Reliability of clinical coding of hip fracture surgery: Implications for Payment by Results?

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Introduction

The coding of diagnoses and surgical procedures is an integral part of the National Health Service (NHS), and has been since its early years. Clinical coding data supplied by individual trusts is used by the Department of Health to publish hospital episode statistics on hospital admissions and surgical procedures performed each year. National and local policy-makers use this information to estimate health service demand, determine health service provision and ultimately allocate health service funding. In addition hospital coding databases also offer an invaluable tool for research and clinical audit. Reliable and accurate clinical coding is therefore of vital importance, which is now even more important with the introduction of Payment by Results (PbR).

With 83,309 hip fractures admitted to hospital in England in 2005–2006, hip fracture surgery is commonplace—the delivery of which remains high on the national health agenda. Yet, to date there have been few studies evaluating how well hip fracture operative activity is recorded. The aim of this study was to assess how well this is performed at our hospital.

Methods and materials

At this hospital, operative activity is coded and recorded using the OPCS 4.3 classification and in addition are entered into an independent theatre databases. Using these two databases we identified patients undergoing hip fracture surgery at this hospital between 1st November 2003 and 30th November 2006. We identified 408 cases. No single database identified all 408 cases. A quarter of cases (N = 98) were not procedurally coded. Only 43.2% (N = 176) of cases were recorded in both the theatre database and procedurally coded at the time of this study. Overall the coding accuracy of these 176 cases was 93.8%.

Clinical coding at this hospital was unreliable and inaccurate, which has major implications for national statistics, performance analysis and most importantly Payment by Results. We discuss this further and offer possible solutions to improve the coding process.

Results

From the two database searches, we identified a total of 408 cases undergoing hip fracture surgery over the 3-year assessment
Discussion

Coding of clinical information is the conversion of verbal descriptions of diseases, injuries, and procedures into numeric or alphanumeric designations. The coding of health-related data by diagnoses and procedures facilitates the use of medical records for clinical care, research, and education. More recently the National Health Service in the UK has created a system of Payment by Result, where tariffs are derived from diagnosis and/or procedure descriptions mapped to a system of codes for a completed patient episode. There is little doubt that clinical information management systems play a crucial role in the functioning of any health service. There is also little doubt that such systems must be reliable and accurate. Despite this, to date only a handful of studies have analysed the accuracy of British hospital coding.1,3,5,6,10,12

In this study we identified 408 cases of hip fracture over a 3-year period by searching two clinical databases. Neither one was individually able to identify all 408 cases. A quarter of cases were ‘missing’ from the hospital coding (OPCS) database, which raises serious concerns about reliability of coding at this hospital. A similar study by Khwaja et al. found 43% of urological operative cases ‘missing’ from their hospital coding database, which supports the view that incomplete hospital coding to the degree found in this study may not be limited to this hospital.12 These findings have major implications for this hospital and the NHS in general if, as has been suggested, similar findings are mirrored elsewhere.

The Audit Commission national report on Payment by Results was published in 2004.7 The report emphasised the need for Trusts to have good quality data on clinical activity, most importantly for billing purposes. Auditors found the main concern and weakness was the level of inaccuracy in activity data from acute and specialist trusts, finding a significant proportion of trusts (14%) where more than 3% of activity was uncoded. The report warned this represented a risk for Trusts, as uncoded work would not be paid for. At this hospital we found 24% of hip fracture procedures uncoded. Based on HRG 3.5 tariffs (H82–H85) for these procedures, this would amount to an estimated £490,000 of unpaid work carried out at this hospital over the last 3 years, had PbR been the mechanism for payment during the entire period.7 The financial penalties for poor coding of operative activity are clear.

However, the implications are not solely financial. If coding of operative activity is as unreliable as has been shown in this study, any estimation of activity based upon OPCS procedural coding is likely to be a significant underestimation of actual activity. This is particularly relevant when this type of information is used for activity analysis of individuals, departments and hospitals.

