

Title: Critical review and analysis of two research articles on the use of GlideScope video laryngoscope vs. direct blade laryngoscope for intubation of difficult airway management or morbidly obese patients

Subject: Nursing

Type of Paper: Assignment

Words: 2470

INTRODUCTION

Endotracheal intubation is a medical procedure which was applied firstly for rescuing the drowning victims in 1788, but this procedure has not been included under anaesthesia practice till one century passed from that date (Chung and Lam 1997, p. 169). The technique of the video laryngoscope is a relatively modern innovation to anaesthesia that uses high-resolution micro cameras and small portable flat-screen monitors to assist the successful endotracheal intubation (Healy et al. 2012, p. 1). Like all other new methods, it has been intensely researched to make this technique possible (Healy et al. 2012, pp. 1-2). The aim of this essay is to critique two articles to determine if this new approach to intubation is a welcome additional support for anaesthetists, especially in difficult airway management or morbidly obese patients.

Health care professionals need to acquire skills and knowledge in research to produce useful and ideal professional research in the future, and these skills with knowledge tend to be in a research critique, research project or dissertation (Moule and Hek 2011, p. 22). Moreover, it has been said by Vance et al. (2013) that the capability to critically evaluate a quantitative design research article is a necessary skill for researchers and practitioners of all disciplines to judge usefulness and integrity of results and conclusions made in an article. Generally, this skill is automatically developed in many practitioners and researchers who have a good working knowledge of research methodology (Vance et al. 2013, p. 67).

This work is a critical review and analysis of two research articles by using a critiquing framework, which is designed by Ingham-Broomfield (2008, p. 108). It has been mentioned (Parahoo 2006, p. 402) that evaluation of a study can be approached in different methods while the beginners in this field like to follow a framework guidance to do so. This framework provides simple questions that trigger the reader to explore the article papers and gain a better interpretation of the article's contents (Ingham-Broomfield 2008, p. 107). The purpose of this

essay is to critically analyze these two articles in the light of relevancy to present practice, purpose of the study, rationale, aims and objectives, literature review, methodology, ethical consideration, findings of the study, recommendations and conclusion drawn.

SEARCH STRATEGY

To find out the relevant articles, an electronic search was carried out through Cardiff University library search and databases, including CINAHL and Ovid Medline. The keywords for this search are: GlideScope, videolaryngoscopy and difficult airway management. The search parameters were confined to adult human, randomized control trials (RCTs), systematic reviews, English language articles and the latest research articles to give a full coverage on the subject (Moule and Hek 2011, p. 50). All the rest of search strategy information is listed and presented in Appendix 1. After briefing all the potential articles, the choice came on article number 1 for Andersen et al. (2011) and article number 2 for Serocki et al. (2010) - which is found in a systematic review (Healy et al. 2012) - to be critiqued in this essay.

RESEARCH CRITIQUE

TITLE AND ABSTRACT

As Crombie (1996, p. 3) has said that the main guide to find out if the article may be worth reading or not begins from the title and abstract. Similarly, the title of research paper provides summary of main ideas of the study where a good title should contains the fewest possible words that describe the contents and the purpose of research paper (Rees 2003, p. 58). Title of both the articles is although short but these are little bit confusing and somewhat difficult to understand. In addition to what Crombie (1996) has said, Parahoo (2006, p. 403) has stated that the abstract should ideally contains “background and aim of the study, the design, including the method(s), sample(s) and sampling, and the main findings”. The abstract of both articles have talked about background, methods, result and conclusions. However, Article 2 has given full abstract requirements by including objectives of study and study question which is not mentioned in Article 1.

IDENTIFYING THE PROBLEM AND HYPOTHESES

A research problem in a piece of research is the topic researcher like to address, investigate, or study, that might be descriptive or experimental. It is the focus or reason for the investigator engaging in research (Tuckman 1999). It is typically a topic, phenomenon, or challenge that attract the researcher and with which he is at least somewhat familiar (Tuckman 1999).

Article 2 while describing the problem statement in introduction section have stated that difficulties in performing conventional direct laryngoscopy commonly arise from the limited view angle of airway track. Insufficient laryngoscopy view can cause the main reason for difficult intubations. However the focus of Article 1 is on difficulties arises during endotracheal intubation of overweight or obese patients. Thus both the articles have well explained research problem to be addressed in the research.

