

CODE: LL-BR2125-H06

SESSION: Breast Imaging

Mammographic Breast Density by Area of Residence: Evidence of Lower Density in Rural Areas

DATE: Tuesday, November 27 2007

START TIME: 12:15 PM

END TIME: 01:15 PM

LOCATION: Lakeside Learning Center

PRESENTER

Nicholas Perry MD

ABSTRACT CO-AUTHOR

Prue Allgood PhD

Sue Milner BSC

Kefah Mokbel MD

Stephen Duffy

SUBSPECIALTY CONTENT

Breast (Imaging and Interventional)

DISCLOSURES

N.P. - Nothing to disclose.

P.A. - Nothing to disclose.

S.M. - Nothing to disclose.

K.M. - Nothing to disclose.

S.D. - Nothing to disclose.

PURPOSE

To investigate whether breast density varies by urban/rural area of residence as breast cancer incidence has been observed to do.

METHOD AND MATERIALS

Using the standard four ACR Birads categories of mammographic density, 617 mammograms of women aged 29-87 receiving mammography at the Princess Grace Hospital, London, were assessed for density. Of these, 225 were from rural residents, 135 from suburban and 257 from urban. The association between having any dense tissue and area of residence was assessed using logistic regression, giving odds ratio estimates of relative risk adjusting for age.

RESULTS

Overall, 161 (26%) mammograms were classed as entirely fatty, 187 (30%) as having scattered fibroglandular densities, 136 (22%) as heterogeneously dense and 133 (22%) as extremely dense. Of the rural residents, 31% had entirely fatty mammograms, compared to 26% of the suburban residents and 22% of the urban residents. This difference was significant both unadjusted ($p=0.035$) and adjusted for age ($p=0.044$). Compared to the rural residents, the odds ratio estimates of relative risk of any dense tissue (scattered or more severe) after adjustment for age were 1.14 (95% CI 0.69-1.86) for suburban residents and 1.54 (95% CI 1.01-2.35) for urban. Age specific analyses suggested that the differences by area were more pronounced in women aged under 50.

CONCLUSION

There is evidence of higher breast density in women residing in urban and suburban areas in the UK compared to rural, consistent with higher breast cancer risk in the urban areas.

CLINICAL RELEVANCE/APPLICATION

An urban population has higher mammographic density and risk of breast cancer, yet has lower uptake of screening. Increased attention to uptake and quality of screening in urban areas is indicated.

CODE: LL-CH4164-B03

SESSION: Chest Imaging

Detection of the Changes in the Lungs of People who had High Exposure to Secondhand Cigarette Smoke Using Long-time-scale Global ^3He Diffusion MRI

DATE: Sunday, November 25 2007

START TIME: 12:30 PM

END TIME: 01:30 PM

LOCATION: Lakeside Learning Center

PRESENTER

Chengbo Wang PhD

ABSTRACT CO-AUTHOR

Talissa Altes MD

Grady Miller PhD

Eduard de Lange MD

Kai Ruppert PhD

Jaime Mata PhD

AWARDS

Trainee Research Prize - Fellow

SUBSPECIALTY CONTENT

Chest Radiology

Magnetic Resonance Imaging

DISCLOSURES

C.W. - Nothing to disclose.

T.A. - Nothing to disclose.

G.M. - Research support, Siemens AG

E.d. - Nothing to disclose.

K.R. - Nothing to disclose.

J.M. - Nothing to disclose.

PURPOSE

To determine whether the effects of secondhand cigarette smoke in the lungs can be detected using long-time-scale (LTS) global hyperpolarized ^3He (^3He) diffusion MRI.

METHOD AND MATERIALS

LTS ^3He diffusion MRI was performed in 38 subjects: 33 healthy subjects who never smoked (17 subjects with low exposure to secondhand smoke: 7 M, 10 F, age: 46-73 yrs; and 16 with high exposure: 4 M, 12 F, age: 41-79 yrs) and 5 active smokers (3 M, 2 F, age: 48-71 yrs, FEV1%pred: 58%-92%) using a 1.5T scanner (Sonata, Siemens). In ALL subjects, global LTS ADC values were obtained after inhalation of 50 ml of ^3He mixed with 950 ml of N_2 . ADC values were calculated at multiple diffusion times (20ms ~ 2.5s, interval: 62ms), however for the sake of brevity only the ADC values at a diffusion time of 1.54s are presented below.

