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Postoperative Pain in Instrumented Spinal Surgery: A Policy for Intraoperative Dexmedetomidine Use

Clinton Whitley

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POSTOPERATIVE PAIN IN INSTRUMENTED SPINAL SURGERY: A POLICY FOR
INTRAOPERATIVE DEXMEDETOMIDINE USE

by

Clinton Harris Whitley

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

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ABSTRACT

Instrumented multilevel spine surgery is associated with a large amount of opioid consumption, difficult mobilization, and significant pain in a population of patients who are predominantly already chronic pain sufferers (Mathiesen et al., 2013). The Health Resources and Services Administration (2018) recently claimed that our nation is in the midst of an opioid epidemic, with more than 115 opioid-related deaths occurring every year. As a result of this epidemic, many anesthesia providers have become aware and are attempting to do something about it. Organizations such as the Society for Opioid Free Anesthesia are at the forefront of the battle against the opioid crisis, promoting alternative drug therapy for pain control during and following surgery. This response has been an effort to not only prevent chronic pain but ultimately, to limit our population's worsening dependence on opioids. One of the most common alternatives to opioids being used is dexmedetomidine. This project, inspired by the current crisis, involved the creation of a policy that details the use of intraoperative dexmedetomidine on patients undergoing instrumented spinal surgery. Collaboration with a physician anesthesiologist and an evidence review guided the development of the policy. Following completion, the policy was present to a panel of experts, which consisted of anesthesia providers who routinely take part in spinal surgery cases. Feedback was taken from the panel using a survey tool. Results of the survey revealed that the experts were willing to consider changing their practices to include dexmedetomidine as part of their anesthetic care.

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DEDICATION

This project is dedicated to my children, Isla Noel and Casey Harris. You are the motivation for everything I do. I love you more than you will ever know.

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LIST OF ABBREVIATIONS

<i>AACN</i>	American Association of Colleges of Nursing
<i>CDC</i>	Centers for Disease Control and Prevention
<i>CRNA</i>	Certified Registered Nurse Anesthetist
<i>DNP</i>	Doctor of Nursing Practice
<i>IRB</i>	Institutional Review Board
<i>MSDH</i>	Mississippi State Department of Health
<i>OI</i>	Orthopedic Institute
<i>PCA</i>	Patient-Controlled Analgesia
<i>PONV</i>	Post-Operative Nausea and Vomiting
<i>USM</i>	The University of Southern Mississippi

CHAPTER I - INTRODUCTION

From 1999 to 2014, prescription opioid sales nearly quadrupled in the United States. In the same period, no overall change in reported pain was reported (Centers for Disease Control and Prevention [CDC], 2017). The number of opioid overdose deaths has increased at a similar rate as the number of opioid prescriptions (CDC, 2017). It is estimated that 1 in 5 patients with pain-related and non-cancer diagnoses is prescribed opioids (CDC, 2017). The number of prescriptions has increased the most among specialists, with surgery prescribing rates among the highest at 37% (CDC, 2017). Greater than 115 Americans die every day from an opioid overdose, with nearly half of those deaths involving a prescription opioid (Mississippi State Department of Health [MSDH], 2018). The highest ratio of prescriptions per person in the country is found in the southern states, including Mississippi where opioid involved overdose deaths have doubled since the year 2000 (MSDH, 2018). Patients undergoing spinal surgery are likely receiving prescriptions for opioids prior to having the procedure. In addition, pain is a common and an expected outcome in patients undergoing these procedures due to the unavoidable tissue damage that occurs during instrumented spinal surgery (Devin & McGirt, 2015). Opioids are commonly continued postoperatively following spinal surgery, typically, the first-line agent in post-operative pain management (Devin & McGirt, 2015). The overuse of opioids has been “associated with significant adverse side effects including somnolence, confusion, urinary retention, ileus, respiratory depression, and death” (Devin & McGirt, 2015, p. 931). Post-operative pain manifests through multiple neurophysiological and chemical pathways. Additionally, sensitization peripherally and centrally further contributes to the occurrence of hyperalgesia, which

results in increased pain. Due to this, multimodal approaches to pain management have become prevalent among anesthesia providers, targeting multiple pain signaling pathways to improve pain management, while minimizing adverse effects (Devin & McGirt, 2015). Due to the alarming increase in opioid prescriptions and overdoses involving opioids, it is important that anesthesia providers be aware of the epidemic and up to date on the most recent recommendations for multimodal pain management.

