

Comparing electronic recording with a diagrammatic template versus traditional handwritten recording of tympanomastoid procedures: third audit cycle of 95 cases

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Abstract

Background: The middle ear and mastoid are complex three-dimensional structures and therefore tympanomastoid procedures require detailed documentation. Traditional written accounts can be inaccurate and difficult to interpret.

Methods: This audit of 95 patients compares the completion of essential operative details using: an all-electronic version of a standardised proforma with a diagrammatic template, a non-electronic version with a diagrammatic template, and a traditional handwritten template.

Results: The electronic template resulted in 81 per cent of essential operative items being recorded, compared to 78 per cent ($p = 0.3$) with a previous non-electronic template and 50 per cent ($p = 0.0004$) when using simple handwritten recording.

Conclusion: An electronic proforma with a diagrammatic template improves the documentation and interpretation of tympanomastoid procedures compared to traditional handwritten records.

Key words: Otological Surgical Procedures; Otolaryngology; Tympanoplasty; Myringoplasty

Introduction

Essential to the management of every surgical patient is an accurate operation record detailing the extent of disease and the procedure performed. This document dictates immediate post-operative care, follow up, planning of revision surgery (if required) and recording outcomes. The middle ear and mastoid are complex three-dimensional structures that are difficult to represent in a two-dimensional plane. Traditional written accounts can be inaccurate and open to misinterpretation.

A standardised template for recording all tympanomastoid procedures was introduced in our department a number of years ago. The template design was based on the recommendations for an otology dataset by the International Otology Database.¹ This puts forth 35 essential items that should be recorded for all tympanomastoid procedures. Since the inception of proformas in 2006, we have developed and audited template versions 1.0 in 2011 and 2.0 in 2014. Successive templates have been shown to significantly improve procedural documentation.^{2,3} These proformas have included a tympanomastoid diagram (Figure 1) with subheadings to prompt clinicians to document essential findings (Table I). The blank template is printed and completed by hand post-operatively.

The introduction of paperless notes and the transition to electronic recording of data led us to develop a version 3.0

template. This is based on the version 2.0 template, but consists solely of electronic data entry. The diagrammatic representation of the middle ear, mastoid and ossicular chain is similar to that in version 2.0. The surgeon can 'draw' on the template, using a combination of a scribble tool and pre-defined shapes to represent site, nature and extent of disease within the middle ear and mastoid cavity (Figure 1). Details previously documented by hand have been replaced by drop-down menus and checkboxes to further improve accuracy and compliance.

This audit aimed to compare this recently introduced electronic version with our standard written template.

Materials and methods

This study involved a retrospective audit of 20 cases in which the new electronic version of the template (version 3.0) was used to record tympanomastoid procedures performed between October 2015 and February 2016. As with previous versions of the template, the essential operative findings and procedures recorded were those 35 items used in the International Otology Database (Table I). Non-applicable operative information was excluded from the analysis (e.g. if a meatoplasty was not performed, this item was excluded in the calculation of the total percentage completion rate).

