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An Educational Module Explaining the Use of Quadratus Lumborum Blockade To Decrease Opioid Usage During Colorectal Surgery: A Quality Improvement Project

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ABSTRACT

Background: Opioid usage has led to an epidemic within the United States. The usage of opioids in the perioperative period has contributed to this epidemic. However, opioids also have side effects that directly impact the physiologic recovery of patients. Regional Anesthesia is a specialty that can help address this issue—specifically, the use of the quadratus lumborum block to decrease opioid administration postoperatively.

Methods: A comprehensive study search was conducted using PubMed to identify research studies from the past five years that have evaluated opioids, opioid usage in the perioperative period, and the use of regional anesthesia to address opioid usage in the perioperative period.

Results: Fourteen articles were identified as relevant for review. The studies included the opioid epidemic, physiologic effects of opioids, opioid use in the perioperative period, regional anesthesia, and the quadratus lumborum blockade to address every piece of the clinical problem.

Keywords: Opioid Epidemic, Postoperative Opioid, Regional Anesthesia, Quadratus Lumborum

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INTRODUCTION

Problem Identification

The United States continues to experience an epidemic related to opioids.[1] Many surgical procedures are associated with an increased risk of opioid usage in the postoperative period, and it is vital to identify those who may be vulnerable. While opioids play a critical role in perioperative care, the short and long-term effects are well known. Enhanced Recovery After Surgery (ERAS) policies have been implemented by many institutions to limit the effects of opioids in the perioperative period and attenuate many other medications used during the perioperative period.[2] Within many of these ERAS pathways is the critical use of regional anesthesia to decrease opioid usage.[3] In addition to the opioid epidemic, opioids impact patients' recovery in the postoperative period. Regional Anesthesia offers a unique adjunct to patients during the perioperative period to help address issues with analgesia and promote recovery. Regional Anesthesia can offer satisfying control of pain through the perioperative period and better outcomes for patients and is becoming safer through the implementation of biotechnology and pharmacology within the specialty.[4] Regional Anesthesia continues to improve with current research and the development of new use methods.[5] The goal of this project is to identify issues related to opioid administration and find a solution to reduce the administration of these pharmacological agents in the immediate postoperative period.

Background

Opiates, including commonly known substances such as morphine and heroin, were derived from the opium poppy and sold to physicians for their medicinal properties as an

effective way to decrease patient suffering.[1] Opioids continue to be an integral part of perioperative care for anesthesia providers because they maintain tremendous analgesic efficacy. From 2001 to 2011, liberal opioid use was encouraged to improve patient satisfaction, alongside a push from the pharmaceutical industry, during a period that the United States Congress referred to as the "Decade of Pain Control and Research."[1] During this period, opioids were overprescribed, and the disconnect between prescriptions to patients and the necessary medications to manage pain led to an increase in continued opioid use and opioid use disorder.[1]

Opioids continue to play a significant role in perioperative care for patients. Opioid administration is managed differently in the preoperative, intraoperative, postoperative, and post-discharge period, and the use of opioids in each phase impacts patients differently.[2] For example, the administration of intravenous opioids is not possible in the post-discharge phase.[2] Traditionally, anesthesia is administered using a balanced technique. Balanced anesthesia considers the assessment of nociceptive pain signals patients express under general anesthesia and the negative physiologic consequences associated and the utilization of opioids as the primary antinociceptive administered in these incidences.[2] This is variable as opioid administration is considered on a case-by-case and patient-by-patient basis.

In addition to opioids, nonpharmacological methods are utilized to address pain in surgical patients. These are typically used as adjuncts to pharmacological methods and can be categorized as physical and psychological. Physical methods include the use of electrical nerve stimulators, acupuncture, continued passive movement, yoga, massage, and cryotherapy. Psychological methods include information provision, stress reduction, cognitive-behavioral therapy, and attentional strategies to attenuate pain response.[2]

Other than opioids, there are pharmacological medications that provide analgesia. These medications are traditionally used as an adjuvant to opioids but can be used independently depending on the scenario. These medications include infusions of magnesium, lidocaine, ketamine, and dexmedetomidine.[2] Many of these are used in combination with each other, and each offers differing sets of side effects.[2]

The use of regional anesthesia continues to increase due to the benefits that include reduction in morbidity and mortality, superior postoperative analgesia, and improved cost-effectiveness.[4] The use of biotechnology and new pharmacological agents has improved the safety and efficacy of regional anesthesia and is contributing to an increase in popularity.[4] However, inclusion rather than exclusion should be a priority with regional anesthesia, and therefore its use must transition from a perspective on novelty to a core component of anesthetic management.[5] There continue to be barriers to the implementation of regional anesthesia due to a specifically to anesthesia providers negative attitudes and knowledge about the niche specialty and extrinsic factors such as a lack of resources, institutional constraints, cost concern, and the extra time needed for implementation.[5]

Scope of the Problem

The statistics related to the opioid epidemic are staggering. For example, between 2005 and 2014, opioid-related hospitalizations increased 64%, while death rates continued to rise as well, with over 42,000 Americans losing their lives to an opioid overdose.[1] The perioperative period is an intriguing factor since the healthcare system provides opioid medications.

