III°CIR
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ESTeSC
COIMBRA HEALTH SCHOOL

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AUDITÓRIO ESTESC   COIMBRA - PORTUGAL

Scientific Sessions and Posters

ABSTRACT BOOK

Welcome to III CIR

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Posters only

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💬 Oral Presentation

📄 Poster

Radiology in veterinary and in the diagnosis of processes and malformations in canids: protocols

M. Álvarez[1], M. Gallo[1], A. Santos[1], G. Paulo[1], K. Osoro[2]

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Animals play a relevant role in our society and therefore, they demand greater attention nowadays, especially regarding the systematic diagnosis of their pathologies. The development and use of new equipments for Image Diagnosis (digital radiology, TC, IRM, ecography, gammagraphy) leads us to our first objective: to analyze the importance of veterinary radiology in Spain. The second objective aims to compare different protocols according to their efficiency to provide good radiological quality, and finally we provide novel ideas to improve them .

For the first objective, all available information concerning the situation of the subject of Radiology in Spanish colleges was gathered from different sources: web pages, interviews, etc.. Another source of data was obtained by visiting a veterinary hospital. For the second objective, a retrospective analysis of the conventional radiological images from a veterinary clinic was done. The statistical analyses were performed with SPSS W20. Later, a comparative study for the thorax projection was done, comparing both the conventional and new techniques.

The number of teaching hours differed markedly between the different colleges. Regarding the second objective, the results for the radiographies of the thorax and abdomen were contradictory. The radiological quality of the thorax was higher in animals with small sizes than in the bigger ones. The reverse was true for the abdomen, the quality was better for the big animals than for the small ones.

According to the present study, the radiological quality can be improved by reducing the kilovoltage in the case of the abdomen, and by reducing the milliamperage in the thorax and forelimb. These strategies also contribute to improve the radiological protection.

Validity of algorithms for the detection of lung fields in chest radiographs

A. Cardoso[1], P. Santos[1], J. Valente[1], J. Costa[1]

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This research is related to image processing and radiology areas, including segmentation of Chest Radiography, which aims to verify the validity of thirteen threshold algorithms available in ImageJ software (Default, Huang, Intermodes, Minimum, IsoData, Otsu, Maxentropy, Mean, Min error, Moments, Percentil, Renyi's entropy, Triangle). The objective was also to identify the best tool to use in lung detection.

We start working with 307 images of Chest Radiographs and after excluding those who did not fulfill the minimum of a good achievement, 299 were manually segmented by two distinct operators, at the same conditions, who segmented the lung fields.

Quality indicators were used, including the Mathews Correlation Coefficient, sensitivity, specificity and Similarity Score, and statistical tests were also applied, including Intraclass Correlation Coefficient (ICC), Pearson Correlation Coefficient (r) and T-student, allowing to determine which algorithm best fit the intended purpose.

From the results analysis, Default algorithm showed the best performance in the role of segmenting lung fields when compared to manual segmentations, showing a Jaccard similarity index of 0.658 for Operator 1 and 0.653 for the Operator 2; an Sorensen index of 0.794 for Operator 1 and 0.790 for Operator 2; and a Pearson correlation coefficient of 0.600 for Operator 1 and 0.682 to Operator 2.

Comparing CCM and IS, and trying to find the algorithm who best fit in each operator, we were able to conclude that the Default algorithm was, for both operators, the most suitable for lung fields segmentation.

Influence of fatigue on the segmentation and analysis of chest radiographs

R. Simões[1], S. Carrilho[1], J. Costa[1], J. Valente[1]

[1]ESALD-IPCB

Fatigue is a manifestation of tiredness or exhaustion characterized by inability to develop daily activities. In health field, imaging technology evolution lead not only to an increase of medical images volume, but also increases the number of hours required for image analysis and interpretation, increasing, consequently, visual fatigue. Segmentation is also used in image analysis and consists on data partitioning of contiguous areas that represents individual anatomical objects, highlighting distinct parts.

The aim of this study was to determine if manual segmentation is reliable when done by different operators, if there are differences in segmentations values and if there's any influence of fatigue.

The sample consists of 150 chest x-ray in the standing position, in the sit position and on the dorsal decubitus position. The fatigue analysis was performed using a quantitative method based on manual segmentation of the lungs after a full work day and after a day of rest.

Segmentation values demonstrated a test-retest reliability intra-operator with an ICC range between 0.983 and 0.991 for operator A and 0.954 to 0.976 for operator B. We also obtained a test-retest reliability inter-operator with an ICC range between 0.978 and 0.988 for manual segmentations performed by both operators.

Obtained values demonstrated reliability on each operator segmentations and also between them. For one of the operators, obtained values indicated some significant statistically differences between manual segmentations performed after rest and with fatigue.