RESULTS

Global ADC values for smoking subjects (mean \pm SD: 0.0327 \pm 0.0086 cm^2/s) were significantly greater than those for low exposure healthy subjects (0.0184 \pm 0.0033 cm^2/s), $p=0.02$. ADC values for subjects with high exposure (0.0201 \pm 0.0068 cm^2/s) were more variable than those of low exposure subjects but mean values were similar, $p=0.38$. Five (31%) high exposure subjects, but only 1 (6%) with low exposure had ADC values greater than 0.0230 cm^2/s ; 1 (6%) high exposure subject, but 9 (53%) with low exposure had ADC values between 0.0185 cm^2/s and 0.0230 cm^2/s ; and 10 (63%) high exposure subjects, but 7 (41%) with low exposure had ADC values less than 0.0185 cm^2/s , $p<0.01$. Thus, the high exposure group tended toward ADC values that were either higher or lower than the low exposure group.

CONCLUSION

Only a fraction (15-30%) of active smokers develop emphysema (structural damage to the lung) while a larger fraction develop chronic bronchitis (chronic airway inflammation). A decrease in ADC values may reflect airway narrowing possibly from early chronic bronchitis, and an increase may be indicative of structural lung damage/sub-clinical emphysema. Our findings suggest that the effects of secondhand smoke in the lungs can be detected using LTS ^3He diffusion MRI.

CLINICAL RELEVANCE/APPLICATION

The effects of secondhand smoke in the lungs can be detected using long-time-scale global hyperpolarized ^3He diffusion MRI.

CODE: VP31-09

SESSION: Pediatric Series: Trauma/Emergency Imaging I

Imaging Findings in 455 Children Following All-Terrain Vehicle Accidents

DATE: Tuesday, November 27 2007

START TIME: 10:50 AM

END TIME: 11:00 AM

LOCATION: N229

PRESENTER

Chetan Shah MBBS

ABSTRACT CO-AUTHOR

Sadaf Bhutta MD

Donna Parnell-Beasley MSc

S. Bruce Greenberg MD

DISCLOSURES

C.S. - Nothing to disclose.

S.B. - Nothing to disclose.

D.P. - Nothing to disclose.

S.G. - Nothing to disclose.

PURPOSE

Our purpose is to identify injury patterns in children suffering ALL-TERRAIN vehicle (ATV) accidents & correlate with outcome.

METHOD AND MATERIALS

455 consecutive children following ATV accidents admitted to a tertiary care pediatric hospital had medical records and ALL imaging studies reviewed. Children mean age was 11.4 years (SD 4.3 yr) and included 318 males and 137 females. χ^2 was used for statistical analysis.

RESULTS

Head injuries detected by CT or MRI included: skull fractures 77, extra axial hemorrhage 62 & brain injuries 53. Skull fractures, extra axial hemorrhage & brain injuries were ALL associated ($p < .01$). 5 of the 6 fatalities had head injuries. Orbit fractures detected by CT were present in 40 children and associated with brain injury ($p < .05$). Non-orbit facial fractures were not associated with brain injury ($p < .2$). Spinal cord injuries were present in 3 of 12 children with spine fractures. Spinal cord injuries were present in 2 children without a fracture. The lung was the most frequently injured torso organ with pulmonary contusions present in 32 children. Hemo/pneumothorax & chest wall fractures were associated with chest contusions ($p < .001$). Three children with pulmonary contusions & pneumothoraces died. Abdomen organs with contusions included: spleen 23, liver 21, kidneys 12 & pancreas 8. Multiorgan torso injuries were common (e.g. 23 spleen contusion patients had associated injuries in: chest 9, kidneys 5, pancreas 3 & liver 2). Extremity fractures occurred in 159 children with the most common locations being the femur 55 & leg bones 51. Lower extremity fractures were associated with long term disability ($p < .025$). There were 11 amputations including 9 partial foot amputations.

CONCLUSION

Head, torso & extremity injuries are common in children suffering ATV injuries. Cranial & orbit fractures are associated with brain injuries & extra axial hemorrhage. Torso injuries frequently involve multiple organs. Extremity fractures are the most common radiographic detected injuries & lower extremity fractures are associated with long term disability.

CLINICAL RELEVANCE/APPLICATION

This is the largest series of imaging findings in children suffering ATV injuries & shows the spectrum of injuries and important associations.

CODE: SSE01-04

SESSION: Breast Imaging (Mammography)

Does Ethnicity Influence Women's Preferences for Higher Recall from Screening Mammography with the Potential for Earlier Detection of Breast Cancer?

