Original research

'Smart' electronic operation notes in surgery: An innovative way to improve patient care

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A B S T R A C T

Aims: Operation notes are the only comprehensive account of what took place during surgery. Accurate and detailed documentation of surgical operation notes is crucial, both for post-operative management of patients and for medico-legal clarity. The aims of this study were to compare operation documentation against the Royal College of Surgeons of England guidelines and to compare the before-and-after effect of introducing an electronic operation note system.

Methods: Fifty consecutive operation notes for inpatients that had undergone emergency orthopaedic trauma surgery were audited. An electronic operation note proforma was then introduced and a re-audit carried out after its implementation.

Results: The results after implementation of electronic operation notes, demonstrated a marked improvement. All notes contained an operation note (previously 5/6). Seventy-five percent included time of surgery and age of patient (vs. 0% previously). A hundred percent included closure details and antibiotic selection at induction (vs. 60% and 69% respectively). Post-operative instructions improved to 100%. All were typed, making for 100% legibility as compared to only 66% of operation notes with legible handwriting in the initial audit.

Discussion/conclusion: We used our pilot audit to target specific information that was commonly omitted and we ‘enforced’ these areas using drop-down selections in electronic operation note. This study has demonstrated that implementation of an electronic operation note system markedly improved the quality of documentation, both in terms of information detail and readability. We would recommend this template system as a standard for operation note documentation.

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1. Introduction

Operation notes are the only comprehensive account of an operation and contain details of what took place during surgery. Accurate and detailed documentation of surgical operation notes is crucial as it facilitates the post-operative management of the patients and serves as an important medico-legal document for any discrepancies or disputes.1 A high standard of medical record keeping has been shown to be invaluable in the safe care of patients serving as a record of care and an instrument for research and audit.

The General Medical Council also recognises its importance and states that good note keeping is an essential part of good medical practice.2 The Royal College of Surgeons of England (RCS) in keeping with this published the booklet, Good Surgical Practice which contains recommendations regarding details that should be documented to create complete and comprehensive operation notes.3

The aims of this study were to compare operation note documentation against RCS guidelines and to evaluate the before and after effect of introducing a ‘smart’ electronic operation note system on operation note documentation.

2. Methods

A retrospective audit of operation notes was carried out at a London Major Trauma Centre with the audit standard set by the RCS guidelines (Table 1). During the initial audit, fifty consecutive operation notes for all inpatients that had undergone emergency orthopaedic trauma surgery were audited. These were audited for accurate documentation of patients’ characteristics (name, date of
birth, hospital number); legible and clear documentation of procedure performed; indication for the procedure; antibiotics at induction; surgical incision made (where appropriate); operative findings; post-operative care plan; follow-up care plan; grade of surgeon and annotation of the surgeon’s signature.

All the operation notes were reviewed by a single reviewer and opinions about legibility were sought from nursing staff and physiotherapists.

The findings were presented at the departmental audit meeting and areas of consistently deficient documentation were identified. In addition to educating surgeons, a ‘smart’ electronic operation note proforma that was a macro containing word document with prompts and drop down menus was introduced to aid in improving documentation.

A re-audit of 50 operation notes was carried out after the implementation of the new electronic operation notes.

3. Results

A total of 60 trauma patient notes were reviewed for the initial audit. Ten of the notes were missing the handwritten operation notes, leaving a total of 50 operation notes that were audited. Nineteen were written by consultants and 31 by specialist registrars (SPR).

All the cases (100%) documented the name of operation and assistant’s name with 98% including the name of operating surgeon. The initial audit showed that 98% documented the date of the surgery, however none documented the time of surgery and age of patient. Eighty four percent stated the incision and only 60% included the closure details. Merely 69% included the antibiotics given at induction. Crucially, only 66% of the operation notes had legible handwriting (Fig. 1).

Good compliance was found for documentation of signature (98%) and 100% for operative findings, prosthesis ID, additional procedures, details of tissue removed and any complications that occurred.

