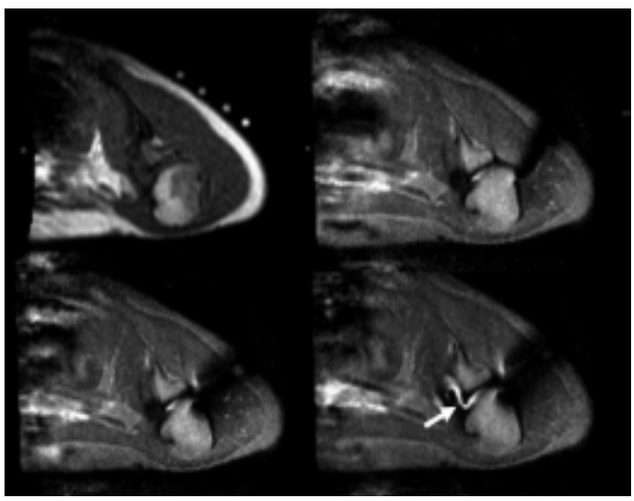
Background and purpose: Because of the anatomical detail MR imaging holds great promise for musculoskeletal interventions. As a first step MR imaging may be used to guide diagnostic musculoskeletal procedures. In the present study we examine the feasibility of a MR guided gadolinium contrast injection protocol in the shoulder joint prior to MR arthrography of the shoulder.

Materials and methods: Forty-two MR guided procedures were performed on an open 1.0 Tesla Philips MR scanner. For the MR guided injection with a posterior approach patients were placed in a prone position. A grid with 16 markers was attached to the shoulder and a 20 slice FFE survey was made. Needle position was evaluated with a 10 slice PD-STIR and a 5 slice T1-TSE sequence. Small test injections of water or gadolinium were used to check the inta-articulair needle position.

Results: Gadolinium contrast within the shoulder joint and shoulder joint distension was maximal in 38 of the patients (90%), intermediate in 3 of the patients (7%) and in 1 patient (2%) there was no contrast present in the shoulder joint.The mean time for the MR guided needle positioning and gadolinium injection was 12 minutes and 51 seconds (SD; 4 minutes and 47 seconds). The mean number of needle positioning and repositioning times per patient was 4.9 ± 2.2 (mean, SD).

Conclusion: We show that MR guided needle positioning for MR arthrography is feasible with a high success rate. In the future MR guiding may especially be useful for musculoskeletal interventions.



Afbeelding 1: MR guided shoulder arthrography

Samenvattingen Posterpresentaties

P01

BEZOAR

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Doel: Bezoar, een in het maagdarmstelsel geaccumuleerde massa van onverteerd vreemd materiaal, vormt een zeldzame oorzaak van intestinale obstructie. Doel is aandacht vestigen op de mogelijkheid van deze diagnose bij radiologisch onderzoek, middels drie casus.
Methoden / beschrijving casus: Drie patiënten presenteerden zich op de SEH. Patiënt 1 (34 jr.) met blanco voorgeschiedenis, misselijkheid, braken, 1 week geen defecatie gehad. Patiënt 2 (40 jr.) voorgeschiedenis azijnzuurintoxicatie, nu hevige epigastrische pijn. Patiënt 3 (51 jr.), voorgeschiedenis maagoperatie, braken sinds 1 week, sinds 5 dagen geen ontlasting. Klinisch bij allen geen verdenking bezoar. Diagnostiek bij patiënt 1 middels buikoverzichtsopname en echografie, patiënt 2 en 3 echografie en CT.
Bij echografie bij drie patiënten beeld van dunnedarmileus met bij de kalibersprong een massa met vrij harde slagschaduw. CT toont intraluminale massa met luchtconfiguraties, loszittend van de darmwand. Beeld passend bij darmobstructie op basis van bezoar. Patiënt 2 en 3 tonen zelfs multipele massa's.
Alle drie patiënten bleken veel sharonvruchten te hebben gegeten voorafgaande aan de klachten.
Conclusie: Het is belangrijk om de diagnose dunnedarmobstructie op basis van bezoar radiologisch te stellen in combinatie met de anamnese van overmatige consumptie van vezelrijke vruchten in combinatie met dysmotiliteit of veranderde gastrointestinale anatomie. Met name echografie en CT zijn hiervoor geschikt, bij beide worden intraluminale massa's gezien (vaak multipel) op de plaats van de kalibersprong. Dit dient onderscheiden te worden van het small bowel feces sign, bij welke de obstructie juist distaal van de massa zit.

P02

DETECTIE VAN LYMFOGENE METASTASEN VAN HET SLOKDARMCARCINOOM DOOR MRI MET ULTRASMALL SUPERPARAMAGNETIC IRON OXIDE (USPIO): EEN PILOTSTUDIE

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Ondanks de uitgebreide standaard preoperatieve stadiëringsmodaliteiten van het slokdarmcarcinoom (EUS/FNA, CT, PET) blijkt er bij exploratie in 10-30% van de gevallen sprake te zijn van lymfeklier metastasen op afstand. Uit recente studies blijkt Magnetische Resonantie (MR) in combinatie met Ultrasmall Superparamagnetic Iron Oxide (USPIO) de stadiëring van kliermetastasen bij verscheidene tumortypen te verbeteren met een relatief hoge sensitiviteit en specificiteit. In deze pilotstudie werd de toepassing van MR+USPIO in de stadiëring van het slokdarmcarcinoom bestudeerd.
Negen patiënten werden succesvol geïncludeerd waarbij geselecteerd werd op een positieve klierstatus (N1) met de standaard beeldvorming en EUS/FNA. Vijf van deze negen patiënten ondergingen geen resectie vanwege peroperatief bewezen metastasering (M1a/b). USPIO-opname in de klierstations werd gezien in 6 van de 9 patiënten. In totaal zijn er van deze 6 patiënten 9 lymfeklierstations histologisch gescoord. Zeven klierstations werden met MR+USPIO positief bevonden. In vergelijking tot de histologie was er sprake van 1 fout positieve en 1 fout negatieve uitkomst bij de gangbare beeldvorming. Voor de MR+USPIO was er ook 1 fout positieve en 1 fout negatieve uitkomst. De MR+USPIO had een toegevoegde waarde bij één patiënt ('upstaging'). Er hebben zich geen neveneffecten voorgedaan bij USPIO infusie.
Conclusie: MR+USPIO kan suspecte lymfeklieren identificeren en heeft waarschijnlijk een toegevoegde waarde bij de locoregionale stadiëring van het slokdarmcarcinoom. Meer onderzoek is noodzakelijk voor een betrouwbare toepassing van MR+USPIO in de stadiëring van het slokdarmcarcinoom.

P03

NON-INVASIVE QUANTIFICATION OF HEPATIC STEATOSIS WITH 3.0 TESLA MAGNETIC RESONANCE SPECTROSCOPY IN AN EXPERIMENTAL RAT MODEL

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Introduction: Hepatic steatosis has been identified as a risk factor in liver surgery. Liver biopsy is the gold standard for histopathological assessment of steatosis. Proton Magnetic Resonance Spectroscopy (H-MRS) could be a non-invasive alternative to liver biopsy. The purpose of this study was to quantify hepatic steatosis with H-MRS in an experimental rat model and correlate the H-MRS measurements with histopathological and biochemical analysis of hepatic fat.
Materials and methods: Hepatic steatosis was induced by feeding rats a methionine-choline deficient diet (MCD) for 0, 1, 3 or 5 weeks (n=5 per group). H-MRS was performed at 3.0 Tesla using an experimental micro-coil. Two ratios from the H-MR spectra were calculated: ratio 1 defined as the total fat peak versus the reference water peak and ratio 2 defined as the unsaturated fat peak versus the water peak. Correlations (Spearman correlation coefficient) were studied between both H-MRS ratios, histopathology and total fatty acid concentration.

Results: We found significant correlations between the total fat/water and unsaturated fat/water ratios and histopathological macrovesicular steatosis (ratio 1: r= 0.92, p<0.001 and ratio 2: r= 0.84, p<0.001) and biochemical assessed total and unsaturated fatty acids in the rat liver (ratio 1: r=0.92, p<0.001 and ratio 2: r= 0.88, p<0.001).

Conclusion: 3.0 Tesla H-MRS is able to accurately measure hepatic fat content in this rat model and strongly correlates with histopathological and biochemical analysis of hepatic fat. To our knowledge this is the first time the unsaturated H-MRS fat/water ratio was correlated with both histopathological and biochemical parameters.

P04

RADIOLOGICAL FEATURES OF THE DIAGNOSIS ACUTE APPENDICITIS ON ULTRASONOGRAPHY AND COMPUTED TOMOGRAPHY

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Purpose: Ultrasonography (US) and computed tomography (CT) are both accurate in diagnosing appendicitis. Relevant for daily practice is knowledge of specific imaging features on US and CT contributing to appendicitis. Therefore imaging features contributing to the diagnosis appendicitis in patients with acute abdominal pain at the emergency department were evaluated.