DATE: Monday, November 26 2007

START TIME: 03:30 PM

END TIME: 03:40 PM

LOCATION: Arie Crown Theater

PRESENTER

Nazia Jafri BA

ABSTRACT CO-AUTHOR

Rama Ayyala BS

Al Ozonoff PhD

Jacqueline Jordan MBA

Priscilla Slanetz MD, MPH

DISCLOSURES

N.J. - Nothing to disclose.

R.A. - Nothing to disclose.

A.O. - Nothing to disclose.

J.J. - Nothing to disclose.

P.S. - Nothing to disclose.

PURPOSE

This study prospectively surveyed underserved women to establish their preferences regarding the trade-off between recall rates and earlier detection of breast cancer.

METHOD AND MATERIALS

To date, 500 women undergoing screening mammography have completed an IRB-approved validated survey in one of three languages: English, Spanish, and Haitian-Creole. Data were analyzed across three groups: Caucasian, Black (African-American or Caribbean descent), and Hispanic, using chi-squared analysis.

RESULTS

Of 500 respondents (37% Caucasian, 42% Black, and 9% Hispanic), Caucasians had almost equal distribution among ALL educational levels, while Blacks and Hispanics had more representation at lower educational levels ($P < 0.001$). Hispanics believed mammography to be more diagnostically sensitive than it is ($P < 0.0001$). Caucasians were more likely to continue with screening mammography despite false-positive results, while Blacks and Hispanics were more hesitant to continue with screening ($P < 0.0001$). Caucasians preferred higher recall rates and were more willing to undergo subsequent invasive ($P < 0.0001$) and non-invasive ($P = 0.002$) procedures, while Blacks were more hesitant and unsure about their willingness to return.

CONCLUSION

Differences in ethnic background appear to influence women's understanding of mammography, compliance with recall, and desire for early detection.

CLINICAL RELEVANCE/APPLICATION

A prior study of Caucasian educated women showed preference for higher recall rates in favor of earlier detection; it is unknown whether higher recall would deter underserved women from screening.

CODE: SSC07-01

SESSION: Nuclear Medicine (PET/CT in Breast and Genitourinary Malignancies)

F-18 fluorodeoxyglucose (FDG) Positron Emission Tomography and Computed Tomography (PET/CT) in the Initial Staging of Inflammatory Breast Cancer

DATE: Monday, November 26 2007

START TIME: 10:30 AM

END TIME: 10:40 AM

LOCATION: E353C

PRESENTER

Selin Carkaci MD

ABSTRACT CO-AUTHOR

Homer Macapinlac MD

Massimo Cristofanilli MD

Huong Le-Petross MD

Ana Angullo-Gonzales MD

Wei Yang MD

AWARDS

Trainee Research Prize - Fellow

DISCLOSURES

S.C. - Nothing to disclose.

H.M. - Consultant, General Electric Company Consultant, Siemens AG

M.C. - Nothing to disclose.

H.L. - Nothing to disclose.

A.A. - Nothing to disclose.

W.Y. - Nothing to disclose.

PURPOSE

To evaluate F-18 fluorodeoxyglucose (FDG) positron emission tomography (PET) and computed tomography (CT) in the initial staging of inflammatory breast cancer (IBC).

METHOD AND MATERIALS

30 women, mean age 49 years (range, 25 to 70 years), with newly diagnosed IBC who had FDG-PET/CT at diagnosis were recruited in this IRB approved retrospective study. ALL PET/CT images were analyzed visually and semi-quantitatively by two physicians. The maximum standardized uptake value (max SUV) in the primary breast, regional nodal (axilla [AX], infraclavicular [IC], supraclavicular [SC]) and extranodal regions was documented. A max SUV >2.5 was considered abnormal for statistical analysis. CT criteria for malignant nodes included short axis diameter > 1 cm. Accuracy of PET/CT was compared to histopathology or concurrent supplementary imaging where available.

RESULTS

ALL patients presented with unilateral IBC. Predominant pathologic type was invasive ductal cancer (27/30, 90% patients). Clinical presentation included swelling and skin erythema in ALL patients. No breast mass was palpable in 20/30 (66%) patients. PET/CT showed hypermetabolic uptake in the affected breast in 29/30 (97%) patients with multicentric distribution in 73% (22/30), and hypermetabolic skin thickening in ALL patients. PathologicALLY confirmed regional nodal disease was detected in 29/30 (98%) patients. 13/30 (43%) patients were found to have distant metastasis on PET/CT. Disease sites included bone, liver, contralateral AX, IC, SC nodes, mediastinal and abdominal nodes, lungs, chest wall, pelvis. Biopsy confirmation of metastases was available in 4/13 (31%), and supplemental confirmatory imaging in 9/13 (69%) patients. There were two false negatives for ipsilateral regional nodal disease (AX and SC respectively), sensitivity 93%, NPV 33%. There was one false positive cardiophrenic angle mass (max SUV 5.3) that was benign on biopsy, specificity 94%, PPV 92%.

