

# Paediatric distal radial fracture manipulation: multicentre analysis of process times

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## ABSTRACT

**Background:** Children with simple radial fractures requiring manipulation are conventionally admitted for manipulation under general anaesthesia. On the assumption that children (and their parents) wish to spend as little time in hospital as possible, a study was undertaken to explore the experience of children with distal radial fractures admitted for general anaesthesia.

**Methods:** A retrospective analysis was performed of the time taken from arrival at the emergency department (ED) to general anaesthesia and the time taken from arrival at the ED to hospital discharge in three centres in south-west England: the Bristol Children's Hospital, Derriford (Plymouth) Hospital and the Royal Devon & Exeter Hospital.

**Results:** The median wait for general anaesthesia was >8 h and the median wait from ED admission to discharge was >21 h. This compares with a typical arrival to discharge time for paediatric procedural sedation of 4–5 h in the ED of the Royal Devon & Exeter Hospital.

**Conclusions:** Given the assumption that children (and their parents) wish to spend as little time in hospital as possible, there appears to be a role for procedural sedation in the ED for this group of children, with a significantly reduced turnaround time anticipated.

Traditionally, children with distal forearm fractures needing manipulation are admitted for a general anaesthetic. There is some evidence that admission for surgery is traumatic to children and their parents,<sup>1</sup> and that overnight admission can cause negative behavioural change.<sup>2</sup> Admitting a child (and usually an accompanying parent) also causes disruption to the rest of the child's family and potential loss of earnings.

One of our departments (Royal Devon & Exeter) has a typical arrival to discharge time for paediatric sedation (for all procedures) of 4–5 h. On the assumption that children (and their parents) wish to spend as little time in hospital as possible, we set out to explore the experience of children with distal radial fractures who are admitted for general anaesthesia.

Specifically we aimed to establish: (1) the time from arrival at the emergency department (ED) to general anaesthesia and (2) the time from arrival at the ED to hospital discharge.

## METHODS

We retrospectively reviewed case notes for all children needing distal radial fracture manipulation under general anaesthesia over a 12-month period at the Bristol Children's Hospital, Derriford (Plymouth) Hospital and the Royal Devon and Exeter Hospital. The review dates were 1 January

2006–31 December 2006, 1 November 2005–31 October 2006 and 1 March 2005–28 February 2006, respectively. Standardised data collection forms were used or adapted to a spreadsheet version. Children with fractures not requiring manipulation or needing open reduction/fixation were excluded. Three clinicians working at the individual hospitals collected the raw data. This was collated and analysed by a fourth clinician to yield centre-specific and collective results. A person independent of the study verified the results.

## RESULTS

Collectively, 147 children were identified of whom 133 (for ED arrival to time of general anaesthetic) and 109 (for ED arrival to discharge time) had data available for analysis (table 1).

## DISCUSSION

Children with greenstick distal radial fractures needing manipulation wait a median time in excess of 8 h for a general anaesthetic and 21 h for hospital discharge. They would appear to wait longer for a general anaesthetic in a paediatric specialist hospital. We suggest this may be a consequence of loss of priority on the trauma list routinely given to children in general hospitals.

Procedural sedation for these children in the ED is a reasonable solution. Ketamine, given either intravenously or intramuscularly, has a strong track record regarding safety and efficacy.<sup>3–4</sup> An evidence-based clinical policy for sedation in children has been established by the American College of Emergency Physicians (ACEM),<sup>5</sup> and evidence-based guidelines by the Clinical Effectiveness Committee of the British Association for Emergency Medicine (BAEM) for the use of ketamine in the ED have been in existence since 2004.<sup>6</sup>

## Limitations of the study

This study is a retrospective chart/notes review so its findings are of limited validity; "medical records are informal diaries of observations, impressions, and hunches ... translation of these verbal descriptions into hard, quantitative data is fraught with error".<sup>7</sup> Nevertheless, we transcribed rather than translated hard data; the time of arrival to the ED is accurately and automatically documented on ED records. The time of onset of general anaesthesia is documented routinely by the anaesthetist on the patient's anaesthetic chart, but is potentially inaccurate and was almost always rounded to the nearest 15 min in our dataset.

The data collectors were not blinded to the study hypothesis, were not specifically trained in data collection and there was no verification of

**Table 1** Median process times for hospitals individually and collectively

Hospital	Arrival to time of general anaesthetic (n)	Arrival to time of discharge (n)
Exeter	7 h 33 min (58)	21 h 11 min (59)
Derriford	6 h 0 min (52)	21 h 52 min (39)
Bristol	18 h 18 min (23)	26 h 30 min (11)
Overall median	8 h 14 min	21 h 38 min

n, number of cases with data available at each centre.

initial data generated from the notes. The time period for data collection was 1 year, but each centre used different start and finish dates, potentially biasing the result.

However, the data collected was simple and numerical and recorded directly by clinicians onto standardised data collection forms. The time elapsed before general anaesthesia and discharge, calculated from the raw data for both individual centres and collectively, was independently verified. The three hospitals studied are arguably collectively representative of most centres in the UK. We feel these factors strengthen the findings of the study.

### CONCLUSION

In this three-centre study, children with a simple radial fracture requiring manipulation had a median wait of 8 h for a general anaesthetic and the median wait from ED admission to discharge was in excess of 21 h. There appears to be a role for

procedural sedation in the ED for these children. Significant reduction in turnaround times might be expected from this strategy, with evident benefit for the children and their families.

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**Competing interests:** None.

**Contributions:** LM collated and analysed the raw data and co-wrote the paper. EA, SM and AM collected the data from their respective emergency departments. LJ and JB advised and helped supervise the study; JB also edited the paper. GL had the original idea, supervised the study, co-wrote the paper and acts as guarantor.

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**Figure 1** Radiograph with metal locking ring clearly visible.

**Competing interests:** None.

**Patient consent:** Obtained.

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