Material and methods: Patients with abdominal pain >2 hours and <5 days presented at the ED were eligible. All underwent US and CT, evaluated by independent blinded radiologists. Imaging features and diagnoses were prospectively recorded. Reference standard was final diagnosis after 6 months. Imaging features resulting in appendicitis or false-positive (FP) appendicitis were evaluated with logistic-regression.

Results: 1021 patients were evaluated, 55% woman; mean age 47.4 years. Observed probability was 100% in patients with combination of thickened appendix, transducer tenderness and moderate appendiceal fat infiltration on US. Combination of a visualized, thickened appendix, increased appendiceal vascularity and mild or moderate peri-appendiceal fat infiltration had an observed probability of 98% on CT. Single features, significantly resulting in FP appendicitis were: transducer tenderness (p<0,01), thickened appendix(p<0,01), and intact appendiceal layered wall (p=0.05) for US, and thickened appendix (p<0,01), mild (p=0.02) or moderate (p=0.02) peri-appendiceal fat infiltration for CT. Highest observed probability of FP was moderate peri-appendiceal fat infiltration on CT (13,1%) and transducer tenderness with intact appendiceal layered wall on US (50%)

Conclusion: Multiple positive imaging features increase the probability of appendicitis. Single findings as mild or moderate fat infiltration at CT or painful compression at US make appendicitis less likely.

P05

BEPALEN VAN DE COMPOSITIE VAN UROLGISCHE CONCREMENTEN MET BEHULP DUAL ENERGY CT

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Doel: Prospectief onderzoek waarbij de compositie van nierstenen wordt bepaald met behulp van dual-energy CT onderzoek.

Methoden: Patiënten die vanaf november 2007 in een niet-acute situatie een CT-scan ondergingen ter evaluatie van urologische concrementen zijn geincludeerd als er stenen werden vastgesteld. Er wordt een standaard natieve scan vervaardigd op de Siemens SOMATOM (Dual Source) CT scanner (coupedikte: 5 mm, 120 kV en 70 mAs) en door de regio van de concrementen wordt vervolgens met de 2 rontgenbuizen tegelijkertijd in de dual-energy (DE) mode gescand (coupedikte, 70 mAs, 80 kV en 140 kV). De DE-scan kan deze groep onderverdelen in 'niet-urinezuurstenen' en 'urinezuurstenen'.
De verkregen concrementen, spontaan of opzettelijk, worden geanalyseerd en vergeleken met de vooraf bij CT berekende compositie.

Resultaten: In de komende maanden zal de inclusie van patiënten doorgaan. Dit betreffen de voorlopige studieresultaten. Er zijn nu 13 patiënten geïncludeerd. Volgens de DE-berekeningen betroffen het 12 niet-urinezuurstenen en 1 gemengde steen. Er zijn tot nu toe twee concrementen verkregen en geanalyseerd in het laboratorium. Beide concrementen bestonden grotendeels uit calciumoxalaat, dus 'niet-urinezuur' stenen. Dit komt overeen met de DE resultaten.

Conclusie: Het lijkt goed mogelijk met behulp van dual-energy CT de compositie van nierstenen te bepalen. Wellicht kan DE analyse van nierstenen gebruikt worden om de slagingskans van ESWL te voorspellen en vervolgens het behandelplan hierop af te stemmen.

P06

MAGNETIC RESONANCE ENTEROGRAPHY FOR SUSPECTED IBD IN A PEDIATRIC POPULATION

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Purpose: To determine the accuracy of Magnetic Resonance Enterography (MRE) in diagnosing and differentiating pediatric inflammatory bowel disease (IBD). Secondary aims were to determine the accuracy of MRE in grading disease activity and to determine the interobserver agreement for individual MRE parameters.

Methods: Pediatric patients scheduled to undergo esophagogastroduodenoscopy, ileocolonoscopy (CS) with biopsies and barium enteroclysis (BE) for suspected IBD were included and underwent MRE. MRE images were evaluated by 3 observers. The accuracy of MRE was calculated using the clinical diagnosis based on endoscopic, histopathological and BE examinations, as reference standard.

Results: 33 patients were available for analysis. IBD was correctly diagnosed in respectively 61%, 61% and 91% of the patients by the 3 observers, with a specificity of 80%, 90% and 60%. Differentiation between CD and UC was accurately done in respectively 67%, 53% and 80% of CD patients and 0%, 14% and 43% of UC patients. Disease activity was understaged on MRE in the majority of patients. Intraclass correlation coefficients for measurements of bowel thickness were 0.52 (observer 1-2;observer 1-3) and 0.34 (observer 2-3).

Interobserver agreement on bowel wall enhancement and stenosis was moderate to good (kappa 0.59; 0.56 and 0.56 and kappa 0.62, 0.32, 0.30 respectively).

Conclusion: Sensitivity and specificity values of MRE for diagnosing pediatric IBD were moderate to good. CD, but not UC, was accurately diagnosed by MRE in a large proportion of patients. Activity was understaged in a large proportion of patients. Interobserver agreement for individual MRE parameters was fair to good.

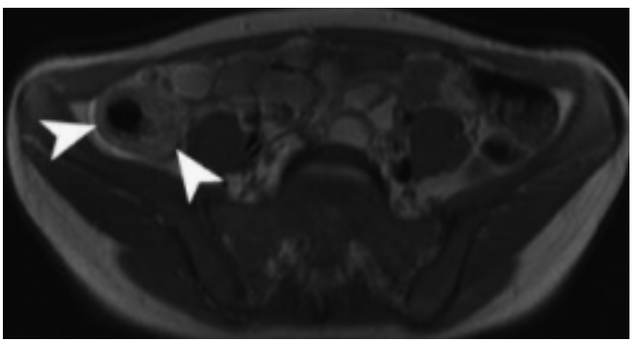

Image 1: 15-year old male patient suspected of IB

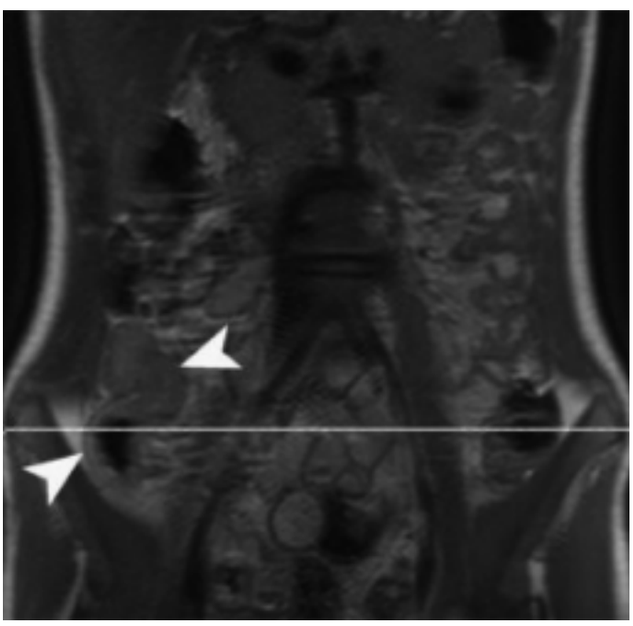

Image 2: 15-year old male patient suspected of IB

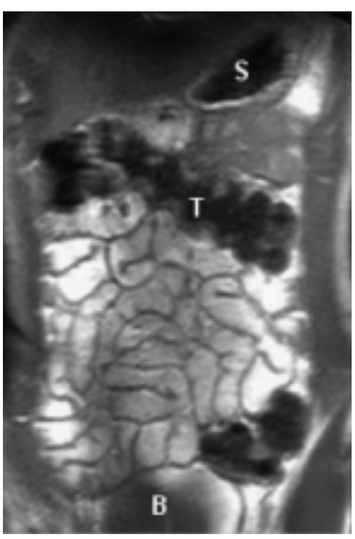

Image 3: 11- year old male patient suspected of I

P07

MAGNETIC RESONANCE IMAGING FOR EVALUATION OF DISEASE ACTIVITY IN CROHN'S DISEASE: A META-ANALYSIS

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Purpose: To determine the accuracy of magnetic resonance imaging (MRI) for grading disease activity in patients with Crohn's disease (CD) by performing a meta-analysis.

Methods and materials: The MEDLINE, EMBASE, CINAHL and Cochrane databases were searched for studies on the accuracy of MRI in grading CD compared to a predefined reference standard. Three disease stages were defined: remission, mild and frank disease. The accuracy rates of MRI per disease stage were calculated by means of a random-effects model.

Results: Seven studies were included from a search resulting in 253 articles. MRI correctly graded 86% of patients with frank disease, 65% of patients with mild disease, and 52% of patients in remission. MRI more often overstaged than understaged disease activity; MRI overstaged disease activity in 48% of patients in remission, mostly as mild disease. Overstaging of mild disease was observed in 24%. However, in patients in whom disease grading was incorrect, mostly grading differed one grade from the activity grading on the reference standard.

Conclusion: MRI can accurately grade disease activity in a large proportion of patients with mild or frank disease. For patients in remission MRI overstaged activity in many patients, mostly as mild disease.