CONCLUSION

PET/CT is useful in the initial staging of IBC and provides information on loco-regional and global disease.

CLINICAL RELEVANCE/APPLICATION

PET/CT demonstrates in breast, regional nodal, and distant disease in IBC patients at initial diagnosis and aids in therapeutic planning.

CODE: LL-PH6124-H02

SESSION: Physics - CAD

An Automated Dental Radiograph Identification System Using Phase-Only Correlation for Mass Disasters

DATE: Tuesday, November 27 2007

START TIME: 12:15 PM

END TIME: 01:15 PM

LOCATION: Lakeside Learning Center

PRESENTER

Eiko Kosuge PhD

ABSTRACT CO-AUTHOR

Ryota Kawamata DDS

Isamu Kashima PhD

Akira Nikaido BENG

Koichi Ito PhD

Takafumi Aoki PhD

SUBSPECIALTY CONTENT

Physics and Basic Science

DISCLOSURES

E.K. - Nothing to disclose.

R.K. - Nothing to disclose.

I.K. - Nothing to disclose.

A.N. - Nothing to disclose.

K.I. - Nothing to disclose.

T.A. - Nothing to disclose.

PURPOSE

In mass disasters such as earthquakes, fires, tsunamis and terrorism, identifying victims by their dental records is extremely time-consuming, since forensic experts must manually compare victim's records with many dental records. The purpose of this study is to develop a novel automated dental radiograph identification system based on Phase-Only Correlation (POC).

METHOD AND MATERIALS

POC is a high-accuracy image matching technique which uses the phase components in 2D Discrete Fourier Transforms of images and can estimate the sub-pixel translational displacement and evaluate the similarity between two images. The proposed system consists of three steps: (i) image registration using the extended version of POC which employs the Fourier-Mellin transform, (ii) distortion correction using a sub-pixel correspondence search technique based on POC and (iii) matching score calculation using POC. Our database consists of 120 images with 60 subjects and 2 different images of each radiograph which are taken before and after dental treatment.

RESULTS

In this experiment, 60 subjects after dental treatment are matched to 60 subjects before dental treatment; the total number of pairs is 3,600 (60x60). We evaluate the identification performance by the ranking of matching scores for each subject before dental treatment. From this experimental result, the number of the genuine pairs whose matching scores are ranked top 1 is 52; the recognition rate is 87% (52/60). The matching scores of the genuine pair are always ranked among the top 3. Thus, the proposed system can reduce the number of pairs to be matched by experts to 5% (180/3,600) of ALL the possible combinations. The computation time of our system is 3.6 seconds per pair. In addition, the subtraction between the aligned genuine pairs clearly shows the dental work. This result indicates that our system is also effective for medical diagnosis.

CONCLUSION

We have proposed an automated dental identification system using POC, which can correctly identify victim's images when mass disasters occur.

CLINICAL RELEVANCE/APPLICATION

An automated dental radiograph identification system based on POC allows identifying victims and imaging diagnosis such as digital subtraction radiography.

CODE: SSC04-05

SESSION: Emergency Radiology (Penetrating Injuries, Emergency Care)

Utility of Whole Body CT Imaging Autopsy in a US State Chief Medical Examiner's Investigation of Traumatic Death: Initial Experience

DATE: Monday, November 26 2007

START TIME: 11:10 AM

END TIME: 11:20 AM

LOCATION: E351

PRESENTER

Barry Daly MD

ABSTRACT CO-AUTHOR

Clint Sliker MD

Dawn Zulauf

Jack Titus MD

Priti Shah MD

Mary Ripple

DISCLOSURES

B.D. - Nothing to disclose.

C.S. - Nothing to disclose.

D.Z. - Nothing to disclose.

J.T. - Nothing to disclose.

P.S. - Nothing to disclose.

M.R. - Nothing to disclose.

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PURPOSE

Early studies have suggested a role for high-resolution multi-detector CT (MDCT) imaging autopsy in the forensic investigation of death. Our study evaluated the sensitivity and potential role of MDCT as a replacement for or adjunct to conventional autopsy in the investigation of traumatic accidental or non-accidental death within a U.S. state medical examiner (ME) system.

