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Research Paper

Improving the quality of orthopaedic elective and trauma operative notes: A completed audit loop study

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ABSTRACT

Introduction: Good medical practice dictates that comprehensive documentation of all surgical procedures is paramount in maintaining a high standard of patient care. This study audited the quality of operative note keeping for elective and trauma procedures against the standards set by the British Orthopaedic Association (BOA) and The Royal College of Surgeons of England (RCSE) guidelines.

Patients and methods: A retrospective assessment of the operative notes of every patient undergoing a total knee and hip replacement (elective cases) was carried out over a period of 2 months. Data recorded were compared against BOA guidelines. Within this time a randomised selection of trauma operative notes were also assessed, and the recorded data were compared against RCSE guidelines. Change in practice was implemented and the audit cycle completed. A total of 173 operative notes were evaluated.

Results: There was a significant improvement (p -value < 0.05) in the quality of total knee replacement notes, with an increase in the percentage of data points from 68.6% to 93%. Similarly the quality of total hip replacement notes showed significant improvement (p -value < 0.01) with an increase in the percentage of data points from 67.5% to 86%. However trauma operative notes showed minimal improvement.

Discussion: This study showed that the quality of elective operative notes was improved through surgeon education and the circulation of a guideline based electronic operative note. We have further plans to implement procedure specific notes for the most common types of trauma cases to help improve the quality of trauma operative notes.

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1. Introduction

Good medical practice states that accurate and detailed operative notes are of paramount importance in all surgical specialities not only to maintain a high standard of patient safety but also to provide key information for research, audit and medicolegal purposes [1].

There has been a year on year increase in NHS claims, with the National Health Service Litigation Authority (NHSLA) estimating that there are currently over 18.9 billion pounds worth of potential clinical negligence claims against the NHS [2]. Getting it Right First Time, a recent review of adult elective orthopaedic services published in 2015 explained how surgical specialities were found to have the highest litigation rates with orthopaedics second to obstetrics and gynaecology. Orthopaedics accounts for more than 50% of claims if obstetrics and gynaecology is excluded [3]. Of particular concern

is that the rate of litigation within trauma and orthopaedics is rising, with a 16% increase in claims between 2010/11 and 2011/12; this is in comparison to a 6% increase in claim volume in the NHS as a whole over the same time [4]. The medicolegal impact of unsatisfactory operative notes was exemplified in an audit conducted by Lefter et al. [5], where 44.73% of 190 operative notes were found to be non-defensible after scrutiny by a medico-legal lawyer. With the rates of litigation in trauma and orthopaedics outstripping rates in the majority of other specialities, this makes it even more important to ensure legible and accurate documentation.

It is well understood that there is a greater risk of misinterpretation when communicating a management plan through a handwritten note as compared to a typed form, as the legibility of the surgeon's writing dictates the quality of the handwritten note. This is reflected in the latest Royal College of Surgeons of England (RCSE) guidelines which now state a preference for typed notes [6]. In fact two recent studies assessing the quality of operative notes showed that only 66% [7] and 80% [8] of notes were considered fully legible.

Dr Atul Gawande in his book "Checklist Manifesto – How to Get Things Right" [9] makes a strong case for the greater implementation of checklists to help reduce death rates stemming from medical

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error, where in the United States estimated rates range from 48,000 to 98,000 [10]. He cites examples of how industries such as aviation and construction improve efficiency and reduce error by utilising checklists. This led to the development of the World Health Organisation (WHO) Safe Surgery Checklist which was piloted across eight hospitals worldwide in 2007. This checklist has been shown to reduce deaths and complications following surgery by up to a third [11]. Templated operative notes and checklists work on similar principles as they both reduce the complexity of the task at hand but at the same time ensure that none of the salient points are missed. The WHO safe surgery checklist is a clear example of how simple measures can maintain patient safety to a high standard.

The study compared orthopaedic notes against standards set by the RCSE and British Orthopaedic Association (BOA). We looked specifically at elective notes that were either total knee or hip replacements and assessed them against BOA bluebook guidelines [12,13]. Trauma notes were assessed against RCSE guidelines [6], which no previous study has specifically examined.

2. Patients and methods

A retrospective (September–October 2014) and prospective (March–May 2015) assessment was carried out of the operative notes of every patient undergoing a total knee and hip replacement in accordance with SQUIRE 2.0 guidelines [14]. During this time a predetermined number of randomly selected trauma operative notes were examined. Randomisation was achieved by assigning each trauma operative note a number which was processed using a computer randomisation generator. British Orthopaedic Association (BOA) guidelines were broken down into individual data points and transferred to a checklist that was used to assess elective case (knee and hip replacements) operative notes. Similarly trauma cases were assessed using a checklist developed from the Royal College of Surgeons of England (RCSE) guidelines. In total 173 operative notes were assessed. The BOA and RCSE guidelines were chosen as the gold standard as they are a well-recognised, reliable and valid measure of operative note quality.

