Adverse Event Recording Post Hip Fracture Surgery

Abstract:

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Introduction

The number of hip fractures occurring each year is increasing primarily due to the ageing demographics of the population. In Ireland it is predicted that between 2008 and 2026 the number of hip fractures occurring will increase by 100%. This will inevitably lead to a larger burden on health service providers. Hip fractures are a major cause of morbidity and mortality in the elderly population. One third of patients may be unable to regain their ability to live independently after a hip fracture. Given the ages and other co-morbidities of these patients, they are at a significant risk of developing general complications common to any major surgery. It is vital that these adverse events are accurately recorded so adequate resources can be allocated for the management of hip fractures. There are large inconsistencies in the rates of adverse events post hip surgery as recorded by different entities. The reasons for this include differences in adverse event definition, the data not being accurately recorded and reporting bias. Much of the information we have on patient complication rates is dependent on administration abstraction methods. This means that the validity of adverse event recording is dependent on accurate interpretation of clinical records by non-medical staff.

The purpose of this study is to assess whether the current administration abstraction method is giving an accurate representation of the number of adverse events occurring in this patient cohort and therefore reflecting the complexity of these patients.

Methods

This study was carried out at University Hospital Limerick. This hospital provides orthopaedic services for a population catchment area of over 360,000 people and serves the counties of Limerick, Clare and Tipperary. There are approximately 300 hip fracture presentations per annum at University Hospital Limerick. All patients admitted with a hip fracture over a two month period from August to September 2011 were included in this study, giving rise to a sample size of 39 patients. Patients were chosen by means of consecutive sampling in order to reduce bias. All adverse events that occurred in these patients were recorded daily on a standardised form by a clinical nurse specialist. It is these adverse events that were compared with adverse events recorded in the Hospital In-Patient Enquiry (HIPE) database for the same patient group. The HIPE database is a national database which was set up and run on a pilot basis in 1969. It is a computer based system which collects demographic, clinical and administration data on discharges and deaths from national hospitals. In Ireland all acute public hospitals participate in HIPE with reporting on greater than 1.3 million records each year. As HIPE is the only national source we have on morbidity data it is imperative that this information is accurately recorded. Currently the validity of the information stored is dependent on the personnel extracting relevant data from the patients chart in addition to the correct information having been recorded in the chart.

A standardised form was used to record adverse events. An adverse event was defined as any event (not the underlying disease process or injury) that requires additional monitoring/investigation or treatment during the patients acute hospital stay. This form was adapted from Spine AdVerse Events Severity system, SAVES. The adverse event was graded from 1-6 depending on the severity. Grade 1: Adverse event does not require treatment and has no adverse effect; Grade 2: Adverse event requires non-invasive treatment but has no long term effect; Grade 3: Requires invasive or complex treatment, for example, surgery/ICU admission for monitoring, likely to have a temporary effect on outcome (< 6 months); Grade 4: Requires invasive or complex treatment, likely to have a prolonged adverse effect on outcome (> 6 months); Grade 5: Significant event. Serious life or limb threatening event; Grade 6: Adverse event resulting in death. Additional information recorded included type of surgery, date of surgery, date of complication and type of complication.

Results

In total, there were 39 patients enrolled in the study. There were 7 males (17.9%) and 32 females (82.1%) with an age range of between 53 and 98 years. The mean age of the sample was 80.5 years. The most common operation that took place was a cemented hemiarthroplasty which accounted for 46.2% of all operations. This was followed by dynamic hip screw insertion 28.2%, hemiarthroplasty 12.8%, proximal femoral nail insertion 10.3% and a revision proximal nail insertion accounting for 2.5% of operations carried out. Please refer to Figure 1, which also illustrates the variations in the occurrence of complications for each surgery type.

Figure 1
28 (71.8%) of the 39 patients were recorded by the prospective data collection as having an adverse event with a total number of 55 occurring (Table 1). Of the female cohort, 24 (68.8%) suffered an adverse event, while only 4 (57%) males suffered an adverse event. The most common complications included constipation (18.2%), anaemia (14.5%), urinary retention (14.5%), pneumonia (9.1%) and delirium (9.1%). More serious/life threatening adverse events recorded in the study included cardiac events (5.5%), respiratory complications that needed intubation/oxygenation (5.5%), acute kidney failure (3.5%), and sepsis (1.8%). The grades of adverse events that occurred ranged from 2 to 6. 10 patients suffered a grade 2 adverse event, 12 patients suffered a grade 3 adverse event, 5 patients suffered a grade 4 adverse event and 1 patient had a grade 6 adverse event resulting in that patient’s death (Figure 2). This demonstrates whilst the majority of patients suffered non-life threatening events, for 6 (15.3%) patients the complication they suffered led to a prolonged (>6 months) adverse effect on their health and in one case the death of a patient.