We conclude that fatigue could affect image analysis and interpretation.

Decision-making process in Radiology: the example of Magnetic Resonance Imaging purchase under a Technology Assessment perspective

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Purpose

To contribute to a deeper understanding of the decision process characterization, taking the MRI as its object of study. More specifically the aim is to identify a)MRI availability in Portugal b) stakeholders actively involved in decision and to c)characterize the decision process by identifying the use of evidence, steps, goals and competences perceived by the decision-makers.

Methods and materials

A questionnaire was applied to 38 decision-makers (public and private institutions). 21 were complemented with semi-structured interviews.

Results

It may just be the patient's own reaction to the technology that defines its success in terms of use. However, results show patient's opinions are not taken into consideration.

There is a market-driven rationality behind the decision process. The regular use of indicators in the decision process is an indicator of an evidence-based decision.

Decision-makers who are strongly involved in the process, usually are not the last ones to decide.

Radiographer Coordinators, Financial/Accounting Responsible and Radiology Dep. Directors are considered to have the most relevant position in the process. These are the stakeholders who strongly support the technology acquisition and in a way, regulate it..

Conclusion

There are more issues at stake than a) cost, b) suppliers and c) technology characteristics, when evaluating health technologies. TA, as an evidence-based approach that can be of substantial assistance. Not only the economic consequences but also the ethical and societal implications should be addressed when deciding on whether or not to purchase a medical device. TA could provide much needed evidence for policy-making in healthcare.

Orthopaedic surgery occupational exposure using active dosimeters

N. Lopes[1], J. Francisco[1], R. Ferreira[2], J. Santos[1], G. Paulo[1]

[1]ESTeSC - Coimbra Health School, [2]CHUC-HUC

Purpose: Quantify occupational exposure on staff in the operating theather during orthopaedic surgeries.

Materials and methods: This study was performed in a central hospital operating theatre. Six health professionals were monitoring during 2 months using a RaySafe i2TM. The staff radiological protection behaviour was also observed. The anatomic region, type of procedure, personal shielding, personal dosimeter, staff positioning, exposure parameters and staff dose levels were also collected. To analyse the staff radiological protection knowledge a questionnaire was also performed.

Results: The exposure monitoring was performed in 29 Orthopaedic surgeries. The most frequent observed procedure was spine fixation (31%). The highest dose value was found for Orthopaedist 1 (17,39µSv) and the lowest exposed was the Circulating Nurse (1,11 µSv). Some staff behaviour and questionnaire responses revealed lack of knowledge in radiation protection.

Conclusions: The staff risk perception needs to be improved, Radiation Protection education and training is essential to change behaviour and promote a safety culture.

Interventional Neuroradiology procedures: patient and staff dose levels

I. Cardoso[1], S. Pereira[1], C. Almeida[2], J. Santos[1], G. Paulo[1]

[1]ESTeSC - Coimbra Helath School, [2]CHLC

Purpose

To contribute to a deeper understanding of the decision process characterization, taking the MRI as its object of study. More specifically the aim is to identify a)MRI availability in Portugal b) stakeholders actively involved in decision and to c)characterize the decision process by identifying the use of evidence, steps, goals and competences perceived by the decision-makers.

Methods and materials

A questionnaire was applied to 38 decision-makers (public and private institutions). 21 were complemented with semi-structured interviews.

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It may just be the patient's own reaction to the technology that defines its success in terms of use. However, results show patient's opinions are not taken into consideration.

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Conclusion

There are more issues at stake than a) cost, b) suppliers and c) technology characteristics, when evaluating health technologies. TA, as an evidence-based approach that can be of substantial assistance. Not only the economic consequences but also the ethical and societal implications should be addressed when deciding on whether or not to purchase a medical device. TA could provide much needed evidence for policy-making in healthcare.

Paediatric Digital Radiography optimisation

F. Lopes[1], P. Freitas[1], D. Costa[2], J. Santos[1], G. Paulo[1]

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Purpose: Establish local Diagnostic Reference Levels (DRLs) for paediatrics chest radiographies in order to optimise the procedures to digital radiology (DR) system.

Materials and methods: This study was divided into two phases: dose exposure retrospective analysis of chest radiographies available on PACS (Picture Archiving and Communication System) by age groups (0, 5, 10, 15 years old); and exposure parameters adaptation taking into account the age categorisation. Values of Dose Area Product (DAP-Gy.cm2), tube voltage (kV), exposure time (ms), irradiated detector area, collimated area and ionisation chamber, were collected for the 68 chest radiographies.

Results: The obtained local DRL's although similar to those found in the literature, were directly influenced by the collimation. Adjusting the tube voltage and the ionisation chamber selection allowed a 9% mean dose reduction and 30% exposure time reduction.