METHOD AND MATERIALS

20 decedents were prospectively investigated with whole body 40-detector row 2D and 3D MDCT (~4,500 images/study) within 24 hours of death following blunt (n=14) or penetrating (n=6; 5 ballistic) trauma. MDCT was interpreted by consensus by 2 radiologists and compared with ME autopsy results for major findings and cause of death. The authors (radiologists and forensic medical examiners) also evaluated the imaging findings as (a) comparable to; (b) a helpful adjunct to; or (c) of no additive value to conventional autopsy.

RESULTS

Imaging correctly identified 92 major findings (sensitivity 95.5%) and ALL 14 causes of death in cases of blunt trauma. These respective figures were 36 (sensitivity 94.7%) and 5 in cases of penetrating trauma. Six major false-negative CT findings included 2 nondisplaced atlanto-occipital subluxations, and lacerations of the bronchus, right heart, ascending aorta, and liver. ALL 26 major ballistic fragments recovered at autopsy were accurately localized, but 13 known pathways were incompletely or not identified, especially where no fragments remained. MDCT identified 7 major findings (3 cases of air embolism, 3 major fractures, 1 lung laceration) not detected at conventional autopsy. The authors evaluated MDCT findings as (a) comparable to autopsy in 13 cases (ALL blunt); (b) a helpful adjunct in 6 cases (5 penetrating); and (c) of no additive value in one case.

CONCLUSION

Early experience suggests that MDCT imaging autopsy shows promise as a sensitive tool for the detection of major injuries and cause of death after accidental blunt trauma. In non-accidental traumatic death, MDCT can be a valuable adjunct to mandatory autopsy for detection of injuries and ballistics.

CLINICAL RELEVANCE/APPLICATION

MDCT autopsy has potential to replace conventional or enable limited, focused autopsy following fatal accidental blunt trauma.

CODE: SJJ04-06

SESSION: Health Services, Policy, and Research (EBM, Guidelines, and Outcomes)

Are We Meeting the Imaging Needs of the Obese? A Longitudinal Study of Patients >450 lbs Who Underwent Gastric Bypass Surgery

DATE: Tuesday, November 27 2007

START TIME: 03:50 PM

END TIME: 04:00 PM

LOCATION: E351

PRESENTER

Raul Uppot MD

ABSTRACT CO-AUTHOR

Susanna Lee MD, PhD

Peter Hahn MD, PhD

Dushyant Sahani MD

Debra Gervais MD

Peter Mueller MD

DISCLOSURES

R.U. - Nothing to disclose.

S.L. - Nothing to disclose.

P.H. - Nothing to disclose.

D.S. - Researcher, General Electric Company Consultant, Bracco Group

D.G. - Speakers Bureau, Tyco Healthcare (Valleylab), Boulder, CO

P.M. - Nothing to disclose.

PURPOSE

To review the clinical course and imaging needs of patients who weighed more than 450 lbs in the 3 year perioperative period surrounding gastric bypass surgery.

METHOD AND MATERIALS

Of the 1188 patients who underwent gastric bypass procedure (GBP) between 06/99 and 04/07, ALL patients who weighed more than 450 lbs (maximum CT table wt limit) were selected for evaluation. The entire clinical course of the patients available in our electronic medical records including inpatient hospital summaries, surgeries, and outpatient clinic notes was reviewed. Age, sex, preoperative ultrasound, postoperative barium swallow, and ALL postoperative CT imaging, or need for imaging in clinic, admission, or operative notes were recorded.

RESULTS

44 patients were >450 lbs. (37 M, 7 F). Avg age = 38(18-62); Avg preop wt 504.93 (617-450 lbs). 48% (21/44) had a preoperative abdominal ultrasound. 100% ultrasounds were limited in quality but none missed a preoperative gallstone. ALL laparoscopic GBP (10) has postoperative barium swallow of which 3 were done with real time fluoroscopy and were not limited in quality. Only 13 patients in this cohort of >450 lbs were recorded to ever get a chest or abdominal CT. CT was performed avg 444.54 days after the bypass surgery. Of the 44 patients, 27% (12) presented with symptoms requiring imaging CT or fluoroscopy, which could not be performed. Cases and outcomes included: 4 surgical anastomotic leaks - operative repair, 2 suspicions for PE - VQ scans, 2 nonspecific abdominal pains - 1 evaluated with ultrasound and the other could not be evaluated with CT but has barium swallow which demonstrated a gastric ulcer, 1 trauma - operative splenectomy; 1 widened mediastinum on chest radiograph - not worked up, 1 atrial fibrillation which could not be ablated - therefore treated medically, 1 bilious drainage around g-tube site - admitted and treated empirically.

