Medical audit

Management of paediatric clavicle fractures – is follow-up necessary? An audit of 346 cases

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We investigated the incidence of complications following childhood clavicle fractures and the necessity for follow-up in fracture clinic after the first orthopaedic consultation. We found that review in fracture clinic has no impact upon the outcome of clavicle fractures and complications such as non-union, mal-union or neurovascular problems are exceptionally rare. We concluded that there is no need for follow-up of children with isolated, uncomplicated clavicle fractures. These patients should be discharged after their first assessment in fracture clinic.

Key words: Audit – Child – Clavicle fracture – Orthopaedic

The clavicle is the commonest bone to be fractured in children and accounts for 5–15% of all fractures.^{1–3} The large number of children being seen in fracture clinics represents a significant workload. Complications arising from simple, isolated clavicle fractures in children are rare and operative intervention is seldom indicated.⁴

The purpose of this study was to investigate whether children with isolated, uncomplicated clavicle fractures may be safely discharged after their first clinic appointment. We assessed our practice, made changes based upon our findings and then closed the loop of the audit cycle by prospectively investigating the outcome of the change in management of this common condition.

Patients and Methods

Retrospective analysis

We reviewed the notes and plain radiographs of all children aged 2–16 years with clavicle fractures attending the

fracture clinic of a district general hospital (PRH) during a 6-year period from July 1992. Only those patients with isolated clavicle fractures in whom all plain radiographs were available were included. The age, sex, right or left side, mechanism of injury and associated neurological or vascular injuries were recorded, along with the total number of clinic appointments attended. All fractures were grouped according to the radiographic classification of Allman (Fig. 1).⁵

Change in practice

Based upon our findings (see below), a protocol for the management of children presenting to fracture clinic was devised, and introduced to two hospitals. Under this scheme, patients with a simple, isolated fracture were counselled and treated with analgesia and a broad arm-sling. They were then discharged from the clinic. Written instructions were provided, and advice regarding return to sporting activities individually determined. The information sheet contained

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Figure 1 Allman classification of clavicular fractures into I (middle third), II (lateral third), and III (medial third) with sub-groups of (a) undisplaced, (b) displaced and (c) comminuted.

telephone numbers to facilitate contacting the fracture clinic in case of unexpected complications. A copy of the information sheet was included with the letter to the general practitioner. Patients who did not satisfy the inclusion criteria (for example, compromised skin over the fracture) were managed according to the practice of the consultant in charge of the fracture clinic.

Prospective analysis

A total of 60 consecutive children aged 2–16 years with isolated clavicle fractures were studied prospectively at two district general hospitals (PRH and KH) over a 6-month period. All children in whom there was no neurological or vascular injury noted at their first orthopaedic appointment and no evidence of skin compromise overlying the fracture were given a broad arm-sling for support, a patient information sheet (Fig. 2) and then discharged from routine follow-up. Patients or their guardian were then interviewed at a minimum of 6 months after the injury to evaluate residual pain or neurological symptoms, restriction in shoulder function and satisfaction with cosmesis. Any re-attendance at clinic was also recorded.

Results

Retrospective analysis

A total of 286 patients satisfied the entry criteria and had complete notes and plain radiographs. The mean age was 7.9 years, 65% were male and the dominant arm was affected in 54%. Of the fractures, 52% were sustained during a simple fall, 24% were sport-related, 15% resulted from a road traffic accident and 9% during a fall down stairs. The rate of re-fracture within 1 year was 1.6%. The fracture pattern (Table 1) did not depend upon the mechanism of injury and is similar to those described in previous papers.^{5–7}

Two patients had non-specific tingling down the affected arm documented in the accident and emergency records, but these symptoms had resolved by the time of the consultation in fracture clinic. One of these patients had sustained a type Ia fracture following a simple fall whilst the other had received a direct blow to the shoulder

Fig. 2 Parental sheet for childhood clavicular fractures.

Your child has a broken (fractured) collar bone. It is the most frequently fractured bone in children. There is no specific treatment needed for the injury other than rest and time.

Expect that this collar bone will be painful for about 4–6 weeks.

A broad arm-sling will help to reduce pain at the fracture site, as will the pain killers prescribed by the doctor at the clinic or from A&E. Your child may find it more comfortable to sleep sitting up a little for the first few days following the injury.

The 'bump' over the break is quite normal and is produced by healing bone. It may take about 1 year to disappear but if your child is older than 10 years a small bump may remain.

Your child may return to sports such as swimming as soon as comfortable, but should avoid contact sports for 6 weeks.

If your child has any of the following symptoms please contact the **FRACTURE CLINIC** at [_____] Hospital on [__telephone number__] and ask for an appointment at the next fracture clinic:

1. Pain at the site of the fracture after 6 weeks.
2. Persistent tingling or abnormal sensation in the arm or hand.

during rugby, sustaining a type Ib fracture. Of the patients, 17% were discharged after their first clinic visit, 68% after their second visit and 12% after the third visit. Some 3% attended four or more appointments and 6% had further plain radiographs during the follow-up period. These additional clinic appointments and radiographs did not alter the subsequent management of the patients.

Prospective analysis

The mean age was 8.2 years, 75% were male and the dominant arm was affected in 62%. The fracture pattern (Table 1) was similar to that described in the retrospective study. There were no neurovascular or skin complications. One patient re-attended the clinic 1 week following discharge complaining of pain at the fracture site. He was reassured, given analgesic advice, and discharged. All patients were interviewed at a mean of 7.3 months (range, 6–10 months) after injury. No patient reported shoulder pain and all were back to normal activities. Every patient was satisfied with the cosmetic appearance at the fracture site

Discussion

This study confirms that the incidence of complications following isolated childhood clavicle fractures is very low. The epidemiology of our patients is similar to others in the literature and, to our knowledge, this is the largest review of paediatric clavicle fractures.^{1–3,6,7} It is unlikely, therefore, that this series of patients is unusual in any way. It demonstrates that routine follow-up of these patients is not necessary in order to achieve a satisfactory clinical outcome.

The thick periosteum that surrounds the clavicular shaft protects the fracture from excessive displacement. The powerful re-modelling characteristics of fractures in children means that even those fractures that are displaced or involve the lateral end of the clavicle appear to unite without complication.¹

In the retrospective part of this study, 83% of patients had follow-up appointments and 6% repeat radiographs. This is an inappropriate use of time and resources both for the patient and the NHS. Our new practice of early discharge with thorough counselling and a patient information sheet proved to be acceptable to patients and did not compromise the clinical outcome.

Table 1 Allman classification of clavicle fractures in 286 children studied retrospectively and 60 children studied prospectively

Fracture type	Number of patients	
	Retrospective (% of total)	Prospective (% of total)
I	271 (94.8)	57 (95)
Ia	112 (39.2)	24 (40)
Ib	155 (54.2)	32 (53.3)
Ic	4 (1.4)	1 (1.7)
II	13 (4.5)	3 (5)
IIa	8 (2.8)	2 (3.3)
IIb	5 (1.7)	1 (1.7)
IIc	0 (0)	0 (0)
III	2 (0.7)	0 (0)
IIIa	1 (0.3)	0 (0)
IIIb	1 (0.3)	0 (0)
IIIc	0 (0)	0 (0)
Total	286	60

Conclusions

We recommend that children with an isolated fracture of the clavicle, in whom there are no complications at initial fracture clinic review, may be safely discharged from further follow-up. Written instructions help re-inforce the information regarding the natural history of such injuries. Managing these patients in this way reduces the burden on busy fracture clinics, where 5–15% of all childhood fractures are of the clavicle.

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