Conclusions: Despite the achieved reduction, optimisation of the procedure is possible, considering that exposure time value is slightly higher than the European recommendations.

Teeth age estimation through orthopantomography in patients 6 to 12 years at the Gregorio Marañón University Hospital (Madrid)

M. Cartanya[1], A. Santos[1], G. Paulo[1]

[1]ESTeSC - Coimbra Health School

This paper aims to determine the dental age estimation through the use of ortopantomographies, applying Demirjian's method to a sample of 277 individuals between 6 and 12 years of age.

This method has been selected due to its requirement of ontopantomography as an analytic tool, its ability to relate sex and age and its widespread use within the scientific community. The main goal of the study has been to apply the Demirjian's method to the sample to compare the results with the real, chronological age of the analyzed individuals.

The research has been organized in three steps. The first one has consisted on the compilation of the required information -ortopantomographies and other basic data as sex and birth age- and its organization through a database. A second stage has analyzed the ortopantomographies to get the estimated ages by Demirjian, according to his methodology and following its tables published in 1973 and 1976.

Finally, t-Student tests have been applied and used to analyze both the coincidences and differences between the chronological age and the results obtained through Demirjian's method and Feijoó's proposal for populations of the Madrid region. The results have shown a relative lack of coherence with Demirjian's method -especially in girls- and a better coherence with Feijoó's model who seems to be very precise for the region.

Frequency and dose levels of paediatric image guide fluoroscopy procedures in Portugal

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[1]ESTeSC - Coimbra Health School, [2]CHUC-HG, [3]CHLC

Purpose: Establish national Diagnostic Reference Levels (DRLs) for the most common paediatric fluoroscopic procedures based on the 75th percentile value of Dose Area product (DAP), per age categorisation in the two exclusively paediatric national hospitals.

Materials and Methods: Digital Imaging and Communications in Medicine (DICOM) headers for brain, digestive, urological and orthopaedic fluoroscopy procedures performed during 2013 were analysed and compared with literature.

Results: The most common procedures were digestive and urological. The dose values obtained for the age groups of [0,1[, [1,5[, [5,10[, [10,15[and ≥15 were 480, 559, 530, 560 and 415cGy.cm2 for digestive studies and 338, 304, 430, 380 and 390cGy.cm2 for urological studies, respectively.

Conclusions: The exposure values obtained in this study are heterogeneous across the age groups and intuitions. To reduce these differences optimisation procedures are needed in order to reduce the risk of radio-induced pathology in children.

Variation of Body Composition in athletes throughout the sports season

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Introduction: The evaluation of body composition (BC) determines the amount of lean mass (LM), fat mass (FM) and bone mineral density of the body (BMD). Each sport requires a certain physical standard of its athletes. For the enhancement of the performance of each of these to occur, many coaches draw up a plan of appropriate training taking into account the values of BC. The Dual Energy X-ray Absorptiometry (DEXA) is an examination used regularly in the evaluation of BC, being considered the gold standard.

Prupose: Evaluate the BC of athletes at three times throughout the sports season.

Materials and methods: We counted on the participation of 38 young males belonging to a football team, of ages between 13 and 14 years old. The inherent data acquisition procedure of this project consisted in collecting anthropometric and DEXA examinations of the full body.

Results: The analysis of the athletes' BC enabled the detection of an average occurrence of fat mass loss and subsequently a slight increase, which showed no significance, unlike the mean values of lean mass and BMD which suffered an increase significant for the study.

Conclusions: DEXA proved to be a good method for assessing the BC. Accurate assessment of BC is beneficial for athletes and coaches as it can indicate the state of physical performance and aid in an appropriate training schedule as necessary.

Correlation between Mineral Bone Density and lifestyles in pre and postmeno-pausal population

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Osteoporosis is a disease characterized by decreased bone mineral density (BMD), increased bone fragility and susceptibility to fractures occur. The most widely used complementary method for osteoporosis diagnosis is Dual-energy X-ray absorptiometry (DEXA), with more useful measurement performed at the lumbar spine and femoral neck.

The objective of this study was to correlate BMD with lifestyles in pre and postmenopausal population, resorting to a sample of 659 women who underwent DEXA scans at the lumbar spine and femoral neck. The BMD, T-score and Z-score values have been recorded, along with a population survey about their eating habits and lifestyles.

Obtained results showed that women who performed physical activity, on average, have total BMD values significantly higher in the level of the spine (1±0,19), femoral neck (0,83±0,13) and femur (0,93±0,14g/cm2) compared to women who had no habits of physical exercise. Also found that women who consumed no vegetables, on average, had higher BMD values compared to those consuming vegetables; the higher BMD values were more significant in younger women; women who were in the postmenopausal stadium had BMD mean values significantly lower (p-value <0.001) compared to pre-menopausal women.

With this study it was shown that menopause is a determining factor in the BMD decrease and that regular physical activity is an important and significant factor in the preservation and maintenance of BMD levels, and also that age determines BMD values, considering that increasing age increases risk factor.

Correlation of bone mineral content between dominant and non-dominant limb in high competition athletes

F. Conceição[1], J. Costa[1], Ó. Tavares[2], J. Figueiredo[2]

[1]ESALD-IPCB, [2]ESTeSC - Coimbra Health School

Osteoporosis has great impact on the population. The beneficial influence of physical activity on bone mineral density (BMD) vales and bone mineral content (BMC) is known, especially in adolescence, being understood as a preventive method.

The method for study bone mass is the Dual-energy X-ray absorptiometry (DEXA), allowing the whole body acquisitions, obtain measurements with high accuracy in a short time and with low doses of radiation.

The main objective of this study was to correlate the BMC values acquired by DEXA, of the sample under study, in the dominant and non-dominant limbs.

In preparing this research we have examined a sample of 30 athletes and 30 sedentary individuals, aged between 14 and 22 years. Were performed acquisition of the whole body, for the determination of values of BMD and BMC of the dominant and non-dominant limbs.

The results obtained involving mean values BMD of the arms, legs and whole body respectively 0.828, 1.263 and 1.212g/cm2 for high performance athletes, and 0.788, 1.173 and 1.14g/cm2 for sedentary. Also involved mean values of BMC of the arms, legs and whole body, respectively, 312.53, 967.17 and 2771.83g for high performance athletes, and 292.27, 824.23 and 2435.9g for sedentary.

With this study it's concluded that the BMC of the leg and body in athletes is significantly higher compared to a sedentary group. As an exception, the BMC of arms differs little with the BMC of the arms sedentary group.

Evaluation of the dimensions of the structures that make up the skin, by ultrasound in young adults overweight, slim and athletes.

V. Simões[1], R. Santos[1], A. André[1],

[1]ESTeSC - Coimbra Health School

Introduction: With aging the dimensions of the layers of the skin are changing. Ultrasound, with high sensitivity and specificity is used for evaluation of the skin.

Purpose: The modality of ultrasound using 10 Mhz and 18 Mhz evaluates the structure of the skin in young adults, the overweight, slim and in athletes groups.

Materials and methods:The study was conducted with an ultrasound and by using samples taken from 29 individuals. The evaluation of the skin layers and hypodermis was performed bilaterally in three different anatomical regions.

Results: Differences between all dimensions of the skin and hypodermis were observed. Significant differences in the epidermis and hypodermis of all groups were present. Dermis and hypodermis skin is higher in overweight individuals and epidermis is more frequent in thin persons. Skin epidermis and hypodermis with lower dimensions are observed in persons who practice sport regularly.

Comparing the different frequencies, a significant difference in the assessment of the skin was found. The epidermis and hypodermis in comparison with different regions showed a significant difference in the dermis for both frequencies.

In general, the dimensions of the skin are higher in males.

Conclusions: Study indicates that there are differences in the dimensions of the layers that forms the skin and hypodermis depends on body mass index, gender, anatomical regions and the regular practice or not, of sport. The higher frequencies have greater accuracy for the evaluation of the skin and hypodermis.

Quantitative evaluation of liver echogenicity

A. Silva[1], R. Santos[1], A. André[1]

[1]ESTeSC - Coimbra Health School

Purpose: To evaluate the liver echo-intensity and verify if there is any correlation among the different quantitative methods for the liver evaluation.

Material and Methods: 92 subjects (mean±SD:25±10.82 years) were submitted to a hepatic evaluation using an ultrasound equipment (GE Logiq e). The individuals with liver (except steatosis) or renal disease, liver transplants or other interventions were excluded. The protocol consisted on the acquisition of 3 images of the liver and one of the right kidney. After the images were evaluated with the Image J software. From the echo-intensity values, the Hepatorenal index (HRI) and the right and left lobes index (RLLI) were calculated, as well as the Hepatorenal coefficient (HRC) and the right and left lobes coefficient (RLLC).

Results: There was no correlation among HRI, RLLI and alcohol consumption, smoking and liver dimensions. On the other hand, the HRI and the RLLI were correlated with p> 0.01 and r=0.5 (Moderate Positive-MP). There were significant differences between the HRC and the HRI, p> 0.01 and r=0.95 (Strong Positive-SP), as well as between the RLLC and the RLLI, p> 0.01 and r= 0.97 (SP). The RLLC and HRC were correlated, p> 0.01 and r = 0.53 (MP)

Conclusion: The results of this study were equivalent to other studies. The HRI proved to be a good indicator to evaluate the presence of steatosis. These results show the importance of ultrasound evaluation and also the utility of the quantitative methods for the liver evaluation

Ultrasound evaluation of internal gastrocnemius muscle

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[1]ESALD-IPCB

This study aimed to analyze the muscular architecture (MA) (pennation angle, muscle fascicle length and muscle thickness) of the internal gastrocnemius muscle (GI) in sedentary and non-sedentary individuals.

The choice of this theme became relevant because muscle injuries are fairly common, affecting the population, finding themselves associated with walking difficulties and consequent loss of productivity as well as reduced quality of life and is relevant to know the differences in MA according to the lifestyle.

Were evaluated by ultrasound, 60 subjects, 30 athletes and 30 sedentary, stratified into two groups, each consisting of 15 male subjects and 15 female subjects, aged 16 to 34 years.

To compare the parameters of the MA between sedentary and non-sedentary individuals in the ultrasound images, non-parametric Mann-Whitney-Wilcoxon test was used for the values of the pennation angle, muscle fascicle length and muscle thickness.

Statistical analysis revealed significant differences between the values of the MA in the two study groups, either in the pennation angle, muscle fascicle length and muscle thickness, both in the neutral position and in maximum voluntary plantar flexion. However, only the mean values of muscle thickness in a neutral position (0.048) and muscle fascicle length in maximum voluntary plantar flexion (0.02) between the two groups showed statistically significant differences ($p < 0.05$).

It is concluded that there are some differences in muscle architecture parameters either in gender or among individuals who regularly exercise.

Ultrasonographic evaluation of patellar deviation and is influence on knee muscles and tendons

A. Fidalgo[1], A. André[1], R. Santos[1]

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Purpose: To evaluate the influence of the quadriceps muscles and tendons thickness on patella deviation. As well as the influence of the o BMI, age, gender and sport on patella deviation.

Materials and methods: In this study, 61 subjects, aged 18-30 years (21 elite athletes and 40 sedentary) were submitted an ultrasound evaluation (GE Logiq e). The thigh muscles and the knee tendons (patellar and quadriceps tendons) thickness were measured, as well their cross-section. The ultrasound images were processed from Image J software and the data was analyzed using SPSS 19.0.

Results: There was a strong correlation among sports (R=80), the thigh muscles thickness (R=0,74), the knee tendons thickness (R=0,79) and their cross-section with the patella deviation (p>0,01). There was correlation between the patella deviation for the right and left knee, and also between gender and BMI (R=0,29) (p>0,01). There was no correlation among BMI, gender and the lower limbs morphology (p<0,01). There was no correlation between gender, sport and the patella deviation and the lower limb morphology (p<0,01).

Conclusions: The individuals that practice sports as well as the sedentary individuals who have a quadriceps muscles and patellar tendons weakness present a patella deviation predisposition.

MRI evaluation of motor functions of upper and lower limbs

F. Ferreira[1], C. Esteves[1], Ó. Tavares[1]

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Introduction: The brain is a very complex organ. Its understanding is in part due to Functional Magnetic Resonance Imaging (fMRI), as it has become an important tool in the active neural regions.

Purpose: Comparison in terms of dimensions and location of the active cerebral motor areas corresponding to the upper and lower limbs.

Material and Methods: An fMRI study was performed with a 1.5T equipment in 30 healthy subjects, aged between 20 and 25 years and right-handed, at IDEALMED Hospital in Coimbra. A motor paradigm was used. Using the SPSS program, all values were statistically analyzed.

Results: There were statistically significant changes between the active areas of the hands and feet (the active area of the right hand is 9.2% larger than the active area of the left hand and the active area of the right foot is 10.0% higher than the left foot). There were also differences between the active areas of the upper and lower limbs (upper limb area is more than twice that of the lower limbs).

Conclusions: This study showed that the active area of the brain is contralateral to the limb under study at the time of the motor paradigm, with the largest area in the left hemisphere. The area corresponding to the activation of the upper limbs is greater than the area corresponding to the lower limbs. The active area of the hand is located in the sensory-motor cortex, slightly lateralized and lower in relation to the foot area.

Cardiac Computed Tomography dose levels: a national approach and comparison with other cardiac radiation procedures

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Purpose: The aim of this study is to obtain Portuguese cardiac Computed Tomography (CT) Diagnostic Reference Levels (DRLs) and compare the effective dose values with other cardiac examinations performed in Portugal and international studies.

Methods: CT dose values and chest anteroposterior diameter (direct measurement on the images) were retrospectively collected in four centres of excellence representing a different regions of Portugal, in order to calculate the DRLs based on the 75th percentile CT values.

Results: The sample has composed by 108 individuals without chest diameter significant differences. Significant differences were obtained for local DRL's. The proposed national DRL for chest CT is 32mGy. The obtained cardiac CT effective dose value is higher than a diagnostic angiography and similar to a cardiac angioplasty.