CONCLUSION

27% of gastric bypass patients > 450 lbs clinically needed imaging which they could not get because they exceeded the table weight limits of CT (450lbs) and fluoroscopy (350 lbs).

CLINICAL RELEVANCE/APPLICATION

Weight limits of CT and fluoroscopy need to be increased in order to address the needs of gastric bypass patients.

CODE: S5J05-02

SESSION: Genitourinary (Fetal MR Imaging)

Utilization of Radiological Examinations in Pregnant Women: A Ten Year Review-1997-2006

DATE: Tuesday, November 27 2007

START TIME: 03:10 PM

END TIME: 03:20 PM

LOCATION: E352

PRESENTER

Elizabeth Lazarus MD

ABSTRACT CO-AUTHOR

Carolynn DeBenedectis MD

William Mayo-Smith MD

Patricia Spencer MD

DISCLOSURES

E.L. - Nothing to disclose.

C.D. - Nothing to disclose.

W.M. - Research support, General Electric Company Research support, Bracco Group

P.S. - Nothing to disclose.

PURPOSE

To document utilization of radiological examinations in pregnant women over ten years in one academic medical center from 1997-2006.

METHOD AND MATERIALS

At our academic institution, every pregnant woman exposed to radiation during an imaging exam is recorded in a database compiled by medical physics. The examinations were comprised of radiographic plain film (PF), nuclear medicine (NM), and computed tomography (CT) examinations. We performed a retrospective review of the database to document the utilization of these radiological examinations in this patient population. We documented the number of patients, number of each type of examination, date of the exam, and the estimated radiological dose to the fetus during each year studied from 1997-2006 and compared this to the number of deliveries per year.

RESULTS

A total of 5235 exams were performed on 3249 patients during the 10 years of the study. The number of patients and examinations increased every year from 231 patients undergoing 325 examinations in 1997 to 447 patients undergoing 730 examinations in 2006, an 89% increase in patient number and 121% increase in examinations. During the same ten years, the total number of deliveries changed from 8661 to 9261, an increase of only 7%. While the number of PF increased an average of 7% per year, and the number of NM examinations increased an average of 12% per year, CT examinations increased an average of 25% per year. During this time period, the number of deliveries stayed nearly static with an average increase of only 1% per year. The average estimated fetal radiation exposure for CT was 0.69 rads (range 0.001 -66.6), PF 0.0015 rads (range 0.001 to 2.25), and for NM was 0.040 rads (range 0.001 to 0.77).

CONCLUSION

Overall utilization of radiological examinations in pregnant women increased by 121% over ten years with an increase in the patient population of only 7%. The greatest increases were in utilization of CT which also averaged the greatest overall radiation exposure to the fetus.

CLINICAL RELEVANCE/APPLICATION

Documenting increased utilization in pregnant women is important to raise awareness of the potential of any adverse effects of increased imaging and to curb inappropriate usage in the future.

CODE: SSK13-03

SESSION: Pediatric (Neuroradiology)

Gray Matter Enlargement in Children with High Functioning Autism and Asperger Syndrome Using a Novel Method of Diffusion Based Morphometry

DATE: Wednesday, November 28 2007

START TIME: 10:50 AM

END TIME: 11:00 AM

LOCATION: N229

PRESENTER

Manzar Ashtari PhD

ABSTRACT CO-AUTHOR

Joel Bregman MD

Shana Nichols

Carolyn McIlree MS

Lindat Spritzer BS

Andrew Adesman MD

DISCLOSURES

M.A. - Nothing to disclose.

J.B. - Nothing to disclose.

S.N. - Nothing to disclose.

C.M. - Nothing to disclose.

L.S. - Nothing to disclose.

A.A. - Nothing to disclose.

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PURPOSE

Neuroimaging findings in autism spectrum disorders (ASD) have been inconsistent in part due to differences in image analysis. Whereas most previous morphometric studies use segmentation techniques, apparent diffusion coefficient (ADC) based morphometry (ABM) is a powerful new technique that is not dependent on tissue segmentation, eliminating the risk for CNS tissue misclassification. In ABM, increase in cortical gray matter is accompanied by a corresponding decrease in the sulcal CSF resulting to an ADC decrease. Thus, ADC images may be used as a surrogate marker for regional gray matter volume change.

