RPS 112-6

Three-dimensional visualisation of large vessel anomalies in foetuses using multivein super-resolution MR technique

F. Prayer, G. O. Dovjak, P. Brugger, G. Gruber, D. Prayer, G. Kasprian; Vienna/AT

Purpose: To assess the feasibility of three-dimensional visualization of foetal large vessels based on multivein MR technique in combination with super-resolution post-processing in normal foetuses, and foetuses with large vessel anomalies.
Methods or Background: Foetal MRI data of fifteen normal cases (mean 29+5 gestation weeks), and fifteen cases with anomalies of the large vessels (mean 28+1 GW) were included. Foetal MRI scans were performed on one 1.5 Tesla scanner (Philips Ingenia). Anomalies of the large vessels included tetralogy of Fallot (n=4), aortic coarctation (n=3), right descending aorta (n=2), common arterial trunk (n=2), hypoplastic left heart (n=1), persistent left superior vena cava (n=1), pulmonary agenesis (n=1), and heterotaxy syndrome (n=1). T2-weighted sequences were acquired in three orthogonal planes using radial k-space sampling multivein technique. Super-resolution post-processing was performed to obtain iso-voxel data sets. Manual segmentation of large vessel structures including aorta, pulmonary arteries, large veins, ductus venosus, and ductus arteriosus was performed to generate three-dimensional models. Multivein images were reviewed alone and in combination with three-dimensional models for large vessel anomalies by one foetal imaging expert.
Results or Findings: Super-resolution aided three-dimensional visualisation of foetal large vessels based on foetal MRI scans was feasible in all thirty cases. Review of orthogonal T2-weighted multivein sequences alone correctly identified 13 of 15, and, if reviewed alongside three-dimensional models, 15 of 15 vessel anomalies. No vessel anomaly was found in the normal group.
Conclusion: Foetal MRI-based three-dimensional visualisation of large vessels including large vessel anomalies using multivein and super-resolution post-processing technique is feasible.
Limitations: Foetal motion artefacts may limit the applicability of super-resolution post-processing.
Ethics committee approval: This study was approved by the IRB.
Funding for this study: No funding was received for this study.
Author Disclosures:
Florian Prayer: Nothing to disclose
DGregor Oliver Dovjak: Nothing to disclose
Peter Brugger: Nothing to disclose
Gerlinde Gruber: Nothing to disclose
Daniela Prayer: Nothing to disclose
Gregor Kasprian: Nothing to disclose

RPS 112-7

Image quality and radiation dose evaluation of paediatric ECG-triggered cardiovascular computed tomography in congenital heart diseases

M. Gulizia, A. Viry, L. Alamo Mastre, T. Cherpillod, C. Chevallier, E. V. Tenisch; Lausanne/CH
(marianna.gulizia@chuv.ch)

Purpose: The aim of this study is to provide an inventory of radiation doses delivered by cardiac CTs in children with congenital heart disease and to subjectively and objectively assess the image quality.
Methods or Background: 56 children between 0 and 6 months having undergone an ECG-triggered cardiac-CT over a 5-year period were included. Images were acquired at 80 kVp, 100-545 mAs using automatic tube current modulation, 0.28 sec tube rotation after injection of iodinated contrast medium with bolus tracking. Images were reconstructed using ASiR-V 50% (0.625mm slice thickness). Sedation was performed in children older than 3 months. Radiation doses were analysed and compared to previous studies. Quantitative analyses were done calculating CNR and SNR in the ascending aorta and pulmonary trunk. Subjective analyses were done assessing the image quality of various vascular structures. Detectability analyses were done on a phantom with iterative and deep learning reconstructions.
Results or Findings: CTDIvol and effective dose were 2.35±0.54 mGy and 0.85±0.22 mSv (range 0.39-1.66) respectively. CNR for pulmonary trunk and ascending aorta were 36.96±2.18 and 32.50±2.02 respectively. SNR ratios were 32.37±2.25 and 37.81±2.04 respectively. Image quality was subjectively very good even for small structures. Detectability analysis provided a 30% optimisation potential thanks to deep learning image reconstructions (AUC=0.995).
Conclusion: Our analysis shows a slightly higher radiation doses compared to the literature. Our current practice provides high quality images with acceptable radiation doses. There is a potential to optimise our protocol by reducing radiation doses and contrast media while maintaining a diagnostic image quality.
Limitations: It is a unicentric study and our patients had suboptimal arms positioning.
Ethics committee approval: This retrospective study has been approved by the Vaud Ethics Committee (Ref CER-VD 2021-00827).
Funding for this study: No funding was received for this study.
Author Disclosures:
Tyna Cherpillod: Author: mm
Anaïs Viry: Author: mm
Marianna Gulizia: Investigator: mm
Leonor Alamo Mastre: Author: mm
Christine Chevallier: Author: mm
Estelle Valérie Tenisch: Investigator: mm

