A week of pain in the emergency department

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Abstract

Background: Pain is a common complaint in patients attending the emergency department (ED), and historically, it is under-assessed and undertreated. Previous research is heterogeneous and does not well describe pain in EDs over time. Our aim was to describe pain in a UK ED using a sample that included every adult attendance over the course of 1 week.

Methods: We retrospectively reviewed every adult attendance (N = 1872) over 1 week to the ED of a large English NHS District General Hospital. We noted the initial pain score and, if the initial score was ≥ 5 , the final recorded pain score. We categorised attendances as 'illness' or 'injury'.

Results: In all, 62.1% of patients had a pain score recorded, of whom 50.7% had a pain score of zero. Median pain score was 6/10 in patients with pain; 58% had a second score recorded. More patients with illness than injury had a second score recorded. Most patients had an improvement in their pain; however, around one-third had no change or worse pain at the end of their ED stay.

Conclusion: We have defined the incidence, severity and change in pain in an ED over 1 week. This information will underpin the design of future studies aimed at improving patient care in this important area of emergency medicine practice.

Keywords

Acute pain, chronic pain, pain, pain measurement, emergency department

Introduction

Pain is a common problem among patients attending the emergency department (ED).^{1–4} Previous studies have found both assessment and reassessment of pain to be inadequate, and suboptimal pain management, termed 'oligoanalgesia', has also been identified as a problem.^{5,6} The underlying reasons are likely to be multifactorial and may be hard to change; however, this is an important area of clinical care.

To provide the basis for sample size calculations for future interventional studies in pain management, we needed to know the incidence of pain of various degrees and the natural history of change in pain during routine ED care. Six previous studies (Table 1) have reported the incidence of pain in the ED to be 61–78%, with the higher value being found on direct questioning of patients. Three studies looked at more than one pain assessment. We did not think that this

existing literature well described the incidence, level and change in pain in patients presenting to emergency care, as the studies found were heterogeneous – varying greatly in size, patient selection, method and aims. All but one were conducted in North America and most were over 10 years old, so may not reflect current practice. Only one study included all possible

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Table 1. Summary of studies addressing pain in the ED.

Authors	Cordell et al. ²	Johnston et al. ¹	Todd et al. ⁴	Tanabe and Buschmann ⁷	Ducharme and Barber ³	Guéant et al. ⁸
Year	2002	1998	2007	1999	1995	2011
Location	Urban tertiary-care referral centre ED, USA	Two university teaching hospitals, Canada	20 EDs in USA and Canada	Large urban ED, USA	Tertiary-care academic ED, Canada	50 EDs across France
Type of study	Retrospective prevalence study	Prospective survey	Observational prospective multicentre cohort study	Descriptive interview study	Prospective blinded observational study	Prospective survey
Type of patients	All ED attenders	Excluded ambulance patients, chest pain and critical illness	All ED patients with a pain score of 4 or more, excluding admissions	ED patients with a 'chief complaint related to pain'	All ED attenders when research nurse present. Excluded chronic pain	Adults (>15), inclusion rate determined a priori
Time period studied	7 days, consecutive notes	1 week (10 a.m.–10 p.m.)	11 days, every other day in 8-h shifts	Seven consecutive days (11 a.m.–9 p.m.) + 2 further days	2 months	1 week
Number of patients included	1602 patients (1665 encounters)	286 adults 334 children	842	203	42	11,617
Number of patients with pain (%)	1019 (61.2%)	218 adults (76%)	All	160 (78.8%)	All	7265 (63%)
Number of patients with documented pain (%)	1019 (61.2%)	Unknown	83%	Unknown	No objective score used More than half of charts had no comment on pain	6527 (89.8%)
Number of patients with no pain (%)	568 (34.1%)	29%	N/A	Unknown	N/A	3455 (29.7%)
Average pain score on admission (/10)	N/A	3.76 (adults) 3.59 (children)	8	6.13	Mild 3.08 Moderate 6.42 Severe 9.08	5.2
Number of patients with moderate-to-severe pain on admission	N/A	52% (adults) 48% (children)	All	Unknown	29 (69%)	4805 (66%)
Average pain score on discharge (/10)	N/A	3.0 (adults) 2.98 (children)	6	Unknown	Unknown	27% had moderate-to-severe pain
Other notes	'Pain equivalent' words included, may have led to over-recording	11% of patients had worse pain on leaving the ED	Only 31% had a reassessment	Few elderly patients included		2666 had reassessment (41%)

ED: emergency department.

