



Results from the first year as a major trauma radiology unit in the UK



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AIM: To record and analyse data from all facets of practice in the first year as a newly set-up major trauma centre radiology department.

MATERIALS & METHODS: Retrospective analysis of all patients who underwent whole-body computed tomography (WBCT) for suspected polytrauma over a 1 year period was performed. The mechanism, the time of day, the number of body parts injured, the type of injuries, and resulting surgical or radiological interventions were recorded. Also recorded was the time from the CT examination to the formal report. Where applicable, the consultant-verified reports were cross-referenced with the out-of-hours registrar reports to assess for discrepancies.

RESULTS: Two hundred and one patients underwent WBCT for suspected polytrauma. Sixty-four percent (128/201) of WBCT examinations were performed “out-of-hours”. Fifty-seven percent (115/201) were road traffic accidents (RTAs), 33% (66/201) were falls, and 6% (12/201) were assaults. At WBCT, 31% (63/201) had no injuries; 27% (54/201) had injury to one body area; 21% (43/201) had injury to two areas; and 20% (41/201) had injury to three or more areas. Nineteen percent (39/201) required urgent radiological or surgical intervention. The mean time from end-of-CT to a formal report was 27 min. There were discrepancies between consultant reports and registrar reports in 22% (31/142) of cases; 1% (2/142) led to a change in acute management.

CONCLUSION: Based on our early experiences, nearly one-third of patients who undergo a WBCT scan for suspected polytrauma, will have no acute injury at WBCT. One-fifth of patients in our study required emergency surgical or radiological intervention for acute injuries found on WBCT. A low discrepancy rate was found between on-call registrar reports and the consultant-verified reports.

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Introduction

In a government-led initiative to improve the care of patients, the National Health Service (NHS) set up major trauma centres (MTC). This followed a report from the

National Audit Office in 2010 that described an unacceptable level of variation in the care of trauma patients between different hospitals.¹ With the advent of MTCs, the care of trauma patients should be standardized so that upon arrival they are immediately assessed by a designated trauma team in the emergency department (ED). Patients should be promptly referred for whole-body computed tomography (WBCT), if clinically indicated, to facilitate early detection of serious injuries within one centre with a full range of trauma specialists.

Multidetector CT has revolutionized the care of polytrauma patients and cemented the pivotal role of radiology

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in directing treatment and specialist referral. Advances in technology and marked improvement in access has led to CT being considered as an essential tool for guiding the immediate management of trauma patients.² Improvement in image quality has allowed detection of serious injuries that are unexpected clinically.

A network of 22 centres, specializing in treating patients who suffer from major trauma, opened across England in April 2012. Sheffield Teaching Hospitals was one of those designated as an MTC. The aim of the present observational study was to record and analyse data from all facets of practice in the first year as a newly set-up MTC radiology department. As the polytrauma imaging pathway was aligned closely to guidelines issued by the Royal college of Radiologists (RCR),³ the aim was to assess how manageable this framework was for everyday practice within a newly set-up MTC.

Materials and methods

The study was conducted as a retrospective analysis of major trauma imaging over a 1 year period, from April 2012 to April 2013. Institutional review board approval was obtained. Retrospective review of the trauma-imaging database was performed to identify patients who underwent WBCT as a result of trauma during the first year as an MTC.

A major trauma-imaging protocol was set up in advance of the start date, with agreement between the Trauma-imaging Lead and the ED Major Trauma Lead. It was based largely on RCR guidelines.³ Some adaptations were made to this framework based on the experiences of the present authors regarding trauma imaging, and in order to make it a workable protocol for staffing levels within the department. A polytrauma CT request card, similar to the template provided in the RCR guidelines, was used for all polytrauma cases (Fig 1). Two protocols for trauma WBCT were established from these guidelines depending on whether the patient was considered haemodynamically stable or unstable by the clinical team. All examinations were performed on a 64 section VCT Phillips scanner (Milwaukee, Wisconsin, USA). Both protocols involved a unenhanced CT examination of the head and cervical spine. In the stable protocol, the arterial phase of the chest/abdomen/pelvis and a portal venous phase abdomen/pelvis were then performed. For the unstable patient, the protocol comprised the above phases and an additional delayed (100 s) abdomen/pelvis phase. The arterial phase abdomen/pelvis was omitted from the stable protocol following a clinico-radiological review of all injuries detected after 3 months.

The location and mechanism for each incident, the time of day, and whether the incident occurred on a weekday or at the weekend were recorded. Data on the number of body parts injured, the type of injuries, and resulting surgical or radiological interventions were collected for each case. Where applicable, the consultant-verified report was cross-referenced with the registrar secondary report to assess for discrepancies. Where discrepancies were found, the CT examinations were reviewed by both a consultant radiologist

and a radiology registrar. A consensus decision was reached as to the significance of the discrepancy. Discrepancies were graded using the following scale: 0, no significant discrepancy; 1, missed incidental finding; 2, missed injury but no potential for acute clinical deterioration; 3, missed injury with potential for acute clinical deterioration; FP1, false positive with no clinical significance; FP2, false positive with clinical significance; Consultant miss, injury reported on the registrar secondary report but not on the consultant-verified report.

The performance in specific areas was recorded: the arrival time in the ED to CT examination; the time from end-of-CT to a primary survey report; and the time from end-of-CT to a formal report were all recorded. A primary survey proforma was filled out in the CT control room as the scan was being performed and then handed to the Trauma Team Lead, typically before the patient returned to the ED (Fig 2). A detailed secondary report was either provided as a final consultant-approved report available on the radiology information service (RIS) system or as a secondary survey proforma filled in by a post-FRCR radiologist for out-of-hours examinations (Fig 3). Both proformas were based on RCR templates.³

The radiation dose, measured in terms of dose-length product (DLP; in mGycm²), was recorded for each MTC CT examination.

Statistical analyses of the data were expressed as frequencies (with percentages) or mean values.

Results

A total of 201 polytrauma WBCT examinations were performed over the 1 year period. Patient demographics are listed in Table 1. One hundred and sixty-five patients were classed as stable and 36 patients unstable. One hundred and seventy-one patients were admitted, 26 were discharged on the same day of the examination, and four patients died on the same day of the WBCT. The majority of patients were brought into the ED by the ambulance service. Two patients self-referred to the ED.

Thirty-six percent (73/201) of patients were examined during “daytime weekday” working hours and 64% (128/201) of examinations were performed in the evenings, overnight, or over the weekend by the on-call radiology team. Seventy-two percent of (145/201) examinations were performed during weekdays and 28% (56/201) at the weekends.

Fifty-seven percent (114/201) of patients were involved in RTAs, the majority of which were high-speed impacts with injury to more than one body region. Thirty-three percent (66/201) suffered a fall. Six percent (12/201) were victims of an assault. In the remainder of cases, the mechanism was either a “miscellaneous” cause or not documented in the notes (Table 1).

Thirty-one percent (63/201) of patients had no injuries at WBCT. Twenty-seven percent (54/201) had an injury to one body area, 21% (43/201) had an injury to two body areas, and 20% (41/201) had an injury to three or more body areas (Fig 4). Chest injuries were most common, seen in 43% (87/201) of patients, with rib fractures accounting for most. This

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