

ESR Survey of paediatric CT practice

Madan M. Rehani, Director of Radiation Protection, European Society of Radiology
Erich Sorantin, Division of Pediatric Radiology, Department of Radiology, Medical University Graz/Austria
Catherine M. Owens, Cardio-respiratory unit, Great Ormond Street Hospital & UCL Institute of Child Health, London/UK
Contact: madan.rehani@gmail.com; madan.rehani@myesr.org

Be part of the European Society of Radiology's radiation protection initiative, become a Friend of EuroSafe Imaging. www.eurosafeimaging.org

An online survey was conducted to assess the situation of paediatric CT practice in Europe using Survey Monkey.

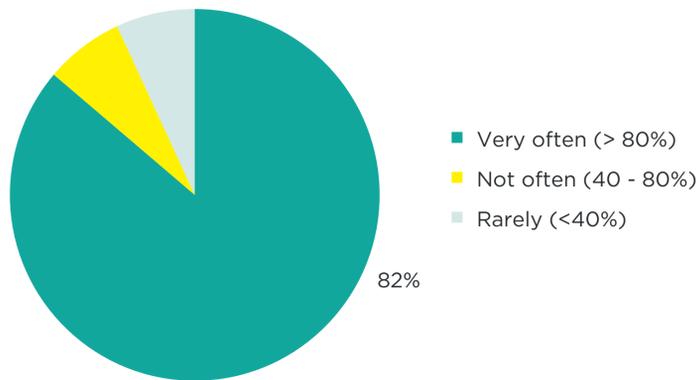
Duration: Aug-Dec 2013

Responses received: 29 from 15 countries

List of countries (number of respondents if more than one): Armenia, Austria (2), Bosnia and Herzegovina, Bulgaria, Finland, France (2), Germany, Ireland, Italy (2), Netherlands (8), Norway, Serbia (2), Spain, Sweden, UK (4)

Do you work in general radiology department: Yes =62% {18/29}

How often do you pay attention to CTDIv (computed tomography dose index volume) or DLP (dose length product) values when reading CT images of a child?



When was the last time the value for CTDI (computed tomography dose index) or DLP (dose length product) for a child in your facility was higher than usual?

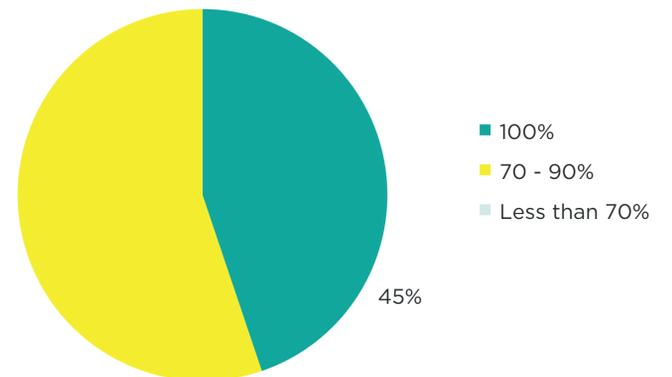
- » Last 6 months= 27%
- » 7-12 months= 10%
- » More than 1 year ago=28%
- » No response= 14%
- » Do not remember or know=21%

What action did you take about the higher value?

Asked the radiographer about the possible reasons/Asked the radiographer to do the following

- » Review the scan protocol selected for the study, and cross reference this to the request form and the patient demographics. Review the images to see if scan range appropriate to request also.
- » Identified issues with contrast enhancement
- » If the child was very large we would discuss with our physicist and if the high CTDI was explained due to patient size and complexity and we were satisfied we would keep a formal record.
- » If this higher than intended dose was not due to patient size we would complete an 'incident form' our local procedure for raising and documenting concerns. If the incident was serious we would inform the Care Quality Commission to discuss in more detail."
- » Register the past 100 paediatric CT examinations to search for a particular pattern.
- » We performed a clinical audit. All procedures were reviewed. Protocols based on the age and the patient weight were integrated in the CT unit. Identify if there was "Wrong protocol selection".
- » The images were reviewed and the case discussed with a medical physicist.

How confident are you that during the last year, no child undergoing a CT scan in your facility has received a radiation dose higher than an adult?



What is the basis for your level of confidence in the answer to the previous question?

- » Special CT protocols for children are implemented and strictly followed. This is evaluated regularly on a dual level basis: 1) assure that all technicians use these protocols only, 2) DLP information is included in the DICOM data set and read by the radiologist.
- » In some instances radiation dose may be higher: in our institution usually when a re-scan is necessary due to motion artefacts in trauma patients. Rarely, in obese paediatric patients re scans are necessary, when the quality of images acquired with the implemented paediatric protocols does not suffice. Because we monitor the dose given and have very specific child protocols
- » Every one child's CT exam is performed under radiologist's surveillance; we checked the dose in the Dose watch database monthly
- » For every child we use a special protocol and fill up a form where the dose is listed.
- » All children are imaged on a CT controlled by the radiology protection service at my hospital unless some during on call service

We have specific weight based protocols for 6 different weight categories in paediatric patients for all body systems. These protocols were developed with careful attention to noise levels for each examination and weight category with progressive reduction in kV and mAs to allow examinations which are optimised as 'fit for purpose' on our own machine (Siemens Somatom Definition Dual Source 64 slice) using CT Expo child phantom.

- » We performed an audit to examine paediatric CT doses over 12 months, as part of a Nordic/Baltic CT dose project
- » Dose is included in the report. Radiation doses are checked regularly by sampling.
- » Routinely verification of dose report of each CT examination

What actions are in place at your facility to prevent children from receiving a dose higher than necessary?

- » Generally, technicians use paediatric scan protocols as a default. Furthermore, before the scan radiologist and technician discuss imaging parameters and predefine image quality. Also in terms of selection of reconstruction parameters (iterative reconstruction)
- » Complex CT exams must be performed by the most experienced CT radiographers with the paediatric CT radiologist present in the scan room during the exam
- » We organise education for paediatricians
- » We have CT protocols adjusted for children, we perform mostly only one intravenous phase without native CT for abdomen and evaluation of neck and mediastinum. When CT is performed as a follow-up for hydrocephalus for example, we use low-dose protocols, just to evaluate the ventricular system. We also use low-dose protocols to evaluate lungs.
- » Checking dose reports at image reading

Acknowledgements

Data provided by :

Avni F., Booij R., Dijkshoorn M.L., Erdélyi T., Gelardi R., Granata C., Halliday K., Hambardzumyan A., Jecković M., Kirova G., Ducou le Pointe H., Lovrenski J., Moodley V., Niewelstein R.A.J., Owens C., Paterson A., Rosendahl K., Salerno S., Schulte O., Sefic-Pasic I., Seuri R., Sommer O. J., Sorantin E., Vermeule W., Vuist, Welsh A.

Disclaimer

The poster is a collation of data provided by participants in the survey and does not reflect the views of the coordinator and authors of the survey, as no interpretations are provided.