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MEMO RAD

JAARGANG 11 - NUMMER 3 - HERFST 2006

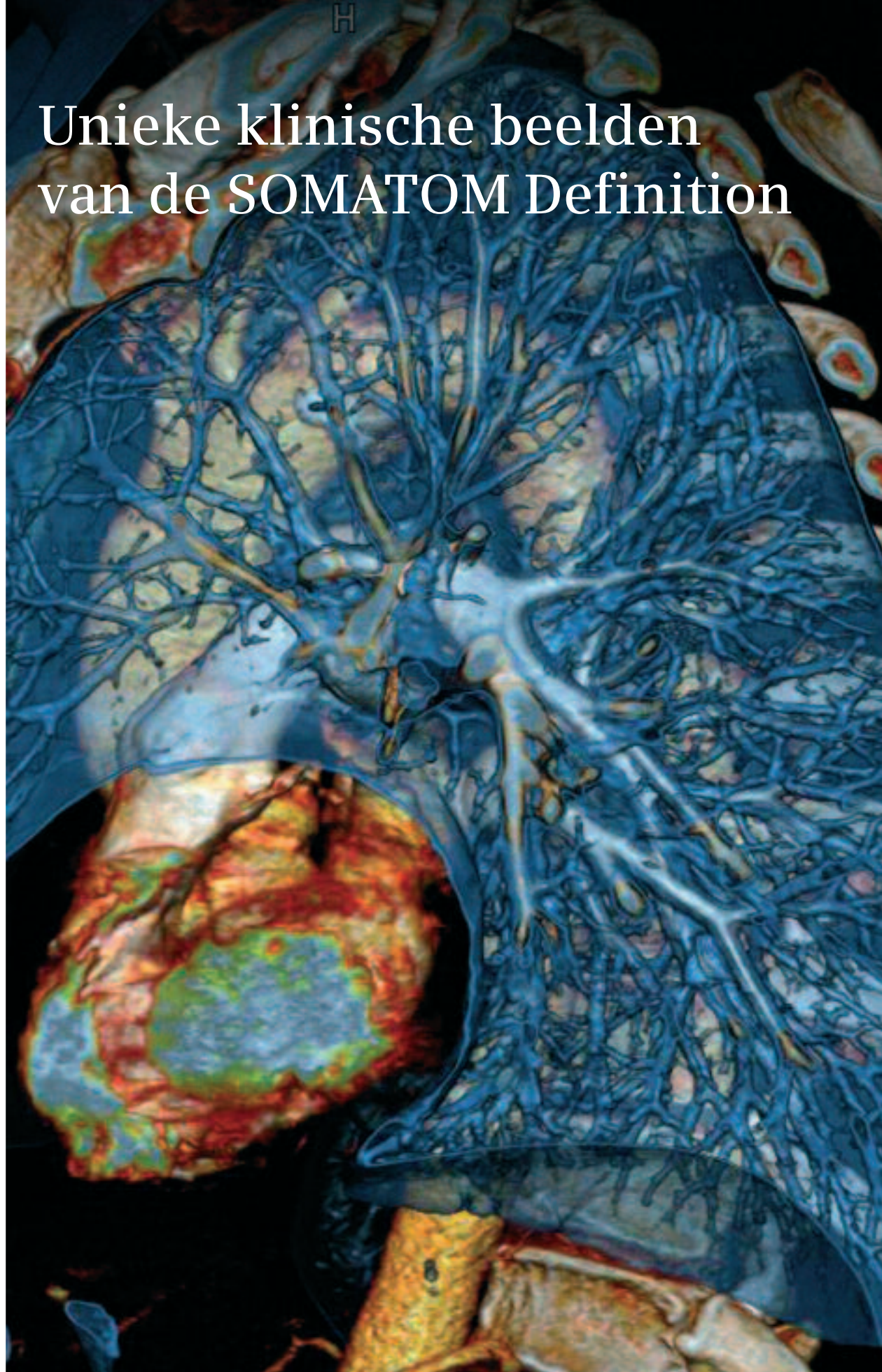
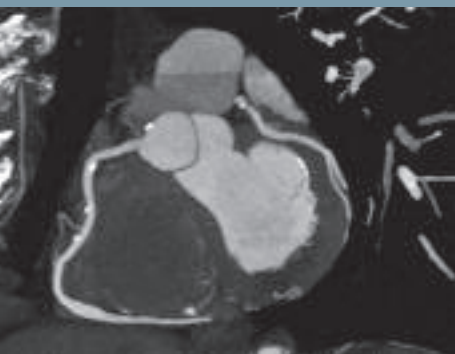
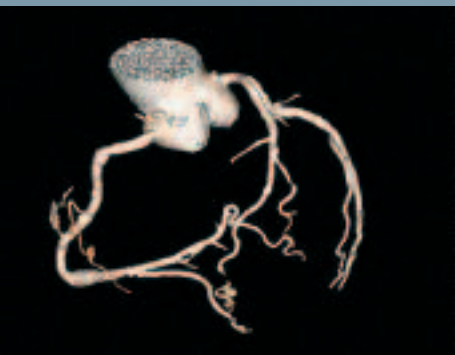
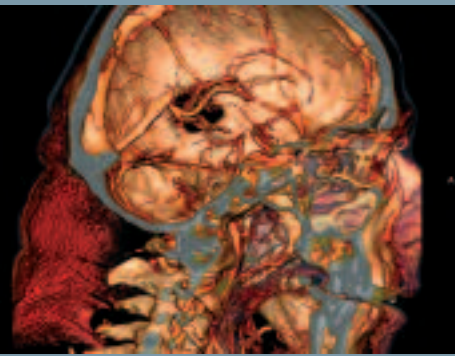
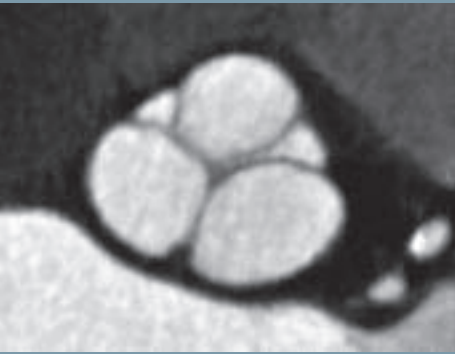
SUPPLEMENT

11^E NEDERLANDSE RADIOLOGENDAG
21^{STE} LUSTRUM VAN DE NVvR
17 NOVEMBER 2006
DE EFTELING, KAATSHEUVEL



Nederlandse Vereniging voor Radiologie
Radiological Society of the Netherlands

Unieke klinische beelden van de SOMATOM Definition



Innovatie staat bij ons hoog in het vaandel. De SOMATOM Definition is daar een duidelijk bewijs van. Deze eerste Dual Source CT scanner ter wereld zorgt voor een absolute doorbraak in CT. De SOMATOM Definition beschikt over twee röntgenbronnen en twee detectorbogen en verlegt daarmee de technische en klinische grenzen. Voordelen van dit systeem zijn: sneller dan ieder hartritme (scannen zonder betablokkers, zelfs bij een onregelmatige hartslag), volledige cardiologische details met de halve dosis, 'one stop' diagnose in de acute zorg en krachtige, verdergaande diagnosemogelijkheden d.m.v. dual energy scanning. Inmiddels zijn de eerste systemen geïnstalleerd en de beelden spreken voor zich.

www.siemens.nl/medical

SIEMENS



Een stralend sprookje



BIRGITTA TER RAHE

Het Organisatiecomité Radiologendag 2006 heet u van harte welkom in de wondere wereld van de Efteling. De 11^e Radiologendagen zijn teruggebracht tot één dag, om een combinatie met het 21^{ste} lustrum van de Nederlandse Vereniging voor Radiologie mogelijk te maken.

Een lustrum nodigt uit tot een terugblik, bezinning en een toekomstvisie: in de Fata Morgana-zaal zal de plenaire sessie plaatsvinden met bespiegelingen over de toekomst van de radiologie en de positie van de radioloog in dit kader. De heelkundige ervaringen met prestatie indicatoren en de implementatie daarvan in de praktijk zullen vervolgens worden besproken. Over deze onderwerpen zal van gedachten kunnen worden gewisseld in de paneldiscussie. Aansluitend zal de Philipsprijs worden uitgereikt.

Tijdens de drie refreshercourses wordt aandacht besteed aan (i) veneus ingebrachte (on)getunnelde lijnen en shunts; (ii) diagnostische en therapeutische mogelijkheden bij een incidentaloom in de lever en (iii) de differentiatie van hobbels en bobbel in skelet en weke delen.

Tijdens de parallelsessies wordt u op de hoogte gebracht van de huidige stand van het wetenschappelijk onderzoek in radiologisch Nederland.

De foyer van het Efteling theater vormt het centrale ontmoetingspunt, waar u kunt bijpraten met collega's.

De radiologendag zal worden uitgeluid met de vertrouwde industrieborrel. Tijdens deze borrel wordt de Radiologendagenprijs uitgereikt aan één van de genomineerde kandidaten. Tevens kunnen de partners zich vanaf dit moment bij u voegen. Na de 'tocht door het park' zal het feest losbarsten in het Carrouselpaleis.

Het Organisatiecomité 11^e Nederlandse Radiologendag,

Birgitta ter Rahe

Louk Oudenhoven

Jan Albert Vos

Vrijdag 17 november 2006

Tijdstip	Onderwerp
08.30 - 19.30 uur	Registratiebalie en garderobe open
08.30 - 16.00 uur	Sprekersruimte open
08.30 - 09.45 uur	Ontvangst in Efteling Theater
09.45 - 09.50 uur	Opening Birgitta ter Rahe
09.50 - 11.20 uur	Plenaire sessie: De Radiologie in Nederland, waar gaan we heen? Voorzitter: Prof. Dr. G.J. den Heeten, AMC, Amsterdam
09.50 - 10.20 uur	Moving the radiologist to the front line; should we be the first point of referral? Spreker: Prof. A.K. Dixon, Addenbrooke's Hospital, Cambridge, United Kingdom
10.20 - 10.50 uur	Overleeft de radioloog de 21ste eeuw? Spreker: Prof. Dr. J.A.M. van Engelshoven, AZM, Maastricht
10.50 - 11.20 uur	Prestatie-indicatoren; ervaringen uit de heekunde Spreker: Dr. A.C. de Vries, Medisch Centrum Haaglanden, Den Haag
11.20 - 11.35 uur	Uitreiking Philips Prijs en lezing prijswinnaar Uitreiking Philips Prijs 2006, door Ir. B. Wijdeveld, Director Benelux, Presentatie Prijswinnaar Philips Prijs 2006
11.35 - 12.10 uur	Pauze
12.10 - 13.14 uur	Parallelsessies: I: Kinderradiologie / Thoraxradiologie Voorzitters: A.J.E. de Bruijn (UMCU, Utrecht) en C. Schaeffer-Prokop (AMC, Amsterdam) II: Gastrointestinale Radiologie I Voorzitters: J.B.C.M. Puylaert (MC Haaglanden, locatie Westeinde, Den Haag) en A. Sramek (LUMC, Leiden) III: Neuroradiologie I Voorzitters: H.L.J. Tanghe (UMCU, Utrecht) en R.B.J. de Bondt (AZM, Maastricht) IV: Mammadiagnostiek / Interventieradiologie I Voorzitters: V. Williams (UMC St. Radboud, Nijmegen) en A.C.W. Borstlap (Viecuri Venlo Ziekenhuis, Venlo) V: Skeletradiologie / Onderwijs en Opleiding Voorzitters: M. Maas (AMC, Amsterdam) en A.D. Montauban-van Swijndregt (OLVG, Amsterdam)
13.14 - 14.20 uur	Lunch
14.20 - 15.16 uur	Parallelsessies: VI: Neuroradiologie II / Diversen (tot 15.24 uur) Voorzitters: B.K. Velthuis (UMCU, Utrecht) en J.C.J. Bot (VUMC, Amsterdam) VII: Gastrointestinale Radiologie II Voorzitters: O.M. van Delden (AMC, Amsterdam) en B. Mearadji (AMC, Amsterdam) VIII: Interventieradiologie II Voorzitters: E. van der Linden (Erasmus MC, Rotterdam) en L. Kaufmann (Spaarne Ziekenhuis, Haarlem) IX: Nucleaire geneeskunde / Urologie Voorzitters: G. Stapper (UMCU, Utrecht) en M.A. Heitbrink (MCA, Alkmaar) X: Cardiovasculaire radiologie Voorzitters: H.W. van Es (St. Antonius Ziekenhuis, Nieuwegein) en L.J.M. Kroft (LUMC, Leiden)
15.16 - 16.00 uur	Pauze
16.00 - 17.15 uur:	Refresher Courses: I: VENEUZE TOEGANG Voorzitter: O.M. van Delden (AMC, Amsterdam) Ongetunnelde veneuze lijnen Spreker: E. van der Linden (Erasmus MC, Rotterdam) Getunnelde veneuze lijnen Spreker: H. van Overhagen (Leyenburg Ziekenhuis, Den Haag) Shunts Spreker: L.E.M. Duijm (Catharina Ziekenhuis, Eindhoven)

Vrijdag 17 november 2006

Tijdstip	Onderwerp
16.00 - 17.15 uur:	Refresher Courses: II: HET INCIDENTALOOM IN DE LEVER Voorzitter: M.E.J. Pijl (Martini Ziekenhuis, Groningen) Echografie en biopsie Spreker: E.J. van der Jagt (UMCG, Groningen) Karakterisatie met CT en MR Spreker: M.S. van Leeuwen (UMCU, Utrecht) Vragen en antwoorden uit de kliniek Spreker: R.A. de Man (Erasmus MC, Rotterdam)
16.00 - 17.15 uur:	III: SOFT LUMPS AND BONY BUMPS Voorzitters: C.S.P. van Rijswijk (LUMC, Leiden) en H.J. van der Woude (OLVG, Amsterdam) Imaging of benign bony bumps Spreker: K. Verstraete (UZ-Universiteit, Gent, België) Imaging of the soft part Spreker: M.A. de Schepper (LUMC, Leiden) Surgical point of view Spreker: A. Taminiau (LUMC, Leiden)
	<i>De 11^e Radiologendag is geaccrediteerd voor 5 punten door de NVvR voor nascholing.</i>
	PARTNERPROGRAMMA, VRIJDAG 17 NOVEMBER 2006 (min. 15 personen)
10.00 uur	Vertrek per bus vanaf de hoofdingang Efteling
11.00 - 12.00 uur	Rondleiding met gids in Textielmuseum te Tilburg
12.00 - 13.45 uur	Aansluitend lunch in de museum Brasserie
13.45 - 14.00 uur	Vertrek per bus naar 's Hertogenbosch
v.a. 14.30 uur	Stadswandeling met gids / vrij rondlopen / winkelen / bezoek aan Noord Brabant museum
16.30 uur	Vertrek per bus terug naar de Efteling
v.a. 17.15 uur	Avondprogramma (borrel en feestavond)
	AVONDPROGRAMMA, VRIJDAG 17 NOVEMBER 2006
17.15 - 18.00 uur	Omkleden voor het feest
18.00 - 19.00 uur	Industrieborrel en uitreiking radiologendagenprijs
19.00 - 20.00 uur	Bezoek van 2 attracties in het park
20.00 - 24.00 uur	Congresdiner en feest
	Dresscode: Black Tie

De Efteling zal alleen voor congresdeelnemers toegankelijk zijn, het park is officieel gesloten.

De Efteling verkoopt geen rookwaar.

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

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HOOFDSPONSORS 11^E RADIOLOGENDAGEN

PHILIPS NEDERLAND B.V.

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Genomineerde abstracts voor de radiologendagen prijs 2006

NR. 13/3.1 REGIONAL CEREBRAL BLOOD FLOW AND CEREBROVASCULAR RISK FACTORS

P.J. van Laar, Y. van der Graaf, W.P.T.M. Mali, J. van der Grond, J. Hendrikse

NR. 37/9.7 MRI WITH A LYMPH NODE SPECIFIC CONTRAST AGENT (FERUMOXTRAN-10): AN ALTERNATIVE FOR MULTI DETECTOR CT-SCANNING AND LYMPH NODE DISSECTION IN PATIENTS WITH PROSTATE CANCER?

R.A.M. Heesakkers, A.M. Hövels, H.C.M. Van den Bosch, J.A. Witjes, F. Raat, G.J. Jager, J.L. Severens, C.A. Hulsbergen van de Kaa, J.O. Barentsz

NR. 39/7.2 IS PREOPERATIEVE RADIOLOGISCHE DIFFERENTIATIE TUSSEN GROTE T2 EN KLEINE T3 RECTUMTUMOR ZINVOL?

M.J. Lahaye, S.M.E. Engelen, G.L. Beets, A.G.H. Kessels, S. Aller, C.J.H. van de Velde, M.F. von Meyenfeldt, J.M.A. van Engelshoven, R.G.H. Beets-Tan

NR. 46/3.2 ASSESSING FIBER DENSITY ASYMMETRY IN THE ARCUATE FASCICULUS (AF) USING DIFFUSION TENSOR TRACTOGRAPHY (DTT) IN BOTH RIGHT AND LEFT HANDED SUBJECTS

M.W. Vernooij, M. Smits, P.A. Wielopolski, G. Houston, G.P. Krestin, A. van der Lugt

NR. 72/4.5 INDEPENDENT DOUBLE READING OF SCREENING MAMMOGRAMS IN THE NETHERLANDS: IMPACT OF ADDITIONAL DOUBLE READING BY SCREENING MAMMOGRAPHY RADIOGRAPHERS

E.M. Duijm, J.H. Groenewoud, R.M. Roumen, M. van Beek, M.L. Plaisier, J. Fracheboud

NR. 74/4.8 AN ECONOMIC EVALUATION OF UTERINE ARTERY EMBOLIZATION VERSUS HYSTERECTOMY IN THE TREATMENT OF SYMPTOMATIC UTERINE FIBROIDS: RESULTS FROM THE RANDOMIZED EMMY-TRIAL

N.A. Volkers, W.J.K. Hehenkamp, P.M. Smit, W.M. Ankum, J.A. Reekers, E. Birnie

NR. 106/3.3 MR IMAGING OF HIPPOCAMPAL LESIONS IN MULTIPLE SCLEROSIS

S.D. Roosendaal, J.J.G. Geurts, B. Moraal, H. Vrenken, P.J.W. Pouwels, J. Castelijns, F. Barkhof

NR. 118/7.1 VIDEOSCOPIIC ASSISTED RETROPERITONEAL DEBRIDEMENT IN INFECTED NECROTISING PANCREATITIS AS A PILOT STUDY TO INTRODUCE A RANDOMISED CONTROLLED TRIAL

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	4.2	Ramshorst, B. van	7.1	Staaks, G.H.A.	9.2	Van Moerkerk, H.	9.6
	8.3	Randen, A. van	2.2	Steyerberg, E.W.	6.5	Van Schijndel, R.A.	3.6
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	10.2	Reekers, J.A.	4.7		2.3	Veldhuis, R.J.B.	9.3
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	10.6	Reijnierse, M.R.	5.1		7.5	Vellinga, M.M.	3.5
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	7.3	Reneman, L.	6.1		7.7	Venema, H.W.	6.3
Minneboo, A.	3.4	Riele, W.W. te	8.1		9.4	Vernooij, M.W.	3.2
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	8.4	Rijn, R.R. van	1.2	Strijen, J.L. van	10.4	Vervest, H.A.M.	4.6
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	10.3	Rinkel, G.	6.4	Tanghe, H.L.J.	6.5		4.8
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Oudkerk, M.	2.6	Scheenen, T.W.J.	9.5	Uitdehaag, B.M.J.	3.4	Walderveen, M.A.A. van	6.3
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Peelen, M.	1.2	Schultz, M.J.	1.7	Van der Flier, W.M.	3.6		9.3
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Petersen, E.T.	3.8	Sijstermans, R.	5.8	Van der Velden, J.	9.4		10.3
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	3.5	Smit, P.M.	4.8	Van Geerenstein, E.V.	1.3	Win, M.L. de	6.1
Pouwels, P.J.W.	3.3	Smits, P.J.H.	1.8	Van Gemert- Horsthuis, K.	7.6	Winkelhagen, J.	9.1
Prokop, M.	1.5	Smits, M.	3.2		7.7		9.5
Pugliese, F.	10.2		6.5	Van Herpen, C.M.L.	2.8		9.6
	10.3	Snel, J.G.	6.3	Van Hilligersberg, R.	4.2		9.7
Quarles van Ufford, H.M.E.	9.2	Spijkerboer, A.M.	9.4	Van Laar, P.J.	3.8	Worp, H.B. van der	8.3
Quekel, L.G.B.A.	9.2	Spronk, P.E.	1.7	Van Mieghem, C.	10.2	Zondervan P.E.	2.7
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Sessie 1 - Kinderradiologie / Thoraxradiologie

Vrijdag 17 november 2006, 12.10 - 13.14 uur

Abstractnr. : 1.1

A COMPARISON OF DOPPLER AND MRA CEREBRAL BLOOD FLOW MEASUREMENTS IN NEONATES AND APPLICATION OF MRA FLOW MEASUREMENTS AFTER EXTRACORPOREAL MEMBRANE OXYGENATION

J. Hendrikse¹, M.J.N.L. Benders², F. Van Bel², L.S. De Vries², F. Groenendaal²

¹UMC Utrecht, UTRECHT, Netherlands

²Wilhelmina Children's Hospital, UTRECHT, Netherlands

Introduction: With phase contrast MR Angiography (PC MRA) absolute volume flow in ml/min can be obtained. However, in newborns there is no experience with this technique. The aim of this study is to compare PC MRA with the wider used Doppler flow velocity measurements and furthermore assess the volume flow in the brain feeding arteries with PC MRA after extracorporeal membrane oxygenation (ECMO) procedures.

Methods: We evaluated volume flow/velocity in the left and right internal carotid artery (ICA) and basilar artery (BA) with quantitative two dimensional PC MRA (1.5T) in 20 newborns. On the basis of a localizer MR angiography slab in the sagittal plane the 2D PC MRA slice (velocity sensitivity of 30cm/sec) was positioned at the level of the skull base to measure the volume flow in the ICAs and BA. Quantitative flow values (ml/min) and maximum flow velocities (cm/sec) were calculated by integrating across manually drawn regions of the vessel lumen by averaging 5 dynamics (scan time: 40 seconds). Immediately thereafter Doppler measurements of the same blood vessels were performed to have the infants in the same clinical condition. Angle-corrected time averaged flow velocities were measured over 3-5 cardiac cycles. MRA flow measurements were performed in 4 neonates with severe respiratory failure after ECMO with (n=2) and without (n=2) ligation of the common carotid artery.

Results: A significant correlation coefficient (0.3-0.5) was found between the volume flow and velocities values measured by PC MRA and velocities (peak and mean) obtained by Doppler measurements of both ICAs and BA (p<0.05). The intraobserver variation of MRA volume flow measurements, as expressed by the standard deviation of the difference, was 2.2 ml/min corresponding to 5.6%. The interobserver variation of volume flow measurements was 2.1 ml/min corresponding to 5.5%. A total volume flow between 63 ml/min and 86 ml/min was measured in the brain feeding arteries (ICAs and BA) after the ECMO procedure.

Conclusions: PC MRA is a useful technique to quantify cerebral blood flow in the brain feeding arteries in neonates.

Abstractnr. : 1.2

KINDEREN MET ANTENATALE DRUGS EXPOSITIE (KADEX): EEN RETROSPECTIVE ANALYSE VAN CEREBRALE ECHOGRAFIE

R.R. van Rijn¹, A.A.M.W. van Kempen¹, M. Peelen¹, M. Timmers¹, B.J. Smit², A.M. van Huis¹

¹Academisch Medisch Centrum Amsterdam, AMSTERDAM, Nederland

²Erasmus Medisch Centrum, locatie Sophia, ROTTERDAM, Nederland

Doel: In utero drugs expositie van de foetus is in het verleden beschreven als oorzaak van intracraniale pathologie bij de neonat. Om deze reden is er in het AMC een screenings programma voor KADEX kinderen opgezet. In deze screening worden kinderen bij wie er sprake is van maternaal gebruik van cocaine en bij neonaten met een abstinentie syndroom een echografie van de schedel verricht. In dit onderzoek wordt de validiteit van deze screening retrospectief beoordeeld.