P08

MDCT ANGIOGRAPHY OF ABDOMINAL WALL VASCULARISATION: PREOPERATIVE IMAGING FOR DEEP INFERIOR EPIGASTRIC PERFORATOR FLAP BREAST RECONSTRUCTION

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Background: Since there is a high variability of the vascular plexus between individuals and even hemi-abdomens of the same person, a reliable method for the precise identification of the dominant arterial perforator(s) with regard to its position, course and calibre is important and could reduce surgical procedure time as well as reduction of donor-site morbidity for breast reconstructions.

Purpose: To determine the feasibility of MDCT angiography for the preoperative evaluation and characterization of abdominal wall perforators in the planning of Deep Inferior Epigastric Perforator flaps autologous breast reconstruction, we performed a pilot study.

Method and materials: Preoperatively a 64 MDCT angiography was performed in 3 patients selected for autologous breast reconstruction. The scan parameters were derived from literature, a bifasic scan protocol was used. 2D- and 3D reconstructions were made: Coronal volume rendered views optimized to highlight the course and branching pattern of the deep inferior epigastric arterial system. Axial maximum-intensity projection views demonstrating the perforators with their anatomical level, subcutaneous and intramuscular course. A coronal overview of the (dominant) perforator(s) with the umbilicus as reference point was made to compare surgical findings.

Results: MDCT angiography reveals the abdominal wall perforators. There was a satisfactory concordance between MDCT angiographic and surgical findings

Conclusion: Preoperative evaluation with MDCT angiography of abdominal

wall perforator arteries with MDCT angiography is feasible in patients undergoing autologous breast reconstruction.

P09

VALIDATIE ECHOGRAFISCHE FOLLOW-UP VAN INFRA-RENAAL ANEURYSMA

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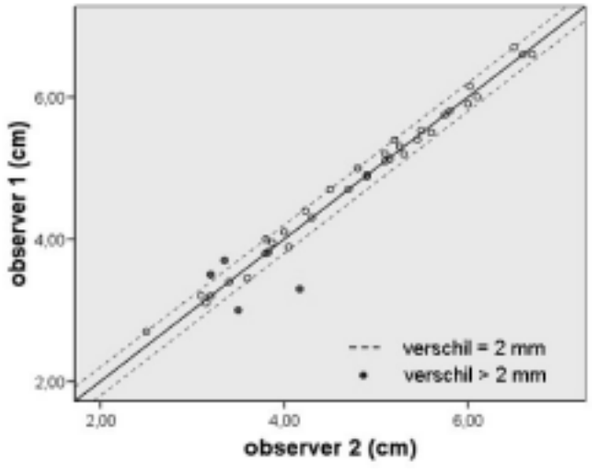
Doel: Het meten van de interobserver variabiliteit bij het echografisch vervolgen van behandelde en niet behandelde aneurysma's van de abdominale aorta.
Materiaal en methode: Twee vaatlaboranten met beiden ongeveer 20 jaar ervaring hebben in de periode van 31-01-2007 t/m 31-03-2008 prospectief en consecutief bij 42 patiënten met een al of niet behandeld aneurysma van de abdominale aorta de maximale AP diameter gemeten.
Dit deden zij onafhankelijk en blind voor het resultaat van de ander. Bij een verschil van >2mm moesten zij tot consensus komen. De patiëntengroep bestond uit 36 mannen en 6 vrouwen met een gemiddelde leeftijd van 74 (60-87) jaar. 1 patiënt had een status na broekprothese, 11 status na endograft en 30 hadden een onbehandeld aneurysma.
De interobserver variabiliteit ten opzichte van elkaar en ten opzichte van de consensus werd geanalyseerd middels de intraclass correlation coefficient (ICC).
Resultaten: Bij 4 patiënten, 3 na endograft en 1 met een onbehandeld aneurysma, werd een verschil van > 2mm tussen beide observers gezien *(figuur 1).*
De ICC tussen beide observers bedroeg: 0,983
(95% BI: 0,969 -0,991)).
De ICC van observer 1 versus de consensus bedroeg: 0,989
(95% BI: 0.98-0,994).
De ICC van observer 2 versus de consensus bedroeg: 0,998
(95% BI: (0,995-0,999).
Conclusie: Echografie is een uitstekende modaliteit voor de follow up van zowel behandelde als onbehandelde aneurysma's van de abdominale aorta. Regelmatige interne validatie van het eigen vaatlab middels boven beschreven methode is hiervoor essentieel.



Figuur 1: Interobserver variabiliteit

P10

DETECTION OF CORONARY CALCIUM WITH 3.0 MM AND 0.5 MM RECONSTRUCTIONS USING 320-DETECTOR ROW COMPUTED TOMOGRAPHY

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Purpose: The purpose of this study was to assess the detection of coronary calcium on 3.0 mm and 0.5 mm slice reconstructions by using 320-detector row computed tomography (CT).
Methods and materials: A prospectively gated nonenhanced volume CT was performed in 20 patients (15 men, 5 women, mean age 58 ± 9 years). All patients had clinical indications for coronary CT. 3.0 mm slice thickness, non-overlapping volume sets were compared to 0.5 mm slice thickness with 0.25 mm overlap, that were reconstructed from the same raw data set. Agatston score (AS) and Volume score (VS) were obtained. For statistical analysis Wilcoxon signed ranks test was used.
Results: AS and VS obtained with the 0.5 mm data set were statistically significant higher than the scores obtained with the 3.0 mm reconstructions: (mean, median) 245, 2.5 versus 281, 15.0 for AS, and 206, 5.0 versus 233, 18.5 for VS, both $p < 0.01$. Coronary calcium was detected in both data sets in 11 subjects (55%). In 4 patients (20%), a calcium score of 0 was calculated in the 3.0 mm set whereas a calcium score of ≥ 3 was obtained in the 0.5 mm data sets. In 5 patients (25%) calcium score was 0 in both data sets.
Conclusion: 0.5 mm reconstructions are more sensitive in detecting coronary artery calcification as compared to 3.0 mm reconstructions. Calcium scores were statistically significant higher and the detection of low attenuation calcifications was increased.

P11

VOLUME MEASUREMENT OF THE LEFT ATRIUM VOLUME USING BALANCED TFE CINE IMAGES IS AN UNRELIABLE METHOD FOR MEASURING THE LEFT ATRIUM SIZE

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Purpose: CE-MRA volume rendering represents a validated standard for left atrium volumetry (LAV). It requires manual tracing of the boundaries and is therefore time-consuming. We examined whether the volume could be accurately measured using balanced TFE cine images.
Methods: We studied 37 scans performed between April 2007 and May 2008 on a 1,5T scanner. The scans consisted of cine balanced TFE images in vertical long axis view of the left ventricle (2-ch), a four-chamber view (4-ch) and short axis of the left atrium (SA). A 3D gadolinium enhanced coronal T1-FFE MRangiography (CE-MRA) with 1.5mm slices was also performed.
On the 2-ch and 4-ch images the endocontour of the left atrium was drawn at the end-diastolic phase. From this the end-diastolic volume of the left atrium (EDV) was calculated using the area-length method. From the SA-images the EDV was measured by drawing the endocontour on consecutive slices (EDV-SA). EDV-2ch, EDV-4-ch and EDV-SA were compared to the left atrium volumes calculated from the CE-MRA (Vol-CE-MRA) by using scatter plotting and Bland-Altman analysis.
Results: EDV-2ch, EDV-4-ch and EDV-SA showed a moderately strong linear correlation with Vol-CE-MRA (0.71, 0,71 and 0,69 respectively). Bland-Altman analysis showed poor agreement when comparing EDV-2ch, EDV-4-ch and EDV-

SA respectively to Vol-CE-MRA.
Conclusions: Computing the volume of the LA on balanced TFE cine images can give an estimate of left atrium size, but is not accurate enough.

P12

INFLUENCE OF A 5% OR 10% RECONSTRUCTION INTERVAL ON THE ASSESSMENT OF LEFT VENTRICULAR FUNCTIONAL PARAMETERS WITH DUAL SOURCE CT

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Purpose: To investigate whether assessment of left ventricular (LV) functional parameters on dual source CT measured with reconstructions at every 5% of the RR-interval is as accurate as measurements with reconstructions at every 10%.
Material and methods: Twenty patients who underwent CT coronary angiography (dual source CT, Somatom Definition, Siemens Medical Solutions, Germany) were included (14 men, mean age 49 ± 17 yrs). Multiphase reconstructions were made with 20 series at every 5% of the RR-interval. LV functional analysis was performed on Vitrea workstation (Vital Images, Minnetonka, MN, USA) using 10 phases at every 10% of the RR-interval and measurements were repeated using 20 phases at every 5% of the RR-interval. End-diastolic and end-systolic phases were automatically calculated by the software, as well as ejection fraction (EF), end-diastolic volume (EDV), end-systolic volume (ESV), stroke volume (SV), cardiac output (CO) and LV myocardial mass (LVM). No manual user interaction was necessary. Data were analysed with t-tests.
Results: Mean EF, EDV, SV and CO were significantly ($p<0.05$) higher for measurements with 20 reconstructions compared to measurements with 10 reconstructions. Mean ESV was significantly ($p<0.05$) lower with the measurements with 20 reconstructions. No significant difference existed between the measurements for LVM.
Conclusion: A significant difference was found between the assessment of LV functional parameters on cardiac CT with reconstructions at every 5% of the RR-interval and assessment with reconstructions at every 10%.