Background and Significance

Instrumented multilevel spine surgery is associated with a large amount of opioid consumption, difficult mobilization, and significant pain in a population of patients who are predominantly already chronic pain sufferers (Mathiesen et al., 2013). Over the last 10 years, the number of patients having spinal surgery has seen an increase (Mathiesen et al., 2013). Spinal procedures are associated with intense postoperative pain, especially in the immediate days following surgery. A considerable degree of pain is common due to the extensive dissection of tissues, ligaments, and bones. The pain resulting from these surgeries is typically severe and lasts for approximately three days. Complicating the postoperative pain management picture is the fact that most of these patients are already being treated with traditional narcotics or analgesics preoperatively. Postoperative pain results from activation of varying mechanisms, including neuropathic, nociceptive, and inflammatory pathways (Mathiesen et al., 2013). A balanced approach to postoperative pain management that targets multiple pain pathways is a logical course of action (Mathiesen et al., 2013). Dexmedetomidine is a highly selective alpha 2 adrenoceptor agonist, with analgesic and sedative properties, that is being increasingly used as an adjunct to multimodal pain management strategies (Ramsay & Luterman, 2004).

Problem Statement

The use of opioids is an essential element of pain management perioperatively, however, their detrimental side effects are well known and feared among anesthesia providers. The escalating use of prescription opioids over the last 20 years has caused their clinical utilization to become a public health concern. Many practitioners and policymakers have called for a reduction in the number of prescriptions as they aim to reconcile the commitment to deliver effective control of pain, with the circumvention of opioid-related side effects. Trending increases in spinal surgical volume will more than likely potentiate the problem. The emergence of dexmedetomidine as an effective agent for providing analgesia post spinal surgery has given anesthesia providers another adjunct to use for multimodal pain management. The decision to use opioid alternatives, such as dexmedetomidine, is solely in the hands of the individual provider. The development of an intraoperative dexmedetomidine policy may help create a standard, increase its utilization, decrease postoperative pain, and prevent further contribution to the current opioid epidemic (Cozowicz et al., 2017).

Purpose of the Project

The purpose of this project was to construct a policy for the use of dexmedetomidine intraoperatively in spinal surgery in an effort to reduce postoperative pain and opioid usage. The policy was written for an orthopedic specialty hospital in southeast Mississippi and was designed to be a point of reference for the providers who practice there. Specific instructions were included related to appropriate dosage, timing of administration, and patient exclusion criteria founded on the most recent evidence-based research and best practice recommendations. The goal of the policy was to educate

the providers and present guidelines that would allow for the safe and effective administration of dexmedetomidine, as a supplement to multimodal pain management.

Needs Assessment

In order to determine the providers' knowledge base and competency concerning proper dexmedetomidine administration during spinal surgery, a needs assessment was performed. Many providers feel that the time it takes to prepare the infusion makes it an unfeasible option, while others were unaware of the analgesic properties of dexmedetomidine. Many providers do not have a firm understanding of the most effective dosage and timing of administration, while others do not have adequate knowledge regarding patient inclusion and exclusion criteria. Having a policy implemented will allow for guidance, instruction, and education that will lead to an increase in the use and effectiveness of dexmedetomidine. The policy is being written at the request of the medical director at the Orthopedic Institute (OI), a specialty orthopedic surgery center in Hattiesburg, MS.

Conceptual Framework

The conceptual framework used for this project was Friedman's Policy Development Framework. Friedman (2003) presented a framework for the development of policy and implementation, based on a review of the evidence. The framework focuses on four dimensions:

1. The stages of policy development and implementation
2. The levels at which policy is developed and the interrelationships among the levels

3. The service sectors or systems affected by policy and the interrelationships among policy in different sectors
 4. The variables that are likely to affect the level of impact of a policy
- (Friedman, 2003, p. 12)

The Stages of Policy Development and Implementation

Five stages can be identified in policy development and implementation. Identification of a problem needing to be addressed is the first stage. The second stage, policy development, follows the problem identification. After the new policy is established, the third stage is the implementation of the statute. Evaluation of the impact of the policy and the effect of its implementation is the fourth stage. Finally, the fifth stage is a modification of the policy with or without modification of the implementation approach (Friedman, 2003).

The Levels at Which Policy is Developed and the Interrelationships among the Levels

Policies are often established at different levels. The most crucial aspect, however, may not be the specific level that establishes the policy, but the relationships between the different levels in the implementation. The relationships play a vital role in the final impact of the policy (Friedman, 2003).