Materialen en methoden: In totaal kwamen 181 neonaten in aanmerking voor KADEX screening. In 10 (5,5%) van de patienten werd geen echografie verricht. In 19 (10,5%) patienten was het onderzoek van onvoldoende kwaliteit voor herbeoordeling. In totaal werden 152 patienten (71 jongens en 81 meisjes) in de studie geïnccludeerd.

Resultaten: De populatie toonde een gemiddelde zwangerschapstermijn van 38,3 weken (N=38,4, range 28,4 - 42,3 weken, waarbij 9 neonaten jonger dan 33 weken (5,9%)), het gemiddelde geboortegewicht was 2802 gram, -0,7 SD (N=149, range 780 - 4350 gr / -4,3 - 1,9 SD). De gemiddelde APGAR score na 5 minuten was 9,6 (N=146, range 4 - 10). De gemiddelde leeftijd van de moeder was 29,7 jaar (range 18 - 43 jaar).

Bij 37 (24,3%) neonaten werden afwijkingen gevonden. In 11 (29,7%) neonaten was er sprake van een doorgemaakt SEH (10SEH graad 1, 1SEH graad 2 en 2cysteuze restlesie), in 13 (35,1%) een plexuscyste, in 7 (18,9%) flairing, in 8 (21,6%) lenticulostriatale vasculopathie en in 3 (0,8%) germinolystische cystevorming. Er was geen significant verschil tussen jongens en meisjes voor de prevalentie van intracraniale pathologie (p=0,63).

Conclusie: Met uitzondering van n graad 2 SEH zijn alle gevonden afwijkingen als klinisch niet relevant te beschouwen met betrekking tot de ontwikkeling van de neonat op oudere leeftijd. In onze populatie was geen sprake van perinatale mortaliteit.

In vergelijking met in de literatuur beschreven prevalentie van intracraniale pathologie, in een normale populatie van prematuren en a-terme neonaten, bleek er geen significant verschil te zijn met de KADEX populatie. Hierdoor kan gesteld worden dat screening op intracraniale pathologie niet geïndiceerd is in deze specifieke populatie.

Abstractnr. : 1.3

WAARDE VAN SKELETSCINTIGRAFIE IN DE DIAGNOSTIEK VAN OSTEOMYELITIS BIJ NEONATEN MET SEPSIS 1994-2005

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Doel: Osteomyelitis is een ernstige complicatie bij neonaten die een sepsis hebben doorgemaakt. Vroege diagnostiek en therapie zijn essentieel voor het voorkomen van functionele beperkingen op lange termijn. Skeletscintigrafie wordt gebruikt bij deze groep kinderen als screeningsmethode op osteomyelitis; de waarde is echter niet bekend.

Het doel van deze studie was de diagnostische efficiëntie van de skeletscintigrafie bij deze groep zonder klinische symptomen te vergelijken met die van kinderen welke een skeletscintigrafie ondergingen vanwege skeletklachten.

Materiaal en methode: T.b.v. dit retrospectief, descriptief onderzoek werden alle kinderen tot 16 jaar geïncludeerd bij wie een botscan werd gemaakt in de periode 1994-2005 in Apeldoorn. De skeletscintigrafie werd beoordeeld op de aanwezigheid van gebieden met verhoogde uptake ('hotspots'). Uit de status werden de volgende gegevens verzameld: leeftijd, indicatie voor botscan, Röntgen onderzoek, uiteindelijke diagnose. Eventuele verschillen werden getest op significantie m.b.v. de Chi2 test.

Resultaten: 71 patiënten werden geïncludeerd, 22 neonaten (leeftijd: 8dagen, 10 [mediaan, IQR]) en 49 andere kinderen met skelet klachten (22, 89 weken). De duur tussen de klinische presentatie en de skeletscintigrafie bedroeg 8d, 8 en 6d, 10 resp. p=ns). Geen van de neonaten had klachten of symptomen van het bewegingsapparaat vs. 38/49 [77%] van de andere kinderen, p<0.001. De indicatie voor de skeletscintigrafie was bij neonaten aanwezigheid osteomyelitis (n=22 [100%]), en bij de overige kinderen osteomyelitis (38 [77%]) of fractuur/overige botafwijkingen (11 [23%]). Hotspots werden bij 0/22 neonaten gevonden en bij 23/49 ([46%]) van de andere kinderen, p<0.001. Conventioneel Röntgen onderzoek werd bij 3/22 neonaten verricht en bij 36/49 andere kinderen en was afwijkend in resp. 0/3 en 10/36 [38%], p=ns. Bij geen van de neonaten werd in de klinische follow-up osteomyelitis vastgesteld. De diagnose bij de kinderen met positieve botscan was osteomyelitis in 13/23 [57%] gevallen.

Conclusie: De diagnostische efficiëntie van de skeletscintigrafie bij neonaten met een sepsis zonder muskuloskeletale symptomen is laag en dient niet routinematig gemaakt te worden.

Abstractnr. : 1.4

THE TRANSIENT FEATURE OF INCREASED ECHOGENICITY OF RENAL CORTEX IN ACUTE ABDOMINAL ILLNESS IN CHILDREN

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Purpose: To evaluate the frequency of hyperechogenicity of renal cortex in children with acute abdominal illness and to evaluate the transient feature of this hyperechogenicity.

Material and methods: Between January 2005 and March 2006, 177 consecutive patients (107 boys and 70 girls; mean age, 10 years; age range 2-15 years) presenting with acute abdominal illness were examined with US.

Patients with a known history of renal disease and those with actual urinary tract infection were excluded from the study. Echogenicity of renal cortex in comparison to adjacent liver was recorded. Renal cortex echogenicity (RCE) was divided in three groups; group 1 RCE is less than liver parenchyma echogenicity, group 2 RCE is similar to liver parenchyma echogenicity, group 3 RCE is greater than liver parenchyma echogenicity. Patients with hyperechogenicity were re-examined with US after two weeks. Final US diagnosis and clinical outcome were noted.

Results: Renal cortex echogenicity was equal (n=16) or higher (n=18) than liver parenchyma echogenicity in 20% (n=32) of 177 patients. Increased renal parenchyma returned to normal in two weeks time in all patients. Only one patient had no follow up. Final US or clinical diagnosis varied from normal abdominal US and follow-up (n=44), to appendicitis (n=79), lymphadenitis mesenterica (n=16), ileoceecitis or colitis (n=15), idiopathic acute abdominal pain (n=21) and intussusception (n=2). No (concurrent) renal disease was diagnosed.

Conclusion: The results of this study show that increased echogenicity of renal cortex in children with acute abdominal illness is a frequent transient feature and does not necessarily indicate true renal disease.

Abstractnr. : 1.5

ULTRALOW-DOSE COMPUTED TOMOGRAPHY: DIAGNOSTIC INFORMATION OF CT AT A RADIATION DOSE LEVEL OF CHEST X-RAY

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Purpose: To demonstrate that ultralow-dose computed tomography (ULDCT) can substitute conventional chest X-ray (CXR) in cases where information of computed tomography (CT) is required, but radiation dose is the limiting factor.

Material and Methods: We enrolled 30 patients (17 men, 13 women, 20-81 years old, mean 57 yrs) from the outpatient department of pulmonology with a wide range of chest abnormalities, referred for chest CT. Standard dose CTs (SDCT) were performed on a multirow-detector scanner (16x0.75mm collimation 120kVp;130mAs, 4.6mSv) followed by an ULDCT performed with identical parameters except for radiation dose (90kVp;20mAs, 0.3mSv). PA and lateral CXR (0.1mSv) were performed on the same day. Chest abnormalities were scored from 1 (definitely absent) to 5 (definitely present) for lungs (8 items), mediastinum (3 items) and pleura, chest wall and bones (=3 items). SDCT was used as gold standard with only scores of 1 and 5. Agreement between CXR and SDCT was compared to agreement between ULDCT and SDCT by ?2-test.

Results: LDCT and SDCT showed more frequently agreement (154/240 for lungs; 76/80 for pleura, chest wall & bones and 42/58 for mediastinum) than CXR and SDCT (129/240, 66/80 and 30/58; p<0.001; p=0.002 and p=0.018, respectively).

Conclusion: Diagnostic interpretation of ULDCT corresponds better to SDCT than CXR, providing more reliable information but at a radiation dose which is less than 1mSv. For benign diseases where the information of a CT is required, but radiation dose is the limiting factor, an ULDCT can be performed.

Abstractnr. : 1.6

PROSPECTIEVE EVALUATIE VAN DE TOEGEVOEGDE WAARDE VAN CT TEN OPZICHTE VAN CONVENTIONEEL RADIOLOGISCH ONDERZOEK VAN DE THORAX BIJ DE OPVANG VAN TRAUMAPATIËNTEN: VOORLOPIGE RESULTATEN

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Doel: is het bepalen van de toegevoegde waarde van standaard vervaardigde multislice CT van de thorax (thorax CT) ten opzichte van conventioneel radiologisch onderzoek bij traumapatiënten met een verdenking op ernstig stomp letsel.

Materiaal en methoden: In deze prospectieve cohort studie werden patiënten van 16 jaar en ouder die primaire traumaopvang op de Spoedeisende Hulp van het UMC St Radboud ondergingen, bestudeerd. Alle neurologisch en hemodynamisch stabiele, niet zwangere patiënten werden gencludeerd indien zij verdacht waren voor ernstig stomp letsel op grond van gestoorde vitale parameters, specifieke letsels, of een hoogenergetisch traumamechanisme. Deze patiënten ondergingen, naast een conventionele thoraxfoto, een thorax CT met intraveneus contrast.

Voorafgaand aan de CT werd bepaald of deze op indicatie, (op grond van afwijkingen bij klinisch en conventioneel radiologisch onderzoek), of routinematig werd uitgevoerd.

Het conventioneel radiologisch onderzoek en de thorax CT werden beoordeeld op aantal (n verschil in detectie van) trauma gerelateerde afwijkingen. Daarnaast werden klinische consequenties van bevindingen die alleen op CT gezien werden, vastgelegd. Letsels van de wervelkolom werden buiten beschouwing gelaten.

Resultaten: In de periode van mei 2005 t/m april 2006 werden 295 patiënten gencludeerd: 192 mannen en 103 vrouwen tussen de 16 en 72 jaar (gemiddelde leeftijd 39 jaar).

Er werden 53 CTs op indicatie verricht; 47 CTs (89%) lieten traumagerelateerde afwijkingen zien. Bij 41 patiënten (77%) toonde deze mr afwijkingen dan de conventionele thoraxfoto. Deze aanvullende diagnoses hadden bij 9 patiënten (17%) klinische consequenties.

Van de 242 routinematige CTs toonden 103 (43%) traumagerelateerde afwijkingen. Bij 93 (38%) patiënten toonde deze CT mr afwijkingen dan conventioneel onderzoek, bij 24(10%) had dit klinische consequenties. Extra bevindingen waren met name longcontusie (21%), ribfracturen (19%) en pneumothorax (12%).

Conclusie: Uit deze voorlopige resultaten blijkt dat de thorax CT bij traumapatiënten een duidelijk toegevoegde waarde heeft ten opzichte van conventioneel radiologisch onderzoek, waarbij een substantiele hoeveelheid CT bevindingen ook klinisch relevant is. De toegevoegde waarde van thorax CT is het grootst bij patiënten waarbij op grond van klinische bevindingen en/of conventioneel radiologisch onderzoek al aanwijzing was voor ernstig thoraxletsel.

Abstractnr. : 1.7

LOW EFFICACY OF DAILY ROUTINE CHEST RADIOGRAPH IN THE ICU

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Background: A daily-routine chest radiograph (CXR) strategy is recommended by the ACR and practiced in many intensive care units (ICU). Its efficacy is controversial. Diagnostic and therapeutic efficacies of daily routine CXRs were evaluated and compared with those of clinically indicated CXRs ('on demand').

Materials and methods: In this prospective blinded controlled study, daily routine CXRs were obtained from all patients in a mixed surgical-medical ICU for one year. CXRs were evaluated by trained radiologists (to score for predefined items like progressive or new infiltrates, pneumothorax, malposition of tube/lines) and were not accessible for intensivists. In addition to these daily routine CXRs, the intensivist ordered 'on demand' CXRs using a specific form indicating the reason for CXR and suspected abnormalities. Considerable worsening according to predefined criteria on the routine CXR, but not clinically recognized, was communicated with the intensivist. From this data, diagnostic efficacy (the number (#) of CXRs with significant abnormalities/total # CXRs) and therapeutic efficacy (# CXRs leading to an intervention/total # CXRs) were calculated. c2-analysis was used to test differences.

Results: During 12 months, 2816 CXRs in 587 patients were obtained (1890 routine CXRs and 926 'on demand' CXRs). Mean age was 66 ± 16.6. Diagnostic efficacies of daily routine CXRs and 'on demand' CXRs were 4.5%, and 17.7% (P<0.0001). Most frequent unsuspected abnormalities observed on routine CXRs were pneumothorax (0.6%) and tubemalposition (0.7%). Most frequent abnormalities of the 'on demand' CXRs were infiltrate (5%) and tubemalposition (3.5%). Therapeutic efficacies of daily routine CXRs and 'on demand' CXRs were 1.9% and 17.3% (P<0.0001). Most frequent interventions based on routine CXRs and 'on demand' CXRs were a change in medication (1.7% and 4.5%) and repositioning of the tube (0.5% and 2.9%).

Conclusion: The value of the daily routine CXR is low. Changing from a routine to an on-demand strategy may result in a reduction of 36 % of CXRs (80.000/yr). Based on these data, daily routine CXRs should be abandoned in the ICU.

Abstractnr. : 1.8

CT GELEIDE DUNNE NAALD HARPOENTECHNIEK VOOR FACILITATIE VAN EEN VATS GELEIDE RESECTIE BIJ EEN PERIFERE LONGNODUS

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Doel: Evaluatie van de bruikbaarheid van een CT geleide harpoendraad localisatie voorafgaand aan een VATS procedure voor resectie en diagnostiek van een solitaire longnodus.

Materiaal en Methodes: Bij 11 patiënten in de periode januari 2002 tot en met april 2006 was diagnostiek van een diep gelegen perifere longnodus aangewezen. VATS alleen kan een dergelijke afwijking niet localiseren, resulterend in een grotere resectie (lobectomie i.p.v. wigexcisie). Bij al deze patiënten waar de nodus niet aan de oppervlakte van het longweefsel lag werd preoperatief onder CT fluoroscopy een dunne harpoendraad in of nabij de afwijking gebracht om preoperatief de afwijking te kunnen localiseren.

Resultaten: Alle 11 harpoendraad localisaties verliepen ongecompliceerd. Tijdens VATS kon de draad in alle gevallen goed gelocaliseerd worden. Bij alle patiënten kon volstaan worden met een wigexcisie (9 via VATS alleen, 2 na een minithoracotomie ivm verklevingen). Pathologisch onderzoek liet in 8 gevallen maligniteit (primair of metastase) zien, 3 bleken benigne.

Conclusie: De diagnostiek van perifere longhaarden is lastig als de nodus niet direct aan de oppervlakte ligt. Bij VATS is deze dan niet localiseerbaar resulterend in grotere resecties. Preoperatieve CT geleide dunne draad harpoenlocalisatie van de nodus direct voorafgaand aan de VATS gaf in alle gevallen een adequate localisatie en kleine wigexcisies.

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Vrijdag 17 november 2006, 12.10 - 13.14 uur

Abstractnr. : 2.1

ACUTE APPENDICITIS: IS ER NOG PLAATS VOOR HET ECHOGRAFISCH ONDERZOEK?

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Doel: In 2004 is door de richtlijnen commissie appendicitis van de Vereniging voor Heelkunde een voorstel gedaan betreffende de diagnostiek bij patiënten met de klinische verdenking acute appendicitis. Deze concept richtlijn houdt in dat, kinderen en vrouwen in de vruchtbare leeftijd uitgezonderd, in eerste instantie een CT-scan dient te worden verricht.

Bij de uitzonderingsgroep wordt gestart met het echografisch onderzoek. Besloten werd tot proefimplementatie van de concept beslisboom in een beperkt aantal ziekenhuizen. Tot op heden heeft in ons ziekenhuis de implementatie niet plaatsgevonden daar de radiologen van mening zijn dat de door ons gehanteerde strategie van het echografisch onderzoek als onderzoek van eerste keuze nog steeds voldoet.

Middels deze studie wilden we uitzoeken of het door ons gevoerde beleid voldoet in de praktijk.

Materiaal en Methode: Retrospectief statusonderzoek over de periode juli 2004 tot juni 2005. Bij alle patiënten met de klinische verdenking acute appendicitis bij wie echografisch onderzoek plaatsvond is de uitkomst vergeleken met de uitkomst van een eventuele operatie of van het resultaat van conservatief beleid.

Resultaten: 293 patiënten werden gencludeerd (gemiddelde leeftijd 28 jaar (12-82), 121 mannen, 172 vrouwen). Bij 133 patiënten was er echografisch het beeld van appendicitis. Dit kon peroperatief worden bevestigd bij 125 patiënten.

Bij 122 patiënten toonde het echografisch onderzoek geen appendicitis. Bij operatie (21 patiënten) bleek er bij 14 patiënten toch sprake van appendicitis.

Bij 38 patiënten was het echografisch onderzoek niet conclusief. (in 20 gevallen is aanvullend een CT-scan verricht, in 26 gevallen werd peroperatief alsnog een appendicitis geconstateerd).

Indien het echografisch onderzoek dat niet conclusief was niet wordt meegewogen, bedraagt de sensitiviteit 94 %, de specificiteit 89%.

Wordt dit wel meegewogen (fout-positief dan wel fout-negatief) dan is de sensitiviteit 79%, de specificiteit 81%. In de literatuur lopen deze getallen uiteen van 75-90% respectievelijk 78-100%.

Conclusie: Deze studie bevestigt ons vermoeden dat, in tegenstelling tot de concept richtlijn appendicitis acuta, echografisch onderzoek een prominente plaats dient in te nemen. Het CT-onderzoek kan worden gereserveerd voor patiënten bij wie het echografisch onderzoek niet conclusief is.

Een prospectieve studie met hetzelfde onderwerp is recent in het MCA gestart.

Abstractnr. : 2.2

COMPUTED TOMOGRAPHY AND ULTRASONOGRAPHY IN THE DETECTION OF ACUTE APPENDICITIS: A META-ANALYSIS

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Purpose: Ultrasonography (US) and computed tomography (CT) are widely used in the diagnostic work up of acute appendicitis. Numerous studies have been performed evaluating both techniques, but which (sequence of) technique is preferable remains unclear. Purpose of this study was to perform a meta-analysis of head-to-head comparison studies on the value of US and CT in the diagnosis of acute appendicitis.

Method and Materials: MEDLINE, EMBASE, CINAHL and Cochrane databases were searched from January 1966 to February 2006. Studies were included when fulfilling the following criteria: 1) prospective cohort design; 2) study population consisted of adults or adolescents; 3) comparison of US and CT, 4) surgery and/or clinical follow-up used as reference standard, and 5) data reported to calculate 2 x 2 contingency table. Two observers independently extracted data. Estimates for sensitivity, specificity, positive and negative likelihood ratios for both US and CT were calculated based on a random effect model.

Results: Seven out of 393 studies met the inclusion criteria, evaluating 743 patients. In most studies specific inclusion criteria, criteria for acute appendicitis, independently assessment of US and CT and the experience of observers were not sufficiently described. US and CT were independently assessed of the reference standard, however the reference standard was not independently assessed from US and CT. Mean sensitivity and specificity values were 82% (95%CI:69 - 90) and 89% (95%CI: 85 -92) for CT versus 71% (95%CI:57 - 82) and 80% (95%CI:73 -86) for US. Specificity for CT was significant higher compared to US ($p=0.0032$).

Positive likelihood ratio for CT and US were 7.6 (95%CI:5.4-10.6) and 3.4 (95%CI:2.5-4.7) respectively ($p=0.0025$). Negative likelihood ratios was 0.20 (95%CI:0.12-0.34) for CT and 0.35 (95%CI: 0.24-0.53) for US ($p=0.023$).

Conclusion: In head-to-head comparison studies, CT was found to be more accurate than US in the diagnosis of acute appendicitis. However all studies had methodological weaknesses, therefore future studies should focus on conducting a study with less bias in internal validity. Acute appendicitis remains a diagnostic challenge and an optimal diagnostic strategy should be determined.

Abstractnr. : 2.3

CT-COLONOGRAPHY WITH LIMITED BOWEL PREPARATION: PERFORMANCE CHARACTERISTICS IN 159 PATIENTS AT INCREASED RISK FOR COLORECTAL CANCER

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Purpose: To evaluate the performance of CT-colonography (CTC) with a limited bowel preparation and fecal tagging for the detection of colorectal polyps in a population at increased risk for colorectal cancer.

Method and materials: 159 consecutive at increased risk patients were included. Fecal tagging comprised 120 mL barium sulfate (40%w/v) and 180 mL of diatrizoic acid (200 mg/mL) divided over the main (low-fiber) meals starting two days before the examination. Patients additionally received 3 times 10 mg of bisacodyl for stool softening. CTC parameters were: collimation 4 x 2.5 mm, tube current 50 mAs. A radiologist (1) and a research fellow (2) evaluated all data blinded and independently with a primary 2D approach. Discrepant lesions = 6mm were solved through consensus. Reference standard was optical colonoscopy with segmental unblinding (CS). Sensitivity and specificity were determined per patient and sensitivity and number of false-positives per polyp for size thresholds = 6 mm and = 10 mm.

Results: At CS in 109/159 patients a total of 405 polyps were found (54 polyps = 6 mm in 43 patients and 16 polyps = 10 mm in 16 patients). The per patient sensitivity of CS before unblinding was 93% for polyp(s) = 6 mm and 94% for polyp(s) with size = 10 mm. Observer 1, 2 and consensus reading detected respectively 77%, 65% and 77% of patients with polyp(s) = 6 mm and 75%, 69% and 81% for lesions = 10 mm. Specificity was 83%, 83%, 84% (= 6mm) and 97%, 96%, 97% (= 10 mm). The per polyp sensitivity for observer 1, 2 and consensus was 72%, 57%, 70% for polyps = 6 mm and 75%, 69% and 81% for polyps = 10mm. The number of false positive findings was 39, 35, 38 (= 6 mm) and 5, 9, 8 (= 10 mm). The 3 missed lesions = 10 mm (2 flat, 1 sessile) at consensus reading were not visible in retrospect.

Conclusion: CT-colonography with limited bowel preparation has satisfactory sensitivity and high specificity in the detection of patients with polyps = 10 mm in a population at increased risk for colorectal cancer.

Abstractnr. : 2.4

DOES ELECTRONIC CLEANSING FACILITATE CT-COLONOGRAPHY READING?

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Introduction: Currently, computed tomography colonography (CTC) is preferably performed with the use of bowel preparation with a contrast agent (tagging). Residual fluid and fecal residue hamper two-dimensional (2D) and three-dimensional (3D) evaluation. This applies particularly to a primary 3D read as residue covers the colonic surface. The densely tagged residue can be removed by electronic cleansing. Aim of this study was to study whether electronic cleansing facilitates CTC reading.

Material and Methods: To evaluate the cleansing algorithm, we compared CTC without cleansing to CTC with cleansing in the same 20 patients. Digital cleansing concerned a new algorithm. We selected the first 10 consecutive

patients from a comparative colonography study (Walter Reed Army Medical Center) with polyps and the first 10 without (8 polyps=6mm, 5=10mm). One patient was excluded because we could not retrieve the review-data. All patients had undergone extensive bowel preparation with fecal tagging (685HU, STD 178). Scan parameters: 120kV, 100mAs, 1.25 to 2.5 collimation, tablespeed 15mm/sec, reconstruction interval 1mm.

