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Evidence-Based Best Practice Policy Recommendation for Postoperative Sore Throat

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EVIDENCE-BASED BEST PRACTICE POLICY RECOMMENDATION FOR POSTOPERATIVE SORE THROAT

by

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A Doctoral Project
Submitted to the Graduate School,
the College of Nursing and Health Professions
and the School of Leadership and Advanced Nursing Practice
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

Approved by:

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ABSTRACT

Airway management is a fundamental aspect of patient care when general anesthesia is being administered. Unfortunately, tracheal intubation can lead to the development of postoperative sore throat (POST) in the recovery room. POST is a minor yet preventable consequence of manipulation and injury of the airway mucosa. POST is routinely considered a minor postoperative complication; however, the occurrence of POST can have a negative influence on patient satisfaction as well as their perception of the perioperative experience. The etiology of POST is multifactorial, but evidence indicates that prevention is possible when evidenced-based practices are employed by anesthesia providers. A targeted review of the current literature explains that the topical application of ketamine or dexamethasone can mitigate the local inflammatory response that occurs with airway manipulation. By employing preemptive POST treatments anesthesia providers can produce a meaningful reduction in the incidence of POST.

This project utilized the evidence identified during the review of the literature to develop a POST prevention policy recommendation. The policy recommendation was created and presented to a panel of experts in the field of anesthesia. Following the presentation, the panel members were asked to complete a questionnaire and provide feedback regarding the policy recommendation. The resulting feedback from the questionnaires indicated that panel members were open to the implementation of policy that required the use of preemptive treatments for patients at risk for POST. This data was then incorporated into the construction of a POST prevention policy and executive summary to be presented to the panel of experts for the potential implementation at their facility.

ACKNOWLEDGMENTS

I would like to express my sincere thanks to my committee chair, Dr. Nina McLain, for her knowledge, support, and guidance throughout the course of this doctoral project. I would also like to extend my appreciation to my committee member, Dr. Michong Rayborn.

DEDICATION

I would like to dedicate this doctoral project to my entire family. To my amazing fiancé, Kerri Ann Leach, without her unwavering support of my goals and countless sacrifices over the last three years none of this would be possible. To my parents, Charlie and Lynda Gambrell, for their tireless support and encouragement throughout all of my ambitions, I am sincerely grateful. I would also like to dedicate this project to Ann Leach, the time and effort you devoted to the rectification of my grammatical shortcomings is greatly appreciated.

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LIST OF ABBREVIATIONS

cm	Centimeter
cm H_2O	Centimeters of water
CNS	Central Nervous System
CRNA	Certified Registered Nurse Anesthetist
DNP	Doctor of Nursing Practice
ETTc	Endotracheal Tube cuff
ETT	Endotracheal Tube
GETA	General Endotracheal Anesthesia
hr	hour
IRB	Institutional Review Board
kg	Kilogram
L	Liter
L/min	Liters-per-min
mg	milligram
min	minute
ml	milliliter
mm	millimeter
NMDA	N-methyl-D-aspartate
PACU	Postanesthesia Care Unit
POST	Postoperative Sore Throat
USM	University of Southern Mississippi
wt/vol	Weight-per-volume

CHAPTER I – INTRODUCTION AND BACKGROUND

The preoperative anesthetic evaluation routinely includes an explanation of the potential complications that a patient may experience while under the effects of general anesthesia. General anesthesia is a procedure used to "induce and sustain as needed, a state of unconsciousness, amnesia, analgesia, and immobility" during a surgical procedure (Kossick, 2014, p. 87). Postoperative sore throat (POST) is a common patient complaint following general endotracheal anesthesia (GETA). The sequelae that result from POST can negatively impact the patient's perception of care during their perioperative experience. Interventions aimed at reducing the incidence of POST could improve this perception and lead to improvements in patient satisfaction, shorten the length of stay in a postanesthesia care unit (PACU), and potentially decrease the overall cost of care (Higgins, Chung, & Mezei, 2002).

Problem Description

For the patient population undergoing most surgical interventions, POST is a likely yet minor complication with a transient and typically self-limiting course. The development of POST is of little significance when compared to other associated risks of general anesthesia such as myocardial or cerebral ischemia, pulmonary injury, or death. The incidence of POST is estimated to be as high as 62% and can be credited to many contributing risk factors (El-Boghdadly, Bailey, & Wiles, 2016). Previously identified risk factors for POST include endotracheal intubation related complications, female gender, pre-existing lung disease, and the duration and type of surgical procedure (Jaensson, Gupta, & Nilsson, 2012). The manifestations of POST are theorized to emanate from mechanical stress or an impediment of mucosal perfusion that results in

local ischemic damage to the frail tissues of the oropharynx and airway (Kalil, Silvestro, & Austin, 2014).

