Coding errors and the trauma patient – is nursing case management the solution?

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Abstract

The aim was to investigate the accuracy of clinical information coding and the financial consequence for trauma patients at a tertiary trauma centre using the resources of trauma nursing case managers. Clinical data for admitted trauma patients in August and September 2000 were compared with data routinely obtained by trauma case managers on their daily rounds. We audited patient injuries, in-hospital complications, investigations, and procedures. Clinical information records requiring alteration were returned to the clinical information manager with additional information and re-entered into the clinical information database.

100 trauma patient records (15% of admissions for 2000) were audited. 28% of recoded records had to have their diagnosis related group (DRG) changed, which resulted in the identification of additional funding of over $39,000. We conclude that the implementation of episode funding for acute episodes, such as the complex trauma patient, is placing increased importance on accuracy of coding. The validity of coding is dependent on legible, comprehensive and complete documentation and is improved dramatically by using nursing case manager patient progress summaries.

Background and literature review

New South Wales has adopted 'episode-based funding' for the provision of acute health services, which is its version of what is known elsewhere as casemix-based funding or per case payment. Per case payment means that the organisation receives a predetermined amount for each type of patient episode. In the case of acute inpatients, the types are usually defined by DRG. This approach provides hospitals with a financial incentive to avoid unnecessary services, as additional funding is not provided if the patient remains in hospital for an additional day or receives additional services (Hindle & Lenz 2001). Whilst this encourages better management of resources, it can create a perceived pressure on medical and nursing staff to aim to discharge patients sooner than is felt appropriate, in turn creating a high re-presentation and admission rate.

Episode funding and trauma

As a result of the recommendations of the NSW Health Council (2000) all NSW Area Health Services are required to fund the acute activity component of a hospital's budget using the episode funding approach (Menadue 2000).

Table 1: acute care patient definition

The principal clinical intent is to:
•   manage labour (obstetric)
•   cure illness or provide definitive treatment of injury
•   perform surgery
•   relieve symptoms of injury or illness (excluding palliative care)
•   reduce the severity of illness or injury
•   perform diagnostic procedures, protect against exacerbation and /or
•   protect against exacerbation and/or complication of an illness and/or injury, which could threaten life or normal function.

Source: NSW Health, 2001

An acute episode of care is defined in Table 1 (NSW Health Service Category Definitions, 2001b). The funding an institution is allocated for the budget period is based on target volumes by DRG. It is well recognised that DRGs are not appropriate for other patient service categories such as palliative care, rehabilitation, maintenance care and geriatric evaluation and management (Eagar et al. 2001). The literature also suggests that DRGs are inappropriate for some subsets of acute inpatients including trauma patients.

Hospitals are encouraged to "manage" their elective workload to ensure the budget is met, operating with a capped pool of funds for acute inpatients. In order to achieve this, a hospital must be able to accurately identify the actual local cost to the organisation of the non-elective workload. If the actual cost is not known, the pool of funding available to be used for elective work might be overstated, resulting in budgetary problems at the end of the period.

Trauma centres or major trauma hospitals have grounds to be concerned of the impact of episode funding on their overall funding. In Australia, O'Connor (1994), from the Road Injury and Major Trauma section of the National Injury Surveillance Unit, has argued that road injury admissions have the potential to be underfunded compared to other patients in the same DRGs. The average length of stay (ALOS) and average cost of road injured patients are substantially higher than for other injured patients overall. The implication for trauma hospitals in Australia is that they may find themselves disadvantaged because they receive a higher proportion of road-injured patients (O'Connor 1994). US research conducted by Cayten et al (1991, cited in O'Connor 1994) concluded that "… there is a consensus that the DRG prospective reimbursement system is inadequate to cover the hospital costs of injured patients, and that this is in part caused by prolonged length of stay".

DRG shortfalls are illustrated by research conducted in 1995 at San Francisco General Hospital. Inter alia, it was found that often DRGs were not appropriate indicators for multi-system injured trauma patients and did not adequately describe the trauma patient's episode of care (Campbell et al. 1995). Whether this applies to hospitals in NSW in unclear, and much will depend on the accuracy of coding and costing.