An observer (prior experience =300CTC) reviewed both scan positions (supine/prone) twice with an Endo 3D Unfolded display: first without cleansing and after a 4 week interval with cleansing.

We compared review time of both cleansed and uncleaned data. The observer determined the assessment effort on a 5-points scale for all non-collapsed segments. The increase in visible colon-surface, the number of detected polyps and number of false positives for lesions=6mm was determined as well.

Results: The mean 'uncleaned' reading-time was 22min 11sec; the assessment effort was extremely easy in 0%, good in 55%, difficult in 35% and extremely difficult in 10% of the segments. For the cleansed data the mean time was reduced to 18min 09sec and the assessment effort was 35%, 47%, 12%, 6% for the respective categories. After cleansing 54% of additional colon surface became visible.

In the 'uncleaned' data 10/13 polyps were seen at expense of 11 false positives, in the cleansed data 9/13 polyps were seen at expense of 7 false positives.

Conclusion: Electronic cleansing can facilitate CTC reading by substantially reducing reading time, assessment effort and number of false positive findings.

Abstractnr. : 2.5

POLYP MISS RATE DETERMINED BY TANDEM COLONOSCOPY: A SYSTEMATIC REVIEW

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Background & aims: Colonoscopy is the best available method to detect and remove colonic polyps and therefore serves as the gold standard for less invasive tests such as virtual colonoscopy. Although gastroenterologists agree that colonoscopy is not infallible, there is no clarity on the numbers and rates of missed polyps. The purpose of this systematic review was to obtain summary estimates of the polyp miss rate as determined by tandem colonoscopy.

Methods: An extensive search was performed within PUBMED, EMBASE and the Cochrane Library databases to identify studies in which patients had undergone two same-day colonoscopies with polypectomy. Random effects models based on the binomial distribution were used to calculate pooled estimates of miss rates.

Results: Six studies with a total of 465 patients could be included. The pooled miss rate for polyps of any size was 22% (95% CI: 19-26%; 370 /1650 polyps). Adenoma miss rate by size was respectively: 2.1% (95% CI: 0.3-7.3%; 2 / 96 adenomas =10mm), 13%(95% CI: 8.0-18%; 16 / 124 adenomas 5-10mm) and 26% (95% CI: 27%35%; 151 / 587 adenomas 1-5mm). Three studies reported data on nonadenomatous polyps: zero of eight nonadenomatous polyps = 10mm were missed (0%; 95% CI: 0-36.9%) and 83 of 384 nonadenomatous polyps < 10mm were missed (22%; 95% CI: 18-26%).

Conclusions: Colonoscopy rarely misses polyps = 10mm, but the miss rate increases significantly in smaller sized polyps. The available evidence is based on a small number of studies with heterogeneous study designs and inclusion criteria.

Abstractnr. : 2.6

CHARACTERISATION OF FOCAL LIVER LESIONS BY CONTRAST ENHANCED ULTRASOUND, MULTI-PHASIC MDCT AND MN-DPDP MRID.B. Rouw, D.M. Blom, H.J. Van der Zaag-Loonen, E.J. Van der Jagt, M. Oudkerk
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Purpose: To evaluate the diagnostic value of contrast enhanced ultrasound (CEUS), multi-phasic MDCT and Mn-DPDP-enhanced MRI in the characterisation of focal liver lesions.

Materials and methods: 112 patients were included in this study, data from 105 patients were available for analysis. Patients underwent MDCT, CEUS and MRI within 4-6 weeks. Ultrasound was performed continuously (5 minutes) at a low mechanical index after a 2.4-4.8 ml. bolus injection with microbubbles containing sulphurhexafluoride. CT exams (4 phases) with injection of iodixanol 270 mg/mL and MR exams with hepatocellular specific 0,01 mmol/mL mangafodipir.

The reference standard was defined as either pathology or a combination of clinical follow up of at least 1 year, comprising any imaging and clinical features.

Results: Sensitivity for malignant versus benign disease at patient level was 90% for CEUS (46/51), 92% for MDCT (47/51) and 73% for MRI (37/51); specificities were 70% (38/54), 75% (41/54) and 91% (49/54), respectively. Accuracy with respect to the final diagnosis was highest for MRI (78%; 82/105), CT correctly characterised 77 (73%) of the patients, whereas CEUS had an accuracy of 66% (69/105).

Conclusion: CEUS and MDCT are equally diagnostic with respect to ruling out malignant lesions, whereas MRI is more specific for ruling in malignant disease. However, CEUS does not perform as well as CT and MRI in specific lesion type characterisation.

Abstractnr. : 2.7

HEPATOCELLULAR CARCINOMA: RELATION BETWEEN TUMOUR SIZE AND DIAGNOSTIC FEATURES AT STATE-OF-THE-ART MR IMAGINGI.C. van den Bos¹, R.S. Dwarkasing¹, S.M. Hussain², P.E. Zondervan¹,
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Purpose: To assess the relationship between tumour size and diagnostic criteria of pathologically-proved hepatocellular carcinoma (HCC) at MR imaging, including T1w, T2w and multiphasic gadolinium-enhanced sequences.

Material and methods: In a retrospective study (2000-2005), 37 patients were identified (11 female, 26 male, mean age 50.8 (23-76)) that underwent MR imaging and surgical resection for HCC. A total of 47 lesions was assessed for signal intensity (SI) on T1w and T2w, fatty infiltration, hemorrhage, central scar, capsule and percentage of enhancement in arterial, portal and delayed phases. Lesions were subdivided as follows: 1) <2 cm (11 lesions); 2) 2-6 cm (14 lesions) and 3) >6cm (22 lesions). Statistical analysis was performed using the Fischer's exact and Kruskal-Wallis tests.

Results: The mean size was 6.85 cm (range 1-25). Lesions >6 cm (group 3) showed higher SI on T1w (68%, $p=0.05$) and lower SI on T2w (82%, $p=0.10$) compared to small lesions (groups 1 (27%, 55%) and 2 (43%, 64%)). Capsule, hemorrhage, fat and central scar were observed in 77, 13, 21 and 6% respecti-

vely. Capsule prevalence was 64%, 86% and 82% for groups 1, 2 and 3 respectively. Mosaic pattern/internal nodules were observed significantly more often in lesions >6 cm ($p<0.01$). Enhancement patterns showed size-related differences, consisting of marked arterial enhancement in lesions <2 cm ($p=0.02$) and marked late wash-out in lesions >6 cm ($p=0.008$). Mean increase in percentage arterial enhancement of lesion compared to liver was 110, 53 and 46% increase for group 1, 2 and 3 respectively ($p=0.07$).

Conclusion: Imaging features of HCC on MR imaging are related to tumour size. Small lesions (<2 cm) show higher arterial enhancement and tendency for T1w and T2w isointensity. Larger lesions (>2 cm) show less intense arterial enhancement, increased delayed phase wash-out, more pronounced hyperintensity on T2w and mosaic pattern/internal nodules. This may provide further understanding in MR imaging findings of HCC and facilitate early detection.

Abstractnr. : 2.8

ORAL MANGANESE AS CONTRAST MEDIUM IN DETECTING LIVER METASTASES WITH MR-IMAGING AT 1.5 AND 3T.H.M. Dekker¹, S. Takahashi¹, H.S. Thomsen², C.M.L. Van Herpen¹,Y.L. Hoogeveen¹, T.J.M. Ruers¹, J.O. Barentsz¹¹*UMC St Radboud, NIJMEGEN, Netherlands*²*Copenhagen University Hospital at Herlev, HERLEV, Denmark*

Purpose: evaluation of the diagnostic performance of oral manganese (Mn) as a new contrast medium in liver MR-imaging in patients with liver metastases.

Materials and Methods: a prospective study was conducted in 18 patients. There were 15 men and 3 women with an age range of 52-78 years (mean age, 66 years). These patients with known liver metastases were examined with MRI at 1.5T and 3T before and 3 hours after oral administration of Mn-contrast diluted in 400 ml water. MRI included T1-w. FLASH breathhold sequences in coronal and in transversal planes. At 1.5T contiguous 5 mm slices and at 3T 3 mm were made. Additionally, a T2w true-FISP sequence was performed to recognize liver cysts and haemangiomas. Contrast enhancement between liver tissue and metastases was determined on the pre- and post Mn-contrast scans. The homogeneity of liver enhancement was also evaluated. In addition, the number of detected liver metastases was evaluated.

Results: there were no side-effects after the intake of oral Mn-contrast. The mean liver-metastases contrast improved at 1.5 and 3T, respectively with a factor 2.1 and 1.5. Higher contrast in liver-metastases increased the number of liver detected metastases by more than 50% at both 1.5 and 3T. In patients with a history of chemotherapy, liver enhancement was inhomogenous, probably due to disturbance of the portal circulation.

Conclusion: this pilot study shows that oral Mn-contrast is a simple and promising contrast agent, which results in improved visualization of liver metastases by selective increase of liver signal.



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Sessie 3 - Neuroradiologie I

Vrijdag 17 november 2006, 12.10 - 13.14 uur

GENOMINEERD

Radiologendagen Prijs 2006

Abstractnr. : 3.1

REGIONAL CEREBRAL BLOOD FLOW AND CEREBROVASCULAR RISK FACTORS

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Background and Purpose: Thus far, most methods for measurement of regional cerebral blood flow (rCBF) were invasive, using radioactive tracers or contrast agents. Consequently, rCBF studies typically have been performed in small patients groups. The aim of the present study was to prospectively investigate in a large patient group, which cerebrovascular risk factors are related to rCBF, measured non-invasively with arterial spin labeling (ASL) MRI.

Materials and Methods: One-hundred-thirty consecutive patients (107 men and 23 women, age 58 range 34-78 years) with symptomatic atherosclerotic disease, were included in the study. Cerebrovascular risk factors were assessed by means of a questionnaire and physical, ultrasonographic and laboratory examination. Regional CBF (ml/min/100gr) measurements were performed with ASL MRI. Linear regression analysis adjusted for a age and sex was used to estimate the magnitude of the relation between rCBF and cerebrovascular risk factors.

Results: We found that hypertension was significantly associated with higher rCBF (6.54 ml/min/100gr; 95% confidence interval (CI) 1.40; 11.67).

Hyperhomocysteinemia was significantly related with lower rCBF (-7.38 ml/min/100gr; 95% CI 12.69; -2.05). No significant association was found for other cerebrovascular risk factors.

Conclusion: Hypertension is related to higher rCBF, possibly due to altered cerebrovascular autoregulatory function. This finding may have clinical implication for blood pressure control in patients with symptomatic atherosclerotic disease. In addition, hyperhomocysteinemia is related to lower rCBF, possibly due to vascular damage to the brain.

GENOMINEERD

Radiologendagen Prijs 2006

Abstractnr. : 3.2

ASSESSING FIBER DENSITY ASYMMETRY IN THE ARCUATE FASCICULUS (AF) USING DIFFUSION TENSOR TRACTOGRAPHY (DTT) IN BOTH RIGHT AND LEFT HANDED SUBJECTS

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Purpose: Left sided hemispheric lateralization for language has been postulated to be associated with a predominant leftward asymmetry in white matter volume in temporal regions. It is unclear whether this reflects a distinct connectivity for each hemisphere and how this is related to functional lateralization. Purpose of this study was to relate relative fiber densities (RFD) measured with DTT in the AF to functional hemispheric dominance for language in both right and left handers.

Materials and methods: 15 Healthy volunteers were imaged on a 1.5T scanner (GE Medical Systems). 11 Subjects were left handed according to the Edinburgh inventory. Functional language hemispheric dominance was established with functional MRI (fMRI) by calculating a laterality index of activation in both Brocas and Wernickes areas. For fMRI we used a T2*w GRE EPI sequence during a verbal fluency task. For anatomical reference a 3DT1w sequence was used. DTT consisted of an DW-EPI sequence (bmax1000, 25 directions). Fiber tracking was performed with dTV (University of Tokyo). Seed and target voxels were semi automatically placed in the superior longitudinal fasciculus (SLF), and regions of interest were grown using an iterative process based on the similarity of eigenvectors. RFD was defined as the ratio of tracked AF lines to the number of seed points in the SLF. RFD was calculated for both sides; asymmetry was calculated.

Results: The AF could be tracked in all volunteers on both sides. 9 Subjects (5 left handed) showed left sided language dominance on fMRI; 2 subjects had symmetrical and 4 had right sided lateralization (all 6 left handed). In all but 1 subject, RFD measured with DTT showed a leftward asymmetry of the AF. In this 1 subject, with right sided language dominance, RFD showed no asymmetry.

Conclusion: DTT can provide quantitative information on brain connectivity patterns. RFD measurement using DTT shows a striking predominant leftward asymmetry for fibers of the AF, regardless of functional hemispheric lateralization for language. We therefore have shown that leftward white matter asymmetry in the AF has its basis in a higher RFD and thus higher connectivity on the left side of the brain.

GENOMINEERD

Radiologendagen Prijs 2006

Abstractnr. : 3.3

MR IMAGING OF HIPPOCAMPAL LESIONS IN MULTIPLE SCLEROSIS

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Introduction: Neuropsychological impairment, especially memory dysfunction, is prevalent in Multiple Sclerosis (MS). The occurrence of hippocampal lesions can therefore be reasonably expected. Little is currently known concerning hippocampal pathology in MS, since conventional Magnetic Resonance Imaging (MRI) notoriously underestimates grey matter (GM) lesion numbers. Cortical GM lesion conspicuity can be improved using 3D-Double Inversion Recovery (3D DIR), recently implemented as a single-slab 3D method. In this study, we evaluated whether 3D-DIR enables detection of hippocampal lesions in MS.

Patients and Methods: Imaging was performed on a 1.5T whole body scanner (Siemens Sonata, Erlangen, Germany). Sagittal 3D-DIR images (TR/TE/T11/TI2: 6500/349/2350/350; voxel dimensions: 1.2x1.2x1.3mm³) and 3D-T2-weighted turbo spin-echo images (3D-T2; TR/TE: 4300/349; voxel dimensions: 1.2x1.2x1.3mm³) of 16 patients (9 females; mean age: 39.5 years, range: 24-56) and 9 control subjects (3 females; mean age: 32.0 years, range: 22-53) were acquired cross-sectionally. Lesions were anatomically classified on 3D DIR as being: white matter (WM; i.e. total of periventricular and deep WM), cortical (total of intracortical, juxtacortical and mixed WM-GM lesions), or hippocampal lesions. For optimal anatomical viewing, hippocampal lesions were assessed on orthogonally reformatted coronal 3D-DIR images. Other lesion categories were assessed on reconstructed oblique axial images. Hippocampal and cortical lesions were scored in consensus and defined as hyperintense with respect to surrounding normal GM, though less hyperintense than WM lesions. A retrospective scoring for hippocampal lesions on coronal 3D-T2 was also performed. Pearson's correlation coefficient was used to evaluate associations between hippocampal and cortical and between hippocampal and WM lesion numbers.

Results: The mean number (SD) of 3D-DIR hippocampal lesions was 2.61.8 in MS patients, with 14 out of 16 patients having at least 1 hippocampal lesion. No hippocampal lesions were detected in control subjects. Hippocampal lesion count correlated with total cortical lesion number ($r:0.58$, $p=0.02$), but not with total WM lesion count ($r:0.22$, $p=0.4$). Retrospectively, 56% of hippocampal lesions could also be detected using 3D-T2.

Conclusion: Hippocampal lesions can be detected in MS using 3D-DIR and are related to cortical lesion number. Further research is indicated to study specific effects of MR-visible hippocampal pathology on clinical disability, especially on neuropsychological impairment.

Abstractnr. : 3.4

MRI AND CLINICAL PARAMETERS ASSOCIATED WITH DISEASE PROGRESSION IN NEWLY DIAGNOSED MS-PATIENTS

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Context: although MRI is a powerful diagnostic tool in multiple sclerosis (MS), associations between (changes in) MRI and disease progression are less straightforward.

Objective: to examine which brain- and spinal cord-based MRI parameters and clinical parameters are associated with disease progression.

Methods: 89 patients (55 women) with recently diagnosed MS had clinical and MRI evaluation at baseline (time of diagnosis) and follow-up after a median of 2.2 years (Inter Quartile Range (IQR): 2.0-2.4). Detailed clinical data were available including disease type (relapse-onset or progressive-onset) and disability (EDSS). MRI parameters: Normalized Brain Volume (NBV) at baseline, percentage brain volume change (PBVC), baseline and follow-up T2 lesion loads (T2LL, T2LLfu), T1 lesion loads (BHLL, BHLLfu), baseline volume of gadolinium enhancing lesions (GADLL), ratio of BHLL and T2LL (Black Holes Ratio (BHR, BHRfu)). Furthermore, number and size of focal/diffuse spinal cord abnormalities were scored. Patients were dichotomized according to progression of disability: progression was defined as change in EDSS ≥ 1 . To find parameters with the strongest associations with progression, several models were composed using stepwise logistic regression. Firstly a model containing only MRI (model 1) or clinical (model 2) parameters was composed. Secondly, for a model containing only clinical parameters, the added value of MRI parameters was tested.

Results: At follow-up but not at baseline, T2LL, BHLL and BHR were significantly higher in the group with progression. Of the changes in MRI parameters during follow-up, only rate of atrophy (PBVC/year) was significantly higher in the group with progression (-1.3 compared to 0.8, $p=.011$). Rate of atrophy (PBVC/year) was included as only explaining MRI parameter in model 1 (Odds ratio (OR) 0.41, 95% CI 0.21-0.78, $p=.007$). Type of disease (OR 9.8, 95% CI 2.17-44.27, $p=.003$), age (OR 1.06, 95% CI 1.00- 1.12, $p=.066$) and EDSS at baseline (OR 0.41, 95% CI 0.21-0.80, $p=.009$) were included in model 2. Adding PBVC/year to model 2 strengthened the model, indicating that MRI parameters added independent information ($p<.001$, area under ROC increasing from 0.72 to 0.82).

Conclusions: rate of atrophy (PBVC/year) is the MRI parameter associated with progression most strongly. Combining clinical and MRI parameters results in stronger models.

Abstractnr. : 3.5

USPIO-ENHANCED CELLULAR MR IMAGING OF LESION ACTIVITY IN MULTIPLE SCLEROSIS.

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Purpose: New therapies in multiple sclerosis (MS) aim at preventing cellular infiltration. In evaluating their therapeutic efficacy ultra-small superparamagnetic particles of iron oxide (USPIO), taken up by macrophages and transported into inflammatory MS lesions, may be a more specific MRI marker than Gd-

DTPA (or Gd-chelate), which only visualizes breakdown of the blood-brain-barrier. Aim of the current study is to visualize cellular infiltration in MS inflammatory lesions using USPIO, and comparing it to Gd-chelate enhancement in a phase II setting.

Patients and Methods: Relapsing-remitting MS patients are currently being screened monthly using T1-weighted spin-echo (TR/TE/slice thickness:830/15/4.0mm), dual-echo T2-weighted spin-echo (TR/TE/slice thickness:3837/16,98/4.0mm), and T2 gradient-echo (TR/TE/slice thickness:615/27/4.0mm). In case of a gadolinium-enhancing lesion (GEL), USPIO (SH U 555 C, Schering AG, Berlin (Germany), diameter<25 nm, T1/2 6-8h) are administered (single intravenous bolus injection of 40 micromol Fe/kg BW) within 24-48 hours. 24 hours after injection, MRI is performed (same protocol) and blood is withdrawn to evaluate monocyte activation level and USPIO-uptake. Follow-up of lesion progression consists of 3 monthly scans. EDSS and relapses are registered.

Results: So far, 12 patients have been included, 4 of which have received SH U 555 C. More patients will be included.

In our preliminary dataset, USPIO-enhancement occurred in 4 different patterns:

1. GEL, hypointense on pre-contrast T1, showing a surrounding hyperintense ring after USPIO-administration (UA). Some originally hypointense lesions (T1 pre-contrast) appeared isointense after UA.
2. GEL, hyperintense throughout following UA, some with surrounding hyperintense clusters.
3. Ring-like and non-ring-like hyperintense lesions on USPIO-enhanced images, not visible as GEL on prior images.
4. GEL not enhancing after UA.

No hypointense lesions appeared on T2 GE images after UA. Results on evaluation of monocyte activation level and USPIO-uptake are pending. In vitro labelling of human monocytes from healthy controls did not result in cell death or monocyte activation.

Conclusion: USPIO-enhancement is based on infiltration of USPIO-labelled macrophages into inflammatory lesions, and shows patterns that are distinct from gadolinium enhancement in MS. Preliminary imaging results with SH U 555 C may be used to increase specificity when evaluating efficacy of future MS therapies such as cellular infiltration prevention

Abstractnr. : 3.6

RELEVANCE OF TEMPORO-PARIETAL ATROPHY IN MCI CONVERSION TO ALZHEIMERS DISEASE: A VOXEL-BASED MORPHOMETRY STUDY

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Introduction: Patients with mild cognitive impairment (MCI) have an increased chance of converting to Alzheimers disease (AD). It is known that patients with AD have more medial temporal lobe atrophy (MTA) and temporo-parietal atrophy compared to patients with MCI and that patients with MCI have more MTA compared to healthy elderly controls. We used voxel-based morphometry (VBM) to find out whether there are structural differences in baseline MRI of the brain between amnesic MCI converters and non-converters, with conversion defined

at three years follow-up.

Patients and methods: Twenty-four amnesic MCI patients (diagnosed according to the Petersen criteria) were included. After three years 46% had converted to AD, n=11, age 72.7+/-4.8 sex F/M 8/3. For 13 patients age 72.4+/-8.6 sex F/M 10/3 the diagnosis remained MCI. Baseline MRI was performed on a 1.5T scanner and included a coronal 3DT1 [160 slices, TR 2700, TE 4, T1 950, ST 1.5]. Localized grey matter differences were sought for with VBM. Total grey matter volume was assessed with the automated method SIENAX.

Results: The converters had more atrophic left medial (including the hippocampus) and lateral temporal lobe structures, left parietal lobe structures and right lateral temporal lobe structures. After correction for age, gender, total grey matter volume (SIENAX) and NYU paragraph recall test, only the left-sided atrophy remained statistically significant. Specifically, converters had more parietal atrophy (angular gyrus and inferior parietal lobule) and lateral temporal lobe atrophy (superior and middle temporal gyrus). Hippocampal atrophy was not significantly different between groups after correction for the above variables.

Conclusion: In this VBM study of a patient population followed up for three years and with a conversion rate of 46%, converters exhibited more atrophy than non-converters in the lateral temporal lobe and parietal lobe, rather than in the medial temporal lobe region (which probably has become quite atrophic in an earlier disease phase).

Abstractnr. : 3.7

CEREBRAL MICROBLEEDS IN A HEALTHY AGING POPULATION: DETECTION BY 3D SWI

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Purpose: Cerebral microbleeds (CMB) can be visualized with T2*GRE MRI. In clinical studies, CMBs indicate an increased risk of stroke, both ischemic and hemorrhagic. Little is known on the prevalence of CMBs in the general population. Available data are based on conventional GRE sequences, rather than on more sensitive susceptibility weighted imaging (SWI). We conducted an MRI study in elderly persons, using high-resolution 3D SWI, to assess the prevalence and the risk factors for CMBs.

Materials and methods: The study is based on 723 participants (aged 61 to 92 years) from the Rotterdam Study, a population-based cohort study. We performed a custom-designed 3D T2*GRE susceptibility-weighted MR-sequence (TR/TE 45/31ms; FA 13; matrix 320*224; slices 1.6mm; acquisition time 5:50 mins), with higher T2* weighting and smaller voxel size than commonly used 2D T2*GRE sequences, to increase the conspicuity of CMBs. Two raters scored the presence, location and number of CMBs. Intra-rater and inter-rater reliabilities were good to excellent. Brain infarcts were rated on a FLAIR sequence. Cardiovascular risk factors were assessed by interview and physical examination. Associations between risk factors and CMBs were assessed by logistic regression, adjusted for age, sex and relevant confounders.

