Our Contribution to the EuroSafe Imaging Call of Action
The Royal College of Radiologists

A pain in the neck!

Too many normal cervical spine CTs in trauma?

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Background and Guidelines

- CT cervical spines contribute up to 60 X higher dosage to the thyroid gland than plain radiography
- In children, ligamentous damage is commoner than bony injury
- CT Cspines are frequently normal and don't alter management [1, 2]
- NICE 2014 guidelines [3] state CT should be reserved where radiographs are inadequate, abnormal, in presence of severe multi-region trauma, reduced GCS or focal neurological deficit.
- Previous local audits found no abnormal CTs in 1996-7 and only 1 in 2002-2003 (rotatory atlanto-axial subluxation, already visible on plain radiography)

Can we reduce the unnecessary paediatric CT Cspines performed?

Standard

- **Target: 100%** CT C-spine requests or attendance notes should state at least one indicator for referral in accordance with NICE guidelines

Methods

- CT C-spines in patients aged <18yrs for acute trauma reviewed with preceding plain radiographs analysed
- Radiology request forms and attendance notes screened for evidence of reduced GCS, neurological deficit or multi-region trauma

First Round

- Time: 1/5/08 – 1/6/12 (49m)
- Total scans: 51 CT Cspines (14 (27%) localised to level of pain)
- Compliance: 26 (51%) cases met guidelines
- Only 1 radiological abnormality (17 year old motorcycle accident with C7 fractures – *see Figures 1a & b below)*

Second Round

- Time : 1/7/12 – 1/4/14 (21m)
- Total Scans: 14 CT Cspines (6 (43%) localized only to level of pain).
- Compliance: 8 (57%) cases met guidelines . All CTs normal
- ~36% reduction in use of CT, (predicted number of CTs based on last round would have been 22CTs)
- Increased number CTs localised just to area of pain
- Reduction in CT referrals due to inadequate plain radiographs
- Mild (6%) improvement in meeting referral guidelines

Actions

- Results presented at local audit meeting
- Review of common diagnostic pitfalls, reiteration of referral indications and demonstration of optimal radiographic technique
- Commitment to reduce CT Cspines was agreed amongst A&E clinicians and radiologists

Actions

- Results re-presented at clinical governance meeting and BSPR (British Society for Paediatric Radiology) conference
- Other hospital depts. encouraged to review own local practices
- Guaranteed next day paediatric MRI cervical spine service in the presence of a normal plain radiograph instead of CT planned locally