METHOD AND MATERIALS

Method: Subjects were recruited from the Fay J. Lindner Center for Autism. All met ADI-R & ADOS-G criteria for autistic or Asperger's disorder. 14 ASD subjects and 12 age-, gender-, IQ-, SES-matched HC underwent diffusion MRI. A 15-direction isotropic diffusion sequence was obtained covering the whole brain. Following inter-subject registration of the ADC maps, two-tailed voxelwise t-test was applied.

RESULTS

ASD participants had enlarged GM volumes (decreased ADC) in the medial frontal gyri, left pre-central gyrus, right post-central gyrus, right fusiform/parahippocampal gyrus, bilateral temporal gyri and bilateral cerebellum ($p < 0.005$ and a cluster size of 100 contiguous voxels). The ASD group had smaller GM volumes in the cerebellum and right amygdala. A separate two-tailed t-test showed no significant differences in the total brain volume of the autism participants as compared with HC.

CONCLUSION

ABM is a new, indirect method for highlighting brain regions with potential GM volume changes using diffusion-weighted MR. We found GM changes consistent with recent volumetric or voxel based morphometry reports. These areas have been linked to deficits in social-cognitive processes in autism. We believe that ABM is extremely valuable for understanding and exploring brain abnormalities in autism and related disorders

CLINICAL RELEVANCE/APPLICATION

We believe that ADC based morphometry ABM is a superior method over the voxel based morphometry as and is extremely valuable for understanding and exploring brain abnormalities in autism and related disorders.

CODE: SSG01-04

SESSION: Breast Imaging (Digital Mammography)

Improved Accuracy of Lesion Detection in Breast Cancer Screening with Stereoscopic Digital Mammography

DATE: Tuesday, November 27 2007

START TIME: 11:00 AM

END TIME: 11:10 AM

LOCATION: Arie Crown Theater

PRESENTER

David Getty PhD

ABSTRACT CO-AUTHOR

Carl D'Orsi MD

Ronald Pickett PhD

Mary Newell MD

Kathleen Gundry MD

Stephanie Roberson MD

DISCLOSURES

D.G. - Nothing to disclose.

C.D. - Consultant, General Electric Company Consultant, Hologic, Inc (R2 Technology, Inc) Stock options, General Electric Company Stock options, Hologic, Inc (R2 Technology, Inc)

R.P. - Nothing to disclose.

M.N. - Nothing to disclose.

K.G. - Nothing to disclose.

S.R. - Nothing to disclose.

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PURPOSE

This is an interim report of an ongoing clinical trial of stereoscopic full-field digital mammography compared to standard (non-stereo) full-field digital mammography. Stereoscopic digital mammography permits the radiologist to view the internal structure of the breast directly and in depth. We compare the two modalities for detection of suspicious breast lesions in a screening population.

METHOD AND MATERIALS

Over 900 patients at elevated risk for the development of breast cancer have been enrolled as of March, 2007. Each patient receives both a standard screening examination and a stereoscopic screening examination which are read independently by different radiologists. If a suspicious finding is reported from either reading, the patient is recalled for standard clinical workup examinations, which form the basis for lesion truth.

RESULTS

Compared to standard digital mammography, stereo mammography is reducing false positive lesion detections by 39% ($p < 0.005$), and reducing false negative lesion detections by 46% ($p < 0.04$). ROC analysis of the readers' paired ratings of likelihood that a finding is real show greater accuracy for stereo, $Az = 0.79$, than for standard, $Az = 0.57$ ($p = 0.0004$).

CONCLUSION

Stereo mammography is significantly more accurate than standard mammography in detecting lesions in breast cancer screening, improving both sensitivity and specificity.

CLINICAL RELEVANCE/APPLICATION

Stereo mammography is significantly more accurate than standard mammography and has high promise of being both clinically acceptable and easily implemented for breast cancer screening.

CODE: SST15-09

SESSION: Musculoskeletal (Shoulder Disorders)

Ultrasound (US)-guided Percutaneous Approach to the Therapy of Calcific Tendonitis of Rotator Cuff

DATE: Friday, November 30 2007

START TIME: 11:50 AM

END TIME: 12:00 PM

LOCATION: S405AB

PRESENTER

Francesca Lacelli MD

ABSTRACT CO-AUTHOR

Luca Maria Sconfienza MD

Michela Gravano

Enzo Silvestri MD

Giacomo Garlaschi MD

Giovanni Serafini MD

DISCLOSURES

F.L. - Nothing to disclose.