The fact that one quarter of patients were ‘missing’ from the hospital coding database highlights the problems researchers and auditors may face if using clinical coding as a method to identify specific groups of patients. Significant numbers of valid cases could be missed, with the potential of compromising sample size, validity of results and any inferences subsequently drawn. Investigators need to be aware that this situation exists and that accuracy of results and inferences subsequently drawn. Investigators need to be aware that this situation exists and that measures are in place to ensure valid cases are not inadvertently excluded.

<table>
<thead>
<tr>
<th>OPCS database entry</th>
<th>PTV database entry</th>
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<tr>
<td>W40.1 Primary total prosthetic replacement of knee joint using cement</td>
<td>Left Hemiarthroplasty Hip Joint</td>
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<td>W24.1 Closed reduction of intracapsular fracture of neck of femur and fixation using nail or screw</td>
<td>Left Dynamic Hip Screw</td>
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<td>W24.1 Closed reduction of intracapsular fracture of neck of femur and fixation using nail or screw</td>
<td>Right Dynamic Hip Screw</td>
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<td>W20.1 Primary open reduction of fracture of long bone and extramedullary fixation using plate</td>
<td>Right Dynamic Hip Screw</td>
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<tr>
<td>W24.1 Closed reduction of intracapsular fracture of neck of femur and fixation using nail or screw</td>
<td>Right Dynamic Hip Screw</td>
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<tr>
<td>W46.1 Primary prosthetic replacement of head of femur using cement</td>
<td>Cannulated Screws Left Hip</td>
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<tr>
<td>W40.1 Primary total prosthetic replacement of knee joint using cement</td>
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In addition to coding for diagnosis and procedures, hospital coding databases also routinely record data that includes dates of admission, surgery, discharge and death (if applicable). With particular reference to hip fractures, information about time to surgery (from admission) and 30-day mortality can be derived from this data. These are two key NHS performance indicators by which hospital performance can be assessed and compared. If original data is incomplete, inaccurate and inconsistent (as was the case in this study), any derived performance figures could be misleading, unreliable and potentially meaningless. This should be considered when interpreting performance tables.

The accuracy of procedural coding was high, with 93.8% of analysed cases accurately coded. This compares favourably with similar studies in urology (two studies) and plastic surgery, which reported coding accuracy at 64%, 88% and 76% respectively. However, in these other studies all urology and plastic surgery procedures were included, increasing the complexity of coding and the margin for coding error. This study only considered hip fracture surgery, for which there are only a limited number of procedures (hemiarthroplasty, dynamic hip screw and cannulated screws) with little ambiguity and only 4 OPCS codes. (We acknowledge that primary total hip replacement is a recognised procedure for hip fracture but this was intentionally not searched for, as this would have included all primary joint replacements in the results.) Therefore, whilst the accuracy was high, it seems difficult to comprehend why coding accuracy is not even higher. However, as were only able to assess fewer than half of cases (43.2%) for coding accuracy, the true coding accuracy could in fact be better (or worse). It has been suggested that coding accuracy could be improved if the operating surgeon were to code the procedure, as is commonplace in the private sector. However several studies have actually found surgeons to be worse than coding clerks at assigning the correct procedural code. We would suggest surgeons code hip fracture procedures at the time of surgery – there are only four common OPCS codes to remember (Table 1) – which would take seconds to type, dictate or write. This would certainly eliminate any coding errors through misinterpretation of clinical records and operative notes.

Whilst improving the accuracy of hip fracture procedural coding seems reasonably straightforward to achieve, the problem of improving reliability of the hospital coding process is an entirely different issue. The problem of inaccurate coding or recording of operative activity was recognised in the Audit Commission report, which stated that many of the problems arose from outdated Patient Administration Systems (PAS). Many of these systems were over 10-years old and not designed to process the range of data now required of them, making it difficult to extract key performance data from systems. The Audit Commission recommended NHS Trusts should conduct regular audits of clinical coding to ensure accuracy is assessed, improved and maintained. As a consequence of the results of this study, further re-audit has been planned at this hospital for later this year. Furthermore, the Audit Commission urged Trusts to ‘...urgently invest in and develop their ability to accurately record and code patient activity.’ In this study, significant numbers of hip fracture cases were found to be ‘missing’ from both the hospital (OPCS) and theatre (PTV) databases, rendering both as potentially unreliable as each other. There is a clear need to improve the way we record data about operative activity, not just at this hospital but within the NHS in general.