P13

NEFROGENE SYSTEMISCHE FIBROSE EN GADOLINIUM: IS DE NIERFUNCTIE VAN TE VOREN BEKEND? ANALYSE IN EEN PERIFEER ZIEKENHUIS

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Introductie: Nefrogene systemische fibrose (NSF) is een ernstige complicatie na intraveneuze gadolinium toediening bij patiënten met nierinsufficiëntie. Bekendheid met NSF onder radiologen en clinici is echter gering. Het doel van dit onderzoek was te analyseren hoe frequent en bij welk type MR onderzoeken de nierfunctie was ingevuld op het aanvraagformulier.
Materiaal en methoden: Alle MRI onderzoeken tussen 1 en 15 mei 2008 werden geselecteerd uit ons PACS. De volgende data werd verzameld: werd de nierfunctie vermeld op het aanvraagformulier, werd Gadolinium toegediend tijdens het onderzoek, type onderzoek en aanvrager. Nierfunctie (eGFR of MDRD) werd retrospectief in het EPD opgezocht indien Gadolinium werd toegediend en de nierfunctie niet vermeld was.
Resultaten: Bij slechts 88/227 MRI aanvraagformulieren bleek de nierfunctie te worden ingevuld. Bij 3/88 was de nierfunctie gestoord (eGFR 17, 39 en 45 ml/min). Bij 56/227 MRI onderzoeken werd intraveneus gadolinium toegediend. Bij 29/56 was de nierfunctie niet ingevuld. Dit gold ook voor MRI onderzoeken die standaard met Gadolinium worden uitgevoerd (b.v. MR mammo, MR hersenen met indicatie: hersenmetastasen). Bij 3/29 bleek achteraf de nierfunctie gestoord (eGFR 37, 47 en 52 ml/min). Bij 19/56 van de contrast onderzoeken was een blanco MRI aangevraagd.
Conclusie: Nierfunctie wordt in de meerderheid niet vermeld op de aanvragen, ook wanneer indicatie voor Gadolinium vooraf al vast staat. Bij de aanvragers dient de NSF problematiek aanhangig gemaakt te worden en het belang van het vermelden van de nierfunctie op het MRI-aanvraagformulier sterk benadrukt te worden.

P14

EX-VIVO RADIO FREQUENCY ABLATION (RFA) IN SMALL BREAST CANCER. EVALUATION OF EFFECTIVENESS USING DIFFERENT TECHNIQUES OF STAINING OF THE HISTOPATHOLOGIC SPECIMEN

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Purpose: To evaluate tissue viability following ex-vivo RFA of small breast cancer using two different histopathologic staining methods.
Material and methods: Twenty consecutive patients (mean age 67 years; range 56-77) with solitary small (< 1,5 cm) breast cancer were included. US-guided RFA of the specimen was performed with a 15 -gauge Cool-Tip RF needle placed central in the tumor immediately following surgery. Next, whole mount sectioning of the ablated region was performed and equal sections (mirror images) were stained with two different methods (Cytokeratine 8 and NADH diaphorase). Histopathologic evaluation was performed to assess remaining cell viability in the ablated region.
Results: All procedures were technically successful. A median temperature of 55° C (range 40°-90°) was applied for 12 minutes. The diameter of the ablated region ranged from 25 to 40 mm. At histopathological examination the mean tumor size was 12 mm (range 7-23). NADHD staining revealed viable cells in 1 lesion, whereas Cytokeratine 8 revealed viable cells in three lesions, however these differences were not statistically significant ($p= 0,2$).
Conclusion: (1) US guided RFA resulted in complete cell death in small invasive breast cancer in most cases. (2) Cytokeratine 8 staining is a good alternative method for the commonly used NADHD staining. Although cytokeratine 8 staining revealed more viable tumor tissue compared to NADHD staining, larger studies are needed to evaluate if the observed differences are statistically significant.

P15

CLASSIFICATIE VAN IATROGENE GALWEGLETSELS; IS DE EERSTE INDRUK DE JUISTE?

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Doel: Het evalueren van de juistheid van de initiële classificatie van iatrogeen galwegletsel door middel van retrospectieve beoordeling.

Methoden: In ons instituut werden 2 verschillende classificaties gebruikt (de Amsterdam Classificatie en de Strassberg classificatie) bij de beoordeling van 470 patiënten (152 mannen, 318 vrouwen, gemiddelde leeftijd 50.6 range: 15.8 - 89.3) met iatrogeen galwegletsel die van januari 1991 t/m december 2005 verwezen werden. Om de betrouwbaarheid van de initiële classificatie te beoordelen, werden alle letsels retrospectief beschreven naar locatie en type letsel. Hierbij werd gebruik gemaakt van radiologie-, operatie- en ERCP-verslagen. Op basis van deze beschrijving werden alle letsels opnieuw geclassificeerd door 2 interventieradiologen en werden de verschillen in consensus bepaald. Vervolgens werden de initiële classificatie en de consensus classificatie met elkaar vergeleken.
Resultaten: Alle patiënten werden geclassificeerd volgens de Amsterdam Classificatie. 388 patiënten hadden daarnaast een Classificatie volgens Strassberg. Er was minimaal 91.9% overeenstemming tussen de beide radiologen bij herclassificatie (kappa 0.893), de minimale overeenstemming tussen een van de radiologen en de consensus was 93.6% (kappa 0.916).
De initiële classificatie van galwegletsels binnen de Amsterdam Classificatie in 31.3% (147/470) onjuist. Bij de Strassberg Classificatie is dit 27.3% (106/388).
Conclusie: De initiële classificatie van iatrogene galwegletsels blijkt in ongeveer 30% van de gevallen onjuist. Er is echter een hoge overeenstemming tussen de beoordelaars bij herclassificatie, wat eerder wijst op verkeerde classificatie door voortschrijdend inzicht dan op de toepasbaarheid van de classificatiemethoden. Wat de gevolgen van een foutieve classificatie voor de patiënt zijn, zal nog worden onderzocht.

P15a

PERCUTANEOUS THROMBIN INJECTION OF FEMORAL ARTERY PSEUDOANEURYSM WITH SIMULTANEOUS ARTERIAL BALLOON OCCLUSION

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Purpose: Iatrogenic femoral pseudoaneurysms are treated by ultrasound guided compression or thrombine injection. Both methods may be ineffective or hazardous if the connection between the artery and the pseudoaneurysm is relatively wide (> 8 mm). Downstream embolisation can occur in up to 2 % of the cases treated with trombine injection. To limit this risk we treated 5 patients with trombine injection in combination with balloon occlusion of the femoral artery at the level of the pseudoaneurysm neck.
Patients and methods: Five patients with a femoral artery pseudoaneurysm who were initial no candidate for percutanous trombine injection because of a too wide aneurysm neck were treated by percutaneous thrombin injection with simultaneous balloon occlusion of the femoral artery at the level of the neck of the aneurysm. The pseudoaneurysms were injected with 0.1 mL trombine (Trombine-calciumchloride, 500 IE Human Trombine and 40 µmol calciumchloride). The balloon catheter (5mm/4cm) was introduced from contralateral and inflated just before injection up to 30 seconds following injection to prevent outflow of trombine into the femoral artery.
Results: All 5 patients were treated successfully. All pseudoaneurysms trombosed instantly and no complications occurred. At follow-up with color Doppler ultrasound performed after 24 hours no recurrence of the pseudoaneurysms could be established.
Conclusion: Pseudoaneurysm of the femoral artery with a wide neck can safley and successfully be treated by percutaneous thrombin injection with simultaneous arterial balloon occlusion.

P16

CRANIAL ULTRASONOGRAPHIC FINDINGS IN CANAVAN'S DISEASE

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Purpose: To present the characteristic ultrasonographic findings in Canavan's disease and, in addition, to introduce some new ultrasonographic findings .
Case report: A 6-month-old male child presented with macrocephaly and axial hypotonia. Until the age of 4 months the development was normal, except for a slight head lag. Physical examination at six month of age showed a lively boy with increased head-circumference (> p98), no reaction to visual stimulants, axial hypotonia and severe head lag. Ultrasonography showed normal central and peripheral CSF spaces, a strikingly increased demarcation of gray and white matter (mainly caused by increased echogenicity of white matter), voluminous gyri and increased echogenicity of the thalamus, caudate nucleus and, to a lesser extent the lentiform nucleus.
These findings are compatible with Canavan's disease, confirmed by demonstration of the gene mutation.
Discussion: Canavan's disease is an inborn error of metabolism caused by aspartoacylase deficiency, leading to elevated levels of N-acetyl-aspartic acid in the brain, eventually causing leukodystrophy. Only a few reports describe the ultrasonographic findings consisting of increased echogenicity of white matter (except for corpus callosum), thalamus and caudate nucleus. In addition, our patient also showed increased volume of the gyri (compatible with increased volume of white matter), the subcortical white matter showed higher echogenicity than central white matter and there was a striking discrepancy between abnormal ultrasonographic appearance of caudate nucleus and its normal MR appearance.
Conclusion: Recognition of the typical ultrasonographic features of Canavan's disease will facilitate early diagnosis.

