Improving the quality of procedure-specific operation reports in orthopaedic surgery

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ABSTRACT

INTRODUCTION The objectives of this study were to: (i) assess whether handwritten operation reports for hip hemi-arthroplasties adhere to The Royal College of Surgeons of England (RCSE) guidelines on surgical documentation; (ii) improve adherence to these guidelines with procedure-specific computerised operation reports; and (iii) improve the quality of documentation in surgery.

PATIENTS AND METHODS Thirty-three parameters based on RCSE guidelines were used to score hip hemi-arthroplasty operation reports. The first audit cycle was performed retrospectively to assess 50 handwritten operation reports, and the second cycle prospectively to assess 30 new computerised procedure-specific operation reports produced for hip hemi-arthroplasties. Eighty patients undergoing hip hemi-arthroplasty in a department of orthopaedic surgery within a UK hospital between September 2007 and August 2008 formed the study cohort.

RESULTS The main outcome measure was the average scores attained by handwritten versus computerised operation reports. Handwritten reports scored an average of 58.7%, rising significantly ($P < 0.01$) to 92.8% following the introduction of detailed, computerised proformas for the operation note. Adherence to each RCSE parameter was improved.

CONCLUSIONS Computerised proformas reduce variability between different operation reports for the same procedure and increase their content in line with RCSE recommendations. The proformas also constitute a more robust means of operative documentation.

KEYWORDS

Operation report – Orthopaedic surgery – Computerised proforma – Audit – Documentation

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Adequate documentation is one of the pillars of good medical practice. Within surgical specialties, the operation report entered into a patient's medical records is a vital piece of documentation which ideally details important intra-operative findings and postoperative management. It should be compiled before the patient leaves the recovery suite and enables not only continuing care by other health-care professionals but also the analysis and refinement of surgical techniques. The Royal College of Surgeons of England (RCSE) has published guidelines on the essential generic components that any operation report should include in order to make it fully informative and medicolegally robust.¹ However, operation reports for single procedures often vary significantly with regards to their level of detail and, indeed, legibility.^{2–7} Several audit studies have shown considerable improvement in the quality of operation notes after the introduction of *aide memoires*, consisting of either proformas with mandatory headings^{2,5} or simple reminder lists,^{6,8,9} in order to prompt the inclusion of certain information. Indeed, the RCSE guidelines do suggest

computerised operation reports are preferable.¹ However, there is a paucity of recent data to support the wide-spread use of pre-designed electronic templates for specific procedures, which were successfully trialled by O'Bichere and Sellu over 10 years ago.⁴

Here, we have audited the content of orthopaedic operation reports for hip hemi-arthroplasties before and after introduction of a computerised proforma structured around the main headings provided by the RCSE plus extra orthopaedic parameters specific to hip hemi-arthroplasty. Our results demonstrate that the electronic template significantly raises the general accuracy of operation reports from 58% to 92%, improves documentation of all the specific RCSE parameters and thus reduces interpersonal variation.

Patients and Methods

Operation reports

A total of 80 operation reports for unilateral hip hemi-arthroplasty performed by orthopaedic surgeons at the Kent

and Sussex Hospital were collected from September 2007 to October 2008. The first 50 of these were written by hand without the use of any computerised proforma or *aide memoire*, whereas a further 50 were completed electronically following introduction of a computerised, operation-specific proforma. This electronic document was made available on theatre work-stations and consisted of generic operation text for a hip hemi-arthroplasty with designated spaces for variable information, such as the details of the patient, surgeon and anaesthetist. All the parameters on the score-sheet were included, but the template could be modified by the individual surgeons. The most senior surgeon present at the time of surgery was responsible for producing each operation report.

Standards

Standards are based on The Royal College of Surgeons of England guidelines¹ for ideal documentation in operation reports (marked with an asterisk in Table 1).

Report assessment

The operation reports were located within a patient's case notes upon their return to the ward following hip hemi-arthroplasty and assessed using a 33-point scoring system. Parameters included the RCSE guidelines for ideal report content as well as extra clinically relevant information. One point was awarded for each parameter covered within the report. All reports penned by the authors of this paper were excluded to eliminate personal bias. The handwritten reports were assessed retrospectively during the first audit cycle and the results presented at the departmental clinical governance meeting, at which the new computerised proforma was also introduced. Details of how to locate the proforma on the theatre work-stations and how it should be completed were discussed.

Statistical analysis

Data were tabulated within a Microsoft Excel[®] computer spreadsheet such that the overall percentage of accuracy, as well as the prevalence of individual parameters, could be calculated. An *F*-test (alpha 0.05) comparing the variance of scores of both groups showed them to be unequal and so an unpaired *t*-test assuming unequal variances (alpha 0.01) was performed. All data were collected confidentially in accordance with Data Protection Laws and Caldicott Principles.

Results

Handwritten operation reports

Handwritten reports scored an average of 19.4 out of 33 parameters (58.7% with a 95% confidence interval of 56.6–60.8%). Documented particularly poorly were: the

time of day, length of operation, name of the responsible consultant, diagnosis, elective or trauma procedure, skin preparation and draping, limits of resection, the presence of drains, estimated blood loss, whether any samples were sent for analysis and the use of antibiotics (see Table 1). Although the operation reports were contained within named medical record files, 14% of them did not have the name of the patient written on the same sheet of paper. Two out of the 50 reports studied (4%) were partly illegible, and thus only the legible text could be assessed.

