Surgical Data Collection: Auditing the Audit

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Introduction

The auditing of surgical data is a key outcome measure for performance and quality of care. We have previously described a surgical audit system that allows for high-level integration into the workflow of an Orthopaedic Unit. It is well established that accurate and effective audit can only be achieved when accurate and effective data are captured, however, many of the concepts integral to surgical audit remained "still more than anaemia", until the 1980s, when computer technology was first employed to keep up with the complexity of data capture required.

Technological advancements have allowed for greater ease in capturing data, and data pertaining to surgery procedures is now collected at multiple levels. Specific to our institution, these include the orthopaedic unit's database, theatre's recording of Medicare Benefits Schedule (MBS) and Primary Planned Procedure (PPP) codes as well as other data, and additionally national joint replacement or trauma registries as applicable.

The temptation that hence exists is to fold 'streamlining' of data collection is often suggested, often by the amalgamation of clinical systems or to allow data within one system, to populate another. Additionally, this drudgery of data raises enormous possibilities for all sorts of potential analysis and subsequent findings.

However, this streamlining of data collection may not be a panacea. Gruer et al.4 analysis and subsequent findings. Additionally national joint replacement or trauma registries as applicable.

Methods

A six month time period was selected (1/04/2010 – 30/09/2010 inclusive) for which data was extracted and retrospectively analysed from two databases pertaining to orthopaedic operations across the three campuses of our health service. These databases are described below:

Orthopaedic Audit

This web-browser-based relational MySQL database, was custom designed by the orthopaedic unit to collect data for Surgical Audit, as well as other uses within the orthopaedic unit; Secondary uses of the data that we hypothesis generate incentive for more accurate data entry. Data fields designed by an experienced orthopaedic surgeon working in the unit. Data is entered by orthopaedic registrars.

iPM Theatre Data

The hospitals inpatient management system, PM (iSoft, Oxfordshire, UK) allows for the capture of a wide range of operative data, prior to, and at the time of, operation. This data is used for financial and codings purposes as well as for two databases pertaining to running of theatre suites. Data is entered by theatre nursing staff at the time of operation.

The first analysis involved matching each procedure record, to its corresponding procedure record within the other database, based on (i) the patient unit record (UR) number, and (ii) the date, time, and nature of the procedure performed. When discrepancies occurred, where possible, patient histories were reviewed in order to classify the discrepancy.

Procedures were then grouped by type within each data set. Following on from this, several sub-analyses were performed to explore specific issues, felt to be of clinical significance.

Results

For the 6-month sample period, the Orthopaedic Audit recorded 1565 procedures. Theatre records identified 1476 procedures. 1406 of these records could be confidently matched and were present in both data sets. 19 procedures were performed on patients undergoing 'simultaneous procedures', and hence theatre data was recorded under the same audit record.

5 patients underwent multiple, separate procedures and these were incorrectly recorded on the same audit record. In excess of 80 patients had multiple hospital UR numbers. This creates difficulties in not being able to accurately capture a wide range of operative data, prior to, and at the time of, operation. This data is used for financial and codings purposes as well as for two databases pertaining to running of theatre suites.

95 cases the error or omission appeared to have occurred in theatre data. A major contribution to this is the nature of trauma operating, often occurring in non-dedicated orthopaedic theatres as well as run by regular operating teams.

Grouping by procedure type (Figure 3) was more difficult than anticipated. This was due to (i) the lack of robust definitions for data, (ii) the complex nature of trauma operating, (iii) the nature of trauma operating, often occurring in non-dedicated orthopaedic theatres as well as run by regular operating teams.

Discussion

While highlighting a number of deficiencies in our collecting surgical data, we believe that this sort of analysis is important in order to inform future data collection and allow for more accurate surgical audit. Overall, data set correlation was lower in trauma cases than in elective cases. This could be due to (i) the complexity of cases involved, (ii) management decisions being made intraoperatively, and (iii) the nature of trauma operating, often occurring in non-dedicated orthopaedic theatres as well as run by regular operating teams.

Total Knee Replacement 112 112 0% GAMP Ankle 12 15 25%
Arthroscopy: Knee 159 141 11% ORIF Ankle Fracture 79 97 23%
Total Shoulder Replacement 6 5 17% ORIF Clavice Fracture 5 8 60%
Lesser Toe Correction 12 8 33% ORIF Distal Radius (Adult) 41 61 49%
Shoulder Hemiarthroplasty 7 9 29% ORIF Distal Humerus 5 8 60%
Scaphoid Procedure 10 13 30%

Figure 3

Figure 4 highlights the difficulty of comparing datasets in which different definitions have been used for categorising, and recording, data, in this case demonstrating the multitude of categories for shoulder surgery. The CMBS codes used do not directly correspond with definitions used within the Orthopaedic Audit. Similar issues occur in the recording of Foram Pain Fracture Procedure, where correlation between the datasets is also poor.

Figure 4

In the Theatre database, the percentage difference of total knee replacements is 112%, with a percentage difference of 11% for ankle fractures.

Figure 5

Our study has several limitations: Firstly, we have demonstrated deficiencies in both datasets examined, and hence have no established "gold standard" to compare to. A comprehensive review of all medical records of orthopaedic patients admitted during the described time period, would arguably provide a better point of comparison, however this sort of analysis would be massive logistical undertaking.

Overall, this analysis provided both the Orthopaedic Unit, as well as Theatre, with results that will allow for adjustments to current data collection procedures, as well as informing future data collection initiatives.


Table 1

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Orthopaedic Audit</th>
<th>Theatre Data</th>
<th>Error/missing</th>
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<td>9</td>
<td>29%</td>
</tr>
<tr>
<td>Shoulder Arthroplasty</td>
<td>6</td>
<td>5</td>
<td>17%</td>
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<tr>
<td>Total Shoulder Replacement</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ankle Fracture</td>
<td>79</td>
<td>97</td>
<td>23%</td>
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<tr>
<td>ORIF Clavicle Fracture</td>
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</tr>
<tr>
<td>ORIF Distal Radius (Adult)</td>
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<td>49%</td>
</tr>
<tr>
<td>ORIF Distal Humerus</td>
<td>5</td>
<td>8</td>
<td>60%</td>
</tr>
<tr>
<td>Scaphoid Procedure</td>
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<td>30%</td>
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<tr>
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