Opioids affect the utility function of patients and have side effects unrelated to the addictive properties of these pharmacological agents.[6] Many healthcare providers consider benefit versus harm in these scenarios, and each opioid affects motility functions differently.

Surgery is a risk factor for chronic opioid usage.[7] While some opioid use is expected in the immediate postoperative period; research continues to be conducted to identify misuse. Identifying risk factors is essential for addressing opioid misuse in the postoperative period. Identifying risk factors such as comorbidities like depression or alcohol/drug use, preexisting prescriptions for benzodiazepines or antidepressants, and age or sex will go a long way towards addressing this issue.[7]

Consequences of the Problem

Opioids continue to remain a cornerstone in managing analgesia for people undergoing surgery.[2] The consequences of opioid administration are well documented. The severe adverse effects caused by opioids include addiction, sedation, respiratory depression, and cardiovascular collapse. In addition, the addictive properties of opioids predispose patients to potential misuse and abuse after recovery from surgery.

Motility function plays a more primary role in the recovery of patients after surgery.[6] While the opioid epidemic should be considered as well, patient recovery in the perioperative period. Opioids affect gastrointestinal motility cause dizziness and respiratory depression, all of which play a tremendous role in the postoperative care of patients and their recovery.[6]

In a 16-year study conducted at the Veteran's Affairs Health Care System in Maryland, postsurgical patients were assessed for potential opioid misuse, and a staggering 58% were

determined to have misuse, while 2.3% even overdosed.[8] While surgery is directly associated with opioid misuse in this study; additionally, a history of alcohol abuse increased the risk.[8]

Knowledge Gaps

The administration of opioid-free anesthesia is a possibility for anesthesia providers to consider. Opioid-free anesthesia refers to the avoidance of opioid administration by anesthesia providers in the perioperative period.[2] While this sounds appealing to address ongoing issues with opioid administration, it is not that simple. Opioid-free anesthesia does not allow individual titration to patient needs of analgesic medications outside of the local/regional medications because Nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen have maximum daily doses for safe use, and medications like gabapentin are not pure analgesics.[2] However, a multimodal approach to pain management should be utilized based on intrinsic analgesic potency, opioid-sparing potential, as well as potential side effects.[2] Multimodal analgesia can help opioid-sparing, but opioid-free analgesia is only possible in specific scenarios.[2] Opioids are the most efficacious in postoperative pain control; however, they are limited in the treatment of neuropathic pain and unable to treat pain in opioid-tolerant patients.[2]

Regional Anesthesia offers another method to decrease the incidence of opioid use and improve perioperative analgesia using local anesthetics.[4] The popularity of regional anesthesia is increasing, and many different methods can be used for similar procedures.[5] For example, Transverse Abdominus Process (TAP) blocks have become a mainstay in perioperative care for abdominal surgery patients. However, Quadratus Lumborum (QL) blocks may be more effective in treating the pain associated with abdominal surgery. A recent study showed that when QL blocks were implemented for similar patients, patients required fewer opioids between 24 and 48 hours than patients who received TAP blocks, and the incidence of dizziness was lower.[9]

However, the incidence of nausea, vomiting, and pruritis was similar amongst both groups of patients.[9]

Proposal Solution

Anesthesia providers have recognized the role they can play in decreasing the burden of the ongoing opioid problem within the United States. Utilization of QL blocks rather than TAP blocks to decrease opioid administration in the colorectal surgery postoperative period. This is important because the adverse effects associated with opioids must be considered. A multimodal approach to pain management is only part of the solution due to surgical patients' continued observation of inadequate pain relief.[2] There continues to be an increased emphasis amongst the regional anesthesia community to create novel blocks based on an intricate understanding of anatomy to address pain associated with specific procedures.[5] As some of the main goals for surgery include enhanced recovery and adequate analgesia, and it is paramount that anesthesia providers maintain current knowledge based on new research to adapt practices to implement new methods of regional anesthesia into practice.

The goal for the perioperative period should be to put the patient at the center of any approach, and therefore, a collaborative effort between the entire surgical team should be utilized to determine the best option for each patient on an individual basis. Advancements in healthcare through current research help ensure a continued effort towards improved patient outcomes. Therefore, the implementation of regional anesthesia into clinical pathways must become the standard. To do this, the overall value of regional techniques must be quantified to include patient experience, patient-reported early postoperative recovery, long-term outcomes, persistent pain, and those related to cost such as length of stay and readmission rates.[5]

PICO QUESTION OR PURPOSE

Population (P): Patients undergoing surgery

Intervention (I): The use of Regional Anesthesia

Comparison (C): Quadratus Lumborum versus Transverse Abdominus Process blocks

Outcomes (O): Decreased utilization of postoperative opioids

LITERATURE REVIEW

Search Strategy

The evidence-based practice project was guided directly by the PICO question, Does the use of regional anesthesia in patients undergoing colorectal surgery lead to decreased opioid usage? Furthermore, does quadratus lumborum (QL) blockade offer superior pain management compared to transverse abdominus process (TAP) blockade? A search was conducted using CINAHL, PROQUEST, and Medline databases to synthesize data associated with the opioid epidemic, opioid side effects, regional anesthesia, TAP, and QL blocks. The keywords and Boolean operators were "regional anesthesia", AND "quadratus lumborum" OR “Transverse Abdominus Process" OR "pain" OR “colorectal surgery” Articles specific to pain, opioid administration, and regional anesthesia for colorectal surgery were obtained.