Conclusions: The obtained dose values should be optimised. Procedures justification must be reconsidered and the radiation examinations risk must be analysed taking into account the clinical indications.

The influence of isocenter gantry patient positioning for paediatric head CT examinations in eye lens dose, using in-plane vinyl bismuth and barium shielding

F. Pereira[1], F. Carvalho[1], M. Malva[2], G. Paulo[1], J. Santos[1]

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Purpose: Evaluate the influence of isocenter gantry patient positioning in eye lens dose, during paediatric head Computed Tomography (CT) examinations using bismuth and barium shielding.

Materials and methods: Head CT examinations were performed in axial mode with and without in-plane shielding (vinyl bismuth and barium) in a anthropomorphic paediatric phantom (ATOM-705) with three different patient positioning (head isocenter, 4cm anterior and posterior). Eye lens dose was measure with Unfors Patient Skin Dose and CT dose was obtained from the dose report. To compare image noise three Regions Of Interest (ROI-1cm2) per CT examination (orbits, periphery and central) were analysed using RadiAnt DICOM Viewer (64-bit) software.

Results: CT dose levels decreased with anterior centring however eye lens dose increased. The higher eye lens dose reduction (29-33%) was obtained using bismuth protection. The impact on image noise was similar for both shielding, affecting exclusively the peripheral.

Conclusions: The best dose and image quality combination was obtained in gantry isocenter using tube current and tube voltage modulation.

Image quality assesment after CT procedures optimisation

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With the constant evolution of Computed Tomography (CT), it is increasingly important to have a justified and optimized clinical practice, ensuring that the level of medical exposure is in accordance with the Diagnostic Reference Levels.

Purpose: To evaluate the image quality after the implementation of optimization measures in thoracic, abdominal and pelvic CT scans at Centro Hospitalar e Universitário de Coimbra.

Materials and methods: Collecting data from two CT equipments: LightSpeed VCT of 64 detectors of GE® and Emotion of 16 detectors of Siemens®; evaluation of image quality after the implementation of optimization measures.

Results: The values obtained before optimization were 12,44 mGy of percentile 75 of the CTDIvol for thoracic, 27,08 mGy for abdominal and 21,64 mGy for pelvic CT; and 419,03 mGy.cm of percentile 75 of the DLP for chest CT and 1364,85 mGy.cm for abdominal and pelvic CT. The Effective Dose values were 6,72 mSv, 16,93 mSv and 22,25 mSv for chest, abdomen and pelvic CT. The values after optimization were: a mean value of 13,79 mGy of the CTDIvol for abdominal and pelvic CT, and the values of DLP were 939,58 mGy.cm regarding to the mean value. Effective dose obtained was 14,09 mSv for abdominal CT and 17,85 mSv for pelvic CT.

Conclusions: The radiation dose (CTDIvol and DLP) obtained after optimization for the equipment LightSpeed VCT from GE ®, was proved to be inferior to the pre optimized 31,23% and 16,71% to abdominal CT, and 27,10% and 19,72% to pelvic CT.

Radiographer Role In The Quality Control In Digital Mammography

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Purpose

Diagnostic detection of different breast pathologies are influenced directly by the sensitivity and specificity of mammography equipment. Both parameters can be compromised in the absence of a regular quality control.

To achieve these objectives, should be carried out quality control measures at the discretion of "Spanish Protocol Quality Control in Diagnostic Radiology", "European Protocol for the Quality Control of the Technical Aspects of Mammography Screening" and / or "ACR Mammography Quality Control Manual "where they recommend annual, semi-annual, weekly and daily testing.

The latter two, task Radiographer.

Methods and Materials

Retrospective analysis of the results obtained in the last six months of weekly quality contol made a digital mammogram of Galdakao-Usansolo Hospital (Vizcaya, Spain), selecting tests CNR (Contrast Noise Relation) and MTF (Modulation Transfer Funtion) recording CNR parameter.

We used a dummy supplied by the manufacturer of PMMA (polymethyl methacrylate) with different components inside as a 0.2mm aluminum plate, performing an acquisition without compression paddle and selected parameters by the automation equipment

Results

24 results recorded for CNR, being the lowest of 24.61 and the highest of 24.86 and discarding anomalous results due to idiopathic 44.54. The mean is 24.63.

All results are recorded in an Excel file for further analysis by the Radiation Protection Service.

Conclusion

The Radiographer is responsible for implementing quality control procedures, monitor, evaluate and take corrective measures to maintain standards, improve the quality of diagnosis in mammographic images of high quality while minimizing the radiation dose to the patient.