The grade of operating surgeon and whether the operative note was typed or handwritten were also recorded. When the operator note entry was deemed illegible it was not credited as a present data point; this decision had to be validated by the second auditor. All notes were assessed by the same two investigators throughout the study.

Prior to the audit, a group of senior orthopaedic surgeons was consulted regarding the applicability of some of the data points to specific orthopaedic procedures. For example “details of serial numbers of prosthetics used” would not be applicable to an incision and drainage of a wound. A list of further examples was drawn up and these were taken into account when collecting data.

After the first audit cycle, our findings were presented at an orthopaedic departmental meeting where areas that needed improvement were highlighted to the surgeons present. In addition electronic templated notes based upon BOA and RCSE guidelines for total knee/hip replacement and trauma surgery were showcased (Appendices S1 and S2). The location of the templates on the hospital-shared hard drive was shown. The templates allowed vari-

able data to be added such as patient details but could be modified by individual surgeons to any of their own additional specifications.

The second audit cycle commenced two months after the presentation of the new electronic templates to allow the surgeons time to adjust to the new operative notes. The continued assessment of operative notes is now an important aspect of departmental clinical governance.

Data were inputted and analysed using Microsoft Excel. Initial results were all found to follow a Gaussian distribution (D’Agostino and Pearson omnibus normality test, $p > 0.05$), favouring analysis using unpaired t-tests. In cases where an F-test showed the variances between the initial and re-audit results to be unequal ($p < 0.05$), an unpaired t-test with Welch’s correction was performed. The prevalence of individual criteria was compared using Fisher’s Exact Test. A value of $p < 0.05$ was considered significant. All data were rounded to three significant figures and was collected confidentially in accordance with Data Protection Laws and Caldicott Principles.

3. Results

A total of 173 operative notes were audited of which 109 were for elective procedures (59 total knee replacements and 50 total hip replacements) and 64 were for trauma surgery (Table 1).

Total Knee Replacement (TKR) operative notes initially scored on average 13 out of 19 data points ($n = 28$); after re-audit the average number of data points increased to 17.7 ($n = 31$). This increase in percentage of average data points from 68.6% to 93% was found to be significant ($p < 0.05$) using un-paired t-test analysis. Of the 19 data points that were assessed using Fisher’s Exact test, there was significant improvement ($p < 0.05$) in 6 of the data points after re-audit (Table 2).

Total Hip Replacement (THR) operative notes initially scored on average 16.2 out of 24 data points ($n = 20$); after re-audit the average number of data points increased to 20.6 ($n = 30$). This increase in percentage of average data points from 67.5% to 86% was found to be significant ($p < 0.01$) using un-paired t-test analysis. Out of the 24 data points that were assessed using Fisher’s Exact test, there was significant improvement ($p < 0.05$) in 9 of the data points after re-audit (Table 3).

On average, trauma operative notes initially met 68.2% of datapoints ($n = 29$); on re-audit there was a slight improvement with an average of 73.7% of data points met ($n = 35$), but the changes were insignificant. Two of the 11 data points showed a significant improvement (p -value < 0.05); these were diagnosis made and details of serial numbers of prosthetics used (Table 4). However one of the data points (details of tissue removed/altered/added) after re-audit was shown to worsen significantly (p -value < 0.05).

The initial cycle showed on average 85.7% of operative notes were typed ($n = 77$); on re-audit there was a significant improvement (p -value < 0.05) with an average of 95.8% of notes being typed ($n = 92$).

All notes were written by either a consultant or registrar. In the case of consultants they wrote 91.7% of all elective operative notes ($n = 109$); in contrast they wrote only 25% of all trauma operative notes ($n = 64$), and this difference was statistically significant (p -value < 0.05).

Table 1

Summary table of results for elective and trauma surgery.

Type of Surgery	Percentage of average data points met in the initial cycle (%)	Number of operative notes (initial cycle)	Percentage of average data points met after re-audit (%)	Number of operative notes (re-audit)
Total knee replacement*	68.6	28	93.0	31
Total hip replacement**	67.5	20	86.0	30
Trauma surgery	69.2	29	73.7	35

* Significant improvement after re-audit with p -value < 0.05 .

** Significant improvement after re-audit with p -value < 0.01 .

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