09:30-10:30 **Open Forum #1 (Radiographers)**

Research Presentation Session: Radiographers

RPS 214

Optimising oncology imaging, treatment, and the patient experience

Moderators
A. Sarchosoglou; Athens/GR
D. Caruso; Rome/IT

RPS 214-3

Analysis of dose and acute radio-toxicity in breast cancer patients

A. M. Carmo[1], M. Ramos[2], F. Serra[2], A. F. C. L. Abrantes[2], S. I. Rodrigues[2], L. P. V. Ribeiro[2], B. Vicente[2], R. P. P. Almeida[2]; [1]Olhão/PT, [2]Faro/PT

Purpose: Over the last 20 years, there have been significant technological and technical advances in radiotherapy for breast cancer. However acute radiation-induced skin toxicity remains a side effect impacting the quality of life in breast cancer patients. The aim of this study was to verify if there is a relationship between the dose-surface that reaches the skin and the location of acute radio toxicity.
Methods or Background: In this study we evaluated 49 patients scheduled to undergo conventional three-dimensional conformal RT after surgery (including breast conserving surgery and mastectomy with breast reconstruction) at a private radiotherapy department. The data collection for this study consisted of two parts: a patient survey and data from the dosimetric planning system. First, the patients were surveyed to describe the toxicity, its symptoms, its location and the week of treatment. Then, the values of the doses of the mapped skin from each patient who was selected in the first part were collected. Subsequently, the location was related to the doses collected from the skin in the dosimetric planning system.
Results or Findings: It was found that the location of side effects in the breast quadrants was not correlated with the mean and maximum dose values, and with the values of V30 and V40. There was a weak correlation of 0.200 ($p<0.05$) with V50. Side effects located in the fold zones were not correlated with dose and V30, V40 and V50 values.
Conclusion: In this study, a relationship between the dose received by the risk organ, the skin, and the development of acute toxicity was not observed.
Limitations: Identified limitation were the sample size and the fact that only one setting was studied.
Ethics committee approval: An ethics committee approved the study and written informed consent was obtained from the participants.
Funding for this study: No funding was received for this study.
Author Disclosures:
Magda Ramos: Nothing to disclose
António Fernando Caldeira Lagem Abrantes: Nothing to disclose
Rui Pedro Pereira Almeida: Nothing to disclose
Bianca Vicente: Nothing to disclose
Sónia Isabel Rodrigues: Nothing to disclose
Ana Maria Carmo: Nothing to disclose
Fábio Serra: Nothing to disclose
Luís Pedro Vieira Ribeiro: Nothing to disclose

RPS 214-4

Application of advanced MRI techniques in white matter characterisation of patients affected by meningioma treated with proton therapy

L. Anemoni, I. E. Mascayano, E. Orlandi, L. Preda, M. S. Cadeo, M. E. Piazzolla, S. Imparato, A. Mancin, S. Tampellini; Pavia/IT

Purpose: The study aimed to detect, through the processing of data obtained from imaging techniques of diffusion weighted imaging (DWI-MRI) and intravoxel incoherent motion technique (IVIM-MRI), early changes in diffusion, pseudo-diffusion and perfusion properties of normal tissue in patients affected by meningioma treated with proton therapy.