Figure 1. Overall distribution of pain scores (per cent of category above).

patients, all others had exclusions based on patient characteristics, sample sizes, pain severity or availability of research staff. We therefore wanted to determine the incidence and severity of pain in an ED by including every adult presenting to the department over the course of 1 week. We also wanted to look at whether there was a relationship between the type of presenting complaint and the pain score.

Methods

We gathered data on every adult attendance to the Emergency Department at Leicester Royal Infirmary during 1 week in November 2015. This is a large university hospital with an annual adult ED census of 120,000 patients. Pain is usually recorded on arrival using a verbal numeric pain score ranging from 0 to 10.

We reviewed the notes of every patient and recorded the day of the week, age, presenting complaint, initial pain score and final recorded pain score if the initial score was ≥ 5 (considered moderate or severe). To find an initial pain score, we first looked at the nursing assessment form, then at the observation chart (which has a space for recording pain scores), and then at the notes themselves. If the patient was initially assessed in the adjoining Urgent Care Centre, we also looked at these notes if a pain score was not present elsewhere. We coded each presentation as either 'illness' or 'injury'. Injury was used where there were terms such as 'injury', 'fall', 'accident' or for musculoskeletal pain. Illness included any description of illness and terms such as 'abdominal pain' or 'headache'. Where no numeric score could be interpreted from the notes

(simply a description in words such as 'aching in chest'), data were classified as 'missing'.

We undertook descriptive analysis of the initial pain scores (excluding patients with a score of zero) and plotted the distributions of pain scores for illness and injury presentations. The change in pain during the ED stay for patients who initially had moderate or severe pain was plotted, assuming that a change of 2 or more was clinically significant.⁹⁻¹³

Results

During the 7-day study period, 1839 adult patients attended the ED. A pain score was found in 1142 sets of notes (62.1%), of which 579 had a pain score of 0 (50.7%). In patients with a pain score >0 , the median initial pain was rated as 6/10. One-third of patients had pain following an injury (28.9%) and two-thirds (71.1%) of pain was secondary to illness. The distribution of patients between illness and injury and categorisation of pain in each group are shown in Figure 1.

Initial pain scores were fairly evenly distributed over the range apart from lower frequencies at 1 and 9 (Figure 2). The distribution of pain in patients with a score >0 was similar in both injury and illness categories (Figure 3), with a median pain score of 6 in both groups.

Of the 378 patients whose initial pain was moderate or severe (initial pain score ≥ 5), just over half (219, 58%) had a second pain score. Fewer patients with injury had a second pain score recorded (50/129, 39%) compared to illness (169/249, 68%). Using Fisher's exact test, this was significant with a p value of <0.0001 .

The median change in pain in the injury group (-3.5) was similar to the illness group (-3.0). Around

two-thirds of patients (135, 62%) had an improvement in their pain which could be considered clinically important (2 or more points; Figure 4 and Table 2). Half of patients with a second score (109, 49.8%) had an improvement of 50% or more. However, about a third of patients (77, 35%) with moderate or severe pain on arrival had no significant change by the time they left the ED.

Discussion

There have been few previous descriptions of pain distribution in UK emergency care. This study has defined the number of patients in pain, its severity and how it changes over the course of the ED visit. We included all adult patients who attended the ED over 1 week. Although there may be casemix variations between EDs, the range of presentations is probably representative of UK emergency care.

Figure 2. The overall distribution of pain for scores >0 .

Figure 3. The distribution of pain in 'injury' and 'illness' categories for patients with a pain score >0 .

Figure 4. Change in pain for 'injury' and 'illness' categories (shaded area = no clinically significant change).

Table 2. Comparison of initial and final median pain scores and distribution of pain change in those with second score available.

	Injury			Illness		
Initial median pain (scores >0 only)	6 (n = 202)			6 (n = 361)		
Change (patients with initial score of 5–10 only)	Better 33 (66%)	No change ^a 16 (32%)	Worse 1 (2%)	Better 102 (60%)	No change ^a 61 (36%)	Worse 6 (3.6%)

^aNo change includes changes of -1, 0 and +1 (i.e. no clinically significant change).