Summary of the Evidence

Understanding Pain. Comprehending the neurochemical and anatomical mediators involved in pain perception and noxious transmission is vital to augmenting chronic and acute pain handling. Pain, by definition, is an undesirable emotive and sensory experience related to possible or real tissue damage. Although severe discomfort and related responses are undesirable and unpleasant feelings, they have vital adaptive roles. They locate and confine noxious

impetuses, prompt withdrawal replies that minimize tissue damage; injuries inhibit movement, enhance wound curing, and begin practical and motivational replies that adjust future behaviors. However, prolonged and intense pain transmission and painkilling under medication can boost postsurgical mobility, delay the healing process, and trigger the progress of chronic discomfort. Pain is defined by various variables, including its duration, pathophysiological mechanism, and clinical context. Concerning the duration of Pain, Pain can be categorized as chronic, convalescent, or acute, while its pathophysiologic mechanisms include nociceptive, physiology, and neuropathic descriptions. In the clinical context, pain can be degenerative, neuropathic, malignant-related, or postsurgical.

Acute pain occurs after a traumatic tissue injury, is restricted mainly in the period, and is associated with temporary limitations in intensity.[11] Meanwhile, chronic pain is the discomfort that persists anywhere between three and six months after the anticipated healing time. In some chronic pain situations, symptomatology, underlying medical condition conditions, and other issues may be of superior clinical status than the descriptions of discomfort or period.

A more recent definition of pain describes the phenomenon as inflammatory, physiologic, or neuropathic. Physiologic pain defines the rapid nontraumatic discomfort that an individual perceives over a concise duration. Physiologic pain is the type of discomfort that alerts the person about the presence of a possibly harmful inducement in the surrounding, such as a sharp or hot object, and causes reflex responses to activate to minimize or prevent injuries. Nociceptive pain can be defined as noxious perceptions that result from cellular damage caused by traumatic, surgical, or clinical-related abrasions. Nociceptive discomfort can also be inflammatory since inflammatory mediators, and peripheral inflammation plays a significant role in its initiation and

progress after that. Generally, the nociceptive pain's intensity is in proportion to the level of tissue injury or damage and the secretion of inflammatory mediators.

Somatic nociceptive discomfort is typically well restricted and occurs typically according to a dermatomal design.[12] Patients describe this type of pain as piercing, crushing, or tearing. On the other hand, visceral nociceptive pain is the discomfort typically related to peritoneal disturbance and the enlargement of the smooth muscle surrounding the tubular or viscous passages. This type of pain is usually localized and non-dermatomal and could be described as colicky or cramping. Moderate to severe visceral pain can be observed in patients presenting with ureteral or bowel obstructions and those with appendicitis and peritonitis. Visceral pain that radiates in a somatic dermatomal pattern can be labeled as referred discomfort—referred pain results from the merging of noxious involvements from visceral afferents that activate second-order cells. These cells typically respond to somatic feelings. Given this convergence, the discomfort radiating from the deep visceral constructions may be described as somatic discomfort at an area next to or lies some distance from internal regions of discomfort, irritation, or injury.

Postoperative pain falls under the acute and chronic pain categories because it is caused by surgical trauma, inflammatory response, and the initiation of the neuronal barrage—postoperative pain results from the combination of various emotional, sensory and mental experiences. Surgical trauma can enhance these experiences and is also associated with endocrine-metabolic, autonomic, behavioral, and physiological responses. A patient experiences acute postoperative pain immediately following a surgical procedure. Acute pain typically lasts seven days; any pain that lasts for three months or more following a surgery falls under postoperative chronic pain.

Psychology of Pain. The primary section of the central nervous system that transmits signals between the brain and other body parts is the spinal cord. Nerves from all body sections enter and leave the spinal cord along its length. The section at which nerves exit the spinal cord is christened the nerve root, while the peripheral nerves describe the area where nerves branch out into tiny nerves that regulate different body parts. These peripheral nerves encompass both sensory and motor nerves. The motor nerves are connected to muscles and work by stimulating movement, while the sensory nerves work by receiving sensory stimuli.

Nociception describes the brain's procedure of processing noxious inducement that results in the brain perceiving pain. Nociception consists of various components, including perception, modulation, transduction, and transmission. Hyperresponsiveness is a characteristic of both chronic and acute pains, and it results from alterations in the nervous system's response at the central and peripheral locations.

Peripheral sensitization happens when an inflamed tissue releases a complex cocktