



Efficacy of Multimodal Intervention Strategies in Improving Perioperative Documentation at a Rural Tertiary Care Centre

Manjit George , Girijanandan D. Menon , Sara Vergis 

Department of Anaesthesiology, MOSC Medical College, Kolenchery, Kerala, India

Cite this article as: George M, Menon GD, Vergis S. Efficacy of Multimodal Intervention Strategies in Improving Perioperative Documentation at a Rural Tertiary Care Centre. *Turk J Anaesthesiol Reanim* 2020; 48(6): 473-6.

Abstract

Objective: To assess the efficacy of intervention strategies in improving perioperative anaesthetic documentation.

Methods: This interventional study was conducted at our hospital over a period of 5 months, i.e. from October 2016 to February 2017. The subjects were anaesthetic consultants. The perioperative anaesthetic documentation of patients who received general anaesthesia was studied by retrospectively reviewing 100 patient charts before the application of intervention strategies. Intervention measures included lecture sessions, posters and handouts to highlight the important parameters to be documented. Later, another set of 100 patient charts of cases who received general anaesthesia from the same group of anaesthetic consultants were retrospectively reviewed. The recommendations of the Australia and New Zealand College of Anaesthetists were taken as the gold standard. A point-based scoring sheet was used for evaluation. Data were analysed using Microsoft Excel, and the statistical test used was the Mann-Whitney U Test.

Results: Documentation standards were significantly improved in the post intervention group compared to the pre intervention group. Furthermore, documentation scores were lower in emergency cases compared to elective cases in both groups.

Conclusion: Multimodal intervention strategies resulted in higher perioperative documentation scores, and scores were lower in emergency cases than in elective cases in both groups.

Keywords: Anaesthesia, charts, documentation, elective, emergency, perioperative, multimodal intervention

Introduction

The first anaesthetic chart was developed by Codman and Cushing in 1894 at Massachusetts General Hospital (1). This was indeed a major breakthrough for the anaesthetic care of patients. Codman and Cushing recorded several items including premedication drugs administered, amount of anaesthetic required and physical signs, such as pupillary size, pulse rate and respiratory rate. Blood pressure charting was included in 1901 upon the insistence of Cushing. Respiration and fraction of inspired oxygen were included by McKesson in 1911. Over the years, anaesthetic record keeping has evolved to such an extent that automated anaesthetic record systems are increasingly being used in many centres worldwide and are even being incorporated into some anaesthetic machines (2, 3). These systems provide accurate and legible data for acquisition and scrutiny.

The importance of perioperative documentation for an anaesthesia provider does not need special mention. From the perspective of patient safety to medico-legal aspect, perioperative documentation is an important reference. It is essential to chart preoperative risk factors, perioperative conduct, course of anaesthesia and postoperative events and instructions. An anaesthetic chart is an important document when handing over care to another anaesthetist or for subsequent anaesthesia providers if the patient comes back for another procedure. Furthermore, it is an important tool for research, teaching and auditing.

Historically, anaesthetic documentations have always been poor with reference to standards of perioperative documentation. Several audits and studies have revealed this inadequacy in standards of perioperative documentation. Vital information regarding patient management, particularly that of airway management and abnormal sensitivity

to drugs, may be missed due to poor documentation. Illegible handwriting could be another factor. All of this could indirectly place patients at significant risk when they present for another anaesthetic eventually.

The aim of our study was to assess the efficacy of multimodal intervention strategies in improving perioperative anaesthetic documentation (preoperative, intraoperative and postoperative anaesthetic notes). Perioperative anaesthetic documentation scoring was based on the degree of documentation, which was evaluated using a point-based scoring system. Recommendations on recording of an episode of anaesthesia care by the Australia and New Zealand College of Anaesthetists (ANZCA) forms the basis of this scoring system (4).

Methods

This interventional study was conducted at a rural tertiary care hospital over a period of 5 months, i.e. from October 2016 to February 2017. The study was commenced after obtaining IRB approval and informed consent from the study group. Approval for the study was obtained from the Institutional Review Board and Institutional Ethics Committee of MOSC Medical College, Kolenchery, Kerala, India (IEC/134/2015 dated 27/11/2015). The subjects of the study were anaesthetic consultants. Written informed consent was obtained from the participating consultants. Our study had two groups- Group A and Group B. Group A included a retrospective review of 100 patient charts of cases who received general anaesthesia before multimodal intervention. These multimodal intervention strategies were in the form of structured lecture sessions using power point presentations, display of laminated cards/posters and individual handouts given to the anaesthetic consultants to highlight the important parameters to be documented. Another set of 100 patient charts of cases who received general anaesthesia was included as Group B. We retrospectively reviewed the charts and noted the scores. Both groups had a mix of elective and emergency cases. The recommendations on perioperative documentation by the ANZCA was used as the gold standard (4). This scoring system was based on the ANZ-

CA recommendations on recording of an episode of anaesthesia care. This documentation had three phases: preoperative, intraoperative and postoperative. We used a prevalidated scoring system to evaluate the adequacy of anaesthetic recording (Appendix 1). Preoperative phase recording had 12 variables with a maximum score of 18, the intraoperative phase had 7 variables with a maximum score of 7 and the postoperative phase had 3 variables with a maximum score of 3. Thus, the cumulative maximum score attainable was 28. Any documentation score greater than 75% was considered as a reasonably 'acceptable' or 'adequate' level of documentation. The documentation scores of 100 patient charts in Groups A and B were evaluated and noted. Data were analysed using Microsoft Excel. The statistical tool used was Mann-Whitney U Test for comparing the scores in Groups A and B.

Results

The overall documentation score was significantly higher in Group B than in Group A ($p < 0.001$). The median scores of Group B (20.5) were higher than those of Group A (15.5), as shown in Figure 1. Furthermore, Group B had significantly higher scores than Group A in elective ($p < 0.001$) and emergency ($p < 0.001$) cases. The documentation scores were significantly higher in elective cases than in emergency cases for both Group A ($p < 0.001$) and Group B ($p < 0.001$), as shown in Table 1.

The preoperative ($p < 0.001$), intraoperative ($p < 0.001$) and postoperative ($p < 0.001$) scores were significantly higher for Group B than for Group A.

The maximum attainable score was 18 in the preoperative phase, 7 in the intraoperative phase and 3 in the postoperative phase, with an overall maximum attainable score of 28. Any documentation score greater than 75% was considered as a

Main Points:

- Perioperative anaesthetic documentation is often overlooked.
- High standards of documentation is important from the clinical and medicolegal point.
- Level of documentation is poorer in emergency settings compared to elective scenarios.
- Documentation standards can be improved by implementation of multimodal intervention strategies.
- Adherence to guidelines on perioperative documentation is very important.

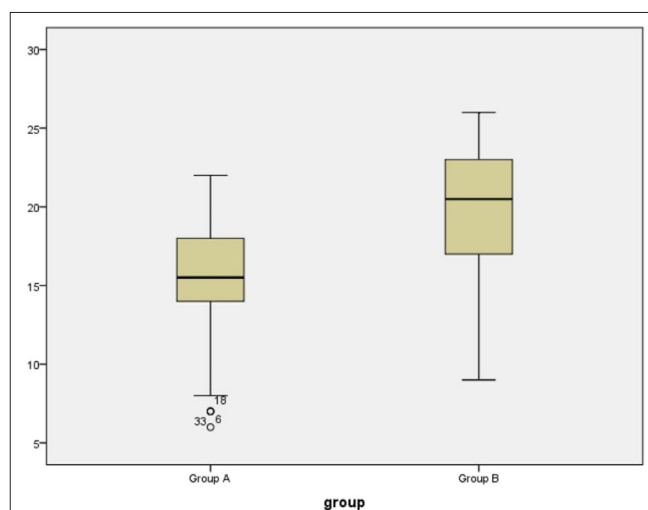


Figure 1. Box plot showing the documentation scores of Groups A and B

Table 1. Group-wise median and inter-quartile range of elective and emergency cases

Groups	Type of cases	Median [Inter-quartile range (IQR)]
A (Preintervention)	Elective	17 (15–18)
	Emergency	13 (9–14)
B (Postintervention)	Elective	21 (19–23)
	Emergency	17 (14–21.5)

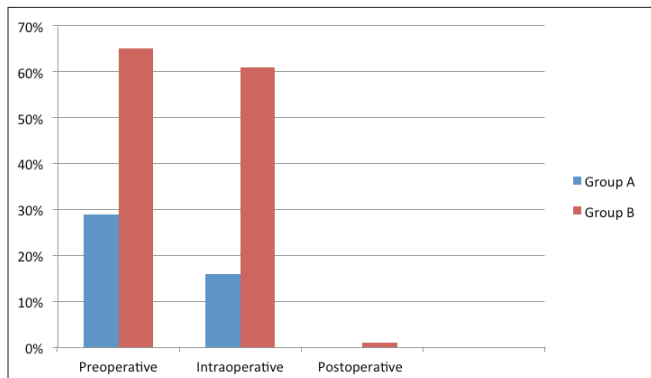


Figure 2. Percentages of charts with 'adequate' documentation on scored entries in Groups A and B

reasonably 'acceptable' or 'adequate' level of documentation. In the preoperative phase, 29% of charts had documentation scores greater than 75% of the maximum attainable scores in Group A, whereas it was 65% in Group B. Likewise, in the intraoperative phase, 16% of charts in Group A had documentation scores greater than 75% of the maximum attainable score, whereas it was 61% in Group B. In the postoperative phase, no chart had a score greater than 75% of the maximum attainable score in Group A, whereas it was 1% in Group B. In all the three phases, documentation scores greater than 75% of the maximum attainable score were higher in Group B than in Group A (Figure 2).

