

Hand injury in the accident and emergency service

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SUMMARY

The management of hand injuries forms an important part of the hospital accident and emergency service, and early recognition and informed management are essential for a favourable outcome (Frazier *et al.*, 1978). In Edinburgh a routine system of hand management is well established and includes the training of casualty officers. In order to evaluate the effectiveness of the hand service in the Accident and Emergency Department, Royal Infirmary of Edinburgh, a prospective study was undertaken to compare the outcome of treatment of hand injury by a routine system with treatment over a similar period by more experienced registrars in hand surgery training posts (Hand Fellows).

PATIENTS AND METHODS

A review of hand injury attendance in the accident and emergency department showed that the mean rate of attendance for hand injury was 18 patients per day, and that there was no significant difference in the types of injuries seen on different days of the week (Smith *et al.*, 1985). Since there were no significant differences in attendance between the 24-hour period commencing at 1300 hours on Mondays and 1300 hours on Tuesdays, it was therefore arranged that all patients attending in the 24-hour period from 1300 hours each Monday would be treated by the Hand Fellow, and those attending in the subsequent 24-hour period to 1300 hours on Wednesdays should be treated by casualty officers. It was recognized, however, that it might not be possible for

the Hand Fellow to see all the patients at busy times, or when dealing with time-consuming cases in theatre. Three study groups were therefore defined:

● *Group A1*—Patients attending the accident and emergency department over a 24-hour period from 1300 hours on Mondays examined and treated by the Hand Fellow.

● *Group A2*—Patients within the above period treated by a casualty officer because the Hand Fellow was unavailable. This was necessary to avoid delay in the treatment of straightforward injuries.

● *Group B*—Patients attending over a 24-hour period from 1300 hours on Tuesdays treated by casualty officers using the established routine system of hand management.

Hand injury was defined as any condition affecting the hand distal to the flexor crease of the wrist, or affecting the nerves, tendons or vessels which cross over the wrist to enter the hand. Fractures of the wrist, radius and ulna were excluded from the study. Patients who had no specific history of injury other than pain, swelling or loss of function were included.

The routine system of management, already well established in the accident and emergency department, was defined as follows:

Patients are initially examined by the accident and emergency senior house officer who decides whether or not to seek advice. This decision is based on guidelines described by MacNicol & Lamb (1983), and on knowledge gained by regular tutorials on the management of hand injury given by a member of the orthopaedic staff. Advice is immediately available from an experienced registrar or senior registrar in accident and emergency medicine, who advises referral to the duty orthopaedic registrar if necessary.

One of the main problems in carrying out a study of this kind within a busy accident and emergency service is to collect and record in a systematic and standard way the multiplicity of variables associated with the structures of the hand, without making additional demands on busy staff. A computer-compatible recording system was therefore developed which allowed information to be recorded on a single sheet and then stored, retrieved and analysed by computer. Details of age, sex, occupation, nature and type of hand injury, including hand injured and dominance, place of injury, management and disposal were recorded by the examining Hand Fellows from group A1, and were recorded retrospectively from the case notes for group A2 and group B.

The outcome of management was measured by use of a postal questionnaire which was sent out 6 weeks after injury. Visitors from abroad, prisoners and patients in institutions were excluded from follow-up. Information was sought on the rate of recovery and the extent of continuing problems. The option of a return appointment for review was offered to those who had already been discharged but who considered that they still had problems with their hand.

RESULTS

A total of 572 patients were studied over a period of 16 weeks as follows:

Group A1—Treated by Hand Fellow	168 (29%)
Group A2—Not seen by Hand Fellow	138 (24%)

Group B—Treated by Casualty Officers 266 (47%)

Forty-seven patients (8%) were excluded from follow-up—27 visitors and 20 from hospitals or prison. Since over half of the initial documentation was obtained from records (groups A2 and B), some of the information sought was not recorded; variables not recorded in more than 10% of cases included right or left hand dominance, place of injury (work, home, etc.), and days since injury (Table 1). The data which were fully recorded throughout—age, sex, hand involved and time of arrival—were similar in the three groups.

The median age was 25 years and the range was 11–90 years. The right hand was injured in 54% of cases, and 68% were male. Twenty-eight per cent of patients had arrived in the morning, 37% in the afternoon, 29% in the evening and 5% after midnight. In 446 cases where the interval from injury to attendance was recorded, 57% attended on the day of injury and 19% on the day following injury; in a further 17% of cases the interval was 3–7 days and the remaining 7% attended within 14 days of injury.

Table 1 Information most frequently not recorded in accident and emergency notes

	Number of cases <i>n</i> = 572	Missing information %
Dominant hand	401	70
Place of injury	165	29
Interval since injury	122	21
Occupation	101	18

CAUSES OF INJURY

Of 408 recorded cases, 25% were injured at home, 33% at work, 19% in the street, 14% at sport and in 9% of cases no specific cause was specified (infection, swelling or pain only). The causes of injury were many and varied; accidents involving tools, metal, machinery and glass predominated. Falls were common, and many of the injuries caused by glass were initially due to falls.

Since many injuries involved more than one structure (a deep cut to a tendon always involved a skin wound as well), only the main structure injured was recorded in a hierarchical summary starting with non-specific and skin injuries only (Table 2). There were no significant differences in the types of injuries treated in groups A1 and A2 compared to group B but, as anticipated, more serious injuries were treated in group A1 when compared to group A2.