In contrast, the HIPE data shows that only 13 (23.6%) adverse events were recorded (Table 1). There were 42 (76.4%) adverse events which were not recorded in the HIPE data for this patient cohort. In addition, two patients who were recorded using the prospective data collection sheet were not recorded by HIPE. There was no grading system or similar system used by HIPE to convey the complexity of adverse events that were recorded and the potential long-term consequences for the patient.

**Figure 2**

**Discussion**

As the demographics of our population is changing and the incidence of hip fractures is projected to increase, it is important that the post-operative complications are accurately documented. This study looked at prospectively collected data in order to gain a more accurate account of all medical complications. The mean patient age was 80.5 years and given the other co-morbidities of the cohort and the nature of the surgery, these factors likely lead to an increased risk of developing post-operative adverse events and complications. We recorded a high level of post-operative adverse events with 71.8% of patients recorded as suffering an adverse event. The majority of these were non-life threatening events but life threatening adverse events such as cardiac events, respiratory complications, acute kidney failure and sepsis accounted for over 16% of total adverse events recorded. Only 25.6% of patients suffered one adverse event while the majority suffering greater than one. These figures are much higher than those reported in the literature, which depends primarily on obtaining data by means of retrospective chart abstraction. Lawrence et al looked at medical complications and outcomes after hip fracture repair. They analysed 8,930 patients and concluded that post-operative complications affect prognosis in addition to 30 day and 1 year mortality rates.

In particular, they found that patients with greater than one post-operative complication had a particularly poor prognosis. This study, which had a large patient cohort, had very different adverse event rates from our study. Overall, they found that 19% of patients had an adverse event with only 0.7% of patients having 2 adverse events and 0.3% of patients having 3 or more adverse events. This significant difference in complication rates between studies may be due to errors in reporting or inaccurate recording of adverse events. Given the fact that post-operative complications have major implications on the patients outcome, it is imperative that accurate recording takes place. In the study by Lawrence et al, they recognised that their study's primary limitation is its retrospective chart audit design. They recognise that this may have led to them having underestimating the incidence of some adverse
The system we used in this study will hopefully eliminate much of this error and as the data is being collected prospectively leads to much more accurate recording of adverse events. Using a standardised adverse event form, as we did in this study, has already been proven to reduce variability in what personnel record for spinal surgeries. This study was a pilot study and a limitation is that we had a small patient cohort of 39. The aim is to introduce this system of recording to a much larger patient cohort across all general and orthopaedic trauma. If this system of prospective adverse event recording is introduced nationally it could lead to more accurate recording of adverse events. In addition, data on adverse events is currently being retrospectively recorded and is dependent on the non-medically trained administrator being able to interpret the information that is recorded in patient charts.

The problem is that there are inconsistencies in the extent of reporting of adverse events between centres. This makes it difficult to make an accurate comparison between centres. Krizek (2000) believes that it is inadequate to retrospectively collect data from the medical record. He believes that we should collect the data at the point of care, which will be much more accurate. Runciman et al compared adverse event reporting in the quality in Australia Health Care Study (QAHCS) and the Utah-Colorado Study (UTCOS) accounting for methodological differences between the two studies. Despite this, a threefold difference in the levels of reporting of adverse events between the two centres was noted. What Runciman concluded was that whilst there were similarities between reporting rates for more serious adverse events than for the remaining categories of adverse events, there were 6-7 times more adverse events reported by QAHCS than UTCOS. This Runciman believes is partly due to under reporting of adverse events by UTCOS.

In our study collecting data prospectively we aimed to give a more accurate representation of adverse events occurring in an inpatient orthopaedic setting. Major differences between levels of adverse event recording were evident between our data and HIPFS data which was obtained retrospectively using a chart abstraction method. Using a grading system for the adverse events also gives a more in-depth analysis of the likely additional cost and informs us whether the adverse event would have a statistical or unquantifiable effect on the patients outcome. Reasons for under-reporting include differences in adverse event definition, reporting bias and the data not being recorded accurately. In addition, data on adverse events is currently being retrospectively recorded and is dependent on the non-medically trained administrator being able to interpret the information that is recorded in patient charts.

This would result in better planning of services and resource allocation without creating additional cost.

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