Trauma rapid review process: efficient out-patient fracture management

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ABSTRACT

INTRODUCTION Our hospital operates a consultant-led, rapid review process of X-rays and case notes of all musculoskeletal injury patients on a daily basis. This compares with other centres where patients are reviewed in out-patient fracture clinics soon after injury. The aim of this study was to evaluate the effectiveness of this consultant-led, rapid review process compared to standard consultant fracture clinics.

PATIENTS AND METHODS A prospective study of the rapid review process over 4 weeks of all musculoskeletal injury patients was conducted. The total number of patients referred per day, time taken to review these patients X-rays and case notes, number of recalls and reason for recall were documented. This was compared to consultant-led fracture clinics, which included time taken to review patients.

RESULTS A total of 797 patients were processed through the rapid review over 4 weeks: 53 (6%) patients were recalled, 32 (4%) for a change of management and 21 (2.6%) because of lack of information. The mean number of patients referred per day was 28 taking a mean of 28 min; thus the mean time to review one patient was 1.0 min. The mean number of patients recalled per day was two. The mean time taken to review a patient in a standard fracture clinic was 11 min. Therefore, the total time that would have taken to review 28 patients in a standard fracture clinic would be 308 min.

CONCLUSIONS A consultant-led, rapid review process of all patients with musculoskeletal injury is a very efficient process. The rapid review process saves clinic time and resources, minimises delays in clinical decision-making and saves the patient an unnecessary visit to the outpatient department.

KEYWORDS

Fracture – Radiograph – Musculoskeletal injury – Out-patient – England

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Musculoskeletal injury is one of the commonest causes for attendances to the accident and emergency department (A&E) and account for about 50% of patients presenting to A&E.¹ These A&E departments are usually staffed by inexperienced junior doctors. Trauma patients are initially treated by the emergency doctor and then referred to fracture clinics for further management. Errors such as misinterpretation of X-rays in A&E are common² and this leads to both a delay in diagnosis and management. Subsequently, this delay may lead to short- and long-term complications and disabilities.

New methods of caring for trauma patients must be designed to serve better the needs of these patients and reduce costs. At the Leicester Royal Infirmary (LRI), a consultant-led, rapid review process is employed 365 days a year. X-rays and case notes of all patients with musculoskeletal injury seen by A&E staff or referred to fracture

clinic from A&E and general practitioners (GPs) on a daily basis are reviewed by the orthopaedic consultant on-call the following morning. This compares to other hospitals where trauma patients are reviewed in the out-patient fracture clinic soon after the injury. We are not aware of this rapid review process occurring at other trauma centres.

The aim of this study was to evaluate the effectiveness of the consultant-led, rapid review process operating at our hospital compared to standard fracture clinics.

Patients and Methods

This study was based on information collected prospectively over a 4-week period in May 2004 at the Leicester Royal Infirmary. The X-rays and case notes of all patients with musculoskeletal injury were reviewed in the rapid review process by the consultant orthopaedic surgeon on-call the

following morning. During this review meeting, decisions are made whether the patient is referred to a routine out-patient fracture clinic, nurse-led fracture clinic, recalled for further review or change of management or discharged back to GP care (Fig. 1). Nurse-led fracture clinics review patients who have injuries that would be expected to require one follow-up appointment and be discharged. The types of injuries suitable for inclusion in nurse-led fracture clinics are summarised in Table 1. The reviewing consultant specifies the time interval for when patients are to be seen in an out-patient fracture clinic or nurse-led clinic. Clerical staff in the fracture clinic send out appointments to patients via mail the same day the case notes and X-rays are reviewed by the consultant orthopaedic surgeon on-call. This is not associated with any increase in administration cost to the hospital as this activity would be required regardless of the review method. Contact details of patients are recorded in the case notes by

the A&E staff and the possibility of losing contact with patients is no different than any other appointment.

The total number of patients per day and time taken to review the X-rays and case notes of all patients during the morning meeting were recorded. In addition, the number of recalls per day was noted. The diagnosis, reason for recall and the day the patient was reviewed following recall were documented. Recall patients are contacted by the nursing staff the same day as the review meeting and requested to return to the fracture clinic.

Another prospective study was undertaken. The number of patients and time taken to review patients in routine out-patient fracture clinics over a 2-week period in September 2004 at the LRI was recorded. These fracture clinic timings were intended to be a guide only.

The time taken to review patients in the rapid review process was compared to the time taken to review patients in a routine out-patient fracture clinic.

Results were analysed using simple descriptive statistical tests.

Results

X-rays and case notes of 797 patients were reviewed by the consultant orthopaedic surgeons on-call in the rapid review process over the 4-week period. Of these 797 patients, 406 (51%) were referred to a routine out-patient fracture clinic and 298 (37%) were referred to a nurse led fracture clinic. Thirty-five (4.4%) patients were discharged back to their GPs and 7 patients (1%) back to A&E for further follow-up. The average number of X-rays and case notes reviewed per day was 28 (range, 12–45). The average time taken to review these 28 patients was 28 min (range, 12–52 min), thus the average time to review one patient's X-rays and case notes was 1 min.