Another point to be highlighted in the postoperative phase documentation was that 96% of charts had documentation scores of zero in Group A, whereas it was 50% in Group B.

Considering the individual variables documented, the least documented variables in both groups were related to information on breathing systems, i.e. flow and ventilation parameters used in the intraoperative phase and pain scores, analgesia for recovery and postoperative wards and postoperative fluid orders in the postoperative phase.

Discussion

Perioperative surgical and anaesthetic notes form an integral part of surgical patient care; however, documentation

Table 2. Group-wise median and inter-quartile range of the three phases

Groups	Phases	Median [Inter-quartile range (IQR)]
A (Preintervention)	Preoperative	13 (9–14)
	Intraoperative	4 (2–4)
	Postoperative	0 (0–0)
B (Postintervention)	Preoperative	14 (12–15)
	Intraoperative	6 (5–7)
	Postoperative	0.5 (0–1)

remains poor despite improvements in patient care over the years. Inadequate documentation can adversely affect quality and safety of patient care, with the medico-legal implications (5). An anaesthetic record is the sole document of an anaesthetist's interaction with the patient. It is a concise document of preoperative assessment, intraoperative drug administration, physiological data recording as well as postoperative orders for analgesia, fluid therapy, oxygen therapy and any other specific instructions. Professional bodies such as the ANZCA and American Society of Anesthesiologists have endorsed specific standards for recording an episode of perioperative event (4, 6).

Handwritten notes are often illegible, inaccurate and often made up. With the advent of electronic recording, this problem has been circumvented to a great extent; however, not many centres have access to this facility (7).

Multimodal intervention strategies in the form of prospective audits, teaching modules, display of posters and one-to-one sessions have been found to produce good results in clinical practice. One example is the role of these strategies in improving hand hygiene compliance in the intensive care unit (8). Repeated training sessions and periodic audits play an important role in improving the standards of patient care (9).

This study highlights the considerable deficiency existing in the recording of all the three phases-preoperative, intraoperative and postoperative, which is higher for Group A than for Group B. Our findings were consistent with the results of previous studies (10, 11). Poor compliance with existing recommendations was evident in the study by Elhalawani et al. (10) in which 32% of preanaesthetic records and 27% of intraoperative records met the criteria. Compared with the preoperative and intraoperative phases, the postoperative phase had the worst scores. At our institution, postoperative pain and fluid management are mostly undertaken by the respective surgical teams, explaining the reason for poor documentation scores in the postoperative phase compared to the oth-

er two phases. Even when multimodal intervention strategies resulted in higher documentation scores in the preoperative and intraoperative phases, postoperative phase documentation still lagged behind. Therefore, postoperative phase documentation needs focused emphasis for further improvement. Furthermore, anaesthesia providers need to be proactive in prescribing postoperative analgesia and fluid orders.

The overall documentation scores were significantly higher for Group B than for Group A. This could be attributed to the effectiveness of the multimodal intervention strategies.

Documentation scores were higher in elective cases than in emergency cases in Groups A and B. This result was similar to the results of Elhalawani et al. (10). Generally, in emergency scenarios, patients are inadequately optimised and poorly assessed preoperatively. Compared with elective patients, the conditions of emergency patients are worse. The urgent nature and clinical instability of these cases often divert the focus from proper documentation.

Study limitations

As this study involved retrospective evaluation of charts, it was not really possible to ascertain the different clinical situations that each anaesthetic consultant encounters. This could have potentially affected documentation standards. Furthermore, we did not have electronic recording option in our hospital. So it was not possible to compare manual and electronic recording methods. A larger sample size could yield more accurate results.

Conclusion

There is a significant deficiency in perioperative anaesthetic documentation. By creating better awareness of existing guidelines on anaesthetic documentation, multimodal intervention strategies resulted in higher perioperative documentation scores. Scores were lower in emergency cases than in elective cases in both groups. Postoperative instructions for analgesics, fluid and oxygen therapy form an integral part of anaesthetic notes and their importance needs to be emphasised.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of MOSC Medical College (MOSC/IEC/134/2015 dated 27/11/2015).