The Service Sectors or Systems Affected by Policy and the Interrelationships among Policy in Different Sectors

The previous dimension deals with groups on different levels, or vertical issues. An example of a vertical issue is the relationship between hospital administration and a hired anesthesia group. This dimension applies to more horizontal relationships or entities

on the same level. Such relationships would include those between a hospital's pharmacy and the operating room (Friedman, 2003).

The Variables That Are Likely to Affect the Level of Impact of a Policy

This dimension deals with describing variables that are thought to be related to the policy's success in achieving its goals. A policy's effectiveness in achieving its intended outcome is dependent on three different variable types: "(a) those related to the nature of the problem that the policy addresses; (b) those related to the policy itself and its implementation; and (c) those that although not related to the policy, affect its implementation nonetheless" (Friedman, 2003, p. 13). Positive results will more likely occur in situations where a clear understanding of the necessary changes to solve the problem is present, the desired behavior to be regulated is unvaried, the problem does not involve a large subset of people, and the amount of change required is minimal (Friedman, 2003).

DNP Essentials

The American Association of the Colleges of Nursing (AACN, 2006) have provided eight essential components required for completion of a Doctorate of Nursing Practice (DNP). These eight essentials are foundational competencies and are a requirement of all DNP graduates in all specialties. This project has addressed each essential and is outlined below.

DNP Essential I: Scientific Underpinnings for Practice

Knowledge of the sciences was used to translate research findings into a policy for the use of dexmedetomidine intraoperatively. This policy was an example of development and evaluation of new practice approaches that were theory based in

nursing. The significance, as well as the nature of the problem, was determined. Actions and advanced strategies to enhance the use of dexmedetomidine was described in the policy and outcomes were evaluated (AACN, 2006).

DNP Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

The organizational and systems leadership requirement was met by improving the safety of patients receiving dexmedetomidine intraoperatively, through the use of policy writing. The need for a multimodal approach to pain management in the population of patients undergoing spinal surgery was assessed based on scientific, organizational, political, and economic sciences. The policy, in a sense, was a method of communication that could potentially lead to an improvement in quality and patient safety within the facility for which it is developed (AACN, 2006).

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

Prior to the development of the policy, analytical methods were used to critically appraise the existing evidence, to determine the best evidence for practice. Information technology was utilized, and research methods applied to collect the appropriate data to formulate the policy. Data were analyzed, and patterns of outcomes and behavior were examined to identify gaps in the evidence and construct the policy (AACN, 2006).

DNP Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

The policy development and intervention for this project were created using information systems/technology. The policy was designed to support the healthcare

system it was developed for and improve patient care. Technical skills and conceptual ability was demonstrated to develop the evaluation plan following policy development (AACN, 2006).

DNP Essential V: Health Care Policy for Advocacy in Health Care

The fifth essential was met through institutional decision making if they chose to accept the policy. Organizational standards created a framework to facilitate the delivery of dexmedetomidine. “The engagement in the process of policy development is central to creating a healthcare system that meets the needs of its constituents” (AACN, 2006, p. 13). The policy was designed to influence, regulate the practice, improve safety, enhance quality, and ameliorate the efficacy of providers (AACN, 2006).

DNP Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

The development of the policy was executed through collaboration with the physician anesthesiologist and medical director of the facility, the facility’s stakeholders, as well as nurse anesthesia program faculty from The University of Southern Mississippi (USM). Interprofessional collaboration was employed to improve health outcomes. The development of the policy using collaboration fulfilled the requirement of essential seven (AACN, 2006).

DNP Essential VII: Clinical Prevention and Population Health for Improving the Nation’s Health

One of the goals of developing the dexmedetomidine policy was a reduction in the requirement of opioids intraoperatively and, secondarily, a reduction in the number of patients being discharged home with opioid prescriptions. This implementation can be a

small step in the right direction of resolving our nation's opioid crisis. The more policies developed that have the potential to reduce narcotic consumption, the faster the trending rise in usage can be reversed (AACN, 2006).

DNP Essential VIII: Advanced Nursing Practice

The eighth and final essential was met through the design, implementation, and evaluation of the policy as an intervention based on nursing sciences. The policy demonstrated an advanced level of clinical judgment, accountability in design, delivery, and systems thinking. Evaluation of evidence-based treatments and dexmedetomidine research was utilized to improve patient outcomes (AACN, 2006).