Results: One or more CMBs were seen in 144 (19.9%) persons, of whom 53 had multiple microbleeds. Of participants with microbleeds, 83% had CMBs located in cortical grey and subcortical white matter, 26% in deep grey matter, and 22% infratentorial. The prevalence of CMBs increased with age (OR per year 1.06; 95%CI 1.02-1.08). Among persons with lacunar infarcts CMBs were 2.3 times more prevalent (95%CI 1.21-4.45), in particular CMBs in deep grey matter (OR 4.46; 95%CI 1.83-10.90). Treated, but uncontrolled hypertension was significantly related to CMBs in deep grey matter, but not to CMBs elsewhere.

Conclusion: Compared to other studies, we found a three- to fourfold higher prevalence of CMBs in an elderly population. The prevalence of CMBs increased with age and showed a strong association with lacunar infarcts. Our sensitive MR sequence can enhance the strength of epidemiological research into causes and consequences of CMBs.

Abstractnr. : 3.8

**CEREBRAL BORDERZONE WEIGHTED MRI:
INTRODUCTION OF A NEW MRI WEIGHTING BASED ON
REGIONAL TIMING DIFFERENCES IN ARTERIAL SPIN
LABELING PERFUSION DATA**

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Studies on the pathophysiology of ischemia in the cerebral borderzone regions would benefit from an imaging method capable of cross sectional demonstration of the location of the borderzone regions in an individual patient. We hypothesize that a longer arterial transit time towards the distal branches of the intracranial arteries can be utilized to detect the cerebral borderzone regions.

Methods: A fluoroscopic MR imaging method based on non-invasive arterial spin labeling perfusion MR with a temporal resolution of 0.2 seconds was used to visualize the cerebral borderzone regions based on a regional increase in arterial transit time. Based on the fluoroscopic MR data regional differences in cerebral blood flow (CBF) and arterial blood volume were evaluated in 15 volunteers and regional cerebral vascular reactivity (30 second breath-hold challenge) in 6 volunteers.

Results: Regional differences in arterial transit time were detected with an increased arterial transit time for the anterior (0.93 s) and posterior borderzones (1.01 s) relative to the non-borderzone grey matter (0.54 s) ($p < 0.001$). The regional CBF and CBV of the anterior borderzone and posterior borderzones were significantly decreased relative to the non-borderzone grey matter ($p < 0.001$). No significant regional differences in cerebrovascular reactivity (CBF change) were detected.

Conclusion: We demonstrate in healthy volunteers a new MRI based contrast for cerebral borderzone imaging based on regional differences in arterial transit time. The detected borderzone regions differ significantly in hemodynamic characteristics as compared to other brain areas.

Sessie 4 - Mammadiagnostiek / Interventieradiologie I

Vrijdag 17 november 2006, 12.10 - 13.14 uur

Abstractnr. : 4.1

IMPACT OF PREOPERATIVE CONTRAST-ENHANCED MRI IN PATIENTS ELIGIBLE FOR BREAST-CONSERVING THERAPY: UPDATE ON 325 PATIENTS

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Purpose: To prospectively assess the incidence and the impact of additional findings in pre-operative contrast-enhanced (CE) MRI of patients eligible for breast conserving therapy (BCT).

Methods: Between November 2000 and December 2005, 325 patients (median age 56 years, range 26-68 years) eligible for BCT on the basis of conventional imaging and palpation underwent pre-operative CE-MRI. The images were read by experienced breast MRI radiologists using the BIRADs lexicon. The incidence of additional findings (enhancing lesions separate from the known malignancy or larger extent of the known malignancy than appreciated from conventional imaging) and their impact on treatment were assessed. The gold standard was histology or follow up.

Results: Additional findings were detected in 101 patients (31%): more extensive disease was found in 6% of patients, additional enhancing lesion(s) in 22%, and both in 2%.

One-hundred additional lesions in 80 patients (80/325=25%) were detected; 59 in the ipsilateral breast (59% of which are malignant), and 20 in the contralateral breast (19% of which are malignant) and 1 bilateral.

BIRADs scores of additional lesions were benign (n=1), probably benign (n=15), indeterminate (n=19), suspicious (n=30) and highly suggestive of malignancy (n=35). A trend was observed towards decreased reporting of benign findings (BIRADs 2 and 3) from 26% to 9%. Additional lesions referred for further work-up (n=74) were visible on ultrasonography in 55% of the patients.

Benign lesions (pathology-proven or benign by follow up (median 40 months)) occurred in 48/325 (15%) of the patients. Additional malignant lesions (all pathology proven) occurred in 36/325 (11%) of the patients. MRI led to a change of treatment in 71 patients (22%): mastectomy in 32 (10%), wider excision in 27 (8%, 1% of which due to benign lesions), contralateral surgery in 3 (1%) and neoadjuvant chemotherapy in 9 (3%) patients.

Conclusions: Preoperative CE MRI results in additional findings in approximately one-third of patients eligible for BCT on the basis of conventional imaging and palpation, leading to a change of treatment in 22% of the patients, and mastectomy in 10% of the patients. Treatment changes due to benign findings (wider excision) are rare (1%).

Abstractnr. : 4.2

HIGH RESOLUTION 3.0T MRI OF THE BREAST: ADDITIONAL VALUE FOR WORK-UP OF PATIENTS DIAGNOSED WITH INVASIVE LOBULAR CARCINOMA

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Purpose: To determine the value of high resolution 3.0T MRI of the breast for work-up of patients diagnosed with one focus of histopathologically proven invasive lobular carcinoma.

Materials and methods: 12 patients, each diagnosed with one lesion on conventional mammography or ultrasound that proved to be invasive lobular carcinoma on pathology, underwent pre-operative imaging with high resolution 3.0T MRI of the breast. Dynamic imaging fat suppressed T1 3D FFE sequence of the entire breast included the following parameters: FOV 340 mm, matrix 352x384 matrix, 1.0 mm slice thickness, gap: 0, TR/TE shortest/shortest, flip angle: 30, scan duration each dynamic scan: 50 sec, started after intravenous bolus injection of 0.1 mmol/kg Magnevist. MR images were evaluated by two radiologists according to the MRI-BI-RADS lexicon criteria. Lesions size, number of lesions and localization in the breast, i.e. multifocal or multicentric disease, were systematically assessed. The impact of these findings on clinical management following MRI were recorded.

Results: High resolution 3.0T MRI of the breast detected the known invasive lobular carcinoma in all patients (n=12). In addition, 10 other suspicious lesions were identified revealing 6 patients with 1 lesion, 2 patients with 2 lesions, and four patients with 3 lesions. Histopathologic sampling of these additional lesions by MRI-guided large-core needle biopsy or needle localization revealed an additional foci of invasive lobular carcinoma. Mean tumor size of the primary lesions was 21 mm (range 6-61 mm), the mean tumor size of additional lesions was 9 mm (4-20mm). In 7 patients multicentric disease was detected, with contralateral disease in 1 patient. Based on the findings on MRI of the breast, the clinical management changed from conservative breast surgery to modified radical mastectomy in 7/12 (58%) of the patients.

Conclusion: High resolution 3.0 T MRI of the breast provide important additional information for the work-up of patients diagnosed with one focus of invasive lobular carcinoma. In our study 58% of the patients had altered surgical therapy following MRI.

Abstractnr. : 4.3

IMPACT OF COMPUTERIZED DECISION SUPPORT ON THE CHARACTERIZATION OF BREAST LESIONS IN MRI OF WOMEN AT INCREASED LIFETIME RISK OF BREAST CANCER: A MULTI-INSTITUTION OBSERVER STUDY

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Purpose: To evaluate the ability of a computerized decision-support system for breast MRI to reduce under-classification of malignant lesions and over-classification of benign lesions detected at MRI of women at increased lifetime risk.

Methods: From 6 institutions in the Netherlands, 42 pathology-proven breast lesions (19 benign, 23 malignant) detected at MRI screening of women at increased lifetime risk were included in this observer study. The results of a previously developed computerized decision-support system that provides probability of malignancy from temporal and morphological features of contrast uptake were offered to radiologists as a second opinion.

Five breast-MRI radiologists (3 experienced, 2 less experienced) independently rated the probability of malignancy and gave BI-RADS scores without and with decision support. ROC analysis was used to compare the performance of the radiologists without and with support. The reduction in under-classification and over-classification was assessed for lesions rated BI-RADS 2 and 3.

Results: All readers showed increased performance to classify lesions according to BI-RADS using the decision support system. In the less experienced readers AZ increased from 0.77 to 0.84, and 0.83 to 0.90, respectively ($p < 0.05$). In the experienced readers AZ increased from 0.83 to 0.87, 0.88 to 0.91, and 0.78 to 0.82, respectively.

Malignant lesions rated BIRADS 3 or 2 were successfully upgraded in 3/10 (30%) and 3/6 (50%) cases read by the less experienced readers and in 1/6 (17%), 2/7 (29%), and 0/4 (0%) cases read by the experienced readers. Benign lesions were successfully downgraded in 1/2 (50%), and 2/5 (40%) cases read by the less-experienced readers and in 1/8 (13%), 1/5 (20%) and 0/13 (0%) cases read by the experienced readers. The system did not result in downgrading of malignant lesions.

Conclusion: The computerized decision-support system has the potential to improve the specificity of breast-MR radiologists to characterize breast lesions detected at MRI of women at increased lifetime risk. In BI-RADS 2 and 3, the incidence of over-classification of benign lesions and under-classification of malignant lesions was reduced.

Abstractnr. : 4.4

PREOPERATIVE CONFIRMATION OF BREAST CANCER IN THE DUTCH BREAST CANCER SCREENING PROGRAM: A PROSPECTIVE, MULTICENTER STUDY

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Purpose: To describe the trends in preoperative pathologic confirmation of breast

cancer of women who underwent breast cancer screening between 1995-2006.

Materials and Methods: We included all women aged 50-75 years who underwent biennial screening mammography in the southern breast cancer screening region of the Netherlands between January 1, 1995 and January 1, 2006. Clinical data, breast imaging reports, biopsy results and breast surgery reports were collected of all women with a positive screening result.

Results: Of 291,917 examinations, 3,513 (1.2%) were positive screens. Workup of positive screens was performed by 16 hospitals and breast cancer was diagnosed in 1,492 women (cancer detection rate: 5.1 per 1,000 women screened; positive predictive value of a positive screen: 42.5%). From 1995 to 2006, the percentage of breast cancers that underwent biopsy prior to surgery, increased from 43.5% to 98.7%. The proportion of breast cancers that was preoperatively confirmed to be malignant by biopsy, increased from 27.1% in 1995 to 96.2% in 2005. In the last six months of 2005, only one out of 66 cancers (1.5%) was not shown to be malignant by biopsy prior to surgery. The ratio of breast cancer cases having a malignant versus benign or inconclusive biopsy result prior to surgery increased from 1.6 to 38.0. Preoperative cytologic confirmation of breast cancer gradually decreased from 91.3% to 20.4% (mean 32.4%), whereas preoperative confirmation of breast cancer by ultrasound guided core biopsy or stereotactic core biopsy increased from 8.7% to 63.2% (mean 57.7%) and from 0% to 16.4% (mean 9.9%) respectively. Through the years, the proportion of in situ ductal cancers and the proportion of invasive breast cancers sized respectively <10 mm (T1a+T1b) and <20 mm (T1a-T1c) ranged from 12.2%-20.0% (mean 16.3%), 21.9%-36.3% (mean 29.8%) and 73.8%-88.1% (mean 79.3%) respectively. Preoperative confirmation of breast cancer did not correlate with tumor size.

Conclusion: This multicenter study shows that a preoperative confirmation of breast cancer is currently obtained in virtually all patients. The spectacular increase of preoperative breast cancer confirmation through 1995-2005 is correlated with the introduction of stereotactic core biopsy and increased use of ultrasound guided core biopsy.

GENOMINEERD

Radiologendagen Prijs 2006

Abstractnr. : 4.5

INDEPENDENT DOUBLE READING OF SCREENING MAMMOGRAMS IN THE NETHERLANDS: IMPACT OF ADDITIONAL DOUBLE READING BY SCREENING MAMMOGRAPHY RADIOGRAPHERS

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Purpose: To determine the value of independent radiographer double reading of screening mammograms in addition to standard radiologist double reading.

Materials and Methods: From January 2003 to April 2004, all 37,693 screening mammograms were independently read by two screening radiologists and two screening mammography radiographers, who for each case blindly recorded whether additional diagnostic procedures were required. All positive radiographer readings were re-evaluated by the radiologists. Patients were referred for further assessment if at least one radiologist considered recall necessary. Two year follow-up of all patients was obtained.

Results: The radiologists referred 612 cases (1.6%), of which 207 (33.8%) were found to be malignant. Review of 257 additional positive radiographer readings led to another 45 referrals, which resulted in the detection of 11 additional cancers. These extra referrals increased the initial referral rate (RR) from 1.6% to 1.7% and the cancer detection rate (CDR) from 5.5 to 5.8 per 1,000 women screened. With radiographer double reading only, 512 women would have been referred (RR 1.4%), resulting in 182 malignant cases (positive predictive value 35.5%; CDR 4.8). These 182 breast cancers included 7 cases which now presented as interval cancers and 3 cases that proved to be malignant at subsequent screening. Referral of all 257 additional positive radiographer readings would have increased the RR to 2.3% (869 cases) and led to 228 cancers found at screening (CDR 6.0).

Conclusions: Radiographer double reading would result in smaller CDRs than radiologist double reading. Radiologist review of positive radiographer readings, however, may add to the sensitivity of the breast cancer screening program.

Abstractnr. : 4.6

LONG-TERM RESULTS AFTER UTERINE ARTERY EMBOLIZATION IN WOMEN WITH SYMPTOMATIC FIBROIDS

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Purpose: To evaluate long-term results following uterine artery embolisation (UAE) in women with symptomatic fibroids.

Material and methods: Eighty-five consecutive women treated with UAE between August 1998 and February 2002 were followed prospectively. In December 2005 all women were contacted by phone and a questionnaire was completed. Treatment failure was assessed and defined when additional therapies were performed or no symptom improvement occurred at last follow-up. Clinical symptoms were compared to baseline. Additional therapies and patient satisfaction were determined.

Results: Follow-up was completed in 78 women with a mean follow-up of 57 months (median 56, range 45-87). Two women deceased and 5 were lost for follow-up. Preprocedural complaints were heavy menstrual bleeding in 94%, pain in 55% and bulk related symptoms in 47%. Additional therapy such as hysterectomy (13%), myomectomy (6%) and repeat embolisation (8%) was needed in 21 women. Of the remaining 57 women, bleeding was improved in 96%, pain in 85% and bulk-related symptoms in 80%. At last follow-up 95% of these patients were satisfied.

Conclusion: Long-term follow-up after UAE in women with symptomatic fibroids shows that additional therapy is needed in about one quarter. Of the remaining women symptom improvement and satisfaction is high and durable.

Abstractnr. : 4.7

UTERINE ARTERY EMBOLIZATION VERSUS HYSTERECTOMY IN THE TREATMENT OF UTERINE FIBROIDS: A RANDOMIZED COMPARISON OF CLINICAL OUTCOME, QUALITY OF LIFE AND SATISFACTION AT 2 YEARS FOLLOW UP.

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Purpose: To compare uterine artery embolization (UAE) and hysterectomy in

the treatment of symptomatic uterine fibroids. Outcome measures: cessation of menorrhagia, secondary procedures, volume reduction, pain, bulk-related complaints, quality of life (QOL) and satisfaction after a follow up period of 2 years.

Material and Methods: Between 2002 and 2004 177 patients with menorrhagia due to uterine fibroids were randomly assigned to UAE (n=88) or hysterectomy (n=89). UAE was performed using PVA particles. Hysterectomies were performed vaginally or abdominally. Secondary procedures were noted. Uterine and dominant fibroid volumes were assessed by ultrasound in the UAE group. Pain and bulk-related complaints were scored on a 5-point Likert scale. QOL was scored using the SF-36 questionnaire, both the mental (MCS) and the physical (PCS) component summary. Satisfaction was measured using a 7-point Likert scale.

Results: At 2 years 19/81 (23.5%) of UAE patients had undergone a secondary hysterectomy for unsatisfactory results. Uterine and fibroid volumes decreased by 48.2% and 60.5%, respectively (UAE group). Improvement in pain was reported in 85% of UAE patients and 78% hysterectomy patients (p=0.30), while bulk-related complaints improved in 66% of UAE- and 69% of hysterectomy patients (p=0.71). QOL improved significantly compared to baseline, and did not differ between both groups (MCS: p=0.50; PCS: p=0.95). Satisfaction was higher in hysterectomy patients at 2 years.

Conclusions: Hysterectomy was avoided in 76.5% of UAE patients. QOL, pain and bulk-related complaints improved equally and significantly in both groups. At 2 years hysterectomy patients were more satisfied.

GENOMINEERD

Radiologendagen Prijs 2006

Abstractnr. : 4.8

AN ECONOMIC EVALUATION OF UTERINE ARTERY EMBOLIZATION VERSUS HYSTERECTOMY IN THE TREATMENT OF SYMPTOMATIC UTERINE FIBROIDS: RESULTS FROM THE RANDOMIZED EMMY-TRIAL

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Purpose: To determine if uterine artery embolization (UAE) is a cost-effective alternative to hysterectomy for patients with symptomatic uterine fibroids, we performed an economic evaluation as part of the multi-center, randomized Emy trial.

Material and methods: Between February 2002 and February 2004, 177 patients were randomly allocated UAE (n=88) or hysterectomy (n=89). Patients were followed until 24 months after the allocated treatment. We performed an intention to treat economic analysis from a societal perspective, including the following cost categories: direct medical in-hospital costs, direct medical out-hospital costs, direct non-medical costs and indirect costs. Standardized costs were calculated as volumes (all centers) x prices (standardized for a single university hospital). Differences in costs were tested using the Mann-Whitney U test.

Results: In total 81 patients underwent UAE, while 75 underwent hysterectomy. 19 (23.5%) secondary hysterectomies were performed in the UAE group. The mean total costs per patient in the UAE group were significantly lower than in the hysterectomy group (8.676 vs. 13.841; mean difference 5.165; p=0.0006). Direct medical in-hospital costs were 4.991 for the UAE group and 6.203 for the hysterectomy group (mean difference 1.212; p=0.0004). Direct

medical out-hospital and direct non-medical costs were low in both groups, with a mean difference of 31 and 85 in favor of hysterectomy ($p=0.018$ and $p=0.0008$, respectively). Indirect costs differed significantly between both treatment options in favor of UAE (mean difference 4.069; $p=0.001$); absence from work accounted for 79% of the difference in overall costs.

Conclusion: The cumulative costs of UAE are significantly lower compared to hysterectomy at two years follow-up. From an economic perspective, therefore, UAE is the superior alternative treatment strategy in women with symptomatic uterine fibroids.

Sessie 5 - Skeletradiologie / Onderwijs / Opleiding

Vrijdag 17 november 2006, 12.10 - 13.14 uur

Abstractnr. : 5.1

REPRODUCIBILITY AND NORMAL VALUES OF THE SONOGRAPHY AFTER TOTAL HIP REPLACEMENT

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Background and aim: The aim of the study was to describe the normal sonographic image after a clinically uncomplicated, primary total hip replacement by the posterior approach including inter- and intra-observer reproducibility, focused on the amount and localization of postoperative fluid collections.

Patients and Methods: We performed sonography of the hip in 47 patients between 2nd and 5th postoperative day. Inclusion of patients was determined by preconceived selection and a lottery program. Bone-capsule distance and extra articular deep and superficial fluid collections were measured. Interclass correlation coefficients and limits of agreement were calculated.

Results: The normal values of bone-capsule distance and extra articular fluid collections after total hip replacement were established by the upper bound of the 95% confidence interval. The upper bound for bone-capsule distance was 6mm, for deep fluid collections 21 mm and for superficial fluid collections 28 mm. In the clinically normal patient group, 4 patients had an extreme value for bone-to-capsule distance. For the deep and superficial fluid collections no extremes were measured. No correlation between bone-capsule distance and the presence of fluid collections was found.

Interclass correlation coefficients were 0.979 for bone-capsule distance and 0.990 for fluid collection measurements.

Conclusion: Sonography is a reproducible method for the evaluation of fluid collections after total hip replacement. The values measured can be helpful in decision making when there is clinical suspicion of postoperative haematoma after hip replacement by the posterior approach.

Methoden: Multidetector CT datasets van de rechter enkel van twintig gezonde proefpersonen werden vervaardigd in neutrale positie met een normale stralenbelasting. Vervolgens werd een kracht op een voetplaat aangebracht waardoor de voet in acht verschillende extreme posities werd gebracht (figuur 1). In iedere extreme positie werden CT datasets met een lage stralenbelasting vervaardigd. Na botsegmentatie en botmatching in de CT datasets werden de schroevingsassen met de translatie en rotatie parameters berekend voor de beweging van de calcaneus ten opzichte van de talus tussen de vier tegenovergestelde extreme posities. De schroevingsassen werden gepresenteerd in een uniek coördinatenstelsel gebaseerd op de geometrische hoofdasen van de talus van de proefpersoon met het geometrische middelpunt van de talus als de oorsprong van het coördinatenstelsel.

Resultaten: Voor maximale inversie naar maximale eversie van de voet werd een talocalcaneaire schroevingsas berekend met een gemiddelde inclinatie van 49.4 ± 4.3 ten opzichte van het horizontale vlak (XY-vlak) en een gemiddelde deviatie van -2.7 ± 7.9 ten opzichte van het sagittale vlak (XZ-vlak) (figuur 2). Bij deze beweging was de gemiddelde rotatie om de schroevingsas 37.3 ± 5.9 met een gemiddelde translatie over de schroevingsas van 2.3 mm ± 1.1 mm. Schroevingsasparameters voor de twee subtalare bewegingen tussen de vier aangrenzende extreme voet posities waren gelijkend. Er werd aanzienlijke variatie gevonden in de schroevingsasparameters voor subtalare beweging van maximale dorsiflexie naar maximale plantairflexie van de voet.

Conclusie: De maximale gemiddelde rotatie om de schroevingsas voor subtalare beweging in twintig gezonde proefpersonen werd gevonden voor maximale inversie naar maximale eversie van de voet. Het bewegingsbereik in het subtalare gewricht kan effectief gemeten worden met behulp van de ontwikkelde techniek op basis van CT-datasets.

Abstractnr. : 5.2

KINEMATICA VAN HET SUBTALARE GEWRICHT IN GEZONDE PROEFPERSONEN MET BEHULP VAN COMPUTER TOMOGRAFIE

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Doel: Kennis van de kinematica van de achtervoet biedt een basis voor diagnostische en chirurgische procedures bij subtalare instabiliteit. Er is geen klinische methode beschikbaar voor nauwkeurige in-vivo metingen van subtalare kinematica. Het doel van de studie was het fysiologische bewegingsbereik te meten van het subtalare gewricht in gezonde proefpersonen in een belaste situatie met behulp van computer tomografie (CT).

Abstractnr. : 5.3

USE OF INTRA-ARTICULAR CARBON DIOXIDE (CO₂) AND AIR FOR MR-ARTHOGRAPHY: A FEASIBILITY STUDY

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Introduction: During animal experiments, carbon dioxide (CO₂) and air were used as a novel contrast agent for direct magnetic resonance arthrography (MRAr).

Materials and methods: MRAr was performed after injection of CO₂ and air in the knee joints of two pigs. MR images of phantoms containing air, CO₂ and nitrogen were compared.

Results: After intraarticular injection both present as a signal void on various sequences and permit sharp delineation of cartilage and other adjacent structures. Despite potential for artefact generation, only slight susceptibility artefact was seen after injection of CO₂ and air in the knee joints of two pigs. In phantom experiments air, CO₂ and nitrogen demonstrated identical, slight regular susceptibility artefacts at the phantom margins.

Discussion: CO₂-MRAr can yield high contrast between cartilage, ligaments and synovium relative to the joint compartment. Therefore this technique might be useful as an investigational method for evaluation of cartilage surface lesions and possibly as an alternate contrast agent for clinical use. One advantage of using gases like CO₂ or air over gadolinium .

