



2nd World Congress on

Medical Imaging and Clinical Research

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Posters

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Reconstruction quality in 4D cone-beam computed tomography incorporated with deformable image registration method

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In conventional three-dimensional (3D) cone-beam computed tomography (CBCT) reconstruction, the image quality of reconstructed images is typically degraded due to patient's motion such as respiration and heartbeat. In order to solve these difficulties, 4D CBCT incorporated with a phase-angle sorting scheme is often utilized. However, in this case, it requires dense projections in each phase to obtain reconstructed images of high quality and also severe aliasing artifacts are often present due to the limited number of projections at each phase used in the reconstruction. In this study, as an alternative, we propose an effective method for reducing motion blur and aliasing artifacts in conventional 4D CBCT reconstruction, the so-called deformable image registration (DIR), and made a quantitative comparison of the reconstruction qualities by both schemes. In the proposed method, DIR process is carried out in two different ways as follows. In the first way, DIR process is applied to the resultant reconstructed images in 4D CBCT, while in the second way to the original projections on the basis of the reconstructed projections that are produced by forward-projecting the reconstructed CBCT images in a single phase. The latter process is possibly performed using the adaptive steepest-descent POCS (ASD-POCS) algorithm for high reconstruction quality. Our results indicate that the motion blur and aliasing artifacts in the reconstructed CBCT images by using the DIR method were more significantly reduced, compared to the phase-angle sorting method. In addition, the second method in the DIR process seems more effective for reducing imaging dose than the first method.

Biography

Dongyeon Lee completed his MS degree from Yonsei University, Republic of Korea, and is a PhD candidate in the Department of Radiation Convergence Engineering at Yonsei University. He has published more than 10 papers in reputed journals and his research interests include CT, image registration, GPU acceleration, and so on.

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Diaphragmatic Shortening Fraction and Pulmonary Ultrasound Combined Analysis For Extubation Success Prediction in Critical Care Patients

Claudia Paola Rivera Uribe

Nuevo León Autonomous University, Mexico

Invasive respiratory support is a cornerstone of Critical Care Medicine, however, protocols for withdrawal of mechanical ventilation are still far from perfect. Failure to extubation occurs in up to 20% of patients, despite a successful spontaneous breathing trial (SBT). We prospectively included ventilated patients admitted to medical and surgical intensive care unit in a university hospital in northern Mexico. At the end of a successful SBT, we measured Diaphragmatic Shortening Fraction (DSF) at the end of inspiration and at the end of expiration, and the presence of B-lines in five zones of the right and left lung. The primary objective was to determine whether analysis of DSF and Pulmonary Ultrasound improves prediction of extubation success. Eighty-two patients were included, 24 (29.2%) failed to extubation. At univariate analysis, DSF (Youden's J: > 30% [sensitivity and specificity 62 and 50%, respectively]) and number of B-lines zones (Youden's J: > 1 zone [sensitivity and specificity 66 and 92%, respectively]) were significant related to extubation failure (area under the curve 0.664 [0.526 to 0.801] and 0.819 [0.703 to 0.934], respectively). At the binomial logistic regression, only the number of B-lines zones remains significantly related to extubation failure (OR 5.91 [2.33-14.98], $p < 0.001$). In patients with a successfully SBT, the absence of B-lines significantly decreases the probability of extubation failure. DSF analysis does not add predictive power over the use of pulmonary ultrasound.

Biography

Claudia Paola Rivera Uribe has completed her medical school at the age of 24 years from Guadalajara University and postgraduate studies from Nuevo León Autonomous University. She is Chief of Residents of Pulmonary and Critical Care Medicine.

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Chest x-ray Confirmation of Safe Nasogastric Tube placement in the intensive care unit, Ysbyty Gwynedd

Amjed Eljaili

Ysbyty Gwynedd, United Kingdom

Retrospective study involved data collection of 50 patients were audited over two-months period during 2016, to assess the quality and the adequacy of the 50 consecutive chest radiograph for confirming NG tube position. The patient’s information was obtained via using radiology information system for radiology reports/requests, that has included checking out 30 Ryle’s tubes(Non-radio-opaque) and 20 fine bore.

The study was carried out to,

1. To audit our compliance in Ysbyty Gwynedd Hospital, ICU, in adherence to the RCR-NPSA/2011/PSA002
2. To improve the optimization of chest radiographic imaging for checking NG tube position.

