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Adverse events in plastic surgery

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SUMMARY. Adverse events are a serious source of harm to patients and a large drain on the resources of healthcare providers. Retrospective studies have previously been carried out in the USA, Australia and the UK. In this study a prospective approach was employed, using similar methods to previous studies to detect the levels of adverse events over a period of one month. We also recorded the categories, causes and preventabilities of adverse events. We measured the degree of disability and the length of additional bed stay. Of the 537 patients treated in our department, 15 (2.8%) had adverse events; these patients were older than those who did not have adverse events, and were mainly emergency admissions. Most of the adverse events were operative and led to temporary disability. Overall, 139 extra bed stays were attributed to these adverse events. This report confirms the feasibility of conducting a prospective study of adverse events and of making preliminary estimates of their incidence and costs. © 2003 The British Association of Plastics Surgeons. Published by Elsevier Science Ltd. All rights reserved.

Keywords: adverse events, prospective study, causation, preventability.

An adverse event is defined as an unintended injury or complication that results in disability, death or prolonged hospital stay and is caused by healthcare management.[1] Hospital-acquired injuries are not systematically reported. This may be because of a fear of litigation and the lack of definitions of the scope and nature of the problem. Preventative measures cannot be implemented until these issues are addressed.

Retrospective studies of hospital-care records in the USA, Australia and the UK have shown a substantial rate of adverse events. The Harvard medical practice study found that 3.7% of hospital admissions were associated with adverse events.[2,3] In 70% of these, the patients experienced only short-term disabilities, but in 7% the disabilities were permanent and in 14% they led to death. Similar rates were found in a study from Colorado and Utah.[4] An Australian study found that 16.6% of admissions were associated with adverse events, half of which were preventable.[1] In the UK, a pilot study using similar methods to those used in the USA and Australia studied adverse events in two acute hospitals in Greater London, and found that 10.8% of patients experienced an adverse event, with the overall rate of adverse events being 11.7%.[5] Half of these were judged to be preventable.

To date, all studies of adverse events have been retrospective, relying on accurate documentation and interpretation. We have used similar methods but conducted a prospective study. We report the proportion of admissions associated with adverse events, the clinical categories of adverse events, the extra bed days attributable to adverse events and the preventability of adverse events.

Patients and methods

The study was carried out during April 2001 in the Department of Plastic Surgery at the Royal Victoria Infirmary, Newcastle-upon-Tyne, UK.

All healthcare professionals in the department were notified of the study so that no patients were missed. They were given a table of 18 predefined screening criteria (Table 1).[1] If they found a patient who did fit any

Table 1 Predefined screening criteria

1.	unplanned admission before index admission
2.	unplanned readmission after discharge from index admission
3.	hospital-incurred patient injury
4.	adverse drug reaction
5.	unplanned transfer from general care to intensive care
6.	unplanned transfer to another acute-care hospital
7.	unplanned return to the operating theatre
8.	unplanned removal, injury or repair of organ during surgery
9.	other patient complications (myocardial infarct, stroke, etc.)
10.	development of neurological deficit not present on admission
11.	unexpected death
12.	inappropriate discharge to home
13.	cardiac/respiratory arrest, low Apgar score
14.	injury related to abortion or delivery
15.	hospital-acquired infection/sepsis
16.	dissatisfaction with care documented in the medical record
17.	documentation or correspondence indicating litigation
18.	any other undesirable outcomes not covered above

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Table 2 Cause

Score	
1.	virtually no evidence for management causation
2.	slight-to-modest evidence for management causation
3.	management causation not likely: less than 50–50, but close call
4.	management causation more likely than not: more than 50–50, but close call
5.	moderate-to-strong evidence for management causation
6.	virtually certain evidence for management causation

of the 18 criteria, a detailed questionnaire was filled in for that case.

Firstly, the type of adverse event (operative, non-operative, etc.) and the cause were defined. Then other details, including where it occurred, the complexity of the case, any coexisting medical conditions or risk factors and whether any protocol was followed, were recorded. Adverse events were those caused by healthcare management rather than by the disease process itself. Each event was given a score according to how likely it was to have been caused by healthcare management (Table 2).[1] Preventability of an adverse event was defined as 'an error in management due to failure to follow accepted practice at an individual or system level'. A score was awarded according to the level of preventability (Table 3).[1] The degree of disability that the patient experienced was then assessed, and divided into temporary (less than 12 months), permanent (over 12 months) and death. To give us an idea of the impact of these adverse events, the length of additional bed stay due to these adverse events was also calculated.

Results

There were 537 patients treated in the Department of Plastic Surgery at the Royal Victoria Infirmary during April 2001 (Table 4). Fifteen (2.8%) of these patients experienced an adverse event, and the total number of adverse events was 17 (3.2%). There was no significant sex bias between patients who did and did not have adverse events. Most adverse events (86.7%) occurred following emergency admission, and patients who experienced adverse events were, on average, older (mean age: 45.3 years) than those who did not (mean age: 37.4 years).

Table 3 Preventability

Score	
1.	virtually no evidence for preventability
2.	slight-to-modest evidence for preventability
3.	preventability not likely: less than 50–50, but close call
4.	preventability more likely than not: more than 50–50, but close call
5.	strong evidence for preventability
6.	virtually certain evidence for preventability

Table 4 Type of surgery

Type of surgery	*Number of patients (%)*
day case	157 (29.2)
elective	102 (19.0)
emergency	278 (51.8)
total	537 (100.0)

Table 5 lists the types of adverse event seen in our department. There were more operative adverse events than non-operative adverse events.

Of the patients who suffered an adverse event, 82% experienced a temporary disability and are expected to recover within 12 months. However, 12% experienced more permanent disability and 6% died. Overall, 53% of adverse events were judged to be preventable.

We calculated that the 17 adverse events led to 139 extra bed days. The basic daily cost of a bed in this unit is £172, so the total cost of adverse events was £23 908 for this month, equivalent to £287 000 per annum.

Discussion

This study has confirmed the feasibility of conducting a prospective study of adverse events within a specialty, in this case plastic surgery. It does have its limitations, in that it was carried out in only one department over the course of one month.

Our rates of adverse events were lower than those reported in previous studies encompassing a wide variety of specialties. One common factor is that about half the adverse events were judged to be preventable. Some adverse events are serious and traumatic for both staff and patients. Others are frequent minor events that go unnoticed in routine clinical care and yet, together, have significant economic consequences.

Table 5 Types of adverse events

Type	*Number of events (%)*
operative	
wound infection	2 (11.8)
technical complications	2 (11.8)
late complications	1 (5.9)
non-technical complications	1 (5.9)
surgical failure	5 (29.4)
total	11 (64.8)
non-operative	
drug related	2 (11.8)
diagnostic mishap	0 (0)
therapeutic mishap	0 (0)
procedure related	2 (11.8)
fall	0 (0)
fracture	0 (0)
anaesthesia related	1 (5.9)
system and other	1 (5.9)
total	6 (35.4)
total	17

This study was inexpensive, requiring minimal resources and time, but relied on the cooperation of fellow healthcare professionals. The individual cases need to be discussed to allow the principal causes to be explored and specific risk-reduction strategies to be identified, costed and implemented. Similar studies could be carried out in other specialties over a longer period of time, and may have implications for risk management and cost reduction for healthcare providers in the long term.

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