MANAGEMENT

A total of 329 patients (57%) were discharged from the accident and emergency department. A higher proportion were discharged in group A2 (99 [71%]) and group B

Table 2 Summary of structures involved

	Group A1 n = 168	Group A2 n = 138	Group B n = 266	Total no. 572	
Non-specific	14	24	50	88	15%
Skin	70	82	141	293	51%
Bone	39	17	44	100	17%
Joint	31	10	21	62	11%
Tendon	7	2	5	14	2%
Nerve	4	1	—	5	1%
Amputation	1	—	3	4	1%
Multiple	2	2	2	6	1%

(164 [62%]) than in group A1 (66 [39%]). Thirty-five patients (6%) were admitted (A1—14; A2—5; B—16). A further 209 (36%) patients were referred to hand clinics for further treatment or review; this represented 88 (52%) of group A1, 34 (25%) of group A2 and 87 (33%) of group B. The main reasons given for the higher rate of review in group A1 were (a) to check progress, (b) to make sure that splintage remained as applied, and (c) to ensure that the patient had understood and was following advice given on first attendance.

There were no significant differences in the treatment methods involved in the three groups: 178 (31%) required advice only, and 109 (19%) required wound toileting and dressing. Wound closure was required in 151 (26%) cases, and was achieved by the use of steristrips (66) or sutures (85). Seventy-nine cases (14%) required immobilization; 15 fractures required reduction and 7 internal fixation; 7 tendons were repaired and 15 cases involved multiple procedures. In six cases the procedure was not specified.

FOLLOW-UP

Experience in previous research (Smith *et al.*, 1985) had shown that 6 weeks after injury was the optimum time to initiate follow-up by postal questionnaire. By the time replies were received the interval from initial injury to the patient's progress report might range from 7 to 12 weeks after injury. Of 525 patients who were sent questionnaires 6 weeks after injury, 391 (74%) replied. A small sub-sample (20 cases) of non-respondents were contacted by a second letter or by telephone, and in every case they reported that their hand had completely recovered. No assumptions were made about the 134 patients who did not reply, other than that they had not sought a further appointment. The follow-up results were based on the 391 patients who replied to the questionnaire.

Of the 391 patients who replied, 221 (57%) reported that their hand had returned to normal; this represented 49%, 64% and 58% in groups A1, A2 and B respectively. Of the remaining 170 patients, 28 (7% of those who replied) were still attending clinics; 41 patients (10%) who had already been discharged requested a further appointment. The

remaining 101 patients considered that although their hand had not fully recovered, they did not wish to return to the clinic for review. Of the 41 patients who requested a further appointment, 20 were in group A1, 7 in group A2 and 14 in group B. Thirty patients kept the appointment and 28 of them required reassurance only. In only two cases was further action required—in one case for a collateral ligament repair and in the other for excision of the nail bed because of persistent infection. The remaining 11 patients, having been given an appointment at their own request, did not attend. Therefore, of a series of 391 patients who replied to a questionnaire more than 6 weeks after hand injury, 57% had fully recovered, 26% did not wish further advice or treatment, 8% sought further advice, 7% were still attending clinics and 2% did not keep their appointment.

DISCUSSION

The importance of early recognition of potential problems is recognized by Johns (1981). The higher proportion of patients followed up in group A1 reflected the anticipation by the trained surgeon of potential problems.

Many of the injuries were superficial skin injuries, often regarded as trivial, yet it is interesting to note that of 391 patients who replied to the questionnaire, only 57% of them considered that their hand had returned to normal more than 6 weeks after injury, although most of them did not consider that further treatment was needed. The majority of patients who took up the offer of a review appointment needed advice only. This suggests that more information needs to be given on the nature and management of the injury, and in particular, reassurance is required that apparently 'trivial' injuries may continue to be stiff and painful for several weeks after injury. On the other hand, the patient should also be instructed that signs such as inflammation and swelling should not be ignored.

A higher proportion of patients in group B (62%) were discharged from the accident and emergency department than in group A (50%), and a correspondingly higher proportion of patients in group A (38%) were reviewed in hand clinics than in group B (32%). In spite of these differences in review management there were no differences in the number who reported full recovery 6 weeks after injury (A1 + A2—56%, B—58%). Those who attended most review clinics (group A1) reported the lowest return to normal hand function. Although this group contained most serious injuries, the results suggest that continuing attendance at review clinics might condition attitudes to full recovery. Of the 572 patients initially seen, only 41 patients sought a review, and only two of these required surgical intervention. This suggests that if early management is good then later review need not be so extensive provided that the patients are alerted to the fact that they must return immediately if any adverse signs such as redness or oedema appear or persist.

Edinburgh has a well-developed system of training for casualty officers and the results indicate that this was the main contributory factor to the successful outcome in both groups. No evidence was found to suggest that in any group serious injuries were missed or that incorrect or inappropriate treatment had been given. The results suggest

that a favourable outcome depends more on the quality of the initial management than any further review. This initial management depends on a well-developed training system for casualty officers with adequate support from senior staff. If appropriate information on management is given both to accident and emergency staff and to the patient, with full back-up support, and with well-defined review procedures, then later problems are reduced to a minimum.

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