Abstractnr. : 5.4

BONE MARROW EDEMA LESIONS CHANGE IN VOLUME IN THE MAJORITY OF PATIENTS WITH OSTEO-ARTHRITIS; ASSOCIATIONS WITH CLINICAL FEATURES

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Purpose: It has been suggested that bone marrow edema (BME) in the knee is associated with progression of osteoarthritis (OA). The purpose of our study is to evaluate prospectively, in patients with OA, changes of BME over two years and its relationship with clinical features.

Materials and Methods: Our institution's medical ethical review board approved the study. Written informed consent was obtained from each patient prior to the study. Magnetic resonance (MR) images of the knee were obtained from 182 (20% male; aged 43-76 years; mean age 59 years) patients who had been diagnosed with familial symptomatic OA at multiple joint sites. MR images were made at baseline and at 2 years follow-up. MR images were analysed by 2 experienced readers on a validated subjective scoring system for total volume of BME and cysts. Symptoms and function were assessed by the Western Ontario and McMaster Universities Osteoarthritis index (WOMAC) after 2 years. Students T-test, Odds ratios (ORs) with 99% confidence intervals (CIs) and Kruskal Wallis test were used to associate BME changes with clinical features.

Results: 132 patients (75%) had BME at any point in time. A total of 327 BME lesions were recorded. Total volume of BME changed in 90 patients (66%). Volume changed in 147 BME lesions (45%): there appeared 69 (21%) new lesions, 32 (10%) lesions disappeared, 26 (8%) increased, and 20 (6%) decreased in volume. A total of 222 cysts were documented in 182 patients (55%). Seventy (32%) cystic lesions in 56 patients (30%) changed in size. If a cystic lesion changed in size, it changed in the same way, either an increase or decrease, as did an associated BME lesion (OR: 37; CI: 6-210). Increase or decrease of BME volume, over a 2 year time period were not associated with severity of WOMAC scores.

Conclusion: In patients with OA, BME volume fluctuates in the majority of patients over a 2 year time period. These changes are not associated with severity of WOMAC scores at the study end point.

Abstractnr. : 5.5

DO MRI FEATURES AT BASELINE PREDICT RADIOGRAPHIC JOINT SPACE NARROWING IN THE MEDIAL COMPARTMENT 2 YEARS LATER?

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Purpose: The purpose of the study is to associate magnetic resonance (MR) imaging parameters with radiographic progression of knee OA measured by joint space narrowing (JSN) after 2 years for the identification of high-risk groups.

Materials and Methods: MR images of the knee at baseline and standardised radiographs at baseline and after 2 years were obtained from 186 patients (20% male; aged 43-76 years; mean age 60 years) who had been diagnosed with symptomatic OA at multiple joint sites.

MR images were analysed by 2 experienced readers on a validated subjective scoring system for bone marrow oedema (BME), cysts, osteophytes, cartilage defects, joint effusion and meniscal pathology at different anatomical locations in the medial compartment.

Radiographs were scored without knowledge of the chronological order by 2 experienced readers for JSN in the medial tibio-femoral joint, semi-quantitatively, using the Altman atlas, and quantitatively, using a medical imaging program. Radiological progression was considered as an increase of at least 1 grade in the Altman score and a decrease of more than 0.50mm in the quantitative JSN assessment.

Logistic regression was used to calculate odds ratios (OR), adjusted for age, sex, body mass index and family effect, to assess the association between MRI parameters and radiological progression.

Results: Respectively 17 (9.1%) and 30 (16.1%) of the 186 patients showed radiological progression using the Altman index and the quantitative measurement. Of the 186 patients, 23% had BME lesions, 14% had cysts, 80% had osteophytes, 60% had cartilage defects, 64% had effusion, 27% had meniscal subluxation and 47% had meniscal tears.

Meniscal tears (OR 4.0; 95% CI 1.1-15.0) and meniscal subluxation (OR 3.2; 95% CI 1.2-8.6) were associated with radiological progression as assessed by the Altman score, although there was a trend for BME, osteophytes, cysts and cartilage defects to be associated.

No association between MR imaging parameters and radiological progression were found using quantitative measurements.

Conclusion: Meniscal pathology (tears and meniscal subluxation) was the MR imaging parameter associated with subsequent radiological progression, as assessed by the Altman score, on a radiograph 2 years later. The role of BME in early OA remains ambiguous.

Abstractnr. : 5.6

RADIOLOGY OF GYMNASTIC INJURIES, A REPORT ON 3.5 YEARS OF EXPERIENCE

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Purpose: In literature the gymnast wrist is a frequently reported injury in gymnasts. However, other skeletal parts are also subject to extensive forces and are consequently at risk for injury. The aim of this study was to evaluate the spectrum of skeletal injuries at imaging in symptomatic competitive gymnasts to get an impression about the distribution and type of common typical gymnast-related injuries.

Materials and Methods: The available X-ray, CT and MRI examinations performed in symptomatic elite-gymnasts between September 2002 and April 2006 were evaluated for injuries by two experienced skeletal radiologists. The number of lesions, as well as the location (axial skeleton, upper extremities, or lower extremities) of lesions was documented. In addition the type (osseous or soft tissue) of lesions was evaluated.

Results: Data were available for 25 gymnasts (21 women; mean age 14 years, range 10-20). In total 56 lesions were found. The total number of injuries per gymnast was one (N=11), two (N=5), three (N=4), four (N=2) or five lesions (N=3). Gymnasts presented more frequently with lesions of the axial skeleton (N=22; 39%) and lower extremities (N=28; 50%) than with upper extremity injuries (N=6; 11%). The majority of depicted lesions (N=45; 80%) concerned osseous pathology (axial skeleton: N=21 (95%); lower extremities: N=19 (68%); and upper extremities: N=5 (83%)). Soft tissue injuries (N=11; 20%) were relatively rare (axial skeleton: N=1 (5%); lower extremities: N=9 (32%); and upper extremities: N=1 (17%)). Bone marrow or soft tissue edema at MR imaging was seen in 31 of 56 (55%) lesions.

Conclusions: Injuries in gymnasts comprise mainly lesions in the axial skeleton and lower extremities and involve primarily damage of osseous structures. The relative high frequency of bone marrow or soft tissue edema emphasizes the value of incorporating fat sat sequences in the MR protocol when imaging athletes. However, the correlation with the clinical situation always needs to be addressed.

Abstractnr. : 5.7

ECHOGRAFIE ALS WAARDEVOLLE AANVULLING OP HET ONDERWIJS IN DE FYSISCHE DIAGNOSTIEK VAN LEVER EN MILT

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Doel: Onderzoeken of echografische controle, bij het oefenen van het percuteeren en palperen van de lever en milt, de student een beter ruimtelijk inzicht kan geven in de ligging van deze organen en meer vertrouwen kan geven in eigen handelen.

Achtergrond: Percussie en palpatie van de lever zijn nog steeds niet weg te denken onderdelen van het fysisch diagnostisch onderzoek. Er zijn echter een aantal valkuilen bij uitvoering en interpretatie van het fysisch diagnostisch onderzoek welke mogelijk de oorzaak zijn van tegenvallende nauwkeurigheid. Deze valkuilen betreffen een sterke variabiliteit in vorm en ligging van de lever. Ook de grootte van de lever is variabel en hangt samen met de lichaamsbouw, het geslacht en de leeftijd. Echografie kan inzicht geven in deze valkuilen en geeft de mogelijkheid tot feedback op de bevindingen van de student.

Methode/opzet: Tweedejaars geneeskunde studenten leren de beginselen van percuteeren en palperen van de lever en milt binnen het vaardigheidsonderwijs. Het practicum duurt 1 1/2u. De studenten werken in tweetallen. De begrenzingen van de lever en milt worden bij elkaar gepercuteerd en zo mogelijk gepalpeerd waarna de gevonden begrenzingen met viltstift op de huid worden aangegeven, onder leiding van een huisarts.

Daarna worden de bevindingen bij iedere student echografisch gecontroleerd door een radioloog/assistent radiologie. Deelname aan de echografische controle vindt plaats op vrijwillige basis, eventuele toevalsbevindingen worden gemeld aan de student en zijn/haar huisarts na toestemming van de student.

Resultaten: 73,5% van de studenten vindt dat de echobeelden een beter ruimtelijk inzicht geven in de ligging van de lever en milt.

61% van de studenten heeft nu meer vertrouwen in het doen van het lichamenlijk onderzoek van lever en milt.

95% van de studenten vindt echografische controle een waardevolle aanvulling bij het leren van het lichamenlijk onderzoek van lever en milt.

Conclusie: Echografische controle, van de bevindingen bij percussie en palpatie van lever en milt, geeft een beter ruimtelijk inzicht en meer vertrouwen in eigen handelen waardoor echografie een waardevolle aanvulling is op het onderwijs.

Abstractnr. : 5.8

ERVARINGEN MET EEN FACULTATIEF GEÏNTEGREERD E-PRACTICUM RADIOLOGIE EN BONUSPUNTEN IN 4DE JAAR GENEESKUNDE

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Achtergrond: In het gehele curriculum Geneeskunde '93 aan de Universiteit van Amsterdam wordt Radiologie onder meer middels e-practica (Computer Ondersteund Onderwijs, COO) aangeboden. De practica zijn verplicht, bevatten radiologische casuïstiek en tellen niet mee voor het eindcijfer van het blok.

Daarnaast is de trend in het medisch onderwijs steeds meer om niet een vak solitair te onderwijzen, maar geïntegreerd aan te bieden.

Elektronisch toetsen wordt wellicht een nieuwe manier van toetsen, vandaar dat we geïnteresseerd waren in de mogelijkheden hiervan.

Doel: Te onderzoeken hoe de 4de jaars studenten de opzet van een geïntegreerd facultatief practicum radiologie waarderen, in vergelijking met een verplicht radiologie practicum. Tevens te evalueren wat er gebeurt wanneer elektronisch toetsen op deze wijze facultatief wordt ingevoerd.

Materiaal en Methode: In het 4de jaar cohort Geneeskunde 2005-2006 is binnen het blok 'bewegingsapparaat' een e-practicum Radiologie in een geïntegreerde opzet aan de studenten aangeboden. Participerende afdelingen waren anatomie, reumatologie, farmacologie, moleculaire biologie, orthopedie. Het practicum is web-based aangeboden, was facultatief. Een maximum van een vol bonuspunt kon verdiend worden. Het tentamen werd dus optimaal gehono-

reerd met een elf (11). In practicum groepen van 32 studenten werd het programma in een periode van drie weken doorlopen. Het programma werd afgesloten met een eveneens facultatieve evaluatie volgens Likert-scale model.

Resultaten: 292 van de 315 4de jaar studenten (93 %) hebben meegedaan aan het practicum. Hiervan waardeerde 71% het geïntegreerde karakter als meer informatief dan de vorige opzet. De studenten die het practicum later in de tijd konden doen, en dus meer onderwijs van het betreffende blok hadden gehad, scoorden beter. Daarom werd besloten de cesuur van toekenning deel bonuspunten per groep sessie vast te stellen.

Gezien het feit dat alle studenten in dezelfde volgorde het practicum door liepen, werd er soms in groepjes gewerkt. Dit werd door andere studenten als oneerlijk ervaren.

Conclusie: Geïntegreerd onderwijzen binnen een e-practicum is een succesvolle methode. Het kunnen behalen van bonuspunten was zeer stimulerend. Het Onderwijs Instituut Geneeskunde heeft dit idee van elektronisch toetsen en bonuspunten omarmd en dit is als onderdeel van het nieuwe curriculum Curius 2006 geïncorporeerd.

Sessie 6 - Neuroradiologie II / Diversen

Vrijdag 17 november 2006, 14.20 - 15.24 uur

Abstractnr. : 6.1

SUSTAINED EFFECTS OF ECSTASY ON THE BRAIN MEASURED WITH ADVANCED MRI AND [123I],-CIT SPECT - RESULTS FROM THE NETHERLANDS XTC TOXICITY (NEXT) STUDY

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Purpose: Previous studies suggested neurotoxic effects of the popular recreational drug ecstasy. However, these findings are debated because of methodological problems, such as polydrug use, lack of baseline data, and different results with different techniques. The Netherlands XTC Toxicity (NeXT) study aimed to assess specific effects of ecstasy on the brain retrospectively in heavy ecstasy users and prospectively in new users with a combination of different neuroimaging techniques.

Material and methods: For the retrospective study, 71 subjects were included with such a variation in type and amount of drugs used that it was possible to differentiate between effects of ecstasy and other substances using linear multiple regression analyses. For the prospective study, 188 ecstasy-naïve subjects with high risk for first ecstasy use were examined at baseline. After 18 months follow-up, 59 incident ecstasy users (6.0±11.6 tablets) and 56 persistent ecstasy-naïves were reexamined. All subjects (abstinent >2 weeks) underwent 1.5T MRI, including 1H-MR spectroscopy (ratios of N-acetylaspartate, choline and myoinositol relative to creatine), diffusion tensor imaging (apparent diffusion coefficient (ADC) and fractional anisotropy (FA)), perfusion weighted imaging (relative cerebral blood volume (rCBV)), and [123I],-CIT SPECT imaging (serotonin transporters). Images were registered to spatially normalized T13D scans and regions of interest were drawn on the normalized T13D brain.

Results: High cumulative doses of ecstasy, and not other psychoactive drugs, was associated with decreased FA, decreased [123I],-CIT binding and increased rCBV, all in the thalamus. Heavy ecstasy use showed no effect on metabolite ratios and ADC.

Low ecstasy doses had a negative effect on FA in thalamus and centrum semiovale and on rCBV in globus pallidus and putamen, and a positive effect on FA in globus pallidus and ADC in the thalamus. Low ecstasy use had no effect on [123I],-CIT binding and metabolite ratios. All values were significant at p<0.05, adjusted for confounders.

Conclusion: Both studies showed sustained effects of ecstasy on the brain, mainly in the basal ganglia. Heavy ecstasy use showed converging findings of a specific toxic effect of ecstasy on serotonergic axons in the thalamus. The first prospective study suggests prolonged vasoconstriction and probably axonal loss in the basal ganglia, even in low-dose ecstasy users.

Abstractnr. : 6.2

SIGNIFICANT BRAIN ATROPHY ON MRI AND COGNITIVE DYSFUNCTION IN LONG TERM SEVERE SEPSIS SURVIVORS

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Introduction: Surviving critical illness such as severe sepsis is associated with long term cognitive impairment. Imaging studies revealed structural, partly reversible brain damage in the course of severe sepsis. The aim of this study is to assess neurocognitive outcome and brain morphology in survivors of severe sepsis.

Methods: Between January 2002 and January 2005 we included 43 severe sepsis survivors (APACHE II score >18, age <70 years, length of stay >48 hours and >24 hours mechanical ventilation). Patients with pre-morbid cognitive disability, chronic underlying disease, cerebrovascular and atherosclerotic disease were excluded (n=29). All patients underwent neuropsychological evaluation and MRI brain imaging. Cognitive impairment was considered if = 3 from the 10 tests scored >1.5 SD below norm-reference. MRI (1.5T) brain imaging included a T1w, T2w and a T2w-FLAIR. All images were analyzed for white matter lesions (WML), infarcts, and brain atrophy, using the bicaudate ratio (BCR) as index for central brain atrophy and the Sylvian fissure width as index for peripheral atrophy. Semi-quantitative brain atrophy analysis was performed using a 8 point sulcal and ventricular grading scale. MRI brain scans of 42 age, health and gender matched individuals served as controls. Fishers exact and Kruskal-Wallis analysis were performed where applicable.

Results: Fourteen patients (mean age 54 ± 11 years, 7F:7M) were analyzed. Median (IQR) APACHE II score was 26 (22-28), ICU stay 20 (15-38) days. Time between ICU discharge and MRI of the brain was 35 (25-39) months. Four (28%) severe sepsis survivors were shown to be cognitive impaired. Territorial infarcts were observed in one (7%) and WML in ten (65%) severe sepsis survivors (n.s compared with controls). Severe sepsis survivors had an increased median BCR 0.54 (0.49-0.57) vs. 0.43 (0.40-0.40), p<0.001 and ventricular grades (median 3 vs. 2, P<0.01) compared to healthy individuals. A trend was observed in increased BCR 0.57 (0.55-0.60) vs. 0.50 (0.45-0.56), p<0.07 between cognitive impaired and unimpaired survivors of severe sepsis.

Conclusions: Survivors of severe sepsis show neurocognitive impairment and central brain atrophy.

Abstractnr. : 6.3

CT VENOGRAPHY OF THE DURAL SINUSES AND DEEP CEREBRAL VEINS USING MATCHED MASKED BONE ELIMINATION AND GRID COMPUTING

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Background and purpose: Matched Mask Bone Elimination (MMBE) is a new technique for digital removal of bone in a fully automated way, using grid computing with Maximum Intensity Projection (MIP) in order to facilitate evaluation of vessel structures in CT Angiography (CTA) images.

The purpose of this study was to evaluate quality of bone removal as well as to determine interobserver variability in detection of dural sinus and deep venous thrombosis using fully automated MMBE/MIP CTA

Methods: We included fifty consecutive patients (16 men, 34 females; mean age 36 years, range 0-82) with clinical suspicion of dural sinus thrombosis. All patients underwent multislice CT Venography with MMBE processing and all images were evaluated by two neuroradiologists. Quality of bone removal was categorised as incomplete, near complete or complete (last two were considered as 'good'). In each patient, twelve venous structures (7 dural sinuses and 5 deep cerebral veins) were evaluated for thrombosis.

We performed a per sinus/vein and a per patient analysis. We expressed interobserver agreement as kappa statistics and proportions full agreement.

Results: Both observers fully considered bone removal as 'good' in 48 of 50 patients (96%).

A total of 600 sinuses/veins was evaluated. Kappa statistic for interobserver agreement on presence or absence of thrombosis was 0.76 (95% confidence interval 0.66-0.86; full agreement 96,5%: 579/600). The observers agreed on the presence of thrombosis in 37 of 600 sinuses/veins (6,1%). There was disagreement in 21 of 600 sinuses/veins (3,5%).

In 47 of 50 patients (94%) there was full agreement in presence (10 patients) or absence (37 patients) of thrombosis; kappa statistic 0.83 (95% confidence interval 0.65-1.00). In 3 of 50 patients (6%) the observers disagreed on the final diagnosis (thrombosis in at least one sinus/vein).

Conclusion: Multislice CT Venography using MMBE and grid computing is a useful fully automated and operator independent technique for visualization of the intracranial venous circulation, removing the bone effectively. The technique has a high interobserver agreement for the presence or absence of dural sinus/vein thrombosis.

Abstractnr. : 6.4

CT PERFUSIE NA SUBARACHNOIDALE BLOEDINGEN: VOORSPELLENDE WAARDE VOOR HET OPTREDEN VAN SECUNDAIRE ISCHEMIE

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Doel: Secundaire ischemie is een belangrijke oorzaak voor morbiditeit en mortaliteit na een subarachnoidale bloeding (SAB). CT Perfusie zou een bijdrage kunnen leveren in het voorspellen van het optreden van secundaire ischemie. Wij onderzochten de aanvullende prognostische waarde van CT Perfusie boven bekende klinische predictoren (als leeftijd, klinische toestand en hoeveelheid subarachnoidaal bloed) voor het ontstaan van secundaire ischemie.

Materiaal en Methoden: 69 patiënten werden gescand met Perfusie CT binnen 72 uur na de SAB. Voor elke patiënt werd de asymmetrie in cerebrale bloed flow (CBF) berekend (door de ratio van CBF in contralaterale hemisferen te vergelijken). Daarnaast werd informatie verzameld over de 3 bekende klinische voorspellers. Adjusted hazard ratios (HRs) werden berekend voor de CBF ratio en de 3 klinische predictoren door middel van multivariate analyse (Cox regressie). De aanvullende prognostische waarde van CBF ratio werd bepaald door de oppervlakte onder de ROC curve te vergelijken voor 2 modellen: 1 van de 3 bekende klinische voorspellers en 1 van de drie voorspellers plus de CBF ratio.

Resultaten: De CBF ratio was een onafhankelijke voorspeller voor het ontstaan van secundaire ischemie (HR: 0.63; 95% CI: 0.46- 0.86), dit gold ook voor klinische conditie (HR: 1.47; 1.01- 2.13). Door de CBF ratio toe te voegen aan de 3 bekende klinische predictoren was er een toename van de oppervlakte onder de ROC curve van 0.76 (95% CI 0.65- 0.89) naar 0.81 (0.71- 0.91), dit suggereert een verbeterde voorspellende waarde.

Conclusie: De CBF ratio is een onafhankelijk voorspeller voor het ontstaan van secundaire ischemie en kan een bijdrage leveren voor het identificeren van patiënten die een hoog risico hebben voor het ontstaan van secundaire ischemie.

Abstractnr. : 6.5

THE DUTCH PREDICTION RULE FOR THE USE OF COMPUTED TOMOGRAPHY (CT) IN PATIENTS WITH MINOR HEAD INJURY

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Purpose: Prediction rules (Haydel et al. N Engl J Med 2000:100-5; Stiell et al. Lancet 2001:1391-6) for minor head injury (MHI) patients suggest that CT may be limited to certain patients at risk of intracranial complications. These rules are applicable only to MHI patients with a history of loss of consciousness (LOC), which is frequently absent. Purpose of this study was to design a prediction rule for the use of CT in all MHI patients, irrespective of the presence or absence of LOC.

Methods and Materials: A prospective multicenter study was performed in 4 university hospitals in the Netherlands of consecutive adult MHI patients (=16 years) who presented with a Glasgow Coma Score (GCS) of 13-14 or with a GCS of 15 and at least one risk factor (LOC, amnesia, headache, vomiting, anterograde amnesia, seizure, neurological deficit, intoxication, supraclavicular injury, coagulopathy). Primary outcome was any intracranial traumatic CT finding; secondary outcome was a traumatic CT finding that led to neurosurgical intervention. Logistic regression analysis was performed using variables from existing prediction rules and guidelines for MHI.

Results: 3,181 patients were included between February 11, 2002 and August 31, 2004. 243 patients (7.6%) had intracranial traumatic findings on CT; 17 (0.5%) underwent neurosurgical intervention. Our model contained the following risk factors: pedestrian/cyclist vs. vehicle, ejected from vehicle, fall from height, LOC, vomiting, persistent anterograde amnesia, anticoagulant use, neurological deficit, post-traumatic seizure, clinical signs of skull contusion or fracture, GCS<15 or GCS deterioration after 1 hour, age and post-traumatic amnesia. Our final model had a sensitivity of 100% for neurosurgical interventions and

90.5% for intracranial CT findings. Specificities were 36.6% and 38.6% respectively. Implementation of this model would reduce the number of CTs by 36.4%.

Conclusion: We developed a highly sensitive prediction rule for the use of CT in all MHI patients, with a high potential to reduce the number of CTs.

Abstractnr. : 6.6

QUANTIFICATION AND CHARACTERISATION OF SYMPTOMATIC CAROTID ATHEROSCLEROTIC PLAQUES WITH MDCTA: RELATIONSHIP WITH RISK FACTORS, SEVERITY OF STENOSIS AND CEREBROVASCULAR SYMPTOMS

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Purpose: To measure the volume of atherosclerotic plaque and its components in symptomatic carotid arteries and to assess the relationship with risk factors, severity of stenosis and cerebrovascular symptoms.

Methods and materials: seventy-four consecutive patients (46 male, 28 female; mean age 62 years, range 20-89 years) with cerebrovascular symptoms (transient ischemic attack and stroke) underwent multidetector CTA (MDCTA) of the carotid arteries. Scanning was performed on a 16-slice MDCT scanner (Siemens, Sensation 16, Erlangen, Germany). With a custom-made software tool plaque volumes were assessed by manually drawing the outer-contour of the carotid artery bifurcation. Luminal boundary was assessed automatically based on a Hounsfield-Unit (HU) threshold validated in a previous study. Within the plaque volume the contribution of different components was assessed (lipid: HU <60; fibrous tissue 60-130 HU; calcification >130 HU). Risk factors were assessed: smoking, hypertension, diabetes, hypercholesterolemia, previous cerebrovascular disease, previous cardiac disease.

Results: Atherosclerotic disease in the symptomatic carotid artery was present in 40 (54%) of the patients. Plaque volume in these 40 patients was 796724 mm³. A difference was found in the contribution of calcium to the plaque volume between patients with and without hypercholesterolemia (912% versus 36%; $p=0,046$) and between patients with and without previous cardiac disease (1513% versus 510%; $p=0,009$). In 25 of the 59 patients with a stenosis < 30% plaque volume was present with a volume of 366202 mm³; 8 patients with a stenosis of 30-70% had a plaque volume of 1267460 mm³ and 7 patients with a stenosis > 70% had a volume of 1794877 mm³. TIA and ischemic stroke was present in 42 and 32 patients, respectively. No significant difference in plaque volume between patients with TIA and ischemic stroke was found (386722 mm³ and 489583 mm³). In addition, no significant difference in the contribution of the different plaque components was found.

Conclusions: Atherosclerotic plaque can be quantified and characterised with MDCTA. The amount of calcification is related to hypercholesterolemia and previous cardiac disease. severity of stenosis is related to plaque volume. Plaque characteristics were not related to the type of cerebrovascular symptoms.

Abstractnr. : 6.7

ROUTINE DOUBLE READ POLICY IN TELERADIOLOGY: FEASIBILITY AND BENEFITS

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Introduction: A well-established European-based teleradiology business has the policy that all cross-sectional images are double read by 2 readers. The object of this study is to evaluate the extra time required for second reading routinely, the rate of inter- and intra- reader discrepancies, and what the potential savings, both in human and financial terms, might amount to.

Material and Methods: A total of 22,056 MR studies were retrospectively reviewed (July 2005-March 2006). The distribution was 66.4% neuro-, 33.2% musculoskeletal, and 0.4% abdominal studies.

All studies are re-read daily with access to the original report by a different radiologist randomly. Discrepant readings are graded from 1 to 4 denoting increasing medical implications. The final report is arrived at by consensus. The time required for this re-read process, the rate of discrepancies per radiologist and according to discrepancy grade as well as the cost were tabulated.

Results: Time required for a first read including report took 9 minutes (+/-2 mins), and a second read 3 minutes (+/- 1 min). There was agreement with the first read in 87.7% of cases. The discrepancies were: 1,896 (8.6%) grade 1; 878 (4%) grade 2; 44 (0.2%) grade 3; and 5 (0.02%) grade 4.. One (part-time) radiologist, who read only 0.6% of cases, received grade 3 in 10.2% and grade 4 in 4% of cases. The other radiologists scored between 0 and 1.3% grade 3s, 0 grade 4s. Assuming an hourly rate of 140 Euros double reads cost an average of 7 Euros extra. On the other hand, the double read time cuts into the time available to interpret further studies.

Conclusion: This study indicates that the additional time and cost for a second reading is a relative benefit.

Abstractnr. : 6.8

RADIATION RISK OF MULTI-DETECTOR CT ANGIOGRAPHY AND DIGITAL SUBTRACTION ANGIOGRAPHY IN PERIPHERAL ARTERIAL DISEASE: A NEGLIGIBLE FACTOR?

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Purpose: To estimate the excess radiation risk corrected for the mortality of peripheral arterial disease (PAD) from the effective dose from multi-detector row CT angiography (MDCTA) and digital subtraction angiography (DSA) in patients with PAD .

Material and Methods: Consecutive patients with peripheral arterial disease were prospectively included in our study to undergo either MDCTA (n = 152) or DSA (n = 54) which was performed according to standard clinical protocols. Effective dose was derived from the radiation exposure which was measured as computed tomography dose index or as dose-area product. The excess risk of radiation induced fatal cancer was estimated using the multiplicative model of the ICRP 60 which was modified in order to account for the reduced life expectancy of patients suffering from PAD.

Results: The mean age of the patients was 64.3 years (MDCTA) and 63.8 years (DSA). The mean effective dose at MDCTA and DSA was 8.3 mSv (SD 1.3) and 9.9 (SD 4.9) mSv, respectively. The estimated excess lifetime radiation-associated risk of fatal cancer for a patient with moderate PAD, associated with a mortality ratio of 2.5, and a mean age and doses as observed in our study, is 0.007% for MDCTA and 0.008% for DSA, respectively.

Conclusion: Patients are exposed to similar radiation doses with MDCTA compared to DSA performed for the evaluation of PAD. The excess mortality risk associated with these radiation doses can be qualified as negligible compared to the mortality rate from their underlying disease of PAD.

Sessie 7 - Gastrointestinale radiologie II

Vrijdag 17 november 2006, 14.20 - 15.16 uur

GENOMINEERD

Radiologendagen Prijs 2006

Abstractnr. : 7.1

VIDEOSCOPIC ASSISTED RETROPERITONEAL DEBRIDEMENT IN INFECTED NECROTISING PANCREATITIS AS A PILOT STUDY TO INTRODUCE A RANDOMISED CONTROLLED TRIAL

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Introduction: The current standard for intervention in patients with infected necrotising pancreatitis (INP) is necrosectomy by laparotomy. Mortality and morbidity remain high. As an alternative, videoscopic assisted retroperitoneal debridement (VARD) was introduced as a minimally invasive treatment strategy. No randomized controlled trial (RCT) has yet compared a minimally invasive strategy with laparotomy in INP.

Methods: In case of (suspected) INP a retroperitoneal percutaneous drain is placed in the (peri-)pancreatic collection, preferably at least 30 days after onset of disease. If surgery cannot be obviated after a maximum of two percutaneous drainage procedures, the collection is approached via a 5 cm subcostal incision using the drain as guidance and videoscopic assisted debridement is performed. Patients in whom retroperitoneal access is not possible undergo laparotomy. The first patients treated with VARD in the period April 2001 to September 2003 were analyzed.

Results: A total of 13 out of 24 patients with INP underwent VARD. Nine complications occurred in 7/13 patients (54%). An additional laparotomy was needed in 4/13 patients (31%). One patient (8%) died. Median preoperative hospital stay was 41 days (range 1 - 90), total hospital stay 100 days (range 41 - 240).

PANTER (pancreatitis, necrosectomy versus minimally invasive step-up approach) is a RCT in which patients with (suspected) INP are randomly allocated to maximal necrosectomy by laparotomy or percutaneous drainage, if necessary followed by VARD. Primary endpoint is the total of major morbidity and mortality. Patients will be allocated from 20 hospitals of the Dutch Acute Pancreatitis Study Group in a 3-year period.

Conclusion: Our initial experience indicates that VARD is a feasible technique in a proportion of patients with INP that needs further definition. PANTER is the first RCT to compare a minimally invasive treatment strategy with conventional necrosectomy by laparotomy.

GENOMINEERD

Radiologendagen Prijs 2006

Abstractnr. : 7.2

IS PREOPERATIEVE RADIOLOGISCHE DIFFERENTIATIE TUSSEN GROTE T2 EN KLEINE T3 RECTUMTUMOR ZINVOL?

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Doel: Differentiatie tussen T2 en T3 rectumkanker is postoperatief eenvoudig door histologisch onderzoek. Preoperatief is de radiologische differentiatie middels MRI echter vaak moeilijker wanneer een tumor net op de grens ligt van de muscularis en het omgevende vetweefsel. Hoewel het duidelijk is dat de differentiatie tussen T2 en T3, en hiermee de indeling in een ander stadium, gebruikt kan worden voor een verschillende neoadjuvante behandeling, is het onduidelijk of de differentiatie tussen tumoren op deze grens, de zgn uitgebreide T2 en minimale T3 tumor klinisch relevant is.

Het doel van deze studie is evaluatie van het belang van differentiatie tussen borderline uitgebreide T2 vs minimale T3 tumoren voor lokaal-recidief-vrije overleving (LRFS), afstandsrecidief-vrije overleving (DRFS) en algehele overleving (OS).

Methoden: Alle patiënten van de Dutch TME trial met een T2 of T3 rectumtumor (n=1320) werden gencludeerd. Data over T-stadium, klierstatus, circumferentiele resectiemarge (CRM), tumorhoogte, lokaal- en afstandsrecidief en overleving waren prospectief verzameld. Verdeling van T2 en T3 tumoren in minimale, gemiddelde en uitgebreide T2 en T3 tumoren (T2-, T2+, T2+, T3-, T3+, T3+ resp.) werd retrospectief gemaakt gebaseerd op pathologieverslagen. Primaire eindpunten waren: LRFS, DRFS en OS in de verschillende subgroepen van T2 en T3 tumoren, bekeken in multivariate analyse waarin bekende prognostische factoren (klierstatus, tumorhoogte, CRM en preoperatieve radiatie) werden meegenomen.

Resultaten: Multivariate analyse laat een significant verschil zien tussen T2+ en T3- tumoren mbt LRFS (Hazard ratio 3,4 p=0,022) en DRFS (Hazard ratio 2,0 p=0,007). Dit verschil werd niet waargenomen voor OS.

Conclusie: Er is een significant verschil tussen uitgebreide T2 en minimale T3 tumoren mbt lokaal recidiefvrije en afstandsrecidief vrije overleving. Wanneer de indeling in T2 en T3 tumoren gebruikt zou worden om een verschillende neoadjuvante behandeling in stellen (Stage I vs stage II tumoren) blijft de preoperatieve differentiatie tussen borderline uitgebreide T2 vs minimale T3 een radiologische uitdaging.

Abstractnr. : 7.3

MESORECTAL LYMPH NODES: USPIO PREDICTIVE CRITERIA AND DISTRIBUTION PATTERNS OF POSITIVE NODES IN PRIMARY RECTAL CANCER

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Purpose: For more accurate prediction of nodal status in rectal cancer, we evaluated specific criteria for USPIO prediction and distribution pattern of positive nodes.

Methods: Two cohorts of patients. Cohort 1 (24 patients): 5x5 Gy +TME (lesion-by-lesion analysis of nodes). Cohort 2 (14 patients): long course radio/chemotherapy (N-stage only based on USPIO prediction on preradiation MRI).

Following items were recorded:

- a. Cohort 1: USPIO aspects on T2*-weighted images: border (sharp, indistinct or disrupted), long and short axis diameter, estimated percentage of white region within the node (<30%, 30-50%, >50%), measured ratio of white region within node (RatioA=

$$\left(\frac{\text{Area of white region}}{\text{Area of total node}} \right)$$

). Additionally signal intensity of the white and dark region within node, total node and gluteus muscle were measured by placing regions of interests (ROI's), to calculate two ratio's: Slwhite /Sldark and SITN/SImuscle.

- b. Cohort 1+2: Distribution of nodes relative to tumor (distal, same, proximal), distance tumor-node in axial/sagittal plane)
- c. Cohort 2: Position relative to rectum in axial plane.

Results:

- a. Cohort 1(14/189 positive nodes):

	AUC	P-value	N
Short Ø LN	0.64	0.090	189
Long Ø LN	0.67	0.031	189
Border	0.66	0.042	189
Estimated % white region	0.88	0.001	189
RatioA	0.94	0.001	189
SITN/SIMUSCLE	0.89	0.001	168
Slwhite/Sdark	0.72	0.008	168

table : AUC of USPIO-MRI criteria on T2*-weighted images

b. Cohort 1+2 (82/434 LN+):

	LN+ (n=82)	LN- (n=352)
Distal to tumor1	(1.2%)	32 (9.1%)
Same height 55	(67.1%)	230 (65.3%)
Proximal to tumor	26 (31.7%)	90 (25.6%)
Range absolute distance (mm)	0-50	0-89

table 2: distribution of nodes

c. Cohort 2 (68/245):

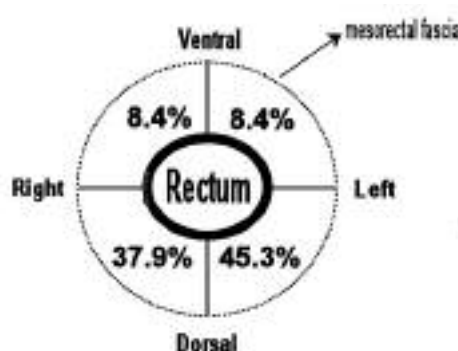


figure 1: transverse section through mesorectum. Percentage of localisation of lymph nodes is given for left lateroventral, left laterodorsal, right laterodorsal and right lateroventral position respectively.

Conclusion:

- a. Both the estimated, calculated ratio and of the white region area within the node versus the total node area were very strong predictors for malignant nodes. The signal intensities were also strong predictors. As expected size criteria, such as long and short axis of the node, and border were not accurate enough for the prediction of malignant nodes.
- b. Almost all positive nodes were seen at the level of or proximal to tumor level.
- c. Majority of nodes are situated in the dorsal half of the mesorectum (83.2%).

Abstractnr. : 7.4

MRI AFTER NEOADJUVANT CHEMORADIATION OF LOCALLY ADVANCED RECTAL CANCER. HOW ACCURATE CAN MRI PREDICT TUMOR DOWNSTAGING AND INVASION OF THE MESORECTAL FASCIA?

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Purpose: To assess the accuracy of post (chemo)radiation MRI for the prediction of tumor downstaging and invasion of the mesorectal fascia (MRF).

Materials and methods: This is a retrospective study. Sixty-four patients with locally advanced rectal cancer who received long term (chemo)radiation followed by resection of the tumor between June 1998 and November 2005 were included. Pre and post (chemo)radiation MRI, surgical report and histology had to be available if not the patient was excluded. This resulted in 38 men with a mean age of 60 years (15-82 years) and 26 women with a mean age of 64 years (45-81 years). An experienced MR pelvic radiologist retrospectively assessed pre and post(chemo)radiation T2-weighted MR images for T stage, tumor invasion of MRF and morphological patterns on threatened sites of the mesorectal fascia. The invasion of the MRF was scored with a confidence level from 1 to 5 (1-2 no invasion, 3-5 invasion). The postCRT MRI was compared to histology of surgical specimen. Sensitivity, specificity, PPV, NPV and area under the ROC curve were calculated.

Results: Downstaging

Sensitivity/specificity of postCRT MRI for pT0, pT1-2, pT3 and pT4 was 20%/98%, 15%/96%, 66%/50%, 88%/76% respectively.

Invasion of the MRF

The area under the ROC curve, sensitivity, specificity, PPV and NPV of post-(chemo)radiation MRI was 0.81 [0.71-0.92], 100%, 32%, 57%, 100% respectively.

Morphological patterns

Three groups of morphological patterns were found: fat pads with or without stranding, iso-intense nodular invasion developing into diffuse hypo-intense infiltration and unchanged nodular invasion correlating with 0% (0/27), 34% (20/58) and 90% (18/20) of cases with MRF invasion after (chemo)radiation respectively.

Conclusion: In experienced hands postCRT MRI had a limited accuracy for the prediction of downstaging. However, postCRT MRI had a better performance for prediction of tumor invasion of the MRF. Specific morphological features identified on MRI corresponded to regression from or persistence of invasion of the MRF which could be useful for surgical planning. A difficult group of morphological patterns remained in which substantial overstaging had to be accepted in order to prevent undertreatment and thus a higher rate of tumor recurrence.

Abstractnr. : 7.5

PELVIC FLOOR MUSCLES LESIONS AT ENDOANAL MR IMAGING IN PATIENTS WITH FECAL INCONTINENCE

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Purpose: Imaging in patients with fecal incontinence focuses mainly on the

internal anal sphincter (IAS) and external anal sphincter (EAS). We aimed at evaluating the (co-)existence of pelvic floor muscles lesions at endoanal MR imaging in fecal incontinent patients and their relation with incontinence severity and manometric findings.

Material and methods: In 188 fecal incontinent patients MR images were evaluated for IAS, EAS, puborectal muscle (PM) and levator ani (LA) lesions by two experienced radiologists. Multivariable regression analysis was used to examine the relative contribution of lesions to differences in incontinence severity (Vaizey incontinence score) and manometric findings (resting and squeeze pressure).

Results: IAS (n=77) and EAS (n=85) defects were more common than PM (n=26) and LA (n=27) defects. PM and LA defects presented mainly with IAS and/or EAS defects (isolated n=2 and 1, respectively). EAS atrophy (n=115) was more common than IAS (n=29), PM (n=26), and LA (n=18) atrophy and presented mainly isolated. PM and LA atrophy presented primarily with EAS atrophy (isolated n=3 and 1, respectively). None of the lesions was associated with the Vaizey incontinence score (all p-values =0.16). PM and LA lesions were not associated with manometric findings (all p-values =0.06). Patients with IAS and EAS lesions had a lower resting (p-values <0.001) and squeeze pressure (p-values =0.02), respectively.

Conclusion: Compared to IAS and EAS lesions PM and LA lesions are relatively uncommon. They present rarely isolated and are not associated with incontinence severity or manometric findings. Awaiting future studies, endoanal MR imaging in fecal incontinent patients can be restricted to assessing the IAS and EAS.

Abstractnr. : 7.6

MRI FINDINGS IN PERIANAL FISTULIZING CROHN'S DISEASE BEFORE AND AFTER REMISSION-INDUCTION THERAPY WITH INFLIXIMAB

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Purpose: To assess whether MRI findings in perianal fistulizing Crohns disease form a useful indicator of response to remission-induction therapy with infliximab.

Methods and materials: Fifteen patients (9 males, 6 females; mean age 34.6, range 18-58) with perianal fistulizing Crohns disease who were scheduled to undergo remission-induction therapy with infliximab, a chimeric anti-tumour necrosis factor- α antibody, underwent clinical evaluation (Perianal Disease Activity Index and C-reactive protein) and 1.5 Tesla MRI of the pelvic region at baseline and after three infusions of infliximab. T2- and T1-weighted sequences were performed. Findings at clinical evaluation were compared with a validated MRI-based score of disease severity using the Wilcoxon signed ranks test for paired non-parametric data. P-values < 0.05 were considered statistically significant.

Results: In all but one patient active fistulas (10 intersphincteric fistulas, 8 transsphincteric fistulas, 2 anovaginal fistulas) were found at baseline; in the patient without fistulas an infiltrate was found. After remission-induction therapy with infliximab PDAI and CRP both showed a significant decrease (p<0.05), while no significant difference was found between MRI-scores before and after therapy. On MRI in 14 of 15 patients active fistulas (intersphincteric (n=10), transsphincteric (n=8), anovaginal (n=2)) were found. The one patient without fistulas had developed fistulizing disease, while in another patient no fistula could be identified anymore.

In two patients who were clinically considered to be responding to therapy, infliximab was discontinued after the first three infusions while in both patients inflammation was still present at MRI; both experienced exacerbation of disease, necessitating restart of therapy. In another patient clinically considered to be a responder to therapy, the MRI-based score had worsened after therapy; this patient developed a perianal abscess necessitating surgical intervention shortly after.

Conclusion: While clinical examination may show improvement of disease after three infusions of infliximab, MR findings show persistence of inflammation. An MRI-based score of disease severity may be a useful indicator of disease activity and may be used to determine the effect of therapy.

Abstractnr. : 7.7

**MAGNETIC RESONANCE IMAGING, SCINTIGRAPHY,
ULTRASONOGRAPHY AND COMPUTED TOMOGRAPHY
IN THE DETECTION OF ACTIVE INFLAMMATORY BOWEL
DISEASE: A META-ANALYSIS**

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Purpose: To perform a meta-analysis on the diagnostic performance of magnetic resonance imaging (MRI), scintigraphy, ultrasonography (US) and computed tomography (CT) in the detection of disease activity in patients with inflammatory bowel disease (IBD).

Method and Materials: MEDLINE, EMBASE, CINAHL and Cochrane databases were searched from January 1993 through February 2006 for studies which assessed the diagnostic accuracy of MRI, scintigraphy, US, and CT in the detection of IBD compared to a predefined reference standard. Studies were included when fulfilling the following criteria: 1) n = 15 patients 2) prospective design 3) findings at histopathology, endoscopy, barium enteroclysis and/or intraoperative findings used as reference standard 4) positive criteria defined for MRI, US, scintigraphy and CT and 5) data reported to calculate 2x2 contingency tables.

Two observers independently extracted data and constructed 2x2 tables to calculate summary sensitivity and specificity. Sensitivity, and specificity estimates for US, CT, scintigraphy and MRI were calculated on per patient and per segment basis by means of a bivariate random effect model.

Results: Of the 1406 studies that were identified, 1249 studies were considered impertinent after reading title and/or abstract. Therefore, 157 studies were retrieved as full-text articles of which 37 fulfilled all inclusion criteria, evaluating 1780 patients (CD in 19 studies, UC in 4 studies and both in 14 studies). MRI was evaluated in 12 studies, scintigraphy in 13, US in 10 and CT in 7 studies.

On a per patient basis mean sensitivity estimates for MRI, scintigraphy, US and CT were comparable: 87.7%(95%CI:77.4-93.7), 86.8%(95%CI:72.1-94.3), 86.6%(95%CI:81.9-90.3) and 82.1%(95%CI:77.8-85.8). Mean specificity estimates were also comparable and respectively 82.0%(95%CI:63.6-92.2), 84.9%(95%CI:74.9-91.3), 93.6%(95%CI:87.6-96.8) and 86.9%(95%CI:70.0-94.8). Per bowel segment mean sensitivity estimates for MRI, scintigraphy, US and CT were lower: 69.3%(95%CI:49.4-83.9), 76.7%(95%CI:70.1-82.1), 73.1%(95%CI:67.6-77.9) and 67.0%(95%CI:60.6-72.8). Only scintigraphy showed a significant difference when compared with CT (p=0.03). Mean specificity estimates were also comparable and respectively 93.4% (95%CI: 90.6-95.4), 88.4 % (95%CI:81.1-93.2), 92.3%(95%CI:92.2-92.4) and 89.3% (95%CI:85.4-92.3).

Conclusion: No relevant differences were observed between imaging techniques. As IBD patients often need frequent re-evaluation of disease activity, use of a diagnostic modality abstaining from using ionizing radiation would be preferable and might be justified.

Sessie 8 - Interventie Radiologie II

Vrijdag 17 november 2006, 14.20 - 15.16 uur

Abstractnr. : 8.1

RESULTATEN VAN ENDOVASCULAIRE RECANALISATIE BIJ CHRONISCHE, LANGE OCCLUSIES VAN DE VENA CAVA INFERIOR

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Inleiding: Chronische lange occlusies van de vena cava inferior komen niet frequent voor, maar leiden wel vaak tot invaliderende klachten zoals veneuze ulcera en soms zelfs tot nier en lever falen. Conservatieve behandeling (compressie therapie of anticoagulantia) is dikwijls onvoldoende en veneuze bypass chirurgie kent aanzienlijke morbiditeit met matige resultaten. Endovasculaire recanalisatie lijkt een waardevol alternatief, maar in de literatuur is zeer weinig bekend over de resultaten, hetgeen het onderwerp van onze studie is.

Doel: De technische uitvoerbaarheid en middellange termijn resultaten te onderzoeken van recanalisatie van lange occlusies van de vena cava inferior.

Materiaal en methoden: Tussen maart 1997 en november 2004 werd bij 9 patiënten een endovasculaire recanalisatie van de vena cava inferior verricht. Elke patiënt had tenminste zes maanden klachten en de occlusie was met duplex onderzoek en venografie bewezen. De gemiddelde lengte van de occlusie was 11 cm (6-22 cm), waarbij in 3 patiënten de occlusie doorliep in het iliacaal traject en bij 2 patiënten tot in het femoralis communis traject.

Alle procedures werden onder lokale verdoving verricht via een bifemorale (n=7) of bipopliteale (n=2) benadering. Bij drie patiënten werd een simultane toegang gecreëerd via de vena brachialis of jugularis. Na predilatatie werden de stenotische trajecten over de gehele lengte gestent. In alle gevallen werden Wallstents gebruikt. Alle patiënten werden na de interventie ingesteld op Sintrommitis met een INR tussen de 2,5 en 3,5.