Resting State fMRI: applications

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Purpose: Resting-state fMRI: the default mode network (DMN)

Methods and materials: In this work, we use resting state functional magnetic resonance imaging (rsfMRI), independent component analysis (ICA) and dual regression approach to investigate DMN in twenty healthy elderly and twenty mild cognitive impairment (MCI) patients. Scanning was performed on a 3T GE scanner using a standard eight-channel head coil. A Gradient-Echo EPI sequence was used: TR=2.5s, TE=25ms, FA=81, matrix=96x128, slice thickness=3mm, GAP=0mm, interleaved acquisition. Resting-state images were analyzed using MELODIC from FMRIB's Software Library (FSL). The preprocessing steps were: movement and slice timing correction, spatial smoothing (FWHM=8mm) and temporal high pass filtering (100s). Next, the processed functional data were temporally concatenated across subjects to create a single 4D dataset. Finally, the analysis between subjects was performed using dual regression approach.

Results: Comparisons of DMN connectivity were performed between older adults and MCI. MCI group showed decreased DMN activity in posterior cingulate and precuneus compared to the control group.

Conclusion: These findings suggest that abnormal DMN activity could be useful as an imaging-base biomarker for the diagnosis and for monitoring MCI patients. Resting-state approach could be a promising tool to detect, to understand and even to treat psychological disorders.

Cardiac Magnetic Resonance. Stress Studies with Adenosine

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INTRODUCTION.

The perfusion technique by adenosine administration on MRI offers the possibility of a stress test in patients who suspected myocardial ischemia.

The good spatial resolution of MRI, the fact of being a non invasive diagnostic test and non-ionizing radiation, provides the opportunity to study with high diagnostic accuracy, cardiac functionality and allows to visualize myocardial perfusion defects indicative of ischemia.

MATERIALS AND METHODS.

You must perform a pre-test interview with the patient to rule out contraindications to the administration of adenosine and inform him that he can not take during pre 24h the study.

It is essential to good information and patient preparation for their collaboration and optimal results.

Adenosine is a vasodilator that causes hypotension, tachycardia, and similar to those produced by angina during his administration but it is a very short-lived drug, these symptoms disappear once administration is discontinued symptoms. Constant monitoring of the patient is required throughout the examination.

Given the special characteristics of RM enclosure and being subjected to a constant magnetic field must be particularly careful with the material used for the study.

The study was conducted by administering contrast ev.

RESULTS.

Since 2011, there have been 143 patients in our center. Infusion of Adenosine has been generally well tolerated. The most common side effect patients have reported facial flushing (30%). Not any AV block or objectified broncoapnea.

CONCLUSION.

Cardiac MRI with administration of adenosine allows a stress test aimed therapeutic and today is shifting to myocardial SPECT with dipyridamole in some patients.

Study of the cranial pairs VII and VIII by 3D constructive interference in the steady-state (CISS 3D)

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OBJECTIVE

The objective of the present work is the comparison between the acquisition of 3 sequence CISS D without angulación and following the direction of the ceiling of the orbit in the evaluation of cranial nerves VII and VIII.

METHODS AND MATERIALS

We will study 10-30 patients by means of the acquisition of two sequences 3D Constructive Interference in the Steady-state (CISS 3 D), without inclination and another following the orientation of the ceiling of the orbit.

We will use the Magnetic Resonance (MRI): Siemens Symphony (1,5 Tesla) Siemens AERA (1, 5 Tesla) Siemens Trio (3 Tesla) and General Electric SIGNA (1,5 Tesla); indifferently.

Once acquired, the radiologist will make the visual analysis comparing the sequence with inclination and without inclination he will have to notice the split of the cranial pairs into four segments: Proximal cisternal, distal cisternal, proximal intracanalicular and distal intracanalicular that will allow to value the segments at a same plan and as many segments display one in the same plan.

RESULTS

Pending of making MRI

CONCLUSIONS

To demonstrate that the sequence CISS 3D following the orientation of the ceiling of the orbit will allow us to evaluate correctly the cranial pairs VII and VIII.

Magnetic Resonance Enterography in Crohn´s disease

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Background: Crohn disease (CD) is a chronic inflammatory process of gastrointestinal tract being the small intestine the bowel segment most frequently affected. Magnetic resonance enterography (MRE) has the potential to safely and noninvasively obtain images without exposing patients to ionizing radiation.

The purpose of this work is to show the characteristic MRE findings and the advantages of this modality.

Material/methods: A group of 20 patients with suspected CD was referred to the realization of MRE. The patients' ages ranged from 20-33 (mean age 25 years). The examinations were conducted on GE Signa HD 1,5 T system. To obtain bowel distension, patients drank 1500ml of oral contrast (1275 ml of water with 225ml of Manitol - Osmofundina Concentrada Braun®). To reduce peristalsis, during examination, was administered 1ml of Butylbromide Scopolamine (Scoburen 20mg/ml®).