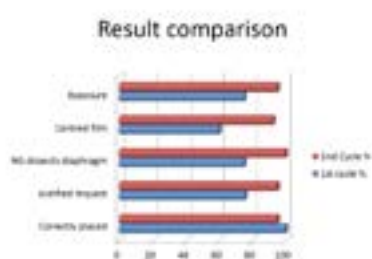
NPSA and RCR Standards Guidelines:

1. The exposure of the x-ray is adjusted to allow the nasogastric tube to be visible to the bottom of the image.
2. The x-ray is centred lower than would normally be appropriate for a chest x-ray so that it shows the abdomen as far as possible below the diaphragm.
3. The x-ray must show the bottom of both hemi-diaphragms in the midline.
4. If the tube is misplaced with the tip in for example the bronchus, the tube should be removed.
5. The Radiology request form must be justified and rationalized.

Result and Conclusion:

Result of the first cycle (pre-intervention)	Result of the second cycle (post-intervention)
1. Justified request: target met in 72.5%	1. Justified request: target met in 95%.
2. Exposure of the film: target met in 75%	2. Exposure: target met in 95%.
3. Centred Film: Target met in 60%	3. Centred Film: Target met in 92.5.
4. visible hemi-diaphragms: target met in 75%	4. visible hemi-diaphragms: target met in 100%.
5. Correctly placed NG tube: target met 100%	5. Correctly placed NG tube: 95%.
6. Exposure: target met in 95%	
7. Centred Film: Target met in 92.5	
8. visible hemi-diaphragms: target met in 100%	
9. Correctly placed NG tube: 95%	

Image : NPSA report of harm and death secondary to usage of misplaced NG feeding tube:



Checking method where error occurred	Total number of reported incidents	Number of reported deaths (out of total)
X-ray misinterpretation	45	12
Fed despite aspirate tested as pH 6-8 (existing advice ignored)	7	2
Fed after apparently obtaining pH 1-5.5	9	1
Water instilled down nasogastric tube before testing pH (i.e. existing advice ignored)	2	0
Not checked at all	9	1
Apparent migration after initially correct placement (e.g. after suction)	8	1
Bubble test	2	0
No information obtained on checking method used: other	12	4
Visual appearance of aspirate	1	0
Total	100	21

Biography

Amjed Eljaili, MBBS, October 2010, University of Al-Zaiem Al-Azhari, Sudan, currently practicing in UK, Ysbyty Gwynedd, BCUHB, Intensive care unit, Surgical department Dr Eljaili has attended several academic meetings regionally and nationally also he has participated in various national work-shops, congress, participation and membership with British institute of Radiology, United Kingdom.

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Non-Monte Carlo methods for investigating the application of coded aperture breast tumour imaging

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This paper describes two non-Monte Carlo methods for investigating the possible application of Coded Aperture (CA) in breast tumor imaging. The first one based on a simple approach called Binary Mask Shift (BMS) representing the action of a distributed source in the projective CA imaging geometry. The second method based on Pseudo-Ray Tracing (PRT) that obtained by purely calculating the angle of incidence of each point in the object that successfully strikes an open aperture element and then hits the detector element. These methods particularly used for CA imaging investigations. Interestingly, these non-Monte Carlo methods yields similar results of a similar CA pattern but takes less computing power, than using a full MCS approach.

Biography

M A Alnafea is presently working as an Assistant professor in King Saud University, Saudi Arabia. He attended several International and National conferences. He published several article in different journals as well.

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The migration and attrition behaviour among Hungarian radiographers

David Sipos, Boncz I, Betlehem J, Petone Cs M, Vandulek and Kovacs A
University of Pecs Faculty of Health Sciences, Hungary

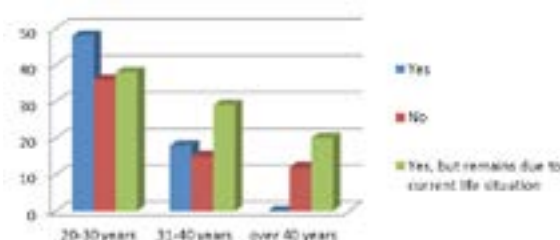
Introduction: Our aim was to identify the possible reasons behind the migration and attrition behaviour among Hungarian radiographers. We were interested whether the dedicated professional staff has concrete ideas across borders which can be connected with attrition.

Materials & Methods: For data collection, we used self-made questionnaire and the Effort-Reward Imbalance (ERI) Questionnaire's shortened version according to international practice in Hungarian language. Our cross-sectional study contained retrospective elements. Our target groups were workers with diploma of diagnostic analysis. Our sample counted 216 radiographers (n=216). For data analysis, we used the 13.0 version of SPSS. We applied analysis of variance, paired sample T-test, Chi-square test, linear regression and descriptive statistics with the performed probability of 95% (p=0.05).

Results: 30.6% of respondents (n=66) were extremely concerned about the idea of working abroad, 40.3% (n=87) of respondents were staying in Hungary just because of their current life situation. At the group of 20-30 age, we can espy significant relationship between the working opportunity abroad (p=0,001). The migration tendency was specific for radiographers with no children (n=54). We found a significant relationship between the working ability abroad and the radiographers years spent in health care system (p=0,008). 41.7% of respondents (n=90) think that it will be favorable option if they change career. We also found a significant relationship between the possible working opportunity abroad and the desire for higher wages and the lack of moving up in the radiographer hierarchy (p=0.001; p=0.001).

Conclusion: Our research provides a broad view of the migration and attrition tendency among Hungarian radiographers and its underlying causes. According to our study, serious changes should be involved in the Hungarian system to keep the younger radiographers home.

The appearance of the migration thought by the view of age groups



Biography

David Sipos is a Lecturer at University of Pecs, Department of Diagnostical Imaging. He completed his BSc and MSc, and is a Radiographer. He is pursuing his PhD at University of Pecs. He is also an Application Specialist at Medipixel Ltd.

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Is single OM15 sufficient for screening of mid-facial fracture in the emergency setting of Ysbyty Gwynedd?

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Ysbyty Gwynedd, UK

Facial trauma is a common presentation to the emergency departments, together with clinical suspicion, radiological investigation are used as screening tools for detecting mid-facial fractures. Previous study has illustrated there is no significant difference between single OM15 degree's radiograph (sensitivity of 89.4%) and combined OM15+ OM30 degree's radiograph (sensitivity of 90.9%) in picking up mid-facial fractures. However in practice, both views are still widely used to ensure no missed fractures in the emergency department. As well known that there is a degree of damage from radiation to the exposed cells though there are more benefits from obtaining the facial radiographs that outweigh the slight damage may happen. Performing single OM view would definitely contribute toward reducing cost, radiation exposure and time spent by radiographers, however some clinicians feel that mid-facial fractures may be missed with single OM view. This study aims to demonstrate that a single OM 15 degrees radiograph is sufficient in picking up mid-facial fractures in emergency department setting for the purpose of screening.

Literature Review: There are five papers to date aimed identifying the best view to be used for screening of mid-facial trauma. Raby and Moore had determined that a lateral view did not add value to sensitivity in picking up mid-facial fracture. This result echoed the findings from Rogers et al that only one view is needed to identify fractures and more view can be requested in difficult cases. The economic benefits of using a single view was calculated by Sidebottom et al which extrapolated to 500 K saving on films alone for NHS. The two paper (Sidebottom et al and McGhee et al) that compare directly between OM15 and MO15/30 combined, both showed no significant change in sensitivity in picking up mid-facial fractures, therefore a single OM15 is enough.

Methods: In this retrospective study, we have looked at 2948 facial X-rays that were performed at Ysbyty Gwynedd and Llandudno general hospital, 61 facial X-rays have demonstrated mid-facial fractures, these scans were reviewed by two clinical radiologists and there was only one fracture that was not seen via OM15.

Results: This study has demonstrated that single OM15 is safe to use for the purpose of screening mid-facial fractures with sensitivity of almost 96%.

Biography

Amjed Eljaili completed his MBBS from University of Al-Zaiem Al-Azhari, Sudan in 2010. Currently, he is practicing at Ysbyty Gwynedd, BCUHB, Intensive Care Unit. He has attended several academic meetings regionally and participated in various national work-shops.

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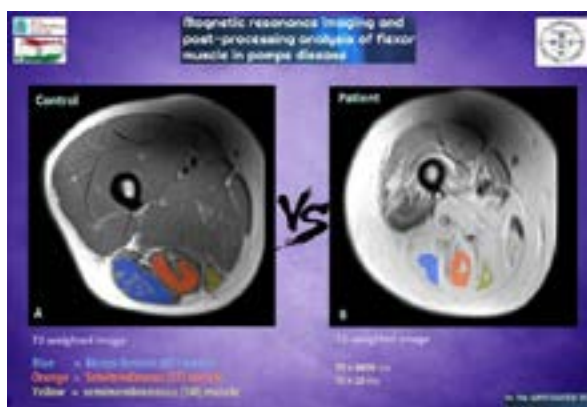
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Magnetic resonance imaging and post-processing analysis of flexor muscle in Pompe disease

Ala Khasawneh

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Pompe disease is a rare multisystem genetic disorder that is characterized by a deficiency of the lysosomal enzyme acid alpha-glucosidase and cytoplasmic glycogen accumulation causing damage that leads to muscle weakness. The aim of this study was to evaluate the muscle MRI pattern of 12 adults with late onset Pompe patients and 12 sex-and age-matched healthy controls (Age range 19-59). A training procedure was implemented using an exercise dynamometer device; MRI data was used to compare the three flexor muscles in the lower limb function. MRI data of biceps femoris (BF) muscle, semitendinosus (ST) muscle, semimembranosus (SM) muscle in exercises over time (base, 30 min, 24 hours) was measured. We performed and quantified T2-weighted (T2-w) data of flexor muscles, all data were analyzed by using repeated measure ANOVA. According to our results, significantly lower T2 value in the ST muscle of controls was observed (base=43 ms, 30 min=48 ms, 24 h=43 ms; $P<0.05$) compared to the patients, but the change in SM muscle and BF muscle were not significant. In patients, we detected significantly higher T2 value in SM muscle change over time (base=129 ms, 30 min=132 ms, 24 h=128 ms; $P<0.05$) compared to the controls, but ST muscle and BF muscle doesn't show significant change. As a conclusion, we can say that in Pompe patients, the SM muscle can only react to the exercise apparently and shows us an activity in affected muscle cells, compared to the control SM muscle that does not show any activity that means perhaps the Pompe disease change the muscle cells structure to interact to the exercise.

**Biography**

Ala Khasawneh is a Jordanian Doctor. He completed his Diploma in General Medicine (MD) and has been awarded the qualification of a Physician and title of Doctor of Medicine from National Pirogov Memorial Medical University. He worked in Basma Hospital, Jordan. Currently, he is a PhD fellow in Diagnostic Medical Imaging in Hungary. As a Doctor, his main interest is to create new pathways for improving health care.

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A N.I.C.E Brexit

Mustafa Sabil and Ramdas Senasi
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We aim to discuss the myriad of international urinary tract infection imaging guidelines. This was achieved by analysing guidelines of 5 developed regions. Our center in the North-East of England adheres to our own guidelines that differ to NICE; but very similar to Europe. This led us to review other guidelines and ask, “Is the UK truly independent?” Unlike other areas where the UK has aligned itself to Europe, this is one area that the UK may have maintained its independence. Although both the UK and Europe agree on routine Ultrasound scanning in infants, they contrast with their MCUG guidelines, with Europe taking a more aggressive stance. Interestingly, although voting to leave the EU, the North-East of England shares very similar guidelines with Europe. Unlike Europe, Australia shares similarities with the UK, except in MCUGS where their upper limit is the age of 2. The Canadians however, possess numerous similarities to the Americans. In 1999, the American Association of Paediatrics (AAP) stopped routine MCUG’s after the first febrile infection in all children and the Canadians followed shortly after. MCUG’s are now rarely used, especially in Canada where a more conservative approach is taken. Ultrasounds are used more frequently for diagnostic purposes. However, in Canada only febrile infections are followed up with Ultrasounds, afebrile infections are managed clinically, therefore: “no fever no imaging”. In the era of globalisation, national guidelines are adapted to resemble one another in certain aspects, whilst some regions maintain their autonomy. Following these comparisons we found inconsistencies in international UTI guidelines. We aim to discuss the evidence put forth in each system. Over the coming year in BREXIT negotiations, we can feel reassured that this is one area non-negotiable. Unless of course the North-East decides to stay with Europe!

Table 2: Summary of NICE imaging guidelines.

Age	Imaging	UTI diagnosis		
		Normal response to treatment within 48 h	Atypical UTI	Recurrent UTI
< 6 months	US during acute infection	No	Yes	Yes
	US within 6 weeks	Yes	No	No
	DMSA	No	Yes	Yes
	VCUG	No	Yes	Yes
6 months to 2 years	US during acute infection	No	Yes	No
	US within 6 weeks	No	No	Yes
	DMSA	No	Yes	Yes
	VCUG	No	No	No
> 2 years	US during acute infection	No	Yes	No
	US within 6 weeks	No	No	Yes
	DMSA	No	No	Yes
	VCUG	No	No	No

DMSA: dimercaptosuccinic acid; NICE: National Institute for Health and Clinical Excellence; US: ultrasonography; UTI: urinary tract infection; VCUG: voiding cystourethrography.

Biography

Mustafa Sabil, a junior doctor in the Northern-Eastern region of the United Kingdom, is an aspiring radiologist. With a keen interest in Radiology, during his Paediatric rotation of Foundation Training, he took it upon himself to do something Paediatric-Radiology related and researched the comparison of international UTI imaging guidelines in children, A N.I.C.E Brexit. With a strong desire to apply for Radiology specialty training in the coming application year, Dr Sabil is keen become renounced for Radiology related publications and research. This particular piece has a unique political-BREXIT related spin to it, in the midst of the political drama occurring at the present.

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