Resultaat: Het initiele klinische en technische succespercentage bedroeg 100%. De procedures verliepen ongecompliceerd en alle patiënten hadden een belangrijke afname van hun klachten. De gemiddelde follow-up, inclusief duplex onderzoek, was 21 maanden (4-110) waarbij de primaire patency 78% bedroeg. Drie patiënten overleden als gevolg van een maligniteit.

Conclusie: Endovasculaire recanalisatie van chronische, lange occlusies van de vena cava inferior met iliacaal of femorale extensie is een veilige techniek met zeer acceptabele middellange termijn resultaten.

Abstractnr. : 8.2

DEPICTION OF THE COMPLETE VASCULAR TREE OF DYSFUNCTIONAL HEMODIALYSIS ACCESS SHUNTS WITH DIGITAL SUBTRACTION ANGIOGRAPHY

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Purpose: To determine the technical success rate of depiction of the complete vascular tree of dysfunctional hemodialysis access shunts with digital subtraction angiography (DSA) and to determine the distribution of stenoses.

Materials and Methods: DSA was performed of 29 arteriovenous fistulas (AVFs; 8 radiocephalic AVFs, 3 forearm AVFs and 18 elbow AVFs), 9 forearm arteriovenous loop grafts (AVGs) and 1 brachiobasilic access shunt. A catheter was advanced into the aortic arch or subclavian artery after retrograde venous access puncture and intravenous heparin administration. DSA series of the complete inflow (including subclavian artery), shunt region and complete venous outflow (including brachiocephalic vein) were obtained. The vascular tree of a shunt was divided into three vascular territories, namely arterial inflow, access region (arterial anastomosis, loop graft and venous anastomosis in case of an AVG; arteriovenous anastomosis, including 1 cm of vessel length on both sides of the anastomosis, in case of an AVF) and venous outflow. Access DSA through femoral artery puncture was obtained of those cases where retrograde venous access puncture failed to depict the complete vascular access tree. The DSA examinations were performed and interpreted by an interventional radiologist. Stenoses showing a diameter reduction exceeding 50% were considered to be significant.

Results: No complications were observed at DSA. The complete vascular tree could be depicted through venous access puncture in 36 of 39 patients (92%). The arteriovenous anastomosis of a radiocephalic AVF could either not be located or could not be passed by a catheter in 3 cases. DSA demonstrated a total of 60 significant stenoses, of which respectively 7, 30 and 23 were located in the arterial inflow (11.7%), access region (50.0%) and venous outflow (38.3%).

Conclusion: The complete vascular tree of a dysfunctional access can usually be depicted after retrograde venous access puncture; failure of this technique is correlated with the presence of a radiocephalic AVF. Access stenoses are predominantly located in the shunt region or venous outflow. However, stenosis formation may occur anywhere in the vascular access tree and therefore we suggest that access DSA also comprises the depiction of the complete arterial inflow.

Abstractnr. : 8.3

HEMODYNAMIC EFFECT OF CAROTID STENTING AND CAROTID ENDARTERECTOMY

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Background and Purpose: Carotid angioplasty with stent placement (CAS) may offer an alternative treatment to carotid endarterectomy (CEA). However, in contrast to CEA, which has been shown to normalize impaired cerebral hemodynamics, the effects of CAS are unclear. To investigate alterations in cerebral hemodynamics we prospectively studied patients undergoing CAS, compared with a group of similar patients undergoing CEA.

Materials and Methods: Randomized controlled trial. Twenty-four consecutive patients (15 men, 9 women; mean age 67 (range 53-81) years) with recently symptomatic >70% internal carotid artery (ICA) stenosis and forty control subjects (25 men, 15 women; mean age 67 (range 47-79) years) matched for age and sex, without abnormalities on MRI and MRA images of the brain and without ICA stenosis were included in the study. CAS was performed in twelve patients and the other twelve patients were subjected to CEA. Flow territory mapping and regional cerebral blood flow (CBF) measurements were performed with arterial spin labeling MRI before and one month after intervention in patients. The findings were compared to control subjects. Voxel based Chi-square testing with Bonferroni correction was performed to analyze differences in extent of the flow territories. Differences in CBF were analyzed with paired sampled t-test and Students t-test.

Results: The flow territory of the ipsilateral ICA in patients with ICA stenosis was smaller, and the territories of the contralateral ICA and vertebrobasilar arteries were larger compared with control subjects ($p < 0.05$). After CAS, CBF in the ipsilateral hemisphere increased from 60.2 16.9 ml/min/100gr to 68.9 9.2 ml/min/100gr ($p < 0.05$). Differences in flow territories and CBF between patients and control subjects disappeared after CAS. Changes in flow territories and regional CBF were similar in patients subjected to CAS and patients undergoing CEA.

Conclusion: CAS results in a normalization of impaired cerebral hemodynamics. The degree of improvement is similar to that seen after CEA. Although the true role of CAS in the management of ICA stenosis remains to be determined by large randomized trials, this study suggests that there is no difference in hemodynamic effect between both approaches.

Abstractnr. : 8.4

THE FATE OF THE EXTERNAL CAROTID ARTERY AFTER CAROTID ARTERY STENTING. A FOLLOW-UP STUDY WITH DUPLEX ULTRASONOGRAPHY

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Objective: To evaluate the long-term effect of carotid angioplasty and stenting (CAS) of the internal carotid artery (ICA) on the ipsilateral external carotid artery (ECA).

Subjects and Methods: We prospectively registered the pre-interventional, post-interventional and follow-up duplex scans obtained from 312 patients

(mean age 70 years) who underwent CAS. Duplex scans were scheduled the day before CAS, 3 and 12 months post-procedural and yearly thereafter, to study progression of obstructive disease in the ipsilateral ECA compared to the contralateral ECA. The current duplex ultrasound criteria used to identify ECA stenosis = 50% were peak systolic velocities of =125 cm/sec.

Results: Preprocedural evaluation of the ipsilateral ECA demonstrated = 50% stenosis in 32.7% of cases vs 29.1% contralateral. Both ipsilateral and contralateral 3 (1%) ECA occlusions were noted. After stenting 5 (1.8%) occlusions were seen vs 1.8% contralateral. No additional occlusions were noted at extended follow-up. The prevalence of = 50% stenosis of the ipsilateral ECA (Kaplan-Meier estimates) progressed from 49.1% at 3, to 56.4%, 64.7%, 78.2%, 72.3%, and 74% at 12, 24, 36, 48, and 60 months respectively. Contralateral prevalences were 31.3%, 37.7%, 41.7%, 43.1%, 46.0%, and 47.2% respectively ($p < 0.001$). Progression of stenosis was more pronounced in 234 patients (75%) with overstenosing of the carotid bifurcation ($p = 0.004$).

Conclusion: Our results show that significant progression of = 50% stenosis in the ipsilateral ECA occurs after CAS. There was greater progression of disease in the ipsilateral compared with the contralateral ECA. Progression of disease in the ECA did not lead to the occurrence of occlusion during follow up.

Abstractnr. : 8.5

RETINAL EMBOLIZATION DURING CAROTID ANGIOPLASTY AND STENTING

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Purpose: Carotid Angioplasty and Stenting(CAS) has increasingly become an alternative to carotid endarterectomy. The retina is the only directly visualized vascular bed in the central nervous system and hence provides a useful observatory for the study of peri-procedural embolism. The purpose of this study was to evaluate the incidence of retinal emboli during CAS and to correlate fundoscopy with TransCranial Doppler (TCD) findings.

Material and methods: Between October 2001 and May 2005, 32 patients, of which 19 symptomatic(22 [69%] male, age 54-82 years, mean 72.3 years) ,were scheduled for CAS were included in this study. Nineteen (59%) had ischemic symptoms of the ipsilateral cerebral hemisphere, prior to therapy. After written informed consent a bilateral fundoscopy was performed by an experienced ophthalmologist pre-, directly post and 24h post-procedurally. In nine cases (28%) cerebral protection devices were used. Twenty-nine (91%) patients had an adequate acoustic temporal window for Transcranial Doppler (TCD) monitoring of the ipsilateral middle cerebral artery during the procedure. TCD detected cerebral emboli were stratified to five procedural phases: wiring, predilatation, stent placement, postdilatation and protection device use (if applicable).

Results: In all cases the procedure was performed successfully.

In four of thirty-two cases (12.5%) the post-procedural fundoscopy showed new retinal embolization. Two of these cases were performed using cerebral protection devices. One of the cases with new retinal emboli had a small retinal infarct. Median number of TCD-detected isolated cerebral micro-emboli in the group with retinal emboli versus without retinal emboli were: wiring 42/53, predilatation 5.5/13, stent placement 42.5/56, tailoring 31/17, device use 72/30, total 181.5/142 Numbers of embolic showers: wiring 0/0, predilatation 1/0, stent placement 6/22, tailoring 3/1, device use 0/4, total 11/32 There was no statistically significant correlation between TCD- data and the incidence of retinal emboli.

Conclusion: The occurrence of retinal embolization during CAS should not be underestimated. The TCD detected cerebral embolization load was not correlated to retinal embolic events, which may therefore be an independent predictor of outcome. Cerebral protection devices did not prevent retinal embolization.

Abstractnr. : 8.6

EMBOLISATIE ARTERIA BRONCHIALIS BIJ CYSTIC FIBROSIS PATIENTEN MET HAEMOPTOE

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Doel: Bij vijf procent van de cystic fibrosis (CF) patiënten treedt haemoptoe op als complicatie. Haemoptoe kan middels embolisatie van de arteria bronchialis worden behandeld. Het doel van ons onderzoek is het beschrijven van de resultaten van 16 jaar embolisatie van bronchiaalarterin bij CF patiënten.

Materiaal en Methode: Retrospectief werden uit de database van de afdeling radiologie alle CF patiënten geselecteerd die in de periode 1989 tot 2006 een angiografie en embolisatie van de arteria bronchialis hadden ondergaan. Uit de statussen werden gegevens verkregen met betrekking tot longfunctie, complicaties na embolisatie, longtransplantatie en overleving. Uit radiologieverslagen werd informatie gehaald met betrekking tot aantal en lokalisatie van bronchiaalarterin, embolisatiemateriaal en complicaties tijdens de procedure. Prognose van de patiënten na embolisatie werd gecorreleerd met klinische parameters en vergeleken met de literatuur.

Resultaten: 41 patiënten, (m=23, v=18), in de leeftijd van 15-54 (gemiddeld 27), ondergingen gezamenlijk 75 embolisaties van n of meerdere bronchiaalarterin. In alle gevallen lukte het bronchiaalarterin te katheteriseren en emboliseren. Er werden geen ernstige complicaties tijdens of na de procedure waargenomen. 21 Patiënten (51%) ondergingen meerdere embolisatieprocedures in verband met recidiverende haemoptoe. Bij drie patiënten was binnen 24 uur een tweede embolisatie noodzakelijk, bij 18 patiënten vond de tweede procedure na gemiddeld 19,6 maanden (2 dagen-45) plaats. De gemiddelde follow-up was 73 maanden (0,25-203). 16 Patiënten zijn overleden na een periode van gemiddeld 52 maanden (0,25-154). Zeven patiënten ondergingen longtransplantatie na gemiddeld 40 maanden (1-119). Onze resultaten komen overeen met gegevens uit de literatuur.

Conclusie: Embolisatie van de arteria bronchialis is een effectieve en veilige behandeling van haemoptoe bij CF. Recidiefpercentages zijn hoog, maar komen overeen met de literatuur en zijn het gevolg van het onderliggend lijden. Bij massale haemoptoe is embolisatie de eerst aangewezen therapie om de bloeding te stoppen.

Abstractnr. : 8.7

HET TECHNISCHE SUCCES EN DE THERAPEUTISCHE CONSEQUENTIES VAN CT-GELEIDE HISTOLOGISCHE LONGBIOPSIN

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Opzet van het onderzoek: Retrospectief cohortonderzoek met als doel inventarisatie van het technische succes en de therapeutische consequenties van CT-

geleide histologische longbiopsin.

Materiaal en methode: Tussen 1-1-2002 en 6-3-2006 zijn 167 patiënten naar de afdeling radiologie verwezen voor een CT-geleide longbiopsie ter karakterisering van een longaesie. Van 164 patiënten waren de gegevens compleet. Deze groep bestond uit 96 mannen en 68 vrouwen, met een gemiddelde leeftijd van 61 jaar (range 16-83 jaar).

Uit het patiënteninformatiesysteem zijn gegevens m.b.t. de patint, de biopsietechniek, de histologie-uitslag, de betrouwbaarheid en de therapeutische consequentie van de histologie-uitslag en het optreden van complicaties verkregen. De maximale diameter en de locatie van de laesie werden bepaald op de CT-scan die tijdens of voor (maximaal 4 weken) de biopsie gemaakt was.

Resultaten: Bij 139/164 (85%) longbiopsin werd een histologische diagnose gesteld, waaraan een therapeutische consequentie werd verbonden. Bij 28 van deze 139 patiënten werd de laesie operatief verwijderd en bij al deze laesies kwam de histopathologische diagnose van het operatiepreparaat overeen met de histologische diagnose van het biop. Bij 13/164 (8%) longbiopsin werd getwijfeld werd aan de representativiteit. Dit leidde in 10 gevallen tot een diagnostische operatieve resectie van de laesie. Bij nog eens 8/164 (5%) longbiopsin was er onvoldoende materiaal voor een histologische diagnose. Bij 4/164 (2%) patiënten werd de procedure voortijdig gestaakt: bij 3 patiënten wegens het ontstaan van een ernstige pneumothorax en bij n patint wegens een niet bereikbare laesie.

Bij 79/164 (48%) patiënten trad een complicatie op, in de meeste gevallen een randpneumothorax of een parenchymbloeding waarvoor geen behandeling nodig was. Bij 20/164 patiënten (12%) trad een significante complicatie op. Bij 10/49 patiënten met een pneumothorax werd een thoraxdrain geplaatst. En patint met een hematothorax werd opgenomen op de intensive care. In 9 gevallen leidde de complicatie tot een verlengde observatie na de biopsie.

Conclusies: CT-geleide histologische longbiopsin leidden in groot aantal gevallen (85%) tot een betrouwbare histologische diagnose waaraan een therapeutische consequentie werd verbonden.

Sessie 9 - Nucleaire Geneeskunde / Uroradiologie

Vrijdag 17 november 2006, 14.20 - 15.16 uur

Abstractnr. : 9.1

INTRA/PERITUMORAL VS SUBAREOLAR RADIOISOTOPE DEPOSIT IN SENTINEL NODE MAPPING FOR BREAST CANCER

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Background: intra- or peritumoral (I/PT) isotope administration in sentinel lymph node mapping for breast cancer leads to suboptimal success rates (71%-94%). Subareolar (SA) administration has been suggested to improve the success rate and is less cumbersome. However, the latter procedure may lead to decreased identification of parasternal sentinel nodes. We compared the two methods in a retrospective cohort study with an historical contrast.

Methods: of all breast cancer patients scheduled for surgery at our hospital between October 2002 and September 2005, the radioisotope sentinel node procedure was reviewed. From March 2004 onwards, administration strategy changed from I/PT to SA. For all procedures, 85MBq 99mTc nanocolloid was used.

Results: a total of 116 I/PT and 140 SA procedures were reviewed. The mean age of the patients was 61.4 years (SD: 12.3) in the I/PT and 58.1 years (SD: 13.8) in the SA group (overall range: 24-91). In the I/PT group, 96 (83%) procedures yielded an identifiable sentinel node, as compared to 138 (99%) of the SA procedures (Fishers exact test: $P < 0.001$). In 20% ($n=19$) of successful I/PT procedures, a parasternal sentinel node could be identified, which was 3% ($n=4$) in successful SA procedures (Fishers exact test: $P < 0.001$). An axillary sentinel node could be identified in 98% ($n=94$) of successful I/PT and 100% ($n=138$) of successful SA procedures (Fishers exact test: $P=0.17$).

A negative radioisotope procedure may lead to unnecessary axillary lymph node dissection (ALND). Of the 22 negative I/PT procedures, 2 patients did not undergo ALND, and within the remaining group, 8 patients (44%) had axillary metastases and 10 (56%) had not. Of the 2 patients with a negative SA procedure, one had no axillary metastases and one had missing information on axillary staging.

Conclusion: In our hospital, SA isotope administration leads to a 99% success rate and is significantly more successful compared to I/PT injection. The latter leads to an unjustified ALND indication in close to 10% of all cases. On the other hand, the SA procedure leads to significantly less parasternal sentinel node identification, which eventually may lead to undertreatment in patients with negative axillary and positive parasternal nodes.

Abstractnr. : 9.2

ESOPHAGEAL ENDOSCOPIC ULTRASONOGRAPHY (EUS) WITH FINE NEEDLE ASPIRATION (FNA) VERSUS POSITRON EMISSION TOMOGRAPHY (PET) AND COMPUTED TOMOGRAPHY (CT) IN STAGING OF PATIENTS WITH NON-SMALL-CELL LUNG CANCER

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Aim: To compare the diagnostic value of EUS-FNA with FDG-PET and CT in staging of patients with non-small-cell lung cancer (NSCLC).

Material and Methods: Twenty-four consecutive patients with NSCLC and lymphadenopathy on FDG-PET and/or CT underwent EUS-FNA. If EUS-FNA was negative, surgical staging was performed.

Results: The mean age of the patients (male:female = 14:10) was 65.7 years (range 46-80). Twelve patients had suspected lymph nodes on CT and FDG-PET, 6 on FDG-PET only and 6 on CT only. In 10 patients (42%), EUS-FNA found proof of malignancy and in 7 (29%), additional surgical staging revealed metastasis. Eighteen patients had suspected lymph nodes on FDG-PET and in 15, metastasis were confirmed (83%). In all FDG-PET negative patients ($n=6$) EUS-FNA was negative, however in 2 patients surgical staging revealed small metastasis (< 4 mm). The CT of these patients did not reveal mediastinal lymph node enlargement. We found sensitivities and specificities of 88% and 57% for FDG-PET, 82% and 43% for CT, 59% and 100% for EUS-FNA, respectively. The positive predictive values for PET, CT and EUS-FNA were 83%, 78% and 100% respectively, while the negative predictive values for PET, CT and EUS-FNA were 67%, 50% and 50% respectively.

Conclusion: EUS-FNA verified mediastinal lymph node metastasis of NSCLC and avoided surgery in 42% of cases. FDG-PET had the highest sensitivity compared to CT and EUS-FNA, suggesting that PET-CT guided FNA improves the sensitivity of EUS-FNA. The specificity of FDG-PET was also higher than CT. Another important finding was that in FDG-PET negative patients EUS-FNA had no yield, indicating that FDG-PET negative patients can undergo thoracotomy directly.

Abstractnr. : 9.3

DE ROL VAN [123I]FP-CIT-SPECT BIJ DE ZIEKTE VAN PARKINSON

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Doel: Evaluatie van de rol van [123I]FP-CIT-SPECT (DaT-scan) bij diagnostiek en behandeling bij de ziekte van Parkinson.

Materiaal en methoden: Patiënten met een klinische verdenking op de ziekte van Parkinson (zvP) ondergingen in de periode maart 2005 tot en met april 2006 een [123I]FP-CIT-SPECT (single photon emissie computer tomogram van de hersenen met behulp van 123 jodium-loflapane). De klinische diagnose zvP werd overwogen wanneer tenminste 2 van de 4 klassieke criteria aanwezig waren: rust tremor, bradykinesie, rigiditeit en houdingsinstabiliteit. Bij gezonde personen wordt [123I]FP-CIT (een gevoelige merkstof voor het nigrostriatale systeem) goed opgenomen in het corpus striatum en maakt zo onderscheid mogelijk tussen aandoeningen waarbij de nigrostriatale banen betrokken zijn en aandoeningen die hier niet van uitgaan (essentiële tremor ed). ZvP is een pre-synaptische ziekte van de nigrostriatale neuronen. De DaT-scan kan niet differentiëren tussen de ziekte van Parkinson en Parkinsonisme (MSA, PSP ed). Retrospectief werd op basis van de klinische status vastgesteld of er een initiele verdenking op de ziekte van Parkinson was. En voorts wat na de DaT-SPECT de uiteindelijke waarschijnlijkheidsdiagnose was volgens de laatste brief van de neuroloog aan de huisarts. Op deze wijze werd nagegaan hoe vaak de initiele diagnose naar aanleiding van de DaT-SPECT werd bijgesteld.

Resultaten: In de periode maart 2005 tot en met april 2006 ondergingen 82 personen met een mogelijke zvP een DaT-SPECT. Bij deze patiënten waren 18 DaT-SPECT scans normaal, 58 afwijkend. Bij 6 patiënten kon de scan niet geïnterpreteerd worden of niet gemaakt worden. Bij 50 patiënten gaf de DaT-SPECT een bevestiging van de vermoede diagnose. Bij 24 gaf de DaT-SPECT aanleiding tot wijziging van diagnose en therapie (zie tabel 1 en 2).

Conclusie: [123I]FP-CIT-SPECT (DaT-scan) neemt een belangrijke plaats in bij de differentiatie tussen verschillende soorten van bewegingsstoornissen. Het kan onderscheid maken tussen een nigrostriatale ziekte (zvP, PSP, MSA ed) en bewegingsstoornissen die hier niet door veroorzaakt worden (essentiële tremor ed). Indien dit onderscheid vroegtijdig gemaakt wordt kan de patient eerder en adequater behandeld worden.

Abstractnr. : 9.4

IS THERE A ROLE FOR MAGNETIC RESONANCE IMAGING IN THE EVALUATION OF INGUINAL LYMPH NODE METASTASES IN PATIENTS WITH VULVA CARCINOMA?

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Objective: To study the accuracy of magnetic resonance imaging (MRI) for detection of lymph nodes compared with pathological results obtained by sentinel node procedure or lymphadenectomy.

Methods: 60 patients (mean age 69 yrs) with diagnosed vulva tumor underwent preoperative MR imaging for evaluation of lymph nodes. Examination were performed using coronal 3D T1-W gradient sequence; axial Half-Fourier acquisition single shot turbo SE (HASTE) of the upper abdomen; axial/sagittal T2-W fast spin echo and coronal T1-W fast spin echo with fat saturation and after administration of Gadopentetate dimeglumine. MRI images were read independently and retrospectively by two radiologists, both unaware of physical examination and surgery findings.

The following characteristics of each node with a short-axis diameter of ≤ 8 mm were recorded: size (axial, sagittal and coronal); aspect (homogeneous, with fatty center or partial fat); margin (smooth, lobulated/speculated or indistinct); shape: (round, ovoid or elongated). Based on these characteristics, each

groin was classified as malignant or benign. Histopathology obtained at sentinel node procedure or by inguinofemoral lymphadenectomy was used as reference standard.

Sensitivity, specificity, positive predictive and negative predictive values per groin were calculated for each observer. Kappa statistics on per groin basis to express interobserver agreement were calculated.

Results: 119 groins were examined either by sentinel node procedure or surgery, of which 23 groins were malignant. Of the 23 positive groins, both observers detected 12 (sensitivity 52%). Of the 96 negative groins, 14 and 11 were scored as positive by observers 1 and 2, respectively (specificity of 85% and 89%). Positive and negative predictive values for observer 1 were 46% and 87% and for observer 2, 52% and 89%, respectively. The interobserver agreement was 104/119, producing a kappa of 0.62 and therefore representing good agreement.

Conclusion: At this stage there is no role for standard MRI in evaluating lymph node involvement in patients with vulva carcinoma.

Abstractnr. : 9.5

DYNAMIC CONTRAST-ENHANCED MR AND PROTON MR SPECTROSCOPIC IMAGING IN LOCALIZING PROSTATE CANCER

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Purpose: To prospectively determine the prostate cancer localization accuracy of T2-weighted MR imaging, dynamic contrast-enhanced MR imaging (DCE-MRI) and quantitative three-dimensional (3D) proton MR spectroscopic imaging (MRSI), of the entire prostate using whole mount sections as the reference standard.