P17

RESULTATEN VAN HERBIOPSIE NA INCONCLUSIEVE PERCUTANE DIKKE NAALD BIOPSIE VAN DE BORST: DE ROL VAN ATYPIE ALS MARKER VOOR MALIGNITEIT

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Doel: Bepaling van frequentie, indicatie, en resultaten van percutane herbiopsie van mammalaesies, met aandacht voor mogelijke indicatoren voor de aanwezigheid van maligniteit.
Methode: Wij reviseerden de resultaten van alle mammabiopsieën uitgevoerd op onze afdeling tussen januari 2004 en september 2007. Gedurende deze periode zijn 807 suspecte (≥ BI-RADS 3) mammalaesies gebiopteerd. Tweeëntachtig vrouwen -leeftijdsgemiddelde 54 jaar, range 27-77- ondergingen herbiopsie. Hiervan zijn alle mammografische en echografische onderzoeken blind gereviseerd met toekenning van BI-RADS classificaties. Daarnaast zijn PA-verslagen en consultgegevens opnieuw ingezien. Voorts is de reden voor herbiopsie bepaald en zijn de resultaten na eerste biopsie, herhalingsbiopsie en eventuele chirurgische interventie vergeleken.
Resultaten: Op 576 van de 807 biopsieën (71,4%) volgde een maligne uitslag. Herbiopsie is 82 maal (10,2%) verricht, waarbij 31 (37,8%) maligniteiten werden geconstateerd. Belangrijke redenen voor herbiopsie waren discordantie

tussen beeldvorming en histopathologie, en onvoldoende diagnostisch weefsel. Van alle aanvankelijke diagnosen kende 'atypie' -met 11 van de 14 eind-resultaten maligne (78,6%)- relatief de meeste onderliggende maligniteiten.
Conclusie: Percutane biopsie maakt adequate pre-operatieve diagnostisering mogelijk. Eén tiende behoeft herbiopsie, waar alsnog bij menig patiënt wordt voorkomen dat mammacarcinoom onopgemerkt en dientengevolge onbehandeld blijft. Twijfel over de juistheid van de diagnose bij patholoog of radioloog vormt direct aanleiding tot herbiopsie. De huidige data tonen dat afwijkingen met atypie (zonder evidente hyperplasie) frequent een maligniteit herbergen. Herkenning van atypie als belangrijk motief voor herhaling van de biopsie, zeker in aanwezigheid van bijkomende factoren, zoals een verdacht klinisch beeld, radio-/pathologische discordantie of beperkt diagnostisch weefsel, is derhalve van eminent belang.

P18

DIFFUSIE GEWOGEN MRI IN SUSPECTE MAMMA LAESIES: REPRODUCEERBAARHEID VAN DE ADC

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Doel: De toevoeging van diffusie-gewogen MRI (DWI) aan het mammatumor-protocol kan mogelijk de specificiteit van MR mammografie verhogen. Maligne laesies hebben een lagere Apparent Diffusion Coefficient (ADC) dan benigne laesies. Voor het berekenen van de ADC wordt een ROI geplaatst in de laesie. De aanwezigheid van non-laesie pixels in het ROI verstoren de ADC berekening. Wij bepaalden de reproduceerbaarheid van de ROI-plaatsing ten behoeve van de ADC berekening.
Materiaal & methoden: Zesentwintig patiënten met 28 nonpalpabele, suspecte mamma laesies ondergingen MR-mammografie op 3T en histopatho-logisch onderzoek van de laesies. DWI beelden werden gebruikt om de ADC waarde te berekenen. Drie beoordelaars plaatsten in elke laesie twee maal een ROI voor de berekening van de ADC. De beoordelaars waren geblindeerd voor de resultaten van de andere beoordelaars en de pathologie-uitslag. De intra- en inter-observer agreement werden bepaald middels de Bland-Altman methode.

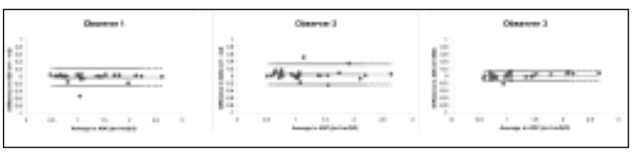

Figure 1: Bland-Altman analyse voor de intra-observer agreem

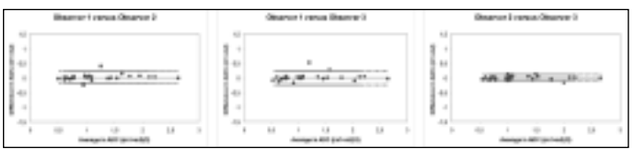

Figure 2: Bland-Altman analyse voor de inter-observer agreem

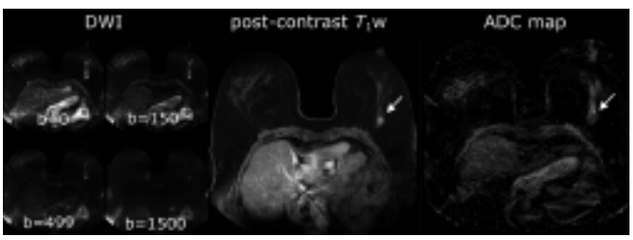

Image 1: DWI, post-contrast T1 gewogen afbeelding en ADC ma

Resultaten: Histolopathologisch onderzoek resulteerde in 15 benigne laesies, 6 non-invasieve carcinomen en 7 invasieve carcinomen. De Bland-Altman analyse toonde een bias (en standard deviation of differences) van -0,03 (0,11), 0,04 (0,14) en 0,01 (0,07) voor de intra-observer agreement van de 3 beoordelaars. Analyse van de inter-observer agreement toonde een bias van -0,04 (0,17) voor beoordelaar 1 versus beoordelaar 2, van 0,01 (0,12) voor beoordelaar 1 versus 3 en van -0,04 (0,14) voor beoordelaar 2 versus 3.
Conclusie: De intra- en inter-observer agreement voor het plaatsen van een ROI voor de berekening van de ADC van suspecte mamma laesies is zeer hoog, hetgeen een hoge reproduceerbaarheid van het gebruik van deze methode aantoont.

P19

MRI IN NONPALPABLE SUSPICIOUS BREAST LESIONS: RATIONALE AND DESIGN OF THE MONET STUDY

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Background: The additional value of Breast MRI compared to X-ray mammography lies in its capacity to detect occult multifocal, multicentric and contralateral disease in breast cancer patients, detect additional invasive components in patients with DCIS, detect cancer in dense breasts and to visualize the tumor in 3 dimensions. Breast MRI therefore, potentially provides better preoperative staging and possibly surgical care in breast cancer patients.
Purpose: The aim of our study is to assess whether performing contrast-enhanced Breast MRI can reduce the number of surgical procedures due to better preoperative staging and to assess the added diagnostic value of Breast MRI in patients with nonpalpable suspicious breast lesions.
Materials & methods: Patients with nonpalpable BI-RADS 3, 4 or 5 lesions who are referred for large core needle biopsy (LCNB) will be randomly allocated to either the control group providing LCNB or the study group with MRI prior to LCNB. Exclusion criteria are: age <18 or >75 years, severe obesity, recent breast surgery/radiation therapy and non-MR compatible items. Patients will be randomized into the MRI group (220) or the usual care group (220). The number of surgical procedures between the MRI and control group will be compared. The added diagnostic value of breast MRI will be determined.
Results: So far (January 2006-March 2008), 315 patients were included. Inclusion is expected to be completed (n=440) in January 2009. Study design and baseline characteristics will be presented.
Conclusions: The MONET-study is the first randomized trial to assess the effect of Breast MRI on patient management.

P20

'ONDERWAARDERING' VAN BORSTKANKER BIJ BIOPSIE MET VACUÜM-SYSTEEM

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Inleiding: Vacuüm geassisteerde biopsiën zijn vaker concordant dan true-cut biopsiën. Van de benigne uitslagen na vacuümbiopsie valt 12% in de categorie 'onzeker benigne' (B3), bijvoorbeeld atypische ductale hyperplasie. In de

literatuur wordt uiteindelijk een zeer variabel percentage van 4-60% van maligniteit aangetroffen bij excisie na een eerdere biopsie-uitslag B3. In februari 2007 toonde een publicatie van een grote serie een percentage van 36% aan.

Bij de operatieve behandeling van mammacarcinoom wordt ernaar gestreefd de patiënt middels 1 operatie te behandelen (dwz lumpectomie / ablatio +/- sentinel node procedure +/- okselkliertoilet). De biopsie-uitslag dicteert het te voeren beleid, zoals wel of geen okselkliertoilet bij DCIS of infiltratief carcinoom. Derhalve wordt gestreefd naar een zo groot mogelijke overeenstemming van de biopsie-uitslag met de uiteindelijke histologie.

Doel: Bepaling van de "onderwaardering"-cijfers van onze vacuümbiopsiën.

Methoden: Uit de periode 2004, 2005 en 2006 zijn 206 patiënten geïncludeerd van wie de middels Mammotome® of Encor® verkregen biopsie uitslagen vergeleken werden met de uiteindelijke pathologie-uitslagen na operatie.