Available Knowledge

Tracheal Intubation

The process by which an endotracheal tube (ETT) is passed through the pharyngeal cavity into the larynx with the tracheal tube cuff positioned approximately 2 cm distal to the glottic opening (Rosenblatt, Abrons, & Sukhupragarn, 2017). Endotracheal intubation usually occurs just after the induction of general anesthesia to ensure airway patency is preserved and to prevent aspiration of gastric content into the lungs. A number of studies have attributed ETT complications to practices such as using an oversized ETT and/or allowing excessive ETT intracuff pressure (Combes et al., 2001; El-Boghdadly et al., 2016; Rosero, Ozayar, Eslava-Schmalbach, Minhajuddin, & Joshi, 2018). These situations are largely modifiable, and improvements will likely reduce the risk of POST following tracheal intubation.

Endotracheal Tube Size

Selecting the ideal sized ETT is, unfortunately, an arbitrary process based on the patient's estimated tracheal diameter and ventilatory requirements (Karmarkar, Pate, Solowski, Postma, & Weinberger, 2015). Karmarkar et al. (2015) suggested that there is a generalized over-estimation of tracheal diameter among male and female patients leading to the placement of erroneously sized ETTs. Regrettably, no standard nomograms or guidelines exist to aid in the selection of adult ETTs (Karmarkar et al., 2015). Although male height has been suggested to have a linear relationship to tracheal diameter and may be used to reliably estimate the ideal ETT size in a male patient

(Karmarkar et al., 2015), the same method is not dependable for estimating the appropriate size ETT for females. The incidence of POST is reported to be higher among females when compared to males (Jaensson et al., 2012), which could be related to anatomical differences or a reporting bias between the two genders (Gustavsson, Vikman, Nystrom, Engström, 2014; Jaensson et al., 2012). The study by Karmarkar et al. (2015) suggested that female patients are likely to benefit from the use of smaller ETTs (6.5 or 7.0 mm), which is in line with many previous studies that support the use of smaller internal diameter ETTs even though a clinical method of estimating the tracheal size has not been identified (Gustavsson et al., 2014; Hu et al., 2013; Jaensson et al., 2012).

Intracuff Pressure

Endotracheal tube cuff (ETTc) pressures greater than 30 cm H_2O are capable of impeding the tracheal mucosa perfusion pressure and have been associated with a number of ischemia-related airway complications (Rosero et al., 2018). At present, the recommended ETTc pressure that will safely prevent aspiration while maintaining adequate tracheal perfusion is within the range of 20 to 30 cm H_2O (Rosero et al., 2018). The practice of utilizing clinical judgment and personal experience for estimating ETTc pressure based on palpation of the pilot balloon has proven to be an ineffective means of assessment (Liu et al., 2010). In a prospective cohort study by Rosero et al. (2018), this method was associated with a high incidence of ETTc over-inflation (89.3%). Furthermore, ETTc pressure is also influenced by procedural characteristics which negatively influence respiratory compliance. The study by Rosero et al. (2018) demonstrated that ETTc pressures display a proportional relationship with increases in peak and mean airway pressures during laparoscopic pelvic procedures. Therefore,

utilization of a manometer to assess and maintain appropriate ETTc pressure has proven to be an important tool for decreasing the incidence of POST (Liu et al., 2010).

Several practice modifications that have demonstrated a reduction in the incidence of POST are described throughout the literature. The utilization of smaller internal diameter ETTs and the routine measuring of intracuff pressure with a manometer have proven to be quick, easy, and effective methods for reducing POST (Higgins et al., 2002). In addition to procedural modifications, ample evidence supports the preemptive administration of medications with anti-inflammatory properties for the prevention of POST. These medications and their proposed mechanisms of action will be discussed in the following section.