Issues of documentation, coding and cost

Despite the importance of accurate clinical coding to hospital funding, many uncertainties remain. In Australia in 1991, Donoghue conducted a large retrospective recoding study with the aim of identifying specific errors and problems relating to medical record documentation and coding in 4000 records. The study reported a 60% aggregated error rate that decreased to 47% when minor errors were eliminated. Error rates from other large international studies are highly variable and range from 35% (Demlo & Campbell 1981, cited in Donoghue 1991) to 64.9% (Barnard & Esmond 1981, cited in Donoghue 1991).

Donoghue (1991) identified 8 sources of coding error in clinical coding. The most prevalent were as follows:

- Inconsistent or unclear documentation – for example, illegible documentation or when the documentation on the patient discharge summary states kidney stones while the patient notes state ureter stones;
- Missing codes – for example, if a patient suffered a chest infection or other complication and the code was not included by the original coder;
- Inappropriate additional codes (Donoghue 1991).

The error rate for DRG allocation in Donoghue's study was 9.2%. This is considerably lower than other large recoding studies conducted in the US, which ranged from 18.6% (Hsia 1988) to 50.6% (Johnson & Appel, 1984 cited in Donoghue 1991).

The most prevalent coding errors for incorrect DRG allocation included ambiguous principal diagnosis, for example when there are two or more possible principle diagnoses; clerical error, that is, human error entering codes into the disease index; coding rules not followed; and missing codes.

Donoghue concludes that poor quality documentation has a large impact on DRG assignment and financial implications. For example, from recoding 4000 records, the 3 hospitals involved were found to have failed to identify $176,805 of potential funding. Stevens et al (1998) reviewed coding in 7 Western Australian hospitals in 1997 and found that coding errors accounted for a loss of nearly $400,000 per year per hospital. In contrast to the loss of funding experienced by Australian hospitals, in the United States Hsia et al. (1988) sampled 239 hospitals and found that 61.7% of coding errors favoured the hospital, meaning that hospitals were receiving a higher net reimbursement than was supportable by the medical records. This "over-coding", or "creeping" trend may be less significant at present in Australia.

The issue of poor documentation raised by most publications concerning coding error is particularly relevant for trauma patients, as their medical records are usually extremely lengthy and complicated. As mentioned by Donoghue (1991), a summary of patient care should be documented on a patient discharge summary. Hickie (1994) confirms that the system succeeds or fails on the basis of the discharge summary, and despite repeated entreaties from medical record departments and hospital administrators in conjunction with a variety of inducements or punishments, compliance with this requirement remains an ongoing issue.

Characteristics of trauma patients

The need for accurate coding prompted an audit of clinical information coding in trauma patients as part of a trauma case management pilot study. Trauma patients are traditionally difficult to code, as their care and documentation are complex. Trauma patients require the utilisation of extensive hospital resources. The care of these patients involves high costs, critical care management and intensive nursing care, they undergo multiple surgical procedures and interventions, and their length of stay is often extended (Fernandez 1995). The plans of care for these patients can be fragmented as a result of the involvement of multiple caregivers and an unpredictable hospital course. This leads to difficulties in coordinating the care of the trauma patient between the different treating services (Spisso et al. 1990). The population lends itself well to case management as trauma patients traditionally have variable injury patterns, premorbid and co-morbid conditions (Miller & Levy 1995) and ineffective communication between disciplines and physician teams (Spain et al. 1998). All these issues contribute to coding difficulties.

Clinical coding at St George Hospital and Community Health Service

St. George Hospital is a major trauma service/tertiary referral centre as defined in the NSW State Trauma Plan (1994). St. George Hospital currently admits nearly 200 severely injured trauma patients, and over 2500 injured patients per year. These numbers are likely to increase significantly in light of the recent announcement from the NSW Minister for Health that St George Hospital will become the only level-6 trauma centre for South East Health.

The process of coding at St George Hospital is undertaken using ICD-10-AM V2 (National Centre for Classification in Health 2000). The purpose of the ICD-10-AM is to permit the systematic recording, analysis, interpretation and comparison of morbidity data collected in different hospitals, states and countries. The ICD-10-AM system enables the translation of diagnoses and procedures and other health problems from text to an alphanumeric code, which permits easy storage, retrieval and analysis of the data. This version was introduced nationally on July 1st 2000, and at St George Hospital on the same date. ICD-10-AM V1 was originally introduced nationally on the 1st July 1998, replacing ICD-9-CM. The procedure codes are based on the Medicare Benefits Schedule (MBS) and are known as the MBS-Extended. Codes are revised in line with biannual updates to MBS.

St George Hospital uses the 3M Coding and Grouping Software to perform the coding function. Manual coding requires a coder to match clinical statements in the patient record to diagnostic or procedural categories in multiple volume coding manuals. A coder using the 3M Coding Application is responsible for identifying the relevant information in the patient's record, but the software replaces searching for codes in a manual with computerised medical decision-making techniques. The program uses the same coding information the coder would use for manual coding, but can help ensure that terminology, rules and codes are applied consistently and that nothing is overlooked (3M Healthcare 1998).

The process of grouping is also undertaken at the same time as coding. The grouper software assigns cases to Australian Refined DRGs (AR-DRGs) (Commonwealth Department of Health and Aged Care 1998). Once codes have been assigned for a patient's diagnoses and procedures, the grouping application uses those codes to compute the appropriate DRG. The software contains all the current DRG definitions, as well as the resource weight and recommended length of stay for each group. At the time of this study, St George Hospital Encoder software was using the latest version of the grouper distributed by the Commonwealth (Version 4.1).

The 3M Encoder is interfaced with the St George Hospital patient database. St George Hospital currently uses the system known as HOSPAS (Hospital Patient Administration System). All DRG data generated by the software are brought across via the interface into HOSPAS. This coded information can then be accessed by the Casemix unit to produce casemix reports, and in the case of this study, costing data.

Method

At the time of the study, St George Hospital (STG) had a yearly discharge rate of 43,856 separations (1999-2000). For the two-month period of the study, the number of separations was 7,824. The Clinical Information Coding Department staff at STG consisted of:
1 FTE Coding Manager (Health Information Manager HIM)
4 FTE Clinical Coders (3 x HIM, 1 Clinical Coder)
4 PPT Clinical Coders (2 x HIM, 2 Clinical Coders)
Total FTE = 5.73
South East Health has a daily average standard of 35 records per coder.

A list of the DRG, MDC, ICD-10-AM Principal Diagnosis and ICD-10-AM Additional Diagnoses for each admitted trauma patient during August and September 2000 was supplied to the Trauma Service from the clinical information database. The clinical information records were compared with the summary of patient care obtained routinely by the trauma case managers on their daily rounds. The trauma case manager record is a hand written outline of the trauma patient's in-hospital stay, and includes comprehensive details of trauma patient injuries, in-hospital complications, investigations and procedures. The trauma case manager records are currently utilised for the trauma service database maintenance and associated projects.

Clinical information records requiring alteration were returned with the additional information and re-entered into the clinical information database. An excel spreadsheet contained the patient MRN, original AR–DRG, altered AR-DRG after trauma service analysis, the number of alterations made in primary diagnosis, secondary diagnoses, procedures and complications. The altered clinical information records were then forwarded to the Casemix unit for financial analysis.

Results

For the months of August and September, which consisted of 100 trauma patient admissions, equating to 15% of overall admissions for the year 2000, many coding errors and omissions were noted. Of the 100 records, 205 ICD-10-AM codes required to be added. Examples of these include superficial injury of scalp (S0001), fracture of shaft of tibia with fracture of fibula (S8221), fracture of skull (S029) and staphylococcus areus as the cause of disease (B956). 7 codes were incorrect and had to be removed, and this resulted in a decreased weighting. For example unspecified injury of abdomen (S399) was changed to unspecified injury to head (S099), which

resulted in the cost weight decreasing from 0.42 to 0.38. 12 principal procedures and 44 additional procedures were also not coded, such as management of continuous ventilatory support and computerised tomography of brain.

The error rate was calculated at 74% (number of records with an error compared with the total number of records).

In addition, 28% of recorded records had to have their AR-DRG changed, which resulted in the identification of over $39,000 of funding (see Table 2). The largest increase ($8,544) was for a patient regrouped from category Craniotomy with Severe or moderate CC (B02B) to Catastrophic CC (B02A). The average increase in funding per revised AR-DRG was $1,427.

The change in AR-DRG rate was calculated 28% (number of records with a changed DRG compared with the total number of records).