Resultaten: De "onderwaardering"-cijfers waren: DCIS gr1-2 wordt DCIS gr 3 = 14%. DCIS gr1-2 wordt invasief ductaal carcinoom = 21%. DCIS gr 3 wordt invasief ductaal carcinoom = 13%. B3 ("onzeker benigne") wordt carcinoom = 14%.

Conclusies: De trend naar steeds dikkere naaldbiopsiën en vacuüm geassisteerde biopsiën leidt tot betere concordantie met de uiteindelijke histologie. Echter in geval van een onzeker benigne PA uitslag blijkt een aanzienlijke "onderwaardering"van maligniteit te bestaan. Het valt derhalve te overwegen laesies met B3 uitslag toch te laten excideren.

P21

QUANTIFICATION OF NEGATIVE ACTIVATIONS MEASURED BY BOLD FUNCTIONAL MRI IN BRAIN TUMOR PATIENTS

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Introduction: FMRI based on the blood oxygenation level dependent (BOLD) signal, is a non-invasive technique used to localize functional cortex. The existence of tumor tissue might invert the regular, positive BOLD response (PBR). Negative BOLD response (NBR) to stimuli is missed by conventional analysis and undermines applicability of fMRI in neurosurgical planning. The aim of this study was to quantify NBR.

Subjects and methods: We retrospectively analysed fMRI data of 23 brain tumor patients, scanned on a Philips 3.0 Tesla scanner during unilateral finger tapping *(Figure 1)*. Patients with paresis were excluded. We performed spectral analysis to identify voxels displaying signal changes with a frequency corresponding to the block design frequency. Voxels with a phase of $^1/_2\ \pi$ and $-^1/_2\ \pi$ were regarded as displaying PBR and NBR respectively. We compared the amount of PBR and NBR voxels in both motor cortices by calculating activation ratios (activated voxels diseased divided by activated voxels healthy hemisphere). Differences were tested for significance (non-parametric Mann Whitney).

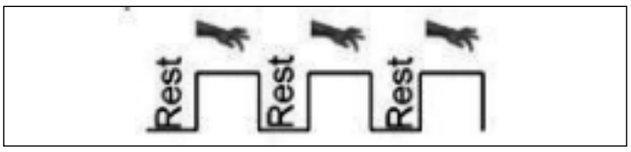

Figure 1: Finger tapping block design

Results: Spectral analysis yielded PBR and NBR activation maps. *Figure 2* shows an example of NBR in brain tumor tissue.

PBR and NBR differed significantly: 0.84 ± 0.36 and 1.06 ± 0.41, $P < 0.05$. NBR in the diseased hemisphere exceeds NBR in the healthy hemisphere. *Figure 3* shows activation ratios against threshold.

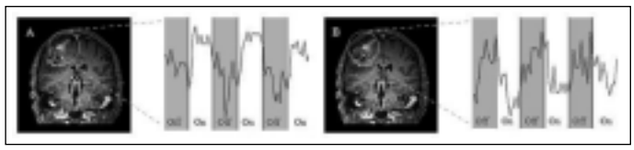

Figure 2: Negative BOLD response in tumor tissue

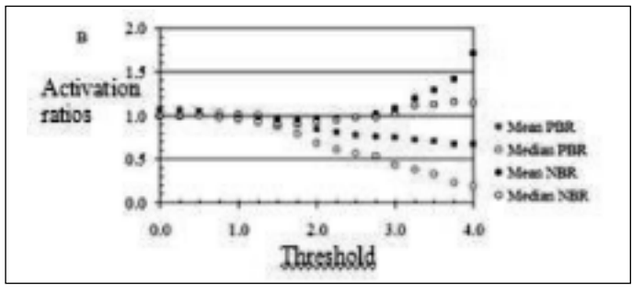

Figure 3: Mean and median of activation ratios

Conclusion: NBR can be found in (the proximity of) brain tumor tissue. To optimize applicability of fMRI in neurosurgical planning, one should control for negative activation patterns.

P22

REPRODUCIBILITY AND CONVERGENCE OF CONTINUOUS ARTERIAL SPIN LABELING AT 3.0 TESLA MRI

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Introduction: ASL is a non-invasive technique used to quantify cerebral blood flow (CBF). The low signal effect of labeled blood remains an important concern. ASL sequences consist of 40 to 60 paired labeled and control acquisitions that are averaged to ameliorate signal effect. Fewer acquisitions might suffice. The aim of this study was to assess reproducibility and convergence of 3.0 Tesla CASL CBF measurements, with an increasing number of averages.

Subjects and Methods: We scanned nine healthy volunteers on three different occasions (five males; mean age 30.39 years). During each session we performed two CASL scans, using the amplitude modulated CASL approach (post labeling delay 1.2 s). We planned the position of the labeling plane perpendicular to the posterior ascending portion of the internal carotid artery, using an MRA each consecutive CASL measurement. Single-shot SE EPI images were acquired. Reproducibility was expressed as the repeatability coefficient (95% confidence interval for the difference between repeated measurements).

Results: Mean whole brain CBF was 44.74 ± 9.02 ml/100g/min. After 20 averages intersession and intrasession repeatability converged to 11.84 and 9.03 ml/100g/min respectively. *Figure 1* shows convergence of absolute differences between CASL measurements as a function of averages. Averaging more than 20 pairs of acquisitions does not alter mean CBF. No clear differences are visible between 30, 40 and 50 averages (*image 1*).

Conclusion: We conclude that the number of averages for CASL at 3T, does not need to be higher than 20. The limited number of averages may improve clinical applicability of CASL.

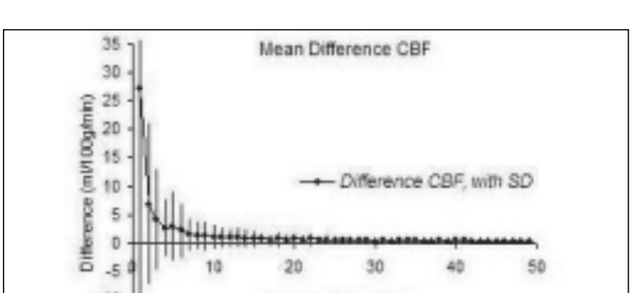

Figure 1: 15-year old male patient suspected of IB

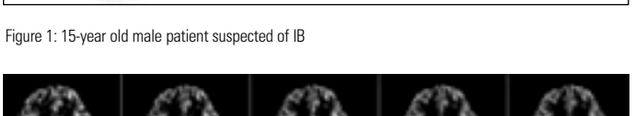

Image 1: Slices with 10, 20, 30, 40, 50 averages

P23

DTI OF THE CORPUS CALLOSUM IN HEAD TRAUMA

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Purpose: To investigate diffusion tensor imaging (DTI) characteristics of the corpus callosum in patients with mild, moderate and severe traumatic brain injury (TBI).

Methods: Ten control subjects (men:women, 7:3; mean age, 37 ± 9 [standard deviation] years) and 39 TBI patients (men:women, 27:12; 34 ± 12 years) were investigated, of whom 24 had mild, 9 moderate and 6 severe TBI. Regions-of-interest were selected in the genu, body and splenium of the corpus callosum to calculate fractional anisotropy (FA), apparent diffusion coefficient (ADC) and number of fibers passing through. Statistical comparison was made through analysis-of-variance with Scheffe's post-hoc analysis.

Results: Compared with controls, mild TBI patients investigated <3 months post-trauma (n=12) had reduced FA (P<0.01) and increased ADC (P<0.05) in the genu, while mild TBI patients investigated >3 months post-trauma (n=12) showed no significant differences. Patients with moderate and severe TBI, all investigated <3 months post-trauma, had reduced FA (P<0.001) and increased ADC (P<0.01) in the genu compared with controls, and reduced FA in the splenium (P<0.001) without significant ADC change.

Conclusion: Mild TBI is associated with DTI abnormalities in the genu <3 months post-trauma. In more severe TBI, both the genu and splenium are affected. DTI suggests a larger contribution of vasogenic edema in the genu than in the splenium in TBI.

P24

DISTRIBUTION AND VOLUME OF CEREBRAL INFARCTIONS, WHITE MATTER LESIONS AND CEREBRAL ATROPHY IN PATIENTS WITH SYMPTOMATIC INTERNAL CAROTID ARTERY STENOSIS

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Aim: To describe the distribution and volume of cerebral infarctions, white matter lesions (WML) and cerebral atrophy in patients with a symptomatic carotid artery stenosis and to investigate the relation between the carotid stenosis and small vessel disease (lacunar infarctions and white matter lesions) in these patients.

Methods: Magnetic resonance imaging (MRI) investigations from patients included in the International Carotid Stenting Study (ICSS) at the University Medical Center Utrecht (UMCU), The Netherlands, were used. Hemispheres ipsilateral and contralateral to the carotid stenosis were compared. In total, 71 ipsilateral (symptomatic) hemispheres from 69 patients were included in the analyses. For the brain segmentation, an automatic method for probabilistic segmentations was used, resulting in volumes of brain tissue, ventricles, cerebrospinal fluid, WML and infarctions. Infarctions were classified as being lacunar, cortical, watershed or subcortical. For the cortical infarctions, the corresponding flow territory was determined. As a measure of brain atrophy, the total brain volume per hemisphere was divided by the total hemispherical volume.