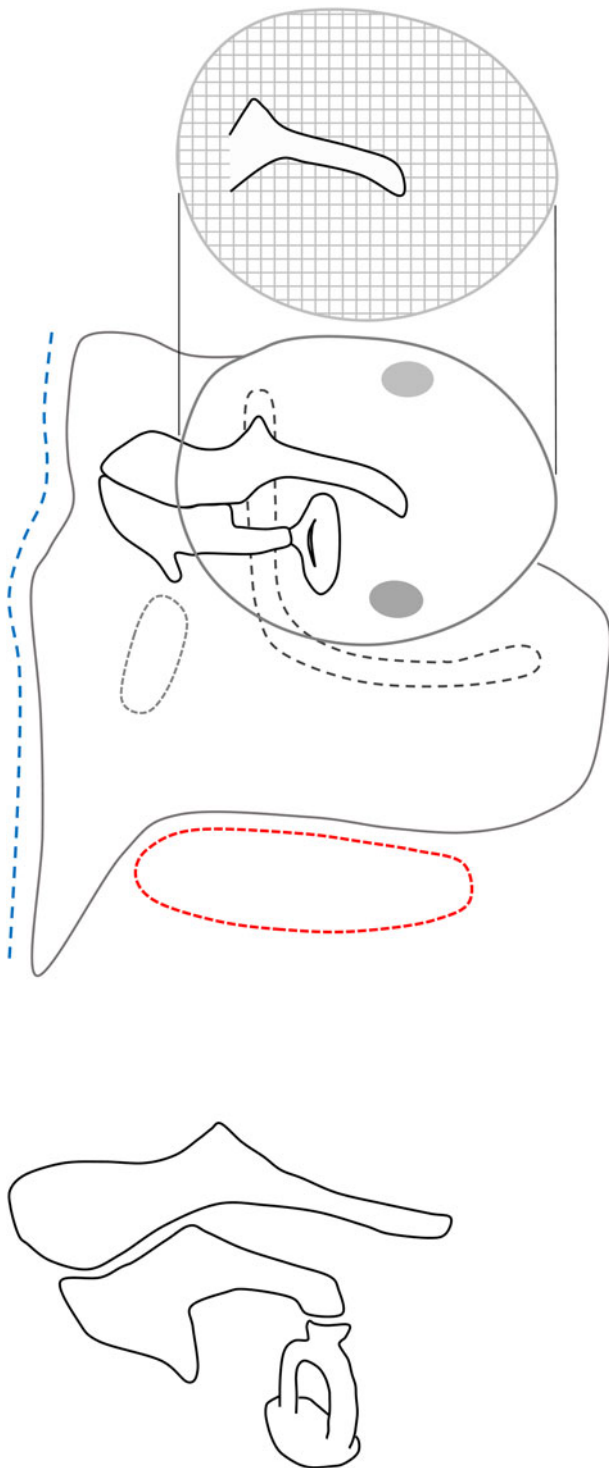


FIG. 1

Tympanomastoid diagrammatic template of right ear.

Results

Use of the version 3.0 all-electronic proforma resulted in the recording of 81 per cent of the 35 essential items, compared to 78 per cent in version 2.0 and just 50 per cent with the traditional written account.⁴ Whilst there was a significant improvement between version 3.0 and the traditional written records ($p = 0.0004$), the minor increase in average

documentation between versions 3.0 and 2.0 was not statistically significant ($p = 0.3$). Table I lists the completion rates for each of the 35 items for all 3 versions of the recording template.

Discussion

The third cycle of this audit supports previous findings which suggest that a standardised method of recording complex tympanomastoid procedures improves the documentation of operation records. The introduction of a purely electronic version of the template showed a minor improvement in the average completion rate of essential items compared with a non-electronic version (version 2.0) on which it is based.

Strengths

The 3 versions of the template, with a case series spanning 10 years and comprising 95 operative records, have continued to show incremental improvements in tympanomastoid procedure documentation. The new version 3.0 template is all-electronic, and is completed using Microsoft Word®, a widely available and familiar word processing and graphics tool. Electronic records completed with the aid of drop-down boxes allow for easy recording and review of the documents. This avoids problems of illegible written accounts, therefore minimising the risk of error based on the incorrect interpretation of operative notes.

The blank electronic templates for both right and left ears were uploaded onto the shared desktop of the Trust's computers; thus, the template was easily accessible on all Trust intranet-connected computers. This allowed easy access to the template from any computer in operating theatres, which negated the need for the surgeon to carry hard copies of the template.

Limitations

The drawing tool and blank tympanomastoid template used to diagrammatically illustrate middle-ear findings on the proforma was initially difficult to use, especially to those unfamiliar with the new electronic version. Without fine detail editing with the diagram on high zoom, which can be time consuming, the drawing tool lacked the refinement to outline precisely the extent of disease, especially that involving the ossicles. Further improvements in the electronic proforma should include a user-friendly diagram, possibly incorporating pre-designed templates of ossicles that are simpler to manipulate within the tympanomastoid diagram.

Conclusion

This third cycle of the audit confirms that a standardised proforma with a diagrammatic template improves the documentation of essential operative details in tympanomastoid procedures when compared with traditional written accounts. An electronic version enabled an incremental improvement in the recording of operation details compared to the paper equivalent. The benefits of the electronic version include clearer interpretation of the operative notes and easy access to the template on hospital computers. Further improvements to the template diagram will be made to allow simpler and more precise illustration of pathology affecting the middle ear and mastoid.

TABLE I
COMPLETION RATES FOR ALL ITEMS IN EACH PROFORMA TYPE

Items to be documented	Version 3.0 electronic proforma* (%)	Version 2.0 non-electronic proforma* (%)	Traditional handwritten proforma (%)
Basic details			
– Name	100	100	100
– Hospital number	100	100	100
– Date of birth	95	92	4
– Operation date	100	96	100
– Operation name	100	100	100
– Previous surgery	60	44	23
– Pre-operative aim	100	56	0
– Audiogram summary	0	0	0
Findings			
– Perforation	100	100	52
– Retraction pocket	92	96	29
– Retraction pocket mobility	33	67	10
– Cholesteatoma	100	84	90
– Facial nerve status	100	100	38
– Chorda tympani status	35	32	31
– Fistula present	75	100	8
– Ossicular erosion	90	91	77
– Ossicles fixed	89	91	29
– Mucosal state	80	100	73
– Sigmoid sinus exposed	73	100	23
– Dura mater exposed	73	100	15
Procedure			
– Primary or secondary	39	53	27
– Approach	100	94	96
– Type of mastoidectomy	100	88	92
– Ossicular integrity at end	90	63	56
– Hearing mechanism at end	75	25	12
– Material in middle ear	89	88	50
– Myringoplasty graft	100	94	65
– Meatoplasty performed	50	57	44
– Reconstruction performed	63	100	0
– Ossiculoplasty material	75	0	100
– Ossiculoplasty performed	60	0	100
– Obliteration performed	33	0	100
– External canal packing	100	100	96
Post-operative details			
– Facial nerve function	95	100	58
– Weber or scratch test	95	100	27

*With diagrammatic template.

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Mr S Fang takes responsibility for the integrity of the content of the paper

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