

QUDI Project QS10

Paediatric CT dose optimisation survey

RANZCR response

Introduction

The consultancy surveyed a range of dose metrics for a generic 5 year old patient undergoing some common MDCT procedures. After the survey data was collated a dose optimisation and feedback workshop was conducted. This was followed six months later by a repeat survey to assess the impact of the audit and workshop.

The one day workshop conveyed theoretical information on dose reduction, confidential feedback to individual participants on their delivered doses for specific procedures, and their “dose ranking” relative to other sites for the same procedure. It also provided participants (who were radiologists and medical imaging technologists at 6 tertiary referral paediatric hospitals) the opportunity to share tips and techniques with other sites in a collegial manner. Face to face interaction also significantly helped sites which had the same type of scanner where one site had developed protocols resulting in substantially lower dose than another with the same equipment.

What the report tells us

This audit-feedback survey/workshop project found that feedback and optimisation training can positively influence paediatric CT patient dosimetry, which can result in sites reducing the radiation dose during CT examinations. However, because of the specific methods of education delivery (audit – feedback, face to face academic detailing, opinion leader personal contact), this project does not inform us about the likely outcome of delivery of the educational package in another way (e.g. on-line). Whether the small group nature of the academic detailing also had an effect on its success needs to be considered when contemplating how a national implementation of such a program might proceed, as small group teaching is inherently more expensive and labour intensive than on-line education, but it may also be worth the cost if it is more effective.

It was outside of the scope of this project to compare the methods used here to online education of another group and so it is not possible to conclude from this study that online education would not be effective.

The success of this project required co-operation between radiographers (medical imaging technologists) and radiologists who interpreted paediatric studies at each site. It also required theoretical training on the principles of dose reduction and optimisation of CT protocols provided by radiation physicists. However, these physicists were not located at participating sites but rather provided workshop training and materials and conducted the baseline and post-intervention audit of dose.

Implications for the Australian health sector

CT scanning is responsible for the largest proportion of the ionising radiation delivered to children through diagnostic imaging procedures. Children may be up to 10 times more sensitive to the effects of radiation than adults in terms of their risk of developing a fatal cancer at some point in their life as a result of exposure to ionising radiation. A quality improvement activity involving audit/feedback/education that will help to minimise this risk is highly desirable in terms of improvement in population health outcomes. It has been estimated, using a linear no threshold model, that every head CT scan increases the lifetime risk of cancer in a school aged child by approximately 0.1% (assuming a lifetime risk of fatal cancer of approximately 25%). This is of particular importance for children who may need multiple CT scans (e.g. those with chronic lung disease such as cystic fibrosis or monitoring of shunted ventricles within the brain).

Implications for RANZCR

This study demonstrates the effectiveness of a quality improvement activity in improving the radiation safety of CT examinations. The results of this survey need to be publicised widely and the potential for improving the safety of CT examinations across the patient population be emphasised.

The College can best make an effective contribution to patient safety by supporting the further development of the existing RANZCR CT Image Review Self Audit activity so that it incorporates a dose optimisation audit/feedback/education process based on the Paediatric CT Dose survey. It is expected that this RANZCR quality improvement activity can operate on a national scale through collaboration with other key stakeholders.