Review of Evidence

An extensive literature review was performed to examine all current evidence of dexmedetomidine's use as an analgesic agent. Databases used included CINAHL with Full-Text, PubMed, MEDLINE, Google Scholar, and Cochrane Library. Terms used in the search included: *dexmedetomidine*, *dexmedetomidine spine surgery*, *spine surgery*, *perioperative pain*, *dexmedetomidine pain*, *multimodal analgesia*, *opioid sparing*, *postoperative pain*, *opioid spine surgery*, and *policy*. Filtering criteria limited searches to full text only with publication dates between 2008 and 2018, which resulted in 105 full-text articles after accounting for duplications. After reviewing all articles, 19 were chosen for the inclusion of the project due to their applicability to the topic.

Multimodal Pain Management for Spinal Surgery

Surgical procedures on the spine are typically associated with severe pain in the postoperative period, especially in the first few days (Bajwa & Haldar, 2015). Pain management after spine surgery has historically relied on the heavy usage of opioid

medications (Kurd, Kreitz, Schroeder, & Vaccaro, 2017). Multimodal strategies of pain control were designed to minimize opioid consumption and the adverse effects associated with their use (Kurd et al., 2017). A growing amount of evidence supports the use of a multimodal technique to pain management during spine surgery (Kurd et al., 2017). Providing patients with adequate postoperative pain control enables for faster rehabilitation, improved mobility, and improved patient satisfaction scores (Kurd et al., 2017). Adequate postoperative pain management has also been shown to prevent the development of chronic pain (Bajwa & Haldar, 2015). Alpha 2 agonists, such as clonidine and dexmedetomidine have proven to be effective agents to provide analgesia in spinal surgery (Bajwa & Haldar, 2015). The lack of respiratory depression and their hemodynamic stability are added benefits of these drugs (Bajwa & Haldar, 2015). Bidyut and Amutha (2012) found dexmedetomidine to be an ideal anesthetic adjuvant in patients undergoing cervical spine surgery. In these patients, dexmedetomidine provided decreases in anesthetic requirements, a reduction in intubation response, improvements in analgesia, and avoided significant respiratory and hemodynamic compromise (Bidyut & Amutha, 2012).

Sparing Effect of Dexmedetomidine and Recovery

“Dexmedetomidine presumably acts on the nociceptive cascade and prevents the sensitization of nociceptors present in the dorsal horn” (Bajwa & Haldar, 2015, p. 109). Dexmedetomidine has a high affinity and selectivity and aids in the decrease of opioid and local anesthetic dosages, therefore, reducing the risk of the adverse effects of these medications when they are used simultaneously with dexmedetomidine (Bajwa & Haldar, 2015). Intraoperative dexmedetomidine has been shown to reduce anesthetic

requirements and lead to early tracheal extubation postoperatively (Afanador et al., 2009). Dexmedetomidine is capable of attenuating various stress responses and is able to maintain hemodynamic stability during surgery when used as an adjuvant during general anesthesia (Patel, Engineer, Shah, & Madhu, 2012). Additionally, dexmedetomidine administered intraoperatively appears to enhance the analgesic property of morphine-based patient-controlled analgesia (PCA) in spinal surgery patients postoperatively (Ge, Qi, Tang, & Li, 2015).

Reduction of Postoperative Side Effects

In addition to providing improvements in analgesia and reductions in narcotic requirements, dexmedetomidine has been shown to limit postoperative side effects of anesthesia (Bakri, Ismail, & Ibrahim, 2015). “Dexmedetomidine has an effect similar to that of dexamethasone in reducing the incidence and severity of postoperative nausea and vomiting (PONV)” (Bakri et al., 2015, p. 259). A recent meta-analysis by Wang et al. (2016) concluded that dexmedetomidine given perioperatively decreased the incidence of shivering and postoperative nausea in laparoscopic surgery patients. Another study by Choi et al. (2017) found similar results, stating that “adjuvant use of intraoperative dexmedetomidine infusion may be effective for the prevention of PONV” (p. 1).

Dexmedetomidine Dosage

The use of dexmedetomidine intraoperatively is well established to improve pain control postoperatively, with or without a loading dose (Fan et al., 2017). In a study comparing the use of dexmedetomidine with and without a loading dose, Fan et al. (2017) found that the administration of a loading dose did not affect the analgesic effect. A review conducted by Ickeringill, Shehabi, Adamson, and Reuttimann (2004) determined

that undesirable hemodynamic effects could be avoided without compromising analgesia by omitting a loading dose. Tiwari (2014) compared two different doses of dexmedetomidine and their effects on postoperative pain and sedation. Patients were divided randomly into three groups—a control group (saline infusion), a low dose dexmedetomidine infusion group (0.3 mcg/kg/hr), and a high dose dexmedetomidine infusion group (0.6 mcg/kg/hr) (Tiwari, 2014). The usage of fentanyl, duration of infusion, and duration of surgery was determined to be statistically insignificant in all three groups (Tiwari, 2014). Pain scores in both dexmedetomidine groups were significantly lower than the control group in the period immediately after surgery through six hours post-surgery (Tiwari, 2014). Tiwari (2014) concluded that both dosages of dexmedetomidine provided similar improvements in postoperative pain control. The recommended dose range of dexmedetomidine is 0.2 to 0.7 mcg/kg/hr for no longer than 24 hours (Kim, 2014).

Summary

The significant pain associated with spinal surgery and the increasing reliance on opioids are representative of the background and significance of this project. Development of intraoperative dexmedetomidine policies may allow for a reduction in narcotic usage. The purpose of the project was to construct such a policy that would outline the use of dexmedetomidine during multilevel instrumented spinal surgery. A needs assessment was performed to determine the current knowledge base of the anesthesia providers at the OI. The review of the evidence presented dexmedetomidine as a useful adjunct to multimodal pain management and provided insight on optimal dosage and timing. Dexmedetomidine was shown to have a sparing effect on narcotics, enhance

recovery, and reduce postoperative side effects. The theoretical framework outlined above was chosen because it was based on evidence and focused on policy development and implementation. Eight DNP essentials required by the AACN have been addressed by completion of this project.

CHAPTER II – METHODOLOGY

Population

This project targeted two populations of interest. The primary population was patients undergoing multilevel instrumented spine surgery. A second population was the anesthesia providers at the OI, a specialty orthopedic surgery center in Hattiesburg, Mississippi.

Target Outcome

The expected outcome of my project was to create a policy that would provide stakeholders at the OI a thorough evidence-based policy. A thorough evidence-based policy would offer the opportunity for a change in the practice of the anesthesia providers at the OI if they chose to implement it. The goal was for the policy to provide a resource that was easily referenced when required and provide a pathway to increase the use of dexmedetomidine during spinal surgery. Increased dexmedetomidine use can potentially improve pain control and may lead to a decrease in postoperative pain and perioperative opioid use.

Design

In collaboration with a physician anesthesiologist and medical director of the OI, an evidence-based policy was developed and submitted for implementation in an effort to increase the routine use of intraoperative dexmedetomidine infusions during spinal surgeries. The policy contained information regarding dosage and timing of administration, exclusion criteria for specific patient populations, and guidelines for administration. Once completed, the policy was presented to an expert panel including anesthesia providers, hospital administrators, DNP, and Certified Registered Nurse

Anesthesia (CRNA) faculty at USM. Input was received, and the survey completed. The survey was given to the expert panel and contained questions such as: “How would you make the policy more user-friendly?”, “What would you add to make the policy better?”, and “What would you add or remove to make the policy clearer or more concise?” Data from the results of the surveys were collected and analyzed. The finalized policy was presented to the DNP project committee members and again to the panel of experts. Lastly, recommendations and the completed policy were submitted via email in pdf format to the medical director of the OI for his consideration to implement the policy.

Barriers

It was important to be prepared for challenges that were possible during the project implementation. Although outside the scope of this project, one potential barrier to the acceptance of an institutional policy was resistance to change on the part of the members of the institution. If pushback was received from the providers of the OI, progress may have been slowed. Consultation with a collaborating physician and director of the OI would hopefully alleviate any hesitancy from the anesthesia staff. Other potential barriers included the increased cost to add the drug to the formulary of the pharmacy, as well as adequately educating the recovery nurses on the proper care of patients receiving dexmedetomidine intraoperatively. The director of the OI agreed to discuss and negotiate these requirements with the pharmacy as needed.