Medication Specifics

Lidocaine, an amide local anesthetic, is an inexpensive and versatile medication that can be used to attenuate or block the pathway responsible for the transmission of painful stimuli. Lidocaine works by disrupting the electrical flow of sodium ions responsible for the propagation of an action potential (Nagelhout, 2014b). Lidocaine reversibly binds to the intracellular portion of the fast voltage-gated sodium channels in the neural cell membrane (Nagelhout, 2014b). This action prevents the intracellular influx of sodium ions needed for the postsynaptic neuron to depolarize, which ultimately eliminates neural conduction (Lin & Liu, 2017), thus causing an anesthetic effect by inhibiting pain signals before propagation to the brain is permitted. Several studies have examined the efficacy of lidocaine in alleviating the incidence of POST. A meta-analysis by the Cochrane Collaboration which examined 19 trials and involved nearly 2,000 participants concluded that topical and systemic lidocaine therapy appears to lessen the

overall incidence of POST; however, these favorable results were insignificant when only high-quality studies were evaluated (Tanaka et al., 2015). Furthermore, the use of lidocaine in the various concentrations and routes of administration described in the aforementioned meta-analysis is not currently recommended in the prevention of POST (El-Boghdadly et al., 2016).

Corticosteroids are known for their immunomodulatory effects on cellular homeostasis, which is often the result of potent anti-inflammatory mechanisms (Macres, Moore, & Fishman, 2017). The anti-inflammatory and analgesic properties associated with corticosteroid use are attributed to the glucocorticoid properties that target the phospholipase-mediated release of eicosanoids, inhibit the release of pro-inflammatory cytokines, and stifle the proliferation of fibroblast (Kumar, Abbas, & Aster, 2013; Macres et al., 2017). A plethora of literature supports the intraoperative use of the corticosteroid dexamethasone for reducing the incidence of POST.

Dexamethasone is frequently administered after the induction of general anesthesia for its anti-inflammatory, analgesic, and antiemetic properties (Zhao, Cao, & Li, 2015). Furthermore, the administration of a single intravenous dose (0.2 mg/kg or 8 mg) of dexamethasone has proven to be an efficacious method of reducing the incidence of POST at 1 hr and at 24 hr post-extubation (Zhao et al., 2015). A study by Lee et al. (2017) described a topical method of application which involved soaking the ETTc in a dexamethasone solution or gargling the dexamethasone solution 10 min prior to induction. These methods demonstrated a clinically significant reduction in POST from 63% to 26% and 63% to 33% at 24 hr postoperatively (Lee et al., 2017). Intravenous

administration of dexamethasone has also been shown to provide a similar decrease in the incidence of POST (Zhao et al., 2015).

Ketamine, a phencyclidine derivative, evokes a dissociative form of anesthesia and analgesia predominantly through antagonism of N-methyl-D-aspartate (NMDA) receptors in the central nervous system (CNS) and spinal cord (Abola, Geralemou, Szafran, & Gan, 2017). Ketamine binds preferentially to the NMDA receptors on inhibitory interneurons. This action blocks the NMDA receptor-mediated glutamatergic transmission systems producing a sedative effect on the medial thalamic nuclei, which is responsible for inhibiting the afferent nociceptive activity in the cortex, hippocampus, and limbic system (Nagelhout, 2014a). It is recognized that NMDA receptors are found on most cells within the CNS and are especially prevalent among primary afferent nociceptive neurons within the spinal cord (Abola et al., 2017). In the spinal cord, ketamine decreases arousal by blocking the excitatory activity of peripheral sensory neurons in the dorsal root ganglion to projecting neurons. The anti-nociceptive properties of ketamine on NMDA receptors in the spinal cord also contribute to unconsciousness (Nagelhout, 2014a). The identification of NMDA receptors on peripheral nerve endings indicates that the application of ketamine as a topical solution can be a valuable pain management strategy for the peripheral compartment (Sawynok, 2014).

The anti-inflammatory mechanisms of ketamine are not fully understood, but there appears to be a similar interaction with plasma membrane proteins that are involved in the regulatory function of cellular homeostasis (Abola et al., 2017). In an experimental animal study, nebulized ketamine was reported to have a protective effect on airway inflammation (Zhu et al., 2007). The use of ketamine is associated with regulatory

immunomodulatory functions of cellular effectors of an inflammatory reaction (Kock, Loix, & Lavand'homme, 2013). Furthermore, the immune regulating mechanism of ketamine involves a significant reduction in the release of pro-inflammatory cytokines, tumor necrosis factor-alpha and interleukin-6 from inflammatory cells (Kock et al., 2013). These cytokines play a major part in the activation of apoptotic pathways responsible for cell death as well as the postoperative inflammatory response (Kock et al., 2013).

The anti-inflammatory and anti-nociceptive properties of ketamine have been investigated in regard to mitigating the severity and incidence of POST. A ketamine gargle (40 mg in 30 ml of saline) administered 5 min before induction of general anesthesia for septorhinoplasty operations effectively reduced POST at 24 hr postoperatively (Canbay et al., 2008). Another study examining the efficacy of a preoperative ketamine gargle (50 mg in 29 ml of saline) observed similar results with a lower incidence of POST (60% and 25%, at 24 hr) when compared to a 30 ml saline gargle (Rudra, Ray, Chatterjee, Ahmed, & Ghosh, 2009). Recent literature has demonstrated the effectiveness of preoperative ketamine nebulization in reducing the incidence of POST. The use of a nebulized ketamine solution (50 mg in 4 ml of saline) administered 15 min before induction of general anesthesia significantly reduced the incidence of POST in two recent studies (Ahuja, Mitra, & Sarna, 2015; Thomas, Bejoy, Zabrin, & Beevi, 2018). The nebulized method of administration provides additional benefits in regard to patient safety, ease of use, and superior coverage of the airway tissues (Thomas et al., 2018).

Table 1

Preemptive Treatments of Postoperative Sore Throat

Medication	Administration	Duration of action
Ketamine	• 50 mg (1.0 ml) with 4.0 ml of saline. • Administered via a nebulization mask connected to wall-mounted oxygen 8 L/min for 15 min.	• Up to 24 hr
Dexamethasone (gargle)	• Mix 5 mg/1 ml of dexamethasone with 9 ml of saline. • 10 min prior to induction, have patient gargle the 0.05% (wt/vol) solution for 5 seconds.	• Up to 24 hr
Dexamethasone (ETTc immersion)	• Mix 5 mg/1ml of dexamethasone with 9 ml of saline • ETTc is immersed in the 0.05% (wt/vol) solution for 10 minutes prior to induction.	• Up to 24 hr

Note. ETTc = endotracheal tube cuff; hr = hour; L = liter; *mg* = milligram; min = minute; ml = milliliter; wt/vol = weight-per-volume.

Summary of Available Knowledge

POST is a minor complication associated with airway instrumentation while under general anesthesia. This unpleasant experience is commonly dismissed and thought to be an unpreventable consequence. The risk associated with tracheal intubation is most likely to be reduced when anesthetists elect to use smaller ETTs and manometers and minimize oropharyngeal and airway instrumentation (Higgins et al., 2002). Despite the incorporation of these practice changes, POST may still occur. The use of local anesthetics and corticosteroids can be considered for these occurrences, but the efficacy of these drugs is variable and there is potential for untoward side effects. However, the use of a nebulized or gargled ketamine solution is a convenient, inexpensive, and effective treatment that can be easily administered to patients immediately before the

induction of general anesthesia. Regardless of which method is used, decreasing POST should decrease overall stay time which should then reduce cost and, ultimately, should result in increased hospital reimbursement. The use of preemptive treatments provides an efficient and appealing method for preventing the inflammatory response that can occur with injured tracheal tissue. The recommended preemptive treatments methods are further described in Table 1.

Rationale

Policy development in health care is undertaken for the implementation of principles aimed at directing the organizational management and decision-making process of patient care (Collins & Patel, 2009). Policy development aims to assist healthcare professionals in achieving the expected standard care (Collins & Patel, 2009). A well-written policy is substantiated with evidence-based research, adheres to federal and state regulatory requirements, and meets accreditation standards set forth by an accrediting organization (Heslip, n.d.). Policy development in health care is described as a multifactorial process that involves identification of an issue or problem, analysis of how different policy options will address the problem and impact the outcomes, development of the proposed policy in a standardized format, implementation of the proposed policy into operational action, and evaluation of the outcomes of the proposed policy (Freidman, 2003). The proper use of policy and procedures affords anesthesia providers the ability to develop better anesthesia plans that reduce the risk of complications and improve the quality of perioperative patient care.

Specific Aims

The purpose of this project was to develop a best practice policy regarding the prevention of POST for patients receiving GETA. The proposed policy aimed to provide anesthesia staff with evidence-based information about procedural and pharmacological techniques that have successfully reduced the incidence of POST during the immediate postoperative period. Patients that develop POST have been reported to have lower patient satisfaction scores, increased stay times in the PACU, and an increased cost of care (Kalil et al., 2014). Through the use of evidence-based research regarding the current best practices for reducing POST, a policy was developed and presented to a panel of anesthesia experts at The University of Southern Mississippi (USM). The proposed policy could provide a means to improve the quality of anesthesia care and patient satisfaction at a hospital in Mississippi.