Results: Significantly more infarctions occurred in the symptomatic hemisphere (p=0,001). However, there were no differences in the occurrence of lacunar infarctions (p=0,563) and the volume of WML (p=0,418) between the symptomatic and asymptomatic hemispheres. The infarction volumes were smaller in the asymptomatic hemispheres (p<0,001). There was no difference in brain atrophy (p=0,688).

Conclusion: A severe carotid stenosis does not lead to more signs of small vessel disease in the ipsilateral hemisphere.

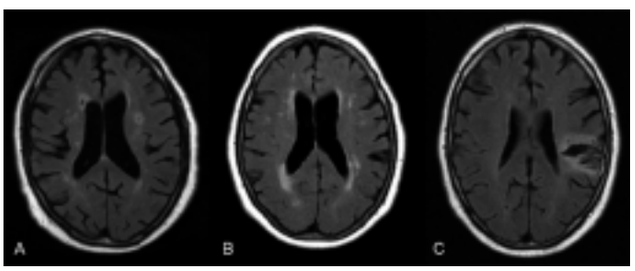

Image 1: T2FLAIR images in patients with a carotid stenosis

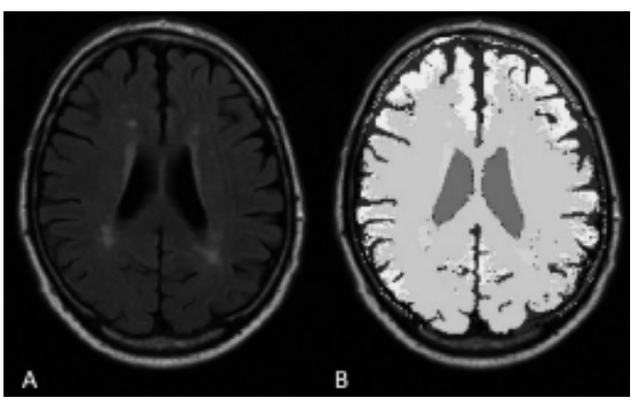

Image 2: Example of automatic segmentation

P25

PERFUSION MRI IN NEURO-PSYCHIATRIC SYSTEMIC LUPUS ERTHEMATHOSUS

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Background: Multiple pathogenic mechanisms can underlie systemic lupus erthemathosus (SLE) patients developing neuropsychiatric (NP) syndromes. Our aim was to use perfusion weighted MR to quantify any perfusion abnormalities and possible ischemia and to determine whether they contribute to neuropsychiatric involvement in SLE.

Materials and methods: We applied dynamic susceptibility contrast-tracking (DSC) perfusion MRI (9 slices of 6 mm thickness, FOV 250 mm, scan matrix 89x55, TR 400 ms, TE 30 ms, flip angle 90 degrees, 25 ml of Gd-DTPA at 5 ml/sec) in 15 patients with active NPSLE, 26 with inactive NPSLE and 11 control subjects. Cerebral blood flow (CBF), mean transit time (MTT) and cerebral blood volume (CBV) maps were reconstructed on an off-line workstation and regions of interest were drawn in the white and the gray matter.

Results: No significant differences were found between the groups in CBF, MTT and CBV in the white and the gray matter. None of the SLE criteria and none of the NP syndromes caused significantly different perfusion parameters. None of the patient groups with anti-cardiolipin antibodies, lupus anti-coagulant, anti-phospholipid syndrome (APS) or medication showed any significant difference as compared to the healthy control group or patients without antibodies, APS or medication.

Conclusion: In conclusion, our findings suggest that the perfusion parameters CBF, MTT and CBV in the white and the gray matter in SLE patients are not significantly different from healthy controls. Nor are they different between patients with and without specific syndromes and patients with or without immunological disorder involving coagulation.

P26

CORRELATION OF MAGNETIZATION TRANSFER RATIO (MTR) HISTOGRAM PARAMETERS WITH NEUROPSYCHIATRIC SYSTEMIC LUPUS ERYTHEMOSUS CRITERIA AND MR SPECTROSCOPY

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Leids Universitair Medisch Centrum, Leiden

Introduction: The underlying pathology and the relation of whole brain MTR histogram peak height with specific symptoms in NPSLE remain unknown. The first aim of our study was to investigate whether in NPSLE the MTR histogram parameters are related with neurochemical findings obtained with proton magnetic resonance spectroscopy (1H-MRS). The second aim was to investigate whether MTR histogram changes are linked to specific SLE and NPSLE characteristics.

Methods: 18 SLE patients (15 female; 3 male, mean age 42.8 SD 12.8), 34 NPSLE patients (32 female; 2 male, mean age 35.9 SD 12.2) and 15 healthy controls (14 female and 1 male mean age 44.7 SD 9.6) underwent magnetization transfer imaging and 1H-MRS. Whole brain MTR histograms parameters were associated with 1H-MRS metabolite ratios, SLE criteria and NP syndromes.

Results: The NPSLE patients had a lower MTR histogram peak height compared to healthy controls. MTR histogram peak height was significantly associated with the ratio of N-acetylaspartate to creatine ratio. Of all SLE criteria, renal dysfunction and arthritis were associated with MTR histogram parameters. After correction for age, gender and these SLE criteria, of the NP syndromes only cognitive dysfunction was associated with the MTR histogram peak height.

Conclusion: The MTR peak height is lower in NPSLE than in healthy controls. MTR peak height reflects neuronal dysfunction as detected by 1H-MRS. Furthermore, MTR peak height is associated with cognitive dysfunction but not with other NP syndromes present in our study.

P26a

ABNORMAL WHITE MATTER METABOLITE RATIOS IN CANCER SURVIVORS TREATED WITH CTC CHEMOTHERAPY AS MEASURED WITH 3 TESLA PROTON-MR SINGLE-VOXEL SPECTROSCOPY

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Systemic chemotherapy is associated with cognitive problems in a subset of cancer survivors (1). The purpose of this cross-sectional study was to identify potential long-term brain white matter pathology induced by adjuvant high dose CTC (cyclophosphamide, thiothepa, carboplatin) chemotherapy in breast cancer survivors. High field (3T) proton-MR spectroscopy data were acquired using the single voxel point-resolved spectroscopy (PRESS) sequence (TE/TR=37/2000ms) in 9 disease-free survivors (mean age 57.11, range 45-64), approximately 8 years after treatment. A voxel of 12 ml was placed in the left centrum semiovale. LCModel fits were used to estimate concentrations of N-acetylaspartate (NAA), Choline (Cho), and Creatine (Cr). For comparison with published data, metabolite concentrations were normalized to metabolite content (Mettot), as previously employed by others (2). Overall NAA/Mettot was reduced in all subjects when compared to normal controls of a similar age in the literature (2): 50.26% [SD 2.82] versus a reported 66.32% [SD 2.84], a reduction of 24%. Cr/Mettot was on average increased by 39% (36.95% [SD 2.52] vs. 22.84% [SD 2.65]) along with Cho/Mettot by 18% (12.78% [SD 1.32] vs 10.84% [SD 1.33]). Although ongoing studies are being undertaken in age matched controls, this study suggests metabolic abnormalities of normal appearing cerebral white matter years following chemotherapy. The metabolic abnormalities are thought to reflect axonal damage/demyelination and microangiopathy, as similar observations have been made in several leukoencephalopathies (2).

References

1. Schagen SB & Vardy J Lancet Oncol 2007;8:852-853.
2. Auer DP et al Neurology 2001;56:635-642.

P27

IN VIVO IMAGING OF GADOLINIUM-LABELLED CELLS: DUALISTIC BEHAVIOUR OF GADOLINIUM AS AN INTRA-CELLULAR PROBE

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Purpose: *In vivo* tracking of cells can be done by labelling the cells with contrast agents. We studied the in vivo dynamics of Gadolinium liposomes as an intra-cellular paramagnetic probe using rapidly dividing tumour cells.
Methods: Tumour cells were labelled in vitro with Gd-liposomes. Labelled tumour cells were injected s.c. in rats and repeatedly imaged in a clinical 3.0T MRI scanner up to two weeks after injection.
Results: Immediately after injection the labelled cells give rise to large signal voids on MRimages independent of the acquisition parameters (flip angle, TE) that were used. Over time, the signal changes over time are dependent on the acquisition parameters used. After 2 days, areas with hyper-intense contrast are observed at the injection site at short TE (e.g. 1.5) and/or high flip angles (e.g. 60). After 7 days areas with hyper-intense contrast are also observed at higher TE (e.g. 3 and 8.8) and/or low flip angles (e.g. 30 and 10).
Conclusion: In rapidly dividing cells, the concentration of gadolinium in the cells will be diluted after each cell division. Depending on the scanning parameters and the concentration of gadolinium within the cells, the labelled cells will give rise to signal voids or hyper- intense contrast. This dualistic behaviour of gadolinium may be used to not only visualize cells with MRI but also to provide information about gadolinium concentration and thus cell division after injection.

P28

MARK-UPS IN E-BASED RADIOLOGY: A USEFUL TOOL?