Informed Consent: Written informed consent was obtained from participating consultants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – M.G., G.D.M.; Design – M.G., G.D.M.; Supervision – M.G., G.D.M.; Resources – M.G., G.D.M.; Materials – S.V., G.D.M.; Data Collection and/or Processing –

M.G., G.D.M.; Analysis and/or Interpretation – M.G., G.D.M., S.V.; Literature Search – M.G., G.D.M., S.V.; Writing Manuscript – M.G., G.D.M.; Critical Review – M.G., G.D.M., S.V.

Acknowledgements: Special thanks to Mrs Celine T M for help with statistical analysis and to Dr Saramma P Abraham for her encouragement and support.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Fisher JA, Bromberg IL, Eisen LB. On the design of anaesthesia record forms. *Can J Anaesth* 1994; 41: 973-83. [CrossRef]
2. Smith NT. Automated Anesthetic Record Keeping. In: Osswald PM, editor. *Computers in Critical Care and Pulmonary Medicine* [Internet]. Berlin, Heidelberg: Springer Berlin Heidelberg; 1985 [cited 2019 Feb 19]. p. 147-61. Available from: https://doi.org/10.1007/978-3-642-70068-2_21 [CrossRef]
3. Lees N, Hall R. Information technology in anaesthesia and critical care. *Contin Educ Anaesth Crit Care Pain* 2011; 11: 104-7. [CrossRef]
4. Australian and New Zealand college of Anaesthetists. The Anaesthesia record. Recommendations on the recording of an episode of anaesthesia care. [Last accessed on 2009 Dec 21] PS06-2006. Revised 2006. Accessed from: <http://www.anzca.edu.au/documents/ps06-2006-the-anaesthesia-record-recommendations>.
5. Powers MJ. Record-keeping in anaesthesia: what the law requires. *Br J Anaesth* 1994; 73: 22-4. [CrossRef]
6. Statement on Documentation of Anesthesia Care [Internet]. [cited 2019 Jul 8]. Available from: <https://www.asahq.org/standards-and-guidelines/statement-on-documentation-of-anesthesia-care>
7. St Jacques PJ, Minear MN. Improving Perioperative Patient Safety Through the Use of Information Technology. In: Henriksen K, Battles JB, Keyes MA, et al., editors. *Advances in Patient Safety: New Directions and Alternative Approaches (Vol. 4: Technology and Medication Safety)*. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008 Aug.
8. Mathai AS, George SE, Abraham J. Efficacy of a multimodal intervention strategy in improving hand hygiene compliance in a tertiary level intensive care unit. *Indian J Crit Care Med Peer-Rev Off Publ Indian Soc Crit Care Med* 2011; 15: 6. [CrossRef]
9. Curtis WB, Sethi R, Visvanathan T, Sethi S. Peri-Operative Anaesthetic Documentation: A Report of Three Sequential Audits on the Quality of Outcomes, with an Insight Into Surrounding Legal Issues. *Turk J Anaesthesiol Reanim* 2018; 46: 354-61. [CrossRef]
10. Elhalawani I, Jenkins S, Newman N. Perioperative anaesthetic documentation: Adherence to current Australian guidelines. *J Anaesthesiol Clin Pharmacol* 2013; 29: 211. [CrossRef]
11. Raff M, James MFM. An audit of anaesthetic record keeping. *South Afr J Anaesth Analg* 2003; 9: 7-9. [CrossRef]

Appendix 1**Scoring sheet**

Preoperative (PAC)	Maximum score
1) Name, Hospital or Reg. No., Gender, Weight (on both pre and intraop)	4
2) Date (on PAC and intraop document)	1
3) Name and Signature (on PAC and intraop document)	1
4) Surgical Procedure description (on PAC and intraop document)	2
5) ASA score (on PAC and intraop document)	1
6) Current medications and Allergies	1
7) Previous anaesthesia (list and issues)	1
8) Airway- MP/TMD, Dentition-loose, false or broken, Gastrooesophageal Reflux Disease (GORD)-presence/severity	3
9) Relevant investigations	1
10) Premedication	1
11) Anaesthetic plans/options description	1
12) Risks description (PAC or consent form)	1
	= 18 points
Intraoperative	
13) Anaesthetic technique-full details	1
14) Drugs administered with timing and dose	1
15) Airway-type/ size, any difficulty encountered	1
16) Breathing system-including flow and ventilation	1
17) Monitoring methods-including site and size of invasive if any	1
18) Vascular access-including size, site, type and volume of fluid	1
19) Significant blood loss-intracavitary/major ortho/gyn & cs, uro, neuro	1
	= 7 points
Postoperative	
20) Pain score & post op recovery analgesia	1
21) Post op ward analgesia (operation chart/ medications chart)	1
22) Post op fluid orders	1
	= 3 points
	Total = 28 points