About two-thirds of the patients had a pain score recorded, which is similar to previous studies.² There are several reasons why a pain score may not be recorded (e.g. a clinical presentation without pain or a patient in such severe pain that the clinical team moves straight to providing analgesia). We do not have any information about the reason for non-recording or whether or not these patients were in fact in pain. Of the patients with a documented pain score, half had a score of zero. This means that the true incidence of pain on arrival must have been between 30.6% and 68.5%. This range seems lower than the proportion of patients in pain in previous North American studies of 71%¹ and 66%.² This may be due to casemix variation (the relative proportions of injury and illness); however, there is insufficient data to draw a firm conclusion. In our dataset, more than twice as many of our patients presented with illness than with injury.

There was a difference in reassessment of pain between the illness and injury categories. Around one-third of patients in the 'injury' category and two-thirds of patients in the 'illness' category had a second score recorded. We do not know whether this difference was because of an intrinsic difference between the two categories or due to other factors. It is possible that some 'injury' patients had a shorter stay and therefore less opportunity for second scores to be recorded. In our department, minor injury patients are unlikely to have an observation chart, which has space to record the pain score and may act as a prompt to staff to repeat the pain scoring.

In our literature review, we were not able to identify any overall standards for the proportion of ED patients who should have a pain assessment. The Royal College of Emergency Medicine (RCEM) renal colic audit¹⁴ specifies a target of 100% of patients having their pain score recorded, and the fractured neck of femur audit¹⁵ specifies that there should be an improvement in the recording of pain scores but does not give a target. The lack of universal standards makes it difficult for departments to audit their own performance and makes it difficult for researchers to determine whether or not there is variation in practice between departments. The Declaration of Montreal¹⁶ sets out clear standards for

all people to have appropriate assessment and management of their pain, and prior to this, there was a drive in the United States to view pain as the 5th vital sign.¹⁷ Some departments in the United Kingdom have pain as an element of their routine observations.

While we found a lower proportion of ED attenders with pain, our patients who did report pain had about the same pain scores as some previous reports,⁴ although lower than one previous study⁸ which recruited only patients who attended due to pain (and would therefore be expected to have a higher pain score than an unselected emergency care population). The lack of patients reporting a score of 1 or 9 is a well-known scale end phenomenon in a 0–10 visual analogue scale.

Change in pain score gives a measure of the effectiveness of treatment, and therefore repeated measurements might be expected in every patient who presents with pain. The RCEM Clinical Standards for Emergency Departments in 2014¹⁸ addresses reassessment of pain, stating that 90% of patients with severe or moderate pain should have documented evidence of re-evaluation within 120 minutes. We found that just over half of these patients had a second pain score measured. This seems rather low, but is in fact higher than comparable published figures where only about 30–40% of patients had the effectiveness of their treatment assessed.^{4,9}

Of the patients initially in moderate or severe pain who had a repeat pain score measured, 62% had an improvement of 2 or more points in their pain. This is similar to the previously published ED figure of 50%.⁴ However, even if comparable to previous data, there certainly seems to be room for improvement as one-third of patients do not have any significant improvement in their pain in the ED. A better understanding on why intervention was not effective has the potential to improve patient experience in emergency care.

This retrospective study has some limitations. Among the 39% of the patients who did not have pain scores available, we could not differentiate between those who were not asked about pain because they were obviously not in pain and those who were in pain but, for some reason, a pain score was not recorded.

Patients with an initial score of 10 could have a decrease of 2 points, which we would consider clinically significant, but not an increase of 2 points. This would be reversed with patients who had a score of zero; however, we did not record subsequent scores for this group. Our data are from one ED, and we do not know how much variation there is between EDs (which in itself is an interesting area for future study). Current results are sufficient for our primary aim of publishing the data required to enable researchers in this area to undertake sample size calculation for future studies.

Conclusion

We have defined the prevalence, severity and change in pain in an ED using an unselected sample of all adult presentations over the course of a week. This information will underpin the design of future studies aimed at improving patient care in this important area of emergency medicine practice.

Conflict of interest

The authors declare that there is no conflict of interest.

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