DNP Essentials

The American Association of Colleges of Nursing (AACN) (2006), delineates eight essential competencies that are fundamental in the varying roles of advanced practice nurses. All eight essentials were met in the completion of this doctoral project and are described in Appendix A. Furthermore, a particular emphasis was placed on Essentials I, II, and VIII throughout the completion of this project.

Summary

The incidence of POST is estimated to be as high as 62% and can be attributed to many contributing risk factors (El-Boghdadly et al., 2016). Previously identified risk factors for POST include endotracheal intubation related complications, female gender, pre-existing lung disease, and the duration and type of surgical procedure (Jaensson et al.,

2012). Regardless of the origin, the manifestations of POST are speculated to result from trauma to the oropharyngeal and tracheal tissues (Kalil et al., 2014). Numerous studies have revealed that the incidence of POST can be reduced if preemptive measures are employed during the preoperative and intraoperative phases of care. The evidence-based policy development for preventing POST has the potential to improve patient satisfaction as well as reduce PACU stay times (Kalil et al., 2014). The process and methodology of development for this policy are described in the Methods section, Chapter II.

CHAPTER II – METHODS

Context

This project was submitted to the USM institutional review board (IRB) for approval (Protocol # IRB-19-70) see Appendix B. Several problematic components of POST are addressed by this project and must be mentioned. These components include: (a) current provider practices, (b) knowledge of literature regarding ETTs and POST, and (c) the conceivable benefits that could occur if the proposed policy recommendation is adopted.

A targeted review of the current literature regarding the best practice for decreasing the incidence of POST was performed. The evidence from the literature was used to guide the creation of a policy aimed at the prevention of POST. It was estimated that up to 65% of patients receiving GETA experience POST (Thomas et al., 2018). Synthesized evidence revealed a correlation between the development of POST and longer durations of stay in the PACU (14 min), ambulatory surgery unit (25 min), or the hospital (51 min) when compared to patients who did not develop POST (Kalil et al., 2014). When patients remain in the recovery room for extended periods as a result of POST, the cost of care increases (Kalil et al., 2014). With the creation of a POST prevention policy, anesthesia providers will have access to evidence-based recommendations that have demonstrated a significant decrease in the incidence of POST among GETA patients.

Design

In developing this best practice policy recommendation, a targeted review of the evidence was performed utilizing the following search databases: EBSCOhost, CINAHL,

PubMed, and MEDLINE. The keywords used included endotracheal tube, tracheal intubation, postoperative sore throat, sore throat, dexamethasone, ketamine, lidocaine, manometer, intracuff monitoring, and policy development. A panel of anesthesia experts was assembled and included four Certified Registered Nurse Anesthetist (CRNA). A PowerPoint presentation describing the policy recommendation was created and presented to the panel members. The information provided during this presentation was derived from a review of current literature and supported the utilization of preemptive treatment modalities to reduce the incidence of POST. The panel members were informed about the etiology and risk factors associated with POST as well as the recommended procedural techniques and pharmacologic treatments for preventing it. After reviewing the policy recommendation, each panel member was asked to complete a questionnaire and provide feedback about their willingness to adopt the policy recommendation. The feedback obtained from the completed questionnaires was then incorporated into the development of a best practice policy and an executive summary. The intervention for this doctoral project was the development of a best practice policy and an executive summary. The purpose of this project was to provide the panel of experts with a best practice policy founded on critically appraised evidence suggesting that implementation of this practice can considerably lower the incidence of POST and lead to improvements in patient satisfaction scores.

Team Details

The collaboration of several individuals led to the completion of this doctoral project. These individuals included the author, who developed the policy recommendation, completed a targeted literature review, and presented the proposed

policy recommendation to the panel of experts. The panel of experts consisted of four CRNA professionals who are faculty at the facility and have more than 10 years of experience as anesthesia professionals with doctoral degrees. Each panel member was asked to review the policy recommendation and provide feedback to the author by completing a questionnaire, which allowed for applicable alterations to the policy recommendation. The completed questionnaires were utilized for data collection and in the development of the final policy and executive summary. The questionnaire was anonymous, completely voluntary, and inquired about the following information:

1. Did this project presentation provide you with evidence-based information regarding tracheal intubation and postoperative sore throat (POST)?
2. Do you measure endotracheal tube cuff pressure now?
3. Do you take other measures to reduce POST? If yes, please briefly state what measures you take.
4. Would you consider changing your practice based on the information presented if given the option to provide preemptive treatment for POST?
5. Please provide any comments or suggestions regarding this practice recommendation.