Reliable and accurate clinical coding of diagnoses faces many barriers. Probably the most important factors are the limitations of the coding systems themselves, the terminologies used within them and the skill gap associated with their use. Furthermore, recording structured data in the consultation takes time, can be distracting and depends on the level of motivation of the clinician. A less obvious but equally important barrier is the priority of clinical coding within an organisation. Clinical information systems have the potential to automate large parts of this process, by associating clinical descriptions to a number of codes. Mapping clinical descriptions of diagnoses and/or procedures to databases of codes enable codes to be obtained simultaneously. The associations need to be performed only once, after which each time the diagnosis or procedure is chosen from a list, all the codes are assigned in the background.

There are many clinical information database systems available—Bluespier is one such system which is in use in the NHS. At this particular hospital, one of the orthopaedic surgeons has been using Bluespier for all clinical activity and in particular for generating operation notes which are template based, typed and coded at the time of surgery. This system is capable of generating clinical codes such as ICD-10, OPCS and BUPA based on the actual procedure performed, as entered by the operating surgeon at the time of surgery. The code associations need to be performed only once. There is potential to use this system to also generate HRG codes. Coding is done in the background based on the procedure carried out and this eliminates any coding errors by the surgeon. It also eliminates any errors in interpretation of operation notes by the coding department. More importantly details about procedure, date of surgery and OPCS code are accurately entered and stored on the database the instant the patient leaves the operating theatre, information which could simultaneously be sent electronically to the coding department. In effect this system offers an accurate dynamic up to date view of operative activity, in complete contrast to PAS systems currently in place. We acknowledge the accuracy and reliability of any clinical information database is wholly reliant on the quality and accuracy of the data entered. Therefore even a system such as Bluespier, or others like it, have the potential to be fallible. Any user should consider this when reviewing data but more importantly ensure accuracy when entering data.

The limitations of this study reflect the problems identified with coding of hip fracture surgery at this hospital. Of the total of 408 cases identified, less than half could be assessed for coding accuracy. As mentioned, the coding accuracy in these cases was high at 93.8% but the true accuracy could be greatly different if were able to cross-reference all 408 cases. Clearly this limits the validity of the results obtained yet at the same time this limitation highlights the inherent problems in data recording and coding procedures we have identified. Furthermore the numbers of hip fracture procedures carried out per year at this hospital may be small by comparative standards. This is a simple reflection of the local trauma workload and should have little bearing on the accuracy and reliability of coding and data collection.

Conclusions

The results of this study highlighted significant problems with the way clinical information is recorded and coded at this particular hospital with routinely coded data about hip fracture surgery found to be unreliable and inaccurate. These findings may be widespread in the NHS, which is of concern as the demands of clinical coding in the new modern NHS have increased. There are major implications relating to Payment by Results, performance analysis and research and audit. There is a need to improve current coding processes with a sense of urgency in the context of PbR. Responsibility for this lies partly with surgeons, coding departments and the coding pathway.

We would recommended surgeon coding at the time of surgery (especially for hip fracture surgery which is common and has few OPCS codes), and regular audit of not only coding accuracy but the coding process itself to ensure cases are actually coded within a reasonable period of time. By employing these mechanisms, it
would be hoped that coding inaccuracies could be minimised, if not eliminated, and failings in the coding process could be identified, addressed and improved. In addition clinical information management systems already exist that could rapidly, adequately and comprehensively address some of the deficiencies in current systems.

Conflict of interest

None.

References