Table 1 Types of injuries seen in nurse-led fracture clinic

UPPER LIMB

- Fractured clavicle
- Fractured radial head, undisplaced
- Fractured distal radius, undisplaced
- Fracture ulna styloid
- Fractured metacarpal(s) not requiring surgical intervention
- Greenstick fractures, radius
- Buckle fractures, radius

LOWER LIMB

- Stable avulsion fractures of lateral malleolus not requiring surgical intervention
- Fractured base of fifth metatarsal, undisplaced

Table 2 The diagnosis of recall patients

Diagnosis	Number of patients
Hand Injuries	16
Fracture of distal radius	14
Fractures around elbow joint	6
Foot injuries	5
Injuries around ankle joint	3
Fracture of tibia/fibula	3
Painful hip	1
Other injuries	5

Of the 797 patients, 53 (6.6%) were recalled for either further assessment or change in management. Thirty-two of the recalled patients (60%) were recalled for a change in management which involved either admission as an in-patient or out-patient procedure. Twenty-one of the recalled patients (40%) were recalled for further assessment because of inadequate information in the case notes or X-rays to allow a clinical decision to be made. The diagnoses and time interval for the recall patients to return to hospital for review are shown in Table 2 and Figure 2, consecutively.

Nursing staff were not able to contact two recall patients. Letters were sent to these two patients with an out-patient appointment after 1 week. Both patients did not attend this out-patient appointment. One recall patient refused to return to the fracture clinic for further management.

In comparison to the rapid review process, 567 patients were seen in routine out-patient fracture clinics over the 2-week period (26 sessions). The average number of patients seen in one session by a consultant was 22 (range, 12–30).

The average time taken to review these patients in one session was 244 min (range, 180–310 min). Thus, the average time to review one patient in a routine out-patient fracture clinic was 11 min.

Discussion

Misdiagnosis of fractures and dislocations has been identified as the cause of about 45% of claims made against A&E services.⁵ It is essential in terms of patient care and financial costs that the interpretation of trauma X-rays is accurate. Currently, there are no national standards of interpretative accuracy of X-rays. Studies have estimated the interpretative accuracy of consultant radiologist to be 99.25–99.8%.^{4,5} Guly,⁶ in a large study, showed that about 80% of diagnostic errors in A&E are due to misreading of X-rays. The majority of the diagnoses missed on X-rays were fractures and dislocations. The most common fractures missed on X-rays were greenstick fractures of the wrist, and fractures of the scaphoid and radial head. These findings are comparable with the fractures of the recall patients in our study.

The majority of diagnostic errors on X-rays are made by senior house officers (SHOs).⁶ McLauchlan *et al.*⁷ suggested that SHOs need specific training in X-ray interpretation and should not be allowed to diagnose from X-rays until their ability to do so has been tested and is of acceptable level. Our aim at the LRI is to achieve a reduction in the errors made in the interpretation of X-rays. Therefore, the rapid review process implemented at the LRI assures that every trauma X-ray requested by A&E is reviewed by a consultant.

Over one-third of trauma patients in our study were referred to a nurse-led fracture clinic. These clinics divert a large number of patients expected to have an uncomplicated recovery from existing large routine fracture clinics to nurse-led follow-ups. A prospective study by Williams *et al.*⁸

Figure 2 Number of days taken for recall patient to return to hospital for review.

was conducted at the LRI to assess nurse-led clinics. In this study, patients perceived nurse-led clinics to be highly satisfactory and discharge by nursing staff was acceptable to patients.

During the study period, 4% of patients had to be recalled for a change in management. This represents a success of the rapid review process that takes place at the LRI. However, 2.6% of the patients had to be recalled for further assessment. The reason for the further assessment was lack of information in the patient case notes. This represents a failure in the system and better documentation is required in A&E case notes. Unfortunately, we were unable to recall two patients for further assessment due to missing contact details that were not recorded in A&E. This also represents a failure in the system. The two lost cases were a distal radius fracture and fifth metatarsal fracture. The patient that refused to attend the hospital for further review had a distal phalanx fracture of the thumb. The majority of recalls returned to hospital for review the same day as they were contacted.

The rapid review process reduces the number of patients that need to be seen in the fracture clinic and relieves pressure on medical staff. The rapid review process allows initial management decisions to be made avoiding the first out-patient appointment. Alternatively, patients with musculoskeletal injuries presenting to A&E would require an early orthopaedic fracture clinic appointment or A&E follow-up to initiate a management plan. Therefore, each patient with the rapid review process has one less out-patient appointment. The frustrations of hospital waiting times and transport difficulties are avoided. One of the most important factors is the financial impact. The same 28

patients reviewed in the rapid review process would require 308 min of routine out-patient fracture clinic time compared to 28 min.

Conclusions

We suggest the introduction of the rapid review process to other trauma centres where the potential to decrease waiting times and cost in fracture clinics would be large.

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