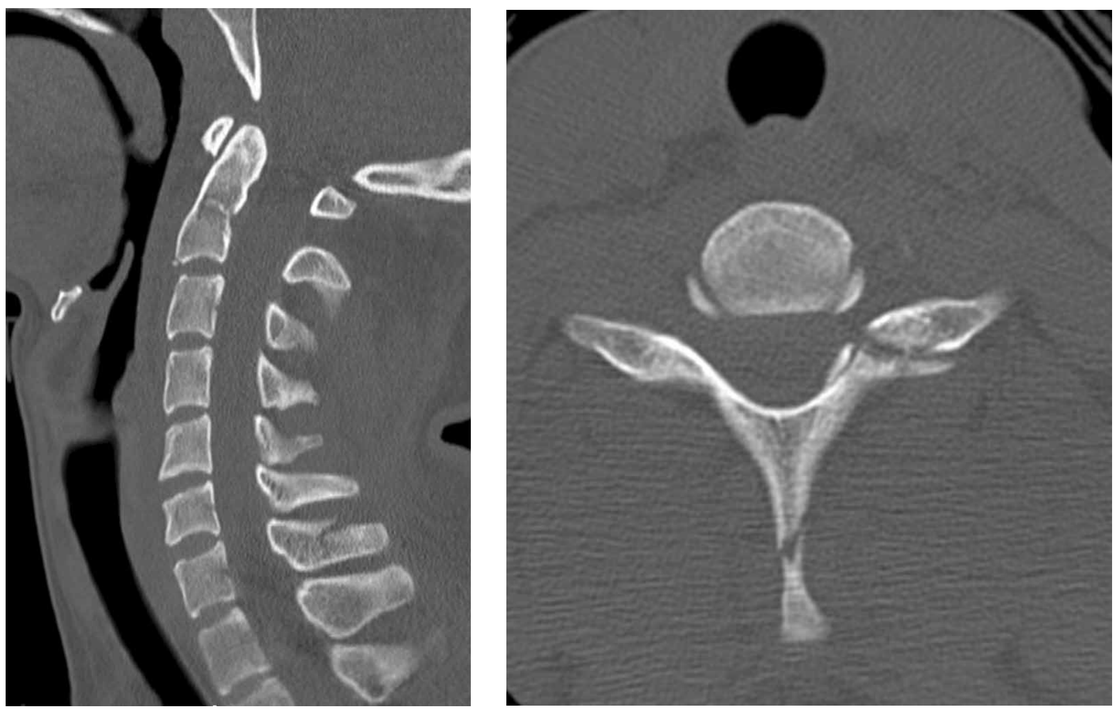
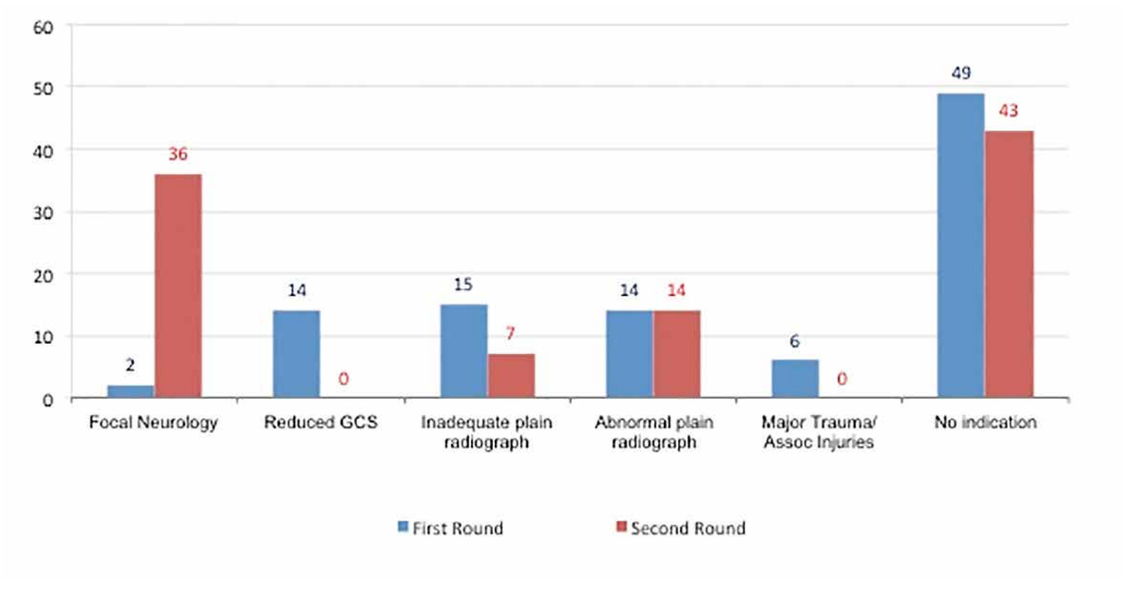


Fig. 1: CT images demonstrating the only patient in our series with a CT C-spine abnormality from both audit rounds. Sagittal (Fig 1a) and axial (Fig 1b) CT images of the cervical spine with bony reconstruction demonstrate multiple fractures of the spinous process and left lamina of C7.



Graph: Graph Demonstrating CT C-spine Indications. The y axis demonstrates percentage of referral indications. The x axis demonstrates various referral indications provided for CT C-spine.

FIVE SECOND SUMMARY

- CT Cspines contribute 60x higher radiation dose to thyroid gland than plain radiography. In children, C-spine ligamentous injury is commoner than bony injury, therefore CT Cspines frequently do not change clinical management.
- Through education, awareness and commitment to setting up a planned next day paediatric MRI Cspine service, we have reduced number of CT spines in paediatric population by 36% and improved compliance with NICE CT Cspine referral indication guidelines.

References
1. Kreykes NS, Letton RW Jr. Current Issues in the Diagnosis of Pediatric Cervical Spine Injury. Semin Pediatr Surg 2010; 19(4): 257-264
2. Holmes JF, Mirvis SE, Panacek EA, Hoffman JR, Mower WR. Variability in Computed Tomography and Magnetic Resonance Imaging in Patient with Cervical Spine Injuries. J Trauma. 2002; 53(3): 524
3. NICE Clinical Guideline 176, Section 1.5.11, Criteria for Performing a CT Cervical Spine scan in children, Issued January 2014.