L.S. - Nothing to disclose.

M.G. - Nothing to disclose.

E.S. - Nothing to disclose.

G.G. - Nothing to disclose.

G.S. - Nothing to disclose.

PURPOSE

To describe a technique for US-guided percutaneous treatment (needle aspiration and 'washing') of rotator cuff calcifications and to evaluate the clinical response to this treatment.

METHOD AND MATERIALS

2543 symptomatic shoulders (1607 women, mean age 42, range 29-72) in patients with RX or US diagnosis of rotator cuff calcific tendonitis and with shoulder pain unresponsive to medical treatment were treated. The procedure is performed with a sterile technique and involves two expert radiologists. The calcification is pricked under US guidance with a 14-16 G needle after local injection of anaesthetic. Successive pressures and aspirations are performed with the syringe plunger to 'wash' the tendon with saline solution and retrieve calcific material, until the aspirate is completely free from calcium. The next step is the injection of steroid in the subacromion-subdeltoid bursa. 2018/2543 patients were followed-up clinically for one year after the treatment.

RESULTS

In 71,7% of patients it was possible to fully aspirate the calcification with a considerable reduction of symptoms and significant improvement of the mobility of the affected limb. In 23,6% of patients a second treatment was performed because of the presence of more than one calcification. In 3,8% of patients the calcification had broken spontaneously before the treatment or had moved into the subacromial-subdeltoid bursa (and then successfully treated). In 0,9% of patients no resolution of symptoms has occurred because of the coexistence of a tendon tear.

CONCLUSION

This US-guided technique for the therapy of tendon calcifications is a quick, non invasive, successful and cheap procedure in comparison with the fluoroscopic guidance. It allows to obtain significant and longlasting reduction of symptoms in shoulder calcific tendonitis.

CLINICAL RELEVANCE/APPLICATION

This technique allows to obtain significant and longlasting reduction of symptoms in shoulder calcific tendonitis.

CODE: LL-NR4054-H08

SESSION: Neuroradiology/Head and Neck

Effects of Hypertension in Normal Aging, Mild Cognitive Impairment, and Alzheimer's Disease Evaluated with Arterial Spin Labeled MRI

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LOCATION: Lakeside Learning Center

PRESENTER

Cyrus Raji BS, BA

ABSTRACT CO-AUTHOR

Charles Lee MD

Weiyang Dai PhD

Oscar Lopez MD

James Becker PhD

Lewis Kuller MD

SUBSPECIALTY CONTENT

Magnetic Resonance Imaging

Neuroradiology

DISCLOSURES

C.R. - Nothing to disclose.

C.L. - Nothing to disclose.

W.D. - Nothing to disclose.

O.L. - Nothing to disclose.

J.B. - Nothing to disclose.

L.K. - Nothing to disclose.

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PURPOSE

Alzheimer disease (AD) is a neurodegenerative process affecting memory and cognition in the elderly. Hypertension (HTN), another disease that increases in prevalence with aging, is hypothesized to mediate decreased cerebral perfusion in AD. We investigated this question using arterial spin labeled (ASL) MRI.

METHOD AND MATERIALS

48 control normals (38 no HTN:10 with) and , 20 AD (10 with/without), and 20 MCI (10 with/without) were recruited from the CHS-CS (Cardiovascular Health Study—Cognition Study) and were scanned with T1W MR and ASL at 1.5 T. ALL scans were voxel warped to a standard colin27 brain. Statistical parametric mapping (SPM2—Wellcome Boroughs) analyzed rCBF on a voxel per voxel basis to evaluate for rCBF deviation in regions involved with memory and cognition.

RESULTS

rCBF is substantially decreased in patients with HTN compared to those without in CN, AD, and MCI groups. Overall rCBF is lowest in AD with HTN (34.8 ml/100g/min) compared to CN with HTN (41.43) and MCI with HTN (47.75). Most notably decreased flow in AD occurs in the posterior cingulate (35.9), prefrontal cortex (29.5), and the thalamus (28.9).

CONCLUSION

Presence of HTN, treated or untreated, is associated with decreased cerebral perfusion in CN, AD, and MCI groups. Magnitude of perfusion decrease was largest in AD. These data suggest that HTN could contribute to the pathology of AD through affects on rCBF.

CLINICAL RELEVANCE/APPLICATION

HTN can be linked to changes in rCBF in AD. This phenomenon can be studied using ASL, a non-invasive technique that uses no external contrast and is cost effective relative to other modalities.