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Background: In the new medical curriculum radiology is partly e-Learning blended education. In the e-Learning course module of Respiratory Disease a new feature is included, a colour mark-up interactive tool, enabling the student to point out the questioned anatomy and pathology.
Work done: The e-Learning program is developed in Adobe Captivate and demonstrated by means of Questionmark Perception (QMP). A pulmonary case is presented and several radiological imaging modalities are shown and students are asked to recognize pathological disorders. In Adobe Photoshop, colour mark-ups are made, shown as transparent overlays, that stress both anatomical and pathological structures. A Likert scale questionnaire is used to acquire student opinion on the use of this tool.
Results: The questionnaire was completed by 199 (68%) of the 290 students. Colour mark-ups were found useful by 79% (n=138) students. It's use gained more insight into radiology was agreed by 80% (n=159). The use of this mark-ups did not hamper the use of the program. The students expressed the need for more use of this interactive tool.
Conclusion: Adding colour mark-ups in e-based radiology are considered a valuable supplement to education.

P28a

VERKORTEN VAN MRI-TOEGANGSTIJDEN DOOR FLEXIBELERE PLANNING

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Academisch Medisch Centrum, Amsterdam

Doelstelling: Eén van de belangrijke bottlenecks voor de doorstroming van patiënten binnen ziekenhuizen vormt de toegangstijd tot de MRI-scans. Aangezien deze entiteit zeer kapitaalintensief is, heeft het optimaal benutten van de capaciteit veel toegevoegde waarde. Het doel van dit onderzoek was het terugdringen van de toegangstijden tot de MRI-scans van het AMC tot de norm van maximaal twee weken voor alle patiëntcategorieën, door de bestaande capaciteit slimmer te benutten.
Methoden: Er is longitudinaal onderzoek uitgevoerd. Vanaf de nulmeting zijn de toegangstijden steeds zowel prospectief als retrospectief gemeten. Op basis van een kwalitatieve en kwantitatieve analyse, zijn potentiële interventies geselecteerd. De belangrijkste interventies zijn nagebootst door middel van een computersimulatiemodel. De resultaten van deze simulatie hebben geleid tot een definitieve keuze van interventies. Na implementatie is de procesgang vijf maanden nauwkeurig gevolgd en wekelijks geëvalueerd.
Resultaten: De belangrijkste potentiële interventie die uit de procesanalyse kwam, was het flexibiliseren van de planning. Uit de simulatie kwam naar voren dat een reductie van het aantal blokken ('slots') in de agenda grote invloed zou hebben op de toegangstijd. 1 januari 2008 is dit geïmplementeerd waarbij het aantal van 15 blokcategorieën is teruggebracht tot 3. Hierdoor is de kritieke toegangstijd in vier maanden afgenomen van 40 tot 11 dagen.
Conclusies: De mate van flexibiliteit voor de planning van een afsprakensysteem zoals de MRI heeft grote invloed op de toegangstijd. Minder blokcategorieën geven meer vrijheid om een patiënt in te plannen en verminderen het aantal gaten in de planning.

P29

ARE ORTHOPEDIC SURGEONS RIGHT WHEN REQUESTING A POSTERIOR APPROACH IN MR ARTHROGRAPHY OF THE SHOULDER?

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Introduction: In our hospital orthopedic surgeons request a posterior approach for shoulder MR arthrography, especially in patients with anterior shoulder instability, to avoid interpretive difficulties in differentiating ventral leakage of contrast from anterior extraarticular contrast injection. In this study we determined the occurrence of ventral leakage of contrast in shoulder MR arthrography when using a posterior approach.
Methods: In this retrospective cohort study we included 73 consecutive patients who underwent shoulder MR (1.5 Tesla) arthrography performed by a senior resident who had no prior experience using the posterior approach under fluoroscopic guidance. Three patients were excluded. Two due to conversion to anterior approach. One due to extracapsular contrast injection. Ventral leakage of contrast, defined as contrast seen around the musculus subscapularis without distention of the posterior capsule *(Image 1)*, was recorded. Descriptive statistics were performed in Excel.
Results: Seventy shoulders were included. Left shoulder was involved in 41 of

70 shoulders (59%). Mean age of patients was 49 years (range 17 to 76 years). 35 of 70 patients were female (50%). Ventral leakage of contrast was seen in 12 of 70 shoulders (17%).

Conclusion: As ventral leakage of contrast was seen in a substantial number of cases when using a posterior approach in shoulder MR arthrography, a posterior approach is recommended to avoid interpretive difficulties that occur when contrast is seen ventral from the shoulder capsule when using an anterior approach.

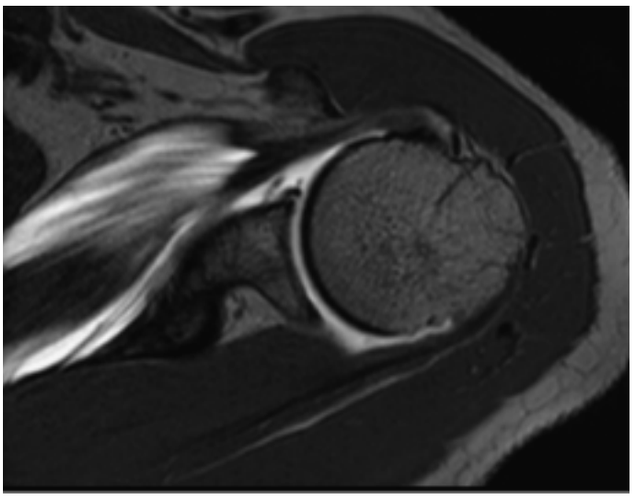

Image 1: Ventral contrast leakage (posterior approach)

P30

A POSITIVE QUADRICEPS FATPAD SIGN ON MRI AND IT'S CLINICAL CORRELATION. A RETROSPECTIVE MRI STUDY

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Purpose: A positive quadriceps fatpad sign (PQFS) on MRI has been correlated to patello-femoral pain. The purpose of this study is to evaluate the prevalence and value of PQFS.

Methods: All MR exams of the knee in 2006 (N=786) were retrospectifily reviewed. The quadriceps fatpad was graded on signal intensity (SI) (0 normal, I increased and II high SI) and shape (convex or concave). The combination of level II SI and a convex shape was graded as PQFS. All positive cases were related to clinical information and concomitant findings on MR exam.

Results: 717 exams were included (695 patients). Increased SI (level I) was found in 104 exams and a level II SI in 23 exams. A convex shape was found in all patients with a level II SI and in 61 with level I SI. In 16 exams with a PQFS there were concomitant findings: meniscal tear (N=14), cruciate (N=2) ligament injury and other findings. In 7 cases (6 patients) no other pathology was found, all of these had complaints of patellofemoral pain.

Conclusions: A 'positive fatpad sign' is an aspecific sign. When there is no other injury it is correlated to patellofemoral pain.

AANTEKENINGEN

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Routebeschrijving De Doelen

INGANG: WILLEM BURGERZAAL COMPLEX

Trein, tram, bus en metro stoppen bij de Doelen voor de deur. Bovendien biedt de omgeving van de Doelen ruime parkeermogelijkheden.

OPENBAAR VERVOER

Trein - Rotterdam CS op 5 minuten loopafstand.
Metro - halte Centraal Station (begin- en eindpunt).
Tram - halte Kruisplein 4, 7, 8, 20, 21, 23 en 25.
Bus - halte Centraal Station, lijn 33, 38, 44, 48 en 49.

Let op

Het Station en het Stationsplein worden op dit moment ingrijpend vernieuwd. Ook bezoekers van de Doelen hebben hiermee te maken.
Zie www.rotterdam-centraal.nl voor meer informatie.

ROUTEBESCHRIJVING AUTO

Vanuit Amsterdam/Den Haag

A13 richting Rotterdam, bij Kleinpolderplein richting Centrum volgen, bij tweede stoplicht borden Euromast/Maastunnel volgen, na stoplicht rechtertunnel nemen, bij stoplicht links. U komt nu uit op het Weena.
Zie verder de onderstaande plattegrond (route A).

Vanuit Utrecht

A20 richting Den Haag/Hoek van Holland, afslag Rotterdam Centrum/ Schiebroek/Hillegersberg, bij einde afslag borden Centrum volgen (Schieweg/ Schiekade). U komt nu uit op het Hofplein.
Zie verder de onderstaande plattegrond (route B).

Vanuit Breda/Dordrecht

Kies op de A16 de rechterbaan (volg Kralingen/Rotterdam Centrum). Rijd over de Van Brienenoordbrug, eerste afslag (Rotterdam Centrum). Onderaan de afslag linksaf (rotonde richting Centrum), de Maasboulevard op. Rechtdoor (langs de Boompjes). Bij Hotel Inntel (aan uw rechterhand) gaat u rechtsaf de Schiedamsedijk op. Volg deze tot aan de kruising Coolsingel-Westblaak.
Ga op deze kruising naar links de Westblaak op of rijd rechtdoor richting Hofplein. Zie verder de onderstaande plattegrond (route C).

Parkeren

In de buurt van de Doelen zijn zes parkeergarages op loopafstand:

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2. Parkeergarage Groothandelsgebouw
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