Table 2: results of clinical information coding audit

	August	September	Total
Number of records recoded	46	54	100
Number of records requiring additional codes	40	34	74
Total number of additional codes			205
Error rate			74%
Number of records where AR-DRG changed	12	16	28
% of records where AR-DRG changed	26	30	28
Increase in funding* due to revised AR-DRGs	$28,536	$11,424	$39,960
Average increase in funding per revised AR-DRG	$2,378	$714	$1,427

*   Using Acute Cost Weights excluding ICU & ED from NSW Costs of Care Report 98/99 (NSW Health Department 2000) Based on $2,400 per casemix weighted separation (excluding ICU and ED) from NSW Health Episode Funding Guidelines 2000/01.

Discussion

The high error rate in trauma patient clinical coding is probably due to the complex nature of trauma patients, extensive patient records, poor documentation, multiple procedures and the possession of a myriad of injuries. These errors mean that there is a significant amount of funding that is not being identified for trauma patients.

Potential solutions for coding issues

In contrast to other authors' negative experiences in addressing the clinical coding dilemma, Holman (1994) claims success in implementing a program to improve the quality of coding in terms of completeness, accuracy and timeliness. As part of the project implementation, the lack of understanding from medical officer at all levels was identified in relation to the process and importance of coding. Holman (1994) also states that there was a lack of planning to ensure all paperwork was completed by medical staff, and that facilities for documentation were poor. Intensive meetings amongst medical, nursing and medical records staff resulted in redesigning the discharge summary, the development of guidelines for completion of discharge summaries and a pocket size folder giving helpful reminders containing coding requirements. Holman succeeded in obtaining a 99% coding completion rate within 1 month of patient discharge, yet there is no presentation of coding accuracy results.

In 1994, Callen, McDonald and Sekel from St George Hospital also attempted to rectify coding problems by testing the feasibility and accuracy of medical officer coding on the ward. Unfortunately the results were not encouraging. The medical officer coding error rate was 84% with an incorrect DRG allocation rate of 33%. There was also difficulty with compliance from the medical officers as a result of time constraints. However on a more optimistic note, the study improved communication and understanding between medical record administrators and clinicians in terms of understanding the coding process and its complexities.

However this benefit would only be short term as medical officers change institutions up to every 6 to 12 months, so for this understanding to continue, the study, or education would have to be ongoing. This has not

occurred. The concept of encouraging medical staff to complete coding has also been trialled in Germany. Konig et al (1994) reported an error rate of 29%, which was higher in more complex patient groups, so it seems that the utilisation of medical staff for coding may not be the answer.

In 1998 the National Centre for Classification in Health (NCCH) established a quality division in an effort to promote coding quality. They introduced the Australian coding benchmark audit and performance indicators for coding quality. However it remains apparent that there are many issues with clinical coding (Perry et al. 1998), and Callen et al (1997) state that health information managers need to explore inventive ways of solving the problem of inadequate clinical documentation and high coding error rates.

It is proposed that trauma patient coding should at the very least be reviewed by an experienced trauma data collector and, perhaps in conjunction with an increase in staffing levels, be integrated into the role of the trauma data manager coordinator, as is the case in many US institutions (Southard 1994). It is also suggested that other complex groups of patients use the services of a nurse case manager. It is thought that the use of the specialist nurse case manager may assist with clinical coding accuracy. Not only will nursing case management potentially improve coding, but more importantly, the quality of patient care.

Nursing Case Management

In the United States, Petryshen & Petryshen (1992) stated that economic reform, changing roles for health care personnel, state health care reform and patient demand for higher quality care contributed to the development of case management. The case management model is used for selected patients because complex, high cost groups that require multiple procedures, interventions and resources benefit most from case management (Allred et al. 1995). Girard (1994) describes case management as a system of health assessment, planning service procurement, delivery, coordination and monitoring to efficiently meet the needs of clients.

A trial of trauma case management was effective in reducing length of stay and in-hospital complications at our institution. In addition, trauma case management improved the utilisation of allied health staff such as physiotherapy, improved staff satisfaction, and increased the detection of patient injuries.

Conclusion

The implementation of episode funding for acute inpatients, such as the trauma patient, is placing increased importance on the accuracy of patient coding. The validity of coding is dependent on legible, comprehensive and complete documentation. Although to some clinicians documentation might not be seen to be of high priority in an acute patient episode, it can severely impact the funding of the hospital. Inappropriate funding will effect resource allocation and potentially the ability to deliver quality patient care. The use of nurse case managers will not only benefit coding accuracy, and funding opportunity, but also improve coordination and the quality of patient care.

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