Importance of developing a comprehensive research question and hypothesis has been acknowledged by many researchers. According to Farrugia et al. (2010), the challenge in developing an appropriate research question is in determining which clinical uncertainties could or should be studied and rationalizing the need for their investigation. Increasing one's knowledge about the subject of interest can be accomplished in many ways (Moule and Hek 2011, p. 26). Appropriate methods include systematically searching the literature, in-depth interviews and focus groups with patients and interviews with experts in the field. In addition, awareness of current trends and technological advances can assist with the development of research questions (Farrugia et al. 2010). Both the research articles have not clearly mentioned aims and objectives of the study. In article 1, two hypotheses were designed to be tested and formulate the original problem. On the other hand, article 2 has not made hypotheses where it contained a question to design the study.

LITERATURE SEARCH

Published literature is needed when researcher is starting any research project because it will provide him academic basis for proposed research, will clarify research ideas and findings and enabled him to find data and research methods, It connects the researcher work to the great scholarly chain of knowledge and in more immediate terms, it demonstrates researcher understanding and puts the work he has done in a wider context (Parahoo 2006, pp. 126-127). Using the published literature is a core part of the academic communication process. The researcher might also find that there is an added benefit since he will find information about the

subject before starting a practical research work and supporting the evidence-based practice with producing standards for audit (Rees 2003, p. 244).

Author of Article 1 did not think necessary to give a separate heading of literature review or search and even did not give heading of introduction in the article. He has just given background of the study subject and has gone to methods directly. Author has used 36 references for the study. In Article 2, the author has given the heading of introduction and discussed the literature in introduction section and no separate section or heading for literature search or literature review. He has given 23 references during his study. Authors of both the articles have used references from the journal related with anaesthesia. Pictorial diagrams of laryngoscopes have been added by the author of article 2 but no such picture has been included in article 1. Pictorial diagrams gave a better impression to the research paper. In both the articles there is unbiased discussion of the subject under study. In article 1 most of the references used are latest articles. However, this is not the case with article 2 in which even studies of 1987 have been used as reference. The researchers have critically appraised the previous studies. According to Auston et al. (1992), literature search is a systematic and unambiguous approach to the identification, reclamation, and bibliographic management of independent studies. The purpose is locating information on a topic, synthesizing conclusions, identifying areas for future study, and developing guidelines for clinical practice. Computer database searches are the most proficient way to identify published studies. Computer searches may be augmented with manual searches of print sources. It is reiterated that literature identification and management, the **search** process are distinguished from the literature **review** process. A literature review involves analyzing, evaluating, and synthesizing scientific evidence derived from studies identified through the search process. Thus, search and review of literature is an important part of research which has been documented by different researchers. So in both the articles under critical review the authors have used and referred the literature but not sufficient enough.

MEHODOLOGY

Article 1 is a prospective, controlled, randomized, non-blinded clinical trial. Article 2 is also a prospective randomized trial. National Cancer Institute (NCI) Dictionary ([no date]) has defined randomized control trial (RCT) as the study which is distributed for the participants to separate groups into different treatments, where the researchers and participants can not choose any

combination. And the use of any chance to assign people to the groups means these groups will be similar and that treatment they receive can be compared transparently. At the trial time, they cannot figure out the best treatment; so patient is being selected in a randomized trial.

Article 1 has mentioned the study population, case definition or eligibility criteria, inclusion or exclusion criteria. Sample size was 100. . The study was conducted in an institution and time period was one year. Intubation time was the primary outcome and was defined as the time from holding the laryngoscope until registration of expired CO₂. Unsuccessful intubation in maximum two attempts was considered as a failure, and subsequent choice of intubation method was at the discretion of the anaesthesiologist. Secondary outcomes were the number of intubation attempts, Cormack-Lehane grade, intubation degree scale (IDS) score, subjective difficulty of intubation, dental trauma and visual mucosal trauma, which were all recorded by the practitioner. Pilot study was conducted. Although the author has described different data and variables, he has not mentioned the methods of data collection instruments..

Article 2 has given sample size of 125 patients. Considering the ethical issues formal approval from institutional review board (IRB) was taken. Inclusion and exclusion criteria mentioned. For each laryngoscopy, the time was measured starting from touching the laryngoscope until achievement of the best glottis view. The number of intubation attempts was documented and taking the laryngoscope completely out was considered as another intubation attempt. After two failed intubation attempts, the study protocol was stopped in order to ensure patients' safety. The author has mentioned the data collection tool as standardized data sheet.

Convenient sampling has been done in both studies. Sample size in study I is 100 patients consecutively registered for surgery. In study 2 samples is 125 patients. Gender and culture has not been considered in both studies during selection of samples. Informed consents and ethical issues have been given due importance. Confidentiality and anonymity has not been ensured in both the studies.

RESULTS

Findings of article 1 revealed that two groups were compared with regard to demographic and airway characteristics. Results are shown in tabulated form and graphs. Results of article 1 reveals that intubation in group of GlideScope (GS) and group of direct laryngoscope (DL) lasted

48 seconds and 32 seconds, respectively with median difference 11 seconds. Laryngoscopy views were better in GS group vs. DL group. IDS scores were significantly lower with GS than with DL. No other statistically significant differences were found. Two cases of failed intubation occurred in group DL vs. none in group GS (non-significant). Both patients were intubated with the GlideScope without problems.

Article 2 revealed that both video laryngoscopes showed significantly better view than direct laryngoscope. Laryngoscopy view was measured in 30% of patients when using direct laryngoscopy, and in only 11% when using the DCI laryngoscope. The GlideScope enabled significantly better view than both direct and DCI laryngoscopes. Clinically relevant improvement in the specific 36 patients with insufficient direct view could be achieved significantly more often with the GlideScope (94.4%) than with the direct laryngoscope (63.8%). Laryngoscopy time did not differ between instruments. In contrast, tracheal intubation needed significantly more time with both video laryngoscopes than with the direct laryngoscope. Intubation failed in four cases (10%) using the direct laryngoscope and in one case (2.5%) each using the direct laryngoscope. And the GlideScope Results of article 2 have been presented in tabulated form, but no graphic presentation is there. This study investigates the capability of two different video laryngoscopes to improve laryngoscopy view in patients with potentially difficult airways. In both articles, inclusion and exclusion criteria mentioned. No patient was excluded during statistical analysis, and probability of the result has been included by chance.

DISCUSSION / RECOMMENDATIONS

This is the section where authors discuss the relevance of research results and how the findings of their research fit with other researches in the area (Moule and Hek 2011, p. 154). It will relate back to literature review and introductory research statement. Recommendations include suggestions for what needs to be done as a result of study findings and recommendations are usually listed in order of priority (Parahoo 2006, p. 406).

Article 1 has described some shortcomings of the study that need to be addressed. It was impossible to blind practitioner to study group assignment. Neither was the assistant during intubation nor the person reviewing the subjects for postoperative complications blinded. According article 1, studies comparing different video laryngoscopes are limited, and differences

in design and quality of the studies make it difficult at present to determine whether one device is more advantageous than the others. Both in general as well as in selected groups of patients Article 2 has also mentioned that study design was confronted with several limitations. First, the investigation was carried out by only two anaesthetists. However, neither of them was involved in the development of the laryngoscopes investigated. Furthermore, the study could not be blinded, thus exposing it to potential observer bias. As at least video laryngoscopy views could be witnessed by the nursing staff to control observer bias, the main findings of this study have to be considered reliable. To validate findings, further investigation is warranted to approve increased intubation success by use of video laryngoscopes..

CONCLUSIONS

Finally, this part needs to look at the conclusion to the research, recommendations and implications (Rees 2003, p. 61). Article 1 has concluded that whether using a video laryngoscope should be recommended as first choice for intubation in morbidly obese patients remains to be answered. Contrary to the hypothesis, intubation with the GS was found to be slightly slower than with direct laryngoscopy. Similarly, author of article 2 has concluded that both video laryngoscopes and the GlideScope in particular enable significantly better visualization of the glottis opening compared with the direct laryngoscope. They may, therefore, be a useful alternative for the management of the difficult airway.

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APPENDIX 1

Databases	Keyword	Limitation	Count
Library Search	GlideScope	English language & after 2010 articles	247
CINAHL	Difficult airway management	Adults & after 2009 articles	22
Ovid Medline	Videolaryngoscopy	Systematic reviews & latest 3 years	415

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