The results after the implementation of ‘smart’ operation notes demonstrated a marked improvement. All notes reviewed contained an operation notes (previously 5 out of 6). Seventy five percent included time of surgery and age of patient and 100% the date of surgery (Fig. 1). All notes (100%) included closure details, antibiotics selection at induction, signature and post-operative instructions. All notes were typed and printed, making for a hundred percent legibility.

4. Discussion

Comprehensive, legible and well documented operation notes are crucial for delivery of quality care. Primarily, medical notes are meant to support patient care.4 The operative findings and post-operative plans they contain, serve not only as a vital means of communication between health professionals, but are also the only comprehensive legal record of an operation.1

The initial audit results showed excellent compliance in certain areas; however, it raised concerns about legibility of handwritten operation notes with only 66% being legible. Other areas showing deficiency included inclusion of closure details (60%), detail of antibiotics selection at induction (69%), incision (84%), time of surgery and age of patient both zero percent.

There is no perfect model for producing faultless operation notes, however, strategies to improve operation note writing in the literature include providing a proforma or providing an aide-memoire both of which have been shown to be of benefit in a number of specialties.1,5,6 There is also evidence of the superiority of computerised operation notes compared to handwritten notes.7

The inspiration of an electronic ‘smart’ operation note template was to facilitate accurate operation note documentation and improve the system by targeting the two main faults detected in this study, namely the omitting of information and the illegibility of handwritten notes.

We used our pilot audit to target specific information that was commonly omitted and we ‘enforced’ these areas using drop-down selections. The electronic operation note was created using macro

<table>
<thead>
<tr>
<th>Table 1: RCS good practice guidelines.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Date and time</td>
</tr>
<tr>
<td>2. The name of operating surgeon</td>
</tr>
<tr>
<td>3. The name of assistant</td>
</tr>
<tr>
<td>4. The operative procedure carried out</td>
</tr>
<tr>
<td>5. The incision</td>
</tr>
<tr>
<td>6. The operative diagnosis</td>
</tr>
<tr>
<td>7. The operative findings</td>
</tr>
<tr>
<td>8. Any problems/complications</td>
</tr>
<tr>
<td>9. Any extra procedure performed and the reason why it was performed</td>
</tr>
<tr>
<td>10. Details of tissue removed, added or altered</td>
</tr>
<tr>
<td>11. Identification of any prosthesis used, including the serial numbers</td>
</tr>
<tr>
<td>12. Details of closure technique</td>
</tr>
<tr>
<td>13. Post-operative care instructions</td>
</tr>
<tr>
<td>14. A signature</td>
</tr>
</tbody>
</table>

Fig. 1. Adequacy of operation notes.
enabled word document with drop down menus of common trauma cases, names of consultants and staff members and their grades and selection of common antibiotics used in trauma and orthopaedic surgery. It contained prompts to include details such as patient demographics, time of surgery and operation details including incision and closure details. These also included post-operative care instructions with emphasis on post-operative antibiotic duration, physiotherapy and mobilisation instructions, wound care and follow-up details to improve the quality of care.

The re-audit after the implementation of this ‘smart’ electronic operation note showed a significant improvement in documentation of the operating notes, in compliance with the RCS guidelines. Importantly, the legibility of notes (previously 66%) was ensured by typing and printing in theatres. These notes were all saved on a secured network database and therefore could easily be accessed by surgeons and staff if patient notes were missing or unavailable especially in the outpatient clinics.

5. Conclusion

This study has demonstrated that implementation of a ‘smart’ electronic operation note system markedly improved the quality of documentation, both in terms of information detail and readability. This would help provide safer and better quality of care for the patients. We would recommend this template system as a standard for operation note documentation.

Ethical approval
None.

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Author contribution
Yaser Ghani: Concept/design, data analysis/interpretation, drafting article, submission of article.
Raj Thakrar: Data analysis/interpretation, drafting article.
Dennis Kosuge: Critical revision of article, approval of article.
Peter Bates: Critical revision of article, approval of article.

Conflict of interest
None.

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