Analysis

The information received from the questionnaires was reviewed and recommendations were compared to evidenced-based literature concerning the use of preemptive treatments for POST and patient outcomes. Two panel members completed and returned questionnaires for analysis. After reviewing the completed questionnaires,

the suggested amendments to the policy recommendation were included in the final policy and executive summary.

Summary

This project aimed to address a potential gap in patient care by providing guidelines that may lead to improved patient satisfaction. A panel of anesthesia experts was assembled and presented with a PowerPoint presentation detailing the proposed policy recommendation. Following this presentation, panel members completed a questionnaire and provided feedback regarding the policy recommendation. The data collected was then incorporated into the development of a POST prevention policy and executive summary. The policy was developed, attached to the executive summary, and presented to the panel of experts.

CHAPTER III – RESULTS

The intent of this DNP project was to develop an evidence-based best practice policy and executive summary utilizing evidence from contemporary literature and recommendations from a panel of anesthesia experts. The panel was comprised of four CRNAs from the facility. The proposed policy recommendation was presented in a PowerPoint format, which was emailed to all members of the panel of experts for review. The presentation was substantiated with evidence that supported the proposed policy recommendation. At the conclusion of the PowerPoint presentation, each panel member was asked to complete a questionnaire to provide feedback about the proposed policy recommendation. The panel members were informed that participation in the questionnaire was entirely voluntary and anonymous. Two of the four panel members completed and returned the questionnaires. The information gathered from the completed questionnaires was subsequently reviewed by the author and recommendations were incorporated into a policy and executive summary.

The two participants who completed questionnaires offered parallel responses to all of the questions. Both agreed that the presentation provided them with evidenced-based information regarding tracheal intubation and POST. Neither of the participants measure ETTc pressure in their current practice; however, both currently use other measures to reduce POST. The participants were then asked to briefly describe the POST reduction methods they currently incorporate into their practice. Both participants utilize intravenous dexamethasone and smaller sized ETTs. One respondent utilizes a video laryngoscope for the second intubation attempt, while another sets a two-attempt limit on the number of tracheal intubation attempts. The data collected from these questionnaires

shows that both participants are willing to adopt the practices described throughout the policy recommendation if given the option in their clinical practice.

Summary

In summary, a policy recommendation was presented to a panel of anesthesia experts for review and evaluation. Following the presentation, all of the panel members were asked to provide feedback by completing a questionnaire. Even though only two of the four panel members completed questionnaires, the data collected from the completed questionnaires indicated that participants are willing to adopt the practices described in the policy recommendation.

CHAPTER IV – DISCUSSION

Interpretation

The feedback collected from the completed questionnaires established that the panel of experts were open to the adoption of a POST prevention policy. Furthermore, comments from the questionnaires indicated that participants already utilize at least one measure to prevent POST in their current practice. The responses suggested that for implementation to be successful the policy should contain additional information about non-pharmacological methods of prevention.

Limitations

This project was limited to the anesthesia faculty at a state university in South Mississippi. Also, a sample size of only four participants inflates the limitations of this project. A larger sample size may have offered more feedback for the policy development portion of this project. Another limitation is that the policy recommendation focused more on pharmacologic methods of prevention, rather than procedural methods, which limits the options available to the clinician.

Conclusions

This project presented a policy recommendation to a panel of experts for them to review, critique, and provide feedback. The feedback was analyzed, and the results indicated that the panel members would be open to the adoption of a similar policy for use in clinical practice. Using the literature described in the policy recommendation and the information obtained from the panel of experts, a POST prevention policy and executive summary was developed and provided to the panel of experts.

Summary

To conclude, the goal of this doctoral project was to develop a POST prevention policy and executive summary for the anesthesia faculty at a university in South Mississippi. A targeted review of the literature was undertaken to identify evidence-based best practices currently being used in clinical practice. This information was then incorporated into a policy recommendation and presented to a panel of anesthesia experts. The panel of experts were subsequently asked to complete a brief questionnaire about the policy recommendation. The feedback obtained from the completed questionnaires was incorporated into the development of the POST prevention policy and executive summary. This project was created to provide anesthesia providers with the tools necessary to close a gap in inpatient care. Current evidence indicates that the use of preemptive treatments for the prevention of POST can meaningfully decrease the number of patients that will experience this complication and positively impact patient satisfaction.

APPENDIX A – DNP Essentials

Table A1.

DNP Essentials

Doctor of Nursing Essential	How the Essential is Achieved
Essential One: Scientific Underpinnings for Practice	This doctoral project applied an in-depth review of evidenced-based literature to identify best practices supporting the use of preemptive treatments in the reduction of POST. The recommendations offered in this project are founded upon the findings of scientific works.
Essential Two: Organizational and Systems Leadership for Quality Improvement and Systems Thinking	This doctoral project aimed to improve quality through policy recommendations to a team of experts that would review the recommendations, disseminate the information, and provide feedback that could lead to policy implementation.
Essential Three: Clinical Scholarship and Analytical Methods for Evidence-Based Practice	This doctoral project used analytical methods during a targeted review of the literature to appraise the best practices available to be included in the development of a policy recommendation to a team of experts.
Essential Four: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	This essential is met through the development and implementation of a questionnaire to evaluate the anesthesia providers use and knowledge of preemptive treatments for POST
Essential Five: Healthcare Policy for Advocacy in Health Care	This essential is met through the identification of a patient care area that lacks a policy. This project could foster the implementation of a new policy and improve the quality of anesthesia care.
Essential Six: Interprofessional Collaboration for Improving Patient and Population Health Outcomes	This doctoral project utilized professional communication and collaboration among anesthesia experts to develop and implement a change in the healthcare system.

Table A1 (continued).

Essential Seven: Clinical Prevention and Population Health for Improving the Nation's Health	The goal of this project was to improve the outcomes and perioperative experiences of patients via the propagation of the evidenced-based practices described in this project for possible future implementation.
Essential Eight: Advanced Nursing Practice	This essential is met through the appraisal of current scientific literature, the delivery of a presentation regarding contemporary practice recommendations, and the collaboration of health professionals to work towards the implementation of new healthcare policy.

APPENDIX B – IRB Approval Letter

Office *of*
Research Integrity

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

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NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- **The risks to subjects are minimized and reasonable in relation to the anticipated benefits.**
- **The selection of subjects is equitable.**
- **Informed consent is adequate and appropriately documented.**
- **Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.**
- **Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.**
- **Appropriate additional safeguards have been included to protect vulnerable subjects.**
- **Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.**
- **The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.**

PROTOCOL NUMBER: **IRB-19-70**
PROJECT TITLE: **Evidence Based Best Practice Policy Recommendation for Postoperative Sore Throat.**
SCHOOL/PROGRAM: **School of LANP, Leadership & Advanced Nursing**
RESEARCHER(S): **Corey Gambrell, Nina Mclain**

IRB COMMITTEE ACTION: **Exempt**
CATEGORY: **Exempt**

Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

APPROVED STARTING: **March 19, 2019**

Donald Sacco, Ph.D.

Insitutional Review Board Chairperson

APPENDIX C – Questionnaire

Questionnaire

Participation in this anonymous questionnaire is voluntary. There are no repercussions for nonparticipation. Thank you for your time.

Please answer the following questions with a yes or no response.

1. Did this project presentation provide you with evidence-based information regarding tracheal intubation and postoperative sore throat (POST)?

    a. Yes
    b. No

2. Do you measure endotracheal tube cuff pressure now?

    a. Yes
    b. No

3. Do you take other measures to reduce POST? If yes, please briefly state what measures you take.

    a. Yes, _____
    b. No

4. Would you consider changing your practice based the information presented if given the option to provide preemptive treatment for POST?

    a. Yes
    b. No

5. Please provide any comments or suggestions regarding this practice recommendation.

_____ _____
_____
_____ _____
_____
_____

APPENDIX D – Executive Summary and Policy

Executive Summary of Evidence Based Best Practice Policy Recommendation for Postoperative Sore Throat

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This is an executive summary of the full report "Evidence Based Best Practice Policy Recommendation for Postoperative Sore Throat." The student registered nurse anesthetist organized a meeting with a panel of anesthesia experts to provide a policy recommendation regarding the use of preemptive treatments for the reduction of postoperative sore throat (POST). The executive summary and policy that follows is aligned with the recommendations from the panel of experts as well as the practices substantiated in current literature.

Available Knowledge

Postoperative sore throat (POST) is not an uncommon complaint among patients that receive general endotracheal anesthesia. The occurrence of POST is regrettably high at approximately 65% and can negatively impact the patient's perioperative experience (El-Boghdadly, Bailey, & Wiles, 2016). However, this complication is avoidable when anesthesia professionals utilize treatment modalities aimed at deterring the development of POST. Therefore, increasing the providers' knowledge of preemptive treatments for POST can lead to an increase in patient satisfaction, shorten the length of stay in a postanesthesia care unit (PACU), and potentially decrease the overall cost of care (Higgins, Chung, & Mezei, 2002).

The development of POST is multifaceted with aspects of airway management playing a major role. Although the use of proper airway etiquette such as using appropriately sized endotracheal tubes (ETT) and routine manometer use for intracuff pressure measurements is advised to reduce the risk of POST, situations still exist that warrant additional treatment modalities. In addition to proper airway etiquette, the use of

preemptive treatments such as ketamine and dexamethasone solutions for nebulization, oral gargle, or ETT cuff immersion have demonstrated an efficacious means to prevent the development of POST.

Process

After providing the panel of experts with a policy recommendation, each member of the panel was given an opportunity to evaluate and provide feedback about the proposed policy recommendation. The panel of experts was comprised of four Certified Registered Nurse Anesthetists (CRNA). The panel members were selected due to their expert knowledge in the field of anesthesia, each held a doctoral degree, and had more than ten years of professional anesthesia experience. Following the presentation, each member of the panel was provided with a questionnaire. The questionnaire inquired whether the panel members believed the proposed policy recommendation should be adopted and included an area to provide feedback. The data collected from the completed questionnaires indicated that participants were presented with an evidence-based policy recommendation describing preemptive treatments for POST. The questionnaires also suggested that participants were amenable to adopting the practices if provided with a best practice policy.

Policy Recommendations

The policy recommendation established by this targeted review of literature and the recommendations from a panel of anesthesia experts, is that preemptive treatments for POST should be included in the plan of care for patients receiving general endotracheal anesthesia. Anesthesia providers should take every opportunity to optimize airway

management. This is accomplished by using smaller sized ETT (6.0-7.0 mm) when appropriate, limiting the number of intubation attempts, and utilizing one of the preemptive treatments described in Table 1.

Policy Area: Anesthesia Department	**Subject:** Preventing Postoperative Sore Throat
Title of Policy: Preemptive Treatment of Postoperative Sore Throat for Patients Undergoing General Endotracheal Tube Anesthesia	**Number:**
Effective Date:	**Supersedes:**
Approved Date: **Revision Date:**	**Approved by:**

1. **Rationale or background to policy:** The incidence of postoperative sore throat (POST) is estimated to be approximately 65%. The etiology of POST is thought to arise from disruptive insults to the tracheal tissue integrity following airway instrumentation. Providers often consider POST to be a minor complication. The etiology of POST is multifactorial with aspects of airway management playing a major role. The incidence of POST can be reduced when proper airway etiquette such as using appropriately sized endotracheal tubes (ETT) and routine manometer use for intracuff pressure measurements is employed. In addition to this, the use of preemptive treatments such as ketamine and dexamethasone solutions for nebulization, oral gargle, or ETT saturation has demonstrated an efficacious means to decrease the occurrence of POST during the first postoperative day.
2. **Policy:** All anesthesia providers will prescribe one preemptive POST treatment for surgical procedures exceeding one hour in duration and/or utilizing steep Trendelenburg position. Treatment is to be administered approximately 10-15 minutes prior to the induction of general anesthesia.
3. **Procedure:** Anesthesia providers will prescribe one preemptive treatment prior to the induction of general anesthesia and administer the treatment as described in Table 1.

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Tables

Table 1

Preemptive Treatments of Postoperative Sore Throat

Medication	Administration	Duration of action
Ketamine	• 50 mg (1.0 ml) with 4.0 ml of saline. • Administered via a nebulization mask connected to wall mounted oxygen (8 L/min) for 15 min.	• Up to 24 hr
Dexamethasone (gargle)	• Mix 5 mg/1 ml of dexamethasone with 9 ml of saline. • 10 min prior to induction, have patient gargle the 0.05% (wt/vol) solution for 5 seconds.	• Up to 24 hr
Dexamethasone (ETTc immersion)	• Mix 5 mg/1ml of dexamethasone with 9 ml of saline • ETTc is immersed in the 0.05% (wt/vol) solution for 10 min prior to induction.	• Up to 24 hr

Note. ETTc = endotracheal tube cuff; hr = hour; L = liter; *mg* = milligram; min = minute; ml = milliliter; wt/vol = weight-per-volume.

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