Ethical Considerations

The Institutional Review Board (IRB) at USM approved this project prior to creation, presentation, and implementation of the policy (Protocol #18071906). No human subjects were being studied; therefore, IRB approval from the OI was not

necessary. Any participation in this project was completely voluntary. At the patient level, a few ethical situations were considered. Inequality of care was an important ethical issue to consider in the process of developing the policy for this project. An example of inequality of care would be if one provider used dexmedetomidine for a patient, while another provider chose not to use the drug on another patient undergoing the same procedure. Another consideration was the issue of an uninsured patient not having the ability to pay for the drug or an insured patient whose insurance company denied payment. An adequate policy would assist to prevent unethical situations from arising in anesthetic planning and the care of patients.

Components of a Quality Policy

Policies are written to address an institution or organization's specific need. The components and structure of a policy will vary according to the need; some being several pages, while others may be a single page. The organization, Sport and Recreation Victoria, suggests that a quality policy has nine components. The first component is a goal statement of what the organization would like to achieve. The goal for this project was for the policy to provide a resource that was easily referenced when required and provide a pathway to increase the use of dexmedetomidine during spinal surgery. Improvement in pain control could lead to a decrease in postoperative pain and perioperative opioid use. The second component is that the policy is founded on principles, values, and philosophies. The policy for the OI was founded on evidence-based research. The third objective is that the policy should contain broad objectives that clearly define what areas the organization is involved in. The policy clearly stated for dexmedetomidine to be used intraoperatively, which met the objective. Objective four

states that there should be strategies included to achieve each objective. Specific actions to be taken should be included in the policy, which is objective five. Objective six states that a policy should include desired outcomes of the specific actions. When constructing the policy, detailed instructions and strategies, along with desired outcomes were provided to ensure objectives four, five, and six were met. The seventh objective is for the policy to include performance indicators that the policy can be effectively measured by. Management plans are included as the eighth objective and provide further detail on the policy's implementation and observation on a daily basis. Objectives seven and eight were met through assistance from the collaborating physician and medical director, and the stakeholders of the OI. The preference for management plans, observation, and performance indicators would be included by the medical director, as it is ultimately his decision whether to implement or not. Finally, the last and ninth objective is that the policy should be reviewed yearly. Examination of performance indicators, a discussion forum involving risk management professionals and management, and consultation of members of the organization should all be a part of the review (Isaac, n.d.). Perhaps the subject of a future DNP project could be the review and analysis of the policy implementation.

Policy Writing

The foundation of any healthcare organization is patient safety. Policies guide patient care and are designed to provide better outcomes but only if they are well written. Many factors determine the appropriate formulation of a policy—healthcare regulations, evidence-based practices, and accreditation standards. The key points in the following

paragraph must be considered when writing a policy to guide healthcare providers (Heslip, n.d.).

Policies should be written by those or with the help of those who are experts on the topic. A one-size fits all approach to policy writing should be avoided, making sure to review existing policies and cross-reference them as needed to prevent a policy from contradicting with another. A policy should be original, and not simply a copy and paste from a textbook or other literature source. The policy should be written following a standardized format and writing style and stored in an easily accessible location. A designated location allows those who are searching for the policy to know exactly where they need to look for the correct information. After completion of the policy, it should be reviewed by an expert in regulatory matters, and ideally someone with experience in patient safety. Lastly, the policy writing should involve staff who will be following the policy. A consultant or member of a policy and procedure committee can represent the staff during the initial phases of policy development and implementation (Heslip, n.d.).

Summary

The goal of the project was to create an evidence-based policy as a resource for the target population of CRNAs at the OI. The policy could potentially improve perioperative pain in patients undergoing instrumented spinal surgery, the other population involved in the project. The design included collaboration with the medical director of the OI in constructing the policy while utilizing the latest research. Throughout the course of the project, potential barriers and ethical issues were carefully considered, as were the components of a quality policy and the keys to effective policy writing.

CHAPTER III – RESULTS

Recent evidence, recommendations from the manufacturer of dexmedetomidine, and input from the medical director of the OI were utilized in the creation of the policy for this project. The policy was presented to a panel of experts, which included six CRNAs who currently practice at the OI. The participants were chosen because of their active involvement in the anesthetic care of patients undergoing spinal surgery. The inclusion of these panel members was also influenced by the fact that they would likely have been able to provide beneficial feedback. Information provided included recent research related to the dosage, timing, and effects of dexmedetomidine administration. The panel was asked to read over the presented policy and complete a 5-question survey aimed at gaining feedback.

