Medical audit

The use of skull X-rays in the accident and emergency department

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The notes of all patients attending the accident and emergency department at the Royal Berkshire Hospital with a head injury from 1–30 September 1999 were analysed for the indications for skull X-ray, the report on film, and the outcome of the consultation. Using the existing Royal Berkshire Hospital guidelines, 50% (193/385) of all patients had skull X-rays performed. One fracture was detected. If the recent guidelines from The Royal College of Surgeons of England Working Party for the use of skull X-rays in institutions which possess a CT scanner were applied, the number of skull X-rays performed would reduce from 193 to 14 without detriment to any patient.

Key words: Head injury – Skull X-ray – CT scan

The use of skull X-rays in the management of head injuries has long been debated. The Working Party on the Management of Head Injury published their findings in June 1999. The objective of this study was to audit the current use of skull X-rays in the management of patients attending the accident and emergency department of the Royal Berkshire Hospital in Reading, a busy district general hospital with a catchment area of approximately 500,000 people. The existing guidelines for the use of skull X-rays followed those recommended in the Oxford Region (Table 1). The Royal College of Surgeons of England guidelines differentiate between hospitals with and without CT scanners. The Royal Berkshire Hospital has a scanner. The new guidelines are shown in Table 2.

Patients and Methods

All patients attending accident and emergency with a complaint of head injury from 1–30 September 1999 were included. Notes were analysed for indications for skull X-ray, report on film, and outcome of consultation. The notes were then reviewed and the indications for skull X-ray

Table 1 Royal Berkshire Hospital indications for skull X-rays

Adults

- Loss of consciousness
- Amnesia – retrograde or post-traumatic
- Altered Glasgow Coma Score
- Neurological symptoms or signs
- Suspected or obvious penetrating injury
- Scalp bruising or swelling (contusion or haematoma)
- CSF leak or blood from nose or ear

Children

- Loss of consciousness
- Amnesia – retrograde or post-traumatic
- Altered Glasgow Coma Score
- Neurological symptoms or signs
- Suspected or obvious penetrating injury
- Scalp bruising or swelling (contusion or haematoma)
- Suspected non-accidental injury
- CSF leak or blood from nose or ear

Falls from height > 60 cm or onto hard surface

from The Royal College of Surgeons of England new guidelines were applied.

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Figure 1 Indications for skull X-rays ($n = 193$).

Figure 2 Radiology reports ($n = 193$).

Results

Over the month of September, 50% (193/385) of all head injury patients seen at the Royal Berkshire Hospital were X-rayed (Table 3). The indications for X-ray are summarised in Figure 1. There was no appreciable sex bias in subsequent imaging: 64% (246/385) of all head injury consultations were male and they comprised of 62% (120/193) of all skull X-rays

Table 2 The Royal College of Surgeons of England indications for skull X-ray

Where CT is available

- Suspected non-accidental injury
- Presence of a boggy swelling particularly in the parietotemporal region
- Suspected penetrating injury
- Suspected compound fracture

Table 3 Audit figures

Total head injuries seen 1–30 September 1999	385
Total skull X-ray requests	193
Confirmed radiological #	1
Consumable costs (only) per X-ray	£4.44

(Table 4). Children were far less likely to be imaged (44% consultations: 29% skull X-rays). The results of the X-rays are shown in Figure 2, three CT scans were performed and 4.4% (17/385) of all consultations were admitted (Fig. 3).

Discussion

Had The Royal College of Surgeons of England guidelines been applied, the number of skull X-rays would have been reduced from 196 to 14; 12 for suspected penetrating injury and 2 for suspected compound fracture. One fracture was detected on skull X-rays which did not alter the management of the head injury. In financial terms, this

Figure 3 Outcome from head injury consultation ($n = 385$).

Table 4 Patient characteristics

	<i>n</i>	%
Male consultations	246	64
Children (< 16 years) consultations	167	44
Male skull X-rays	120	62
Children skull X-rays	57	29

represents a saving of £808 in consumable cost alone (Table 3). The true saving to the institution would be far

greater if radiographer call-out time, radiologist reporting time and general administrative costs were calculated. Overall, 182 patients would not have received the radiation dose involved and no patient would have been put at risk. The introduction of the new guidelines for the use of skull X-rays will benefit both hospital and patient.

References

1. The Royal College of Surgeons of England. *Report of the Working Party on the Management of Patients with Head Injury*. London: RCSE, 1999.