Materials and methods: This study was approved by the institutional review board, and informed consent was obtained from all patients. Thirty-four consecutive men were examined. Mean age and prostate specific antigen level were 60 years and 8 ng/ml, respectively. Median biopsy Gleason score was 6. T2-weighted MR imaging, DCE-MRI and 3D MRSI were performed and based on these image data, two readers with different levels of experience recorded the location of suspicious peripheral zone and central gland tumor nodules on a standardized division of the prostate (14 regions of interest (ROI)). The degree of diagnostic confidence for each ROI was recorded on a five-point scale. The localization accuracy and ROI based receiver operating characteristics (ROC) were calculated.

Results: For both readers, the area under the ROC curve for T2-weighted MR imaging, DCE-MRI and 3D MRSI were 0.68, 0.91 and 0.80, respectively. DCE-MRI reading performed significantly better for tumor localization than quantitative MRSI ($P < 0.01$). Both DCE-MRI and MRSI were significantly better than reading T2-weighted imaging ($P < 0.01$).

Conclusion: The use of DCE-MRI and 3D MRSI showed significant improvement in localization accuracy in prostate cancer patients compared with T2-weighted MR imaging.

Abstractnr. : 9.6

LOCAL PROSTATE CANCER STAGING: COMPARISON OF HIGH-FREQUENCY TRANSRECTAL ULTRASOUND AND 3T MR IMAGING WITH AND WITHOUT ENDORECTAL COILS.W.T.P.J. Heijmink, J.J. Fütterer, H. Van Moerkerk, T.W.J. Scheenen, C.A. Hulsbergen-Van der Kaa, J.A. Witjes, J.O. Barentsz
UMC St Radboud, NIJMEGEN, Nederland**Purpose:** To evaluate the local prostate cancer staging accuracy of high-frequency transrectal ultrasound (TRUS) and MRI at 3 tesla (T) with and without endorectal coil (ERC).**Method and materials:** Prospectively, 30 consecutive patients (mean PSA 6.30 ng/ml, median biopsy Gleason score 6) with clinically localized prostate cancer underwent TRUS and MRI at 3T before radical prostatectomy. Axial TRUS images covering the entire prostate were acquired with a 10 MHz rectal probe. T2-weighted images in three planes were obtained first with a body array coil (TR/TE 3700/124 ms) and second with an ERC (TR/TE 5000/153 ms) alone. Two radiologists independently read all imaging sets. Radiologist 1 had no TRUS experience but four years of prostate MRI experience. Radiologist 2 had two years of experience in both TRUS and prostate MRI. The local stage was scored by means of predefined criteria as organ-confined or locally advanced on a 5-point probability scale. All prostate specimens were staged according to the 2002 TNM classification. Areas under the ROC curve, sensitivity and specificity were calculated. $P < 0.05$ was considered statistically significant.**Results:** Twenty-six patients were included. Seven patients had locally advanced disease. The AUCs for TRUS, body array coil MRI, and ERC MRI were .49, .67, and .93 for Radiologist 1, and .85, .54, and .97 for Radiologist 2. The AUC of ERC MRI was significantly higher than TRUS for Radiologist 1 and than body array coil MRI in Radiologist 2 ($P < 0.05$). Sensitivity of TRUS, body array coil MRI, and ERC MRI were 14% (1/7), 14% (1/7), and 71% (5/7) for Radiologist 1 and 57% (4/7), 0% (0/7), and 71% (5/7) for Radiologist 2. Specificity was high (90-100%) for all modalities in both radiologists.**Conclusion:** ERC MRI at 3T obtained the highest accuracy for local staging prostate cancer. If ERC MRI is not available, high-frequency TRUS is an alternative only in experienced readers. Body array coil MRI should not be performed due to its low sensitivity.**Purpose:** to compare in a multi-centre study the diagnostic performance of Ferumoxtran-10 MRI (MRL), with multi-detector CT-scanning (MDCT), and pelvic lymph node dissection (PLND) in patients with prostate cancer with intermediate to high risk for nodal metastases.**Materials & Methods:** 375 consecutive patients with biopsy proven prostate cancer and intermediate to high risk for nodal metastases (PSA > 10, or Gleason > 6 or digital rectal examination stage T3) were enrolled in this study by 10 centers. All patients were examined by MDCT and MRL and underwent PLND. At 1.5T, T1-weighted TSE, T2*-weighted GRE MR images and T1-weighted 3D GRE images of the pelvis were obtained, 24 hours after Ferumoxtran-10 administration. Imaging results were correlated with histopathology. Pearson test between the number of inclusions and accuracy was performed.**Results:** Sixty-one of 375 patients (16%), had histologically proven lymph node metastases. Sensitivity, specificity, negative and positive predictive values of MDCT and MRL respectively were 34% and 82%, 97% and 93%, 88% and 96%, 66% and 69%. Sensitivity and negative predictive value of MRL were significantly better compared to MDCT ($p < 0.05$). Forty out of the 61 patients (66%) had metastases in normal size nodes with diameter smaller than 8 mm, which were detected by MRL only. With MRL in 41% of patients lymph node metastases are found outside the normal surgical dissection area, and thus would have been missed by PLND. There was a significant correlation (0.8) between the included number of patients per center and MRL accuracy. When having experience of 20 cases MRL sensitivity increased from 82% to 93% and NPV from 96% to 98%. The post test probability of having positive nodes after a negative MRL dropped to 1.6%.**Conclusion:** Ferumoxtran-10 enhanced MRI in patients with prostate cancer with an intermediate to high risk of having lymph node metastases, shows a high sensitivity and NPV even when implemented in general practise with radiologists with no experience. Thanks to the high sensitivity and NPV (>98%), after a negative MRL a PLND can be omitted. MDCT is of limited use in lymph node staging due to the low sensitivity.**GENOMINEERD**

Radiologendagen Prijs 2006

Abstractnr. : 9.7

MRI WITH A LYMPH NODE SPECIFIC CONTRAST AGENT (FERUMOXTRAN-10): AN ALTERNATIVE FOR MULTI DETECTOR CT-SCANNING AND LYMPH NODE DISSECTION IN PATIENTS WITH PROSTATE CANCER?R.A.M. Heesakkers¹, A.M. Hövels¹, H.C.M. Van den Bosch², J.A. Witjes¹, F. Raat³, G.J. Jager⁴, J.L. Severens⁵, C.A. Hulsbergen van de Kaa¹, J.O. Barentsz¹
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Sessie 10 - Cardiovasculaire Radiologie

Vrijdag 17 november 2006, 14.20 - 15.16 uur

Abstractnr. : 10.1

DIAGNOSTIC ACCURACY OF DUAL SOURCE CT CORONARY ANGIOGRAPHY IN PATIENTS REFERRED FOR CONVENTIONAL ANGIOGRAPHY

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Purpose: To prospectively evaluate the diagnostic accuracy of Dual-Source Computed Tomography (DSCT) coronary angiography to detect significant stenoses (defined as $\geq 50\%$ lumen diameter reduction) in patients referred for conventional coronary angiography without the use of pre-scan beta-blockers.

Method and materials: We studied 30 patients (24 men; mean age 66.13.2) with atypical chest pain, stable or unstable angina pectoris, non-ST-segment elevation myocardial infarction, scheduled for diagnostic conventional coronary angiography. All patients were scanned with a DSCT scanner (Somatom Definition, Siemens Medical Solutions Forchheim, Germany) equipped with an improved temporal resolution of 83 ms as compared to previous CT scanner generations. Only patients able to breath hold for 10 s and in sinus rhythm were included. Patients with contra-indications to Iodinated contrast material were excluded. No β -blockers were administered prior to the scan. A bolus of 70 ml of contrast material with a high iodine concentration was injected with a flow rate of 5 ml/s followed by a saline chaser of 50 ml at 5 ml/s. Mean scan time was 7.81.9 seconds. Pitch varied between 0.2 and 0.5. Mean heart rate was 73.16. The CT angiograms were analyzed by 2 observers blinded to the results of invasive coronary angiography, which was used as the standard of reference.

Results: Conventional coronary angiography demonstrated the absence of significant disease in 20% (6 of 30), single vessel disease in 27% (8 of 30), and multi-vessel disease in 53% (16 of 30) of patients. Sensitivity of CT coronary angiography for detecting significant stenoses on a segment-based analysis was 92%, specificity was 96%, and positive and negative predictive values were 73% and 99% respectively.

Conclusion: Our preliminary results show that the diagnostic accuracy of DSCT coronary angiography for the detection of significant lesions in patients referred for conventional angiography is high, even in patients with fast heart rates.

Abstractnr. : 10.2

PREOPERATIVE COMPUTED TOMOGRAPHY CORONARY ANGIOGRAPHY TO DETECT SIGNIFICANT CORONARY ARTERY STENOSIS IN PATIENTS REFERRED FOR VALVE SURGERY

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Invasive conventional coronary angiography (CCA) is recommended in most of patients scheduled for valve surgery. We studied the diagnostic performance of 64-slice CT coronary angiography (CTCA) to rule out or detect significant coronary lesions in patients referred for valve surgery.

During a 6-month period, 145 patients were prospectively identified from a consecutive patient population scheduled for valve surgery. Thirty-five patients were excluded because of CTCA criteria: irregular heart rhythm ($n=26$), impaired renal function ($n=5$) and known contrast allergy ($n=4$). General exclusion criteria were: hospitalization in community hospital ($n=4$), no CCA ($n=4$), previous coronary artery bypass surgery ($n=1$) or percutaneous coronary intervention ($n=4$). Of the remaining 97 patients, 27 denied written informed consent. Thus, the study population comprised 70 patients (49 male, 21 female; mean age 63.11 years).

Prevalence of significant coronary artery disease, defined as having at least one $\geq 50\%$ stenosis per patient was 25.7%. Beta-blockers were administered in 71% and 64% received lorazepam. The mean heart rate dropped from 72.512.4 to 59.57.5 bpm. The mean scan time was 12.81.3 seconds. On a per-patient analysis the sensitivity, specificity, positive and negative predictive value were: 100% (18/18; 95% CI, 78-100), 92% (48/52; 95% CI, 81-98), 82% (18/22; 95% CI, 59-94), 100% (48/48; 95% CI, 91-100), respectively.

The diagnostic accuracy of 64 slice CTCA for ruling out the presence of significant coronary lesions in patients undergoing valve surgery is excellent and allows CTCA implementation as a gatekeeper for invasive CCA in these patients

Abstractnr. : 10.3

DIAGNOSTIC PERFORMANCE OF 64-SLICE CT IN SYMPTOMATIC PATIENTS WITH PREVIOUS CORONARY BYPASS SURGERY. EVALUATION OF GRAFTS AND CORONARY ARTERIES

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CT accurately detects coronary graft occlusion. However, assessment of graft stenosis and coronary artery disease in post-CABG patients is more challenging and has not been described using 64-slice CT. Therefore an evaluation of the performance of 64-slice CT angiography in patients that previously underwent coronary artery bypass surgery (CABG) was conducted for the detection of graft obstruction and native coronary artery stenosis.

64-slice CT angiography (Siemens Sensation 64, Germany) was performed in 52 symptomatic patients, 10.35.1 years after CABG. Scan parameters: rotation time 330ms, detector width 0.6mm. Two independent, blinded observers assessed all grafts and coronary arteries for significant (>50%) luminal narrowing. Using conventional quantitative angiography as reference, descriptive statistics were performed. Confidence of assessment was classified as high, moderate or low.

A total of 109 grafts, including 182 graft segments, 123 distal coronary run-offs and 116 non-bypassed coronary branches (288 segments) were analyzed. Per-segment detection of graft disease by CT yielded a sensitivity and specificity of 99% (71/72) and 96% (106/110). Nearly all obstructed run-offs were identified (8/9, sensitivity 89%), although overestimations frequently occurred. In non-grafted coronary branches, CT detected significant stenosis (per segment) with a sensitivity and specificity of 97% (62/64) and 86% (192/224). Overestimation occurred more often in calcified segments (positive predictive value of 66% (62/94)). Assessment confidence, inter-observer agreement and diagnostic performance was better in grafts compared to distal run-offs and non-grafted coronary branches.

64-slice CT angiography allows complete angiographic evaluation including both bypass grafts and native coronary arteries.

64 slice coronary angiography can be an alternative to diagnostic conventional angiography, however overestimation of coronary stenosis frequently occurs due to extensive vessel wall calcification

Abstractnr. : 10.4

DIAGNOSIS AND MANAGEMENT OF SUBSEGMENTAL PULMONARY EMBOLISM

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Introduction: Although the advent of multi-detector row computed tomography enabled better visualization of subsegmental pulmonary arteries, subsegmental pulmonary embolism is of uncertain clinical significance. We aimed at answering the following questions: Is spiral computed tomography an accurate method to detect subsegmental pulmonary embolism? How are subsegmental perfusion defects managed in outcome studies including spiral computed tomography? What are the main characteristics and outcomes of patients in whom computed tomography detects isolated subsegmental defects?

Methods: We performed a Medline search on July 1, 2004, using the keywords 'pulmonary embolism' AND 'computed tomography'. We limited our search to English language prospective studies comparing computed tomography to pulmonary angiography, and to prospective outcome studies including computed tomography in a diagnostic strategy, with at least a three months follow-up.

Results: Fourteen studies comparing computed tomography to pulmonary angiography, and five prospective management studies using computed tomography were retrieved. The sensitivity of single-detector computed tomography for detecting subsegmental defects compared with pulmonary angiography was low: 25%. The proportion of isolated subsegmental pulmonary images was significantly higher in management studies using multi-detector computed tomography (17 of 770 scans, 2.2%) compared with those using single-detector CT (22 out of 2232, 1.0%), $p=0.01$. No straightforward attitude regarding anticoagulation therapy for isolated subsegmental defects emerges from the available literature. Finally, important clinical differences were found between patients having subsegmental and segmental or more proximal defects.

Conclusions: These findings underline the uncertainty regarding the clinical significance of subsegmental pulmonary embolism, and the management of patients with such findings.

Abstractnr. : 10.5

SERIAL ASSESSMENT OF ATHEROSCLEROTIC CAROTID PLAQUE VOLUME AND PLAQUE COMPONENT VOLUMES WITH MULTIDETECTOR COMPUTED TOMOGRAPHY ANGIOGRAPHY

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Purpose: To assess the potential of multidetector computed tomography angiography (MD-CTA) in the measurement of progression of atherosclerotic carotid plaque volume and plaque component (calcifications, fibrous tissue and lipid) volumes.

Methods and materials: Atherosclerotic plaque volume and plaque component volumes at the symptomatic and asymptomatic carotid artery were measured in the MD-CTA images of 6 patients with a TIA and minor stroke at base line and at follow up (12, 12, 12, 16, 20 and 34 months).

Plaque volumes were assessed with a custom-made software tool by manual drawing of the outer-contour of the carotid artery bifurcation. Luminal boundary was based on a Hounsfield-Unit (HU) threshold. Within the plaque volume the contribution of different components was measured by counting the number of voxels within defined ranges of HU-values (calcification >130 HU, fibrous tissue 60-130 HU, lipid <60 HU) validated in a previous study.

Finally, differences in plaque volume and plaque component volumes between base line and follow up were assessed.

Results: At base line the plaque volume in the 12 arteries was 942 373 mm and the calcified, fibrous tissue and lipid volumes were 136 132 mm, 600 297 mm and 207 141 mm, respectively.

At follow up, atherosclerotic plaque volume and plaque component volumes showed progression in each carotid artery. The atherosclerotic plaque volume was 1616 794 mm and the calcified, fibrous tissue and lipid volumes were 245 268 mm, 917 387 mm and 454 295 mm, respectively.

A significant ($p < 0.05$) increase in plaque volume was found (674 380 mm); the changes in calcified, fibrous tissue and lipid volumes were not significant.

Conclusions: Atherosclerotic carotid plaque volume and plaque component volumes can be assessed with MD-CTA. Follow-up studies revealed an increase of atherosclerotic plaque volume.

Clinical relevance / application: Progression of atherosclerotic carotid plaque volume and a change in plaque composition can be monitored in vivo with MD-CTA.

Abstractnr. : 10.6

VOLUME MEASUREMENTS OF INTRACRANIAL INTERNAL CAROTID ARTERY CALCIFICATIONS AND THE RELATIONSHIP WITH CARDIOVASCULAR RISK FACTOR

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Purpose: To measure the volume of intracranial internal carotid artery (ICA) calcifications and to assess the relationship with cardiovascular risk factors.

Methods and materials: The volume of intracranial ICA calcifications (from the petrous part of the ICA to the top of the ICA) was assessed in MD-CTA images of 87 consecutive patients with TIA or minor stroke. A custom-made software tool allowed an observer to draw a region of interest around an ICA calcification and if such a region did not include bone, the volume of the calcification can be computed automatically based on a Hounsfield Unit (HU) threshold that was set above the maximal measured intracranial luminal attenuation caused by contrast material (> 400 HU).

The presence of cardiovascular risk factors (hypercholesterolemia, hypertension, diabetes, smoking, previous cerebrovascular disease and previous cardiac disease) was extracted from the patients history files.

The difference in volume of the intracranial ICA calcifications between the left and right side, and between the symptomatic and asymptomatic side was analyzed with a students t-test. The relation between the volume of the intracranial ICA calcifications and the cardiovascular risk factors was assessed with a Mann-Whitney test.

Results: In 61 patients intracranial arterial calcifications were present, with a mean of 171.261 mm. No significant difference in the volume of the intracranial arterial calcifications was found between the left and right side ($p > 0.8$), and the symptomatic and asymptomatic side ($p > 0.2$). A significant positive relation was found between the volume of intracranial arterial calcifications and hypercholesterolemia ($p < 0.03$), previous cerebrovascular disease ($p < 0.05$), and previous cardiac disease ($p < 0.01$).

Conclusions: Intracranial arterial calcification can be quantified. Intracranial arterial calcifications are strongly related to hypercholesterolemia, previous cerebrovascular disease and previous cardiac disease.

Clinical relevance / application

Intracranial arterial calcification is a marker of atherosclerosis and may have a predictive value for future cardiovascular events. Follow up studies are required.

resolved by using intravascular ultrasound at 20 MHz as gold standard.

Additionally, we compared CTA and DSA with regard to measurements of in-stent lumen diameter, mean stent diameter, and reference lumen diameter of the distal renal artery.

Results: CTA and DSA agreed on the presence and absence of significant in-stent restenosis in 25/31 stents (4 stenosed and 21 patent stents). In 6 stents, CTA showed in-stent restenosis whereas DSA was normal. Subsequent IVUS imaging in 3 stents confirmed restenosis in one stent and excluded restenosis in the 2 remaining stents. Sensitivity and specificity of CTA for the detection of significant restenosis were therefore 100% and 81%, respectively, and of DSA 80% and 100%, respectively. In comparison to DSA, CTA underestimated the smallest lumen diameter in the stent (2.91.09 mm and 3.11.27 mm, respectively, $p < 0.033$) and overestimated the percentage in-stent stenosis (4119.6% vs. 3617.9%, respectively, $p < 0.032$).

Conclusion: Sixty-four slice CTA appears to be a suitable alternative to DSA in the follow-up after renal artery stent placement. CTA appears more sensitive for the detection of restenosis than DSA, at the expense of more false-positive results. A normal CTA reliably excludes significant in-stent restenosis.

Abstractnr. : 10.7

ACCURATE NON-INVASIVE EVALUATION OF RENAL ARTERY STENTS BY USING 64-SLICE CT ANGIOGRAPHY. A COMPARISON WITH QUANTITATIVE DSA

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Purpose: To compare the accuracy of 64-slice CT angiography (CTA) relative to quantitative digital subtraction angiography (DSA) with regard to the detection of significant restenosis after stent placement for atherosclerotic renal artery obstruction.

Methods: We examined 31 stented renal arteries in 27 patients which were tested for the presence or absence of significant in-stent restenosis of >50% lumen diameter reduction. Discordant results between CTA and DSA were

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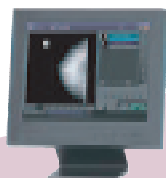
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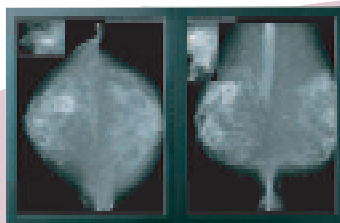
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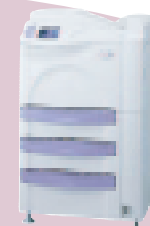
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Samenstelling 1 ml Vasovist oplossing voor injectie bevat 244 mg (0,25 mmol) gadofosveset-trinatrium als werkzaam bestanddeel. **Hulpstoffen:** Fosveset, natriumhydroxide, zoutzuur en water voor injecties. **Indicaties** Dit geneesmiddel is uitsluitend voor diagnostisch gebruik. Vasovist is geïndiceerd voor contrast-versterkte MRA voor het zichtbaar maken van bloedvaten van het abdomen of van de ledematen bij patiënten met verdenking op of bekende vasculaire aandoeningen.

Contra-indicaties Overgevoeligheid voor het werkzame bestanddeel of voor een van de hulpstoffen. **Speciale waarschuwingen en voorzorgen bij gebruik**

Waarschuwing voor overgevoeligheid

Men dient immer rekening te houden met de mogelijkheid van een reactie, waaronder ernstige, levensbedreigende, dodelijke, anafylactische of cardiovasculaire reacties, of andere idiosyncratische reacties, in het bijzonder bij patiënten met een bekende klinische overgevoeligheid, een eerdere reactie op contrastmiddelen, astma of andere allergische aandoeningen in de voorgeschiedenis.

Overgevoeligheidsreacties Indien een overgevoeligheids-reactie optreedt, dient toediening van het contrastmiddel onmiddellijk te worden gestaakt en - indien nodig - specifieke veneuze behandeling te worden ingesteld.

Nierfunctiestoornissen Omdat gadofosveset door het lichaam via de urine wordt uitgescheiden, dient voorzichtigheid te worden betracht bij patiënten met nierfunctiestoornissen (zie Rubriek 5.2). Dosisaanpassing bij nierfunctiestoornissen is niet noodzakelijk. Bij patiënten met ernstiger gestoorde nierfunctie (klaring <20 ml/min) die geen routine dialyse ondergaan, dienen de voordelen en de risico's zeer zorgvuldig te worden afgewogen.

Veranderingen op het ECG Verhoogde spiegels van gadofosveset (bijvoorbeeld bij herhaald gebruik gedurende een korte periode (binnen 6-8 uur), of accidentele overdosering van > 0,05 mmol/kg kan in verband gebracht worden met een geringe QT prolongatie (8,5 msec bij Fridericia correctie). In het geval van verhoogde gadofosveset-spiegels of onderliggende QT-verlenging, moet de patiënt zorgvuldig worden geobserveerd met inbegrip van hartbewaking.

Vaatstents In gepubliceerde studies is beschreven dat de aanwezigheid van metaalstents artefacten veroorzaakt bij MRA. De betrouwbaarheid van het met VASOVIST zichtbaar maken van het lumen bij vaten waarin een stent is geplaatst, is niet onderzocht.

Bijwerkingen De meest voorkomende bijwerkingen waren pruritus, paresthesiën, hoofdpijn, misselijkheid, vasodilatatie, brandend gevoel en dysgeusie. De meeste ongewenste bijwerkingen waren van lichte tot matige intensiteit en traden binnen 2 uur op. Vertraagde reacties kunnen optreden (na uren tot dagen). Zie verder de SmPC-tekst.

Handelsvorm 10 flacons à 10 ml **Registratienummer** EU/1/05/313/003 **Naam en adres van de registratiehouder** Schering AG Berlijn, in Nederland vertegenwoordigd door Schering Nederland B.V., Postbus 116, 1380 AC Weesp - tel. (0294) 46 24 24. **Afleveringsstatus** UR. **Datum van goedkeuring/herziening van de SmPC** 3 oktober 2005. **Stand van informatie** maart 2006. Uitgebreide informatie (SmPC) is op aanvraag verkrijgbaar.

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