Results: In all 20 cases studied, 2 were diagnosed as normal, 18 with CD. Of these 18, only just 2 colonic diseases was found and all showed parietal wall thickening and enhancement after intravenous contrast. There was obtained 2 cases of fistulas and 6 cases with the presence of stenosis. The vasa recta hypertrophy was present in 12 patients, while the presence of enlarged lymph nodes was found in 10 cases. Also showed a proliferation of mesenteric fat (n= 8) and mesenteric inflammation (n=14).

Conclusions: MRE is an excellent examination, which provides accurate information about CD. Intrinsic advantages and the lack of ionizing radiation may make MRE the preferred modality for evaluation of small bowel disease.

Evidence-based Screening: Mammography as health policy or hot potato?

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Purpose

All Radiographers and Radiologist involved in breast cancer screening programs are living some difficult dilemmas: is my screening program clearly justified? Should be different?.

Many works have been published on the topic, with significant differences between them.

Also, differences between programs of the Member States have been observed.

A systematic review of recommendations is proposed to answer both questions.

Methods and materials

The inclusion criteria was: at least one large randomized controlled trial, national or international organizations with recognized relevance in public health or preventive programs.

The exclusion criteria was: No independent organizations, private foundations, organizations linked to political groups or lobbyists.

We analyzed the differences in: screening period, lasting between mammograms, age in the begining of the program, age at the end of the program and breast self-exam.

We also analyzed the possible reasons for the differences between programs.

Results

Ten recommended programs were analyzed, some agreed same proposals (WHO, IACR, UICC, European Commission) and others had differences in one or more aspects studied (PAPPS, USPSTF, ACS, CTFPHC, AAFP, NHS Breast Screening Program).

The differences could be explained by the different health systems and differences in populations and development, and considering some bias in the interpretation of data: Lead-Time Bias, Length Bias and Overdiagnosis.

Conclusion

The recommendations made by the WHO and the European Commission are of great external validity, however it should think about the population characteristics and their preferences and determine to what extent overdiagnosis bias as has been accepted and how much is acceptable.

Evaluation of the extensor digitorum brevis muscle and adipose footpad in patients with type II diabetes - ultrasound study

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Type II diabetes is a disease which affects a high percentage of mundial population. This disease affecting 50% of the patients.

Changes in the extensor digitorum brevis muscle (MEDB) and adipose footpad (AFP) are factors that potentiate complications in the diabetic foot.

Purpose: Verify the effectiveness of ultrasound in the evaluation of MEDB and AFP in patients with diabetes in order to do an early diagnosis of the disease.

Materials and methods: Ultrasound evaluation was performed to MEDB and AFP in both feet using an ultrasound GE®, LOGIQe® The study was constituted by diabetic patients and non diabetic, an total of 56 individuals, age 48-89 years. The data was analyzed using SPSS 22.

Results: In right and left foot, MEDB is larger in its antero posterior dimension (0.49 cm and 0.51 cm) as the area (1.12 cm^2 and 1.11 cm^2) in diabetes subjects, while transverse dimension is smaller (2.62 cm and 2.46 cm). The evaluation to the AFP, the dimensions of the falanges to subcutâneos celular tissue, was well as the tissue until the periosteum, in right and left foot, is larger in the control group, (0.33 cm-0.32 cm and;1.30 cm-1.26 cm), respectively.

Conclusions: It is possible to do an evaluation of MEDB and AFP by ultrasound. As the prevention involves significant costs less than the treatment of diabetic complications, a good monitoring of the diabetic population may help reduce the risk of in-hospital interventions

Median nerve ultrasonography anthropometric analysis

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Purpose: The aim of this study is to characterize the median nerve ultrasound in asymptomatic young adults.

Methods: 31 individuals (18 female and 13 male) with an average age of 21,5±3,3 and an average BMI of 2,8±3,9. Patients with superior limb right dominant, asymptomatic and students were included in the study. After informed consent, the individuals were submitted to an ultrasound exam to evaluate the median nerve bilaterally at the forearm level. The perimeter of both forearms, the gathered, weight, height, age and gender of each individual were also collected. Images were analysed in terms of the cross sectional area (CSA), thickness and echogenicity with Image J software. All the data was analysed with SPSS19.

Results: Through the evaluation of each forearm, there are no statically differences between limbs. The right and left limb perimeter was 22,4±2,4cm. The CSA mean value of the right limb has 5,8±1,3mm2 and the left 6,1±1,2mm2. The right limb median nerve thickness was superior values (2,4±0,5mm) than left (2,2±0,4mm). The right median nerve presents greater echogenicity (94,2±9,9) than left (90,3±13).

Conclusion: The obtained measurements are according with other European studies made in asymptomatic adults.

119th anniversary

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