Electronic operation reports

Operation reports compiled using the computerised proforma scored an average of 30.6 out of 33 (92.8% with a 95% confidence interval of 91–94.6%). The difference between this and the handwritten scores reached significance following unpaired *t*-test analysis ($P < 0.01$). An improvement in the prevalence of all parameters was observed (see Table 1). All reports were entirely legible and signed for authenticity.

Discussion

Here, we have demonstrated that the implementation of an easy-to-use electronic proforma for hip hemi-arthroplasty operation reports significantly improves the calibre of surgical documentation, including adherence to RCSE guidelines, compared to handwritten reports.

Exploring techniques to improve the level of medical documentation has been a long-standing pursuit, especially when healthcare professionals' entries are increasingly the subject of medicolegal scrutiny. In a recent audit, we drew attention to the inadequacies of generic, hand-completed, consent forms for orthopaedic operations, instead favouring down-loadable procedure-specific forms from <www.orthoconsent.com>, which significantly improve patient understanding of their surgery and the record of an informed consent process.¹⁰ Similarly, hand-written operation reports have been shown repeatedly to vary with respect to their legibility and the extent to which they encompass the parameters of RCSE guidelines.^{2–4} Indeed, the RCSE requests that 'all medical records are legible, complete and contemporaneous, and have the patient's identification details on them'.¹ However, the first cycle in this audit showed that 4% of operation notes were partly illegible and 14% omitted the details of the patient. Information concerning the procedure itself and the extent of postoperative instructions were also variable, which can promote confusion particularly for junior healthcare professionals required to continue patient care on the wards. Therefore, we broke down the assessment of postoperative instructions into six separate headings so as to improve their helpfulness in clinical terms.

Table 1 Individual parameter scores for all operation reports

Parameter	Handwritten	Proforma
Patient's name	86	100
Date*	100	100
Time*	24	100
Length of operation	0	96.7
Full name of procedure*	92	100
Name of responsible consultant	16	100
Name of performing surgeon*	100	100
Name of anaesthetist	68	100
Side on which performed	98	100
Diagnosis*	16	96.7
Elective versus trauma*	0	76.7
Type of anaesthetic(s)	50	80
Skin preparation and draping	4	100
Patient position	58	100
Incision*	88	100
Approach	96	100
Findings*	46	96.7
Limits of resection/difficulties*	18	96.7
Bone removed*	90	100
Prosthesis inserted with serial no.*	90	100
Stability checked	88	100
Drains inserted	28	70
Estimated blood loss	2	86.7
List of specimens sent for analysis	2	30
Closure with sutures*	100	100
Dressings	58	100
Postoperative instructions*		
Weight-bearing status	86	100
Antibiotics	38	66.7
Check X-rays	92	100
Postoperative bloods	90	100
Anticoagulation measures	68	100
Follow-up	46	70
Signature/identification*	98	100

Electronic proformas increased the prevalence of all parameters with respect to handwritten operation notes. Scores are given as a percentage and the specific RCSE parameters are marked with an asterisk.

It has been suggested for many years that some sort of prompting system should be employed to improve the quality and consistency of operation reports.³ Studies have either provided a print-out of bullet points to act purely as an *aide memoire* for the surgeon^{6,8,9} or constructed a generic reporting template with subheadings,^{2,4,5} and shown that

the completed operation reports greatly improve their adherence to the specific RCSE parameters^{2,5,8} or similar criteria.^{4,6,9} Although many were still completed by hand,^{2,6,8,9} they became more legible and easier to follow. Two of the studies only used computers to complete the operation note on their pre-designed templates and demonstrated that this process took no extra time to perform compared with writing them by hand.^{4,5} However, these studies were conducted over 10 years ago and, although the authors conceded that availability of word-processors and functional printers in theatre suites was likely to limit computerised documentation, the practice not been widely adopted.

In this study, we furthered the practice of fully computerised operation notes by providing a document consisting of a ready-made, but still adaptable, description of the hip hemi-arthroplasty procedure in prose form, with additional spaces for more variable information about the patient, surgeon, prosthesis and so on. Although all the parameters listed in Table 1 were included somewhere, the use of some still did not reach 100%. Having received some feedback at the completion of the study, surgeons admitted that certain extracts of text were inadvertently deleted or removed purposely in some cases, such as 'specimens sent for analysis', which is rarely done during hip hemi-arthroplasty and the most poorly recorded aspect of the operation note (see Table 1). A mark could not be awarded even if no specimens were actually sent because the parameter was not then mentioned at all. However, our results show that use of all 33 parameters was either improved or remained at 100% (see Table 1). Notably from the RCSE guidelines, mention of whether the procedure was elective or trauma increased from 0% to 76.7%, the time performed from 24% to 100%, the diagnosis from 16% to 96.7%, intra-operative findings from 46% to 96.7% and, perhaps most importantly, documentation of the patient's name from 86% to 100%. We also found it simple to implement the electronic proforma, with a master-copy sent to all orthopaedic surgeons, and achieve full compliance with its use. Deployment of similar procedure-specific forms for other orthopaedic or general surgical operations may necessitate a means of easier access to them, so that locating and storing the master-copies on personal hard disc space is negated. This could occur online via the NHS Trust Intranet website or, indeed, through a separate internet website similar to <www.orthoconsent.com> which already houses the procedure-specific consent forms for orthopaedic procedures.

Conclusions

Handwritten operation reports are subject to a high degree of variation with regards their level of information and legibility. A computerised procedure-specific proforma for the

operation note significantly improves the standard of information and strengthens adherence to The Royal College of Surgeons of England guidelines. Computerised proformas should, therefore, be encouraged for all surgical procedures but will require easy access from theatre work-stations as well as the means to produce a hard copy for the patient's case notes.

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