The results of the surveys are as follows. All participants reported that the policy was user-friendly, clear and concise, and met the needs of the institution. In addition, all 6 participants reported that the policy would help them utilize dexmedetomidine effectively. One participant answered “No” when questioned if they would consider changing their current practice. Beneath the answer, the respondent indicated that they were already utilizing dexmedetomidine intraoperatively during spinal surgery. The presentation validated this participant’s current practice and was considered positive feedback. The rest of the respondents answered “Yes” to the question and indicated that they would consider changing their practice based on the information provided. No additional comments or suggestions were presented.

Summary

The panel of experts agreed that the policy was clearly and concisely worded, was user-friendly, and met the needs of their institution. The panel also unanimously believed that the policy enabled them to utilize dexmedetomidine effectively. Those who were not already doing so said they would consider changing their practice to include intraoperative dexmedetomidine in the anesthetic care of patients undergoing multilevel instrumented spinal surgery.

CHAPTER IV – DISCUSSION

Summary

The purpose of this project was to gather evidence that supported the use of dexmedetomidine during spinal surgery and use that evidence to develop a policy, in hopes to implement a practice change. The trending increase in our nation's opioid consumption was the inspiration for this project, but the benefits of dexmedetomidine use go far beyond a reduction in narcotic administration. The evidence presented in this project and to the panel of experts showed that intraoperative dexmedetomidine administration reduced the requirement of other anesthetic agents and opioid consumption, decreased PONV and shivering, maintained hemodynamic stability, reduced sympathetic responses to intubation, avoided significant respiratory compromise, increased patient satisfaction scores, and led to earlier tracheal extubation and recovery times. This evidence-based research was the foundation of the policy. The policy was developed and written based on Friedman's Policy Development Framework, the recommendations on policy writing, and the components of a quality policy that were outlined in Chapter II.

Interpretation

Based on the results of the survey, this project was successful in eliciting a pathway to practice change. All members of the panel provided positive feedback to the effects of dexmedetomidine and the rationale for its use in spinal surgery. In addition, all members of the panel were satisfied with the way in which the policy was written and worded. Due to the absence of suggestions in the surveys collected, no indications for policy revision were present. The decision as to whether the policy was to be

implemented or not was left up to the director of the OI. One of the potential barriers to this project was the provider's having a resistance to change. Any such resistance did not exist based on the findings.

Limitations and Future Implications

The sample size of the expert panel was one limitation for this project. The OI is a small facility with 6 operating rooms, and therefore, they do not have many CRNAs there day in and day out. Developing a similar policy for a larger facility may have a greater impact on the practice of anesthesia, as it would reach more providers. Still, it is possible for a small change to kick-start a much larger movement. Perhaps a future DNP project can be constructing a similar policy for larger/additional institutions. Another limitation was the cost of dexmedetomidine. The added cost of adding the drug to the anesthetic plan of all spinal surgeries would make it difficult for the OI to justify the implementation of the policy. Another future DNP project could be based on a cost-analysis of the policy's implementation. The implementation of the policy itself could also be considered a limitation. To remain concise and focus on proper policy creation, the decision was made to exclude the implementation process within this project. A prospective DNP student may choose to investigate the policy implementation process as a topic moving forward.

Conclusions

The number of patients undergoing spinal surgery, a painful and stimulating procedure typically associated with heavy opioid use both intraoperatively and postoperatively, has increased over the last ten years with no signs of slowing down. Combine the increase in spinal surgery procedures with the rampant opioid crisis

currently affecting our country, and it poses a significant problem that will require intervention. This situation presents a prime opportunity to make an impact, by implementing practice change among anesthesia providers. The utilization of the various multimodal non-narcotic agents, such as dexmedetomidine, is a great place to start in the fight against the epidemic. This project, as well as similar ones done in the future, can encourage an increase in these adjuncts and a decrease in opioid use. Hopefully, this project can assist in advancing the opioid-free movement among anesthesia providers, or at the very least, allow for a reduction in the reliance on narcotics.

APPENDIX A – Letter of Support



07/02/18



Hattiesburg, MS 39401

Dear IRB Members:

I have read over Clint Whitley's proposal for a Doctorate of Nursing Practice project to be carried out at the Orthopedic Institute. I understand that this student is conducting this project as part of their requirements for the Nurse Anesthesia's Doctorate in Nursing practice program at University of Southern Mississippi, Hattiesburg, and will have the opportunity to present their findings in other venues.

I understand that the Institutional Review Board for the Use of Human Subjects in Research (IRB) at the University is concerned with protecting the confidentiality, privacy, and well-being of research participants. Further, it is my understanding that the student will additionally be advised in this project by their project chair Dr. Nina McInain and committee member Dr. Michong Rayborn, both of whom will have regular contact with this student.

I do not have concerns about the project the student has proposed based on conversations with the student and after reviewing their project proposal. The agency supports this student's plan and approves of the project.

Should you have additional questions or concerns, you may contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'W. O. J.', written over a redacted area.



APPENDIX B – Protocol



Clinical Protocol

PERIOPERATIVE DEXMEDETOMIDINE ADMINISTRATION FOR SPINE SURGERY

1. Policy Statement

This document details guidelines for the administration of dexmedetomidine in the perioperative period for patients undergoing spine surgery. The addition of dexmedetomidine into a multi-modal pain management regimen will provide an effective decrease in postoperative pain.

2. Background

Dexmedetomidine not only has been shown to improve analgesia and reduce narcotic requirements, but there is also evidence that it can limit other postoperative side effects of anesthesia (Bakri, Ismail, & Ibrahim, 2015). “Dexmedetomidine presumably acts on the nociceptive cascade and prevents the sensitization of nociceptors present in the dorsal horn” (Bajwa & Haldar, 2015, p. 109). Dexmedetomidine is capable of attenuating various stress responses and is able to maintain hemodynamic stability during surgery when used as an adjuvant during general anesthesia (Patel, Engineer, Shah, & Madhu, 2012). Dexmedetomidine administered intraoperatively appears to enhance the analgesic property of morphine based patient controlled analgesia in spinal surgery patients postoperatively (Ge, Qi, Tang, & Li, 2015).

3. Responsibilities

CRNA
MD/DO
SRNA

4. Plan of Care

Patient Selection

- Patients undergoing spinal surgery at the Orthopedic Institute of Forrest Health

Exclusion Criteria

- Absolute Contraindications:
 - None

- Relative Contraindications
 - Bradycardia
 - Hypotension
- Warnings and Precautions
 - Transient Hypertension: Observed primarily during administration of loading dose
 - Arousability: Patients can become aroused/alert with stimulation

Preparation

- Dilute in 0.9% Sodium Chloride Injection to concentration of 4 mcg/ml prior to administration

Administration

- Administer intravenously using a controlled infusion device
- Administration duration should not exceed 24 hours
- Continuously monitor blood pressure, heart rate, and oxygen levels during administration and as clinically appropriate after discontinuation
- Maintain the patient on the volatile inhalation agent or intravenous agent of choice, in accordance with surgical requirements and patient's needs
- Prior to surgical incision, initiate at 0.6 mcg/kg/hour and titrate to achieve desired clinical effect with dosages ranging from 0.2 to 1 mcg/kg/hour
- Geriatric patients (age greater than 65): Consider dosage reduction
- Hepatic impairment: Consider dosage reduction

5. References

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APPENDIX C – Evaluation Tool

Dexmedetomidine Policy Survey

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

Please answer yes or no to the following statements. If you answer no, please explain.

1. I feel that the policy is user friendly.
 - a. Yes
 - b. No:

2. The policy meets the needs of my institution.
 - a. Yes
 - b. No:

3. The policy is clear and concise.
 - a. Yes
 - b. No:

4. The policy will help me effectively utilize dexmedetomidine intraoperatively.
 - a. Yes
 - b. No:

5. Would you consider changing your practice based on the information presented if given the option of utilizing dexmedetomidine as an adjunctive therapy?
 - a. Yes
 - b. No:

6. Additional comments/suggestions.

APPENDIX D – IRB Approval Letter



INSTITUTIONAL REVIEW BOARD

118 College Drive #5147 | Hattiesburg, MS 39406-0001

Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project 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 (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are 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 regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 18071906

PROJECT TITLE: Postoperative Pain in Spinal Surgery: A Policy for Intraoperative Dexmedetomidine Use

PROJECT TYPE: New Project

RESEARCHER(S): Clinton Harris Whitley

COLLEGE/DIVISION: College of Nursing and Health Professions

DEPARTMENT: School of Leadership Advanced Nursing Practice

FUNDING AGENCY/SPONSOR: N/A

IRB COMMITTEE ACTION: Expedited Review Approval

PERIOD OF APPROVAL: 08/09/2018 to 08/08/2019

Edward L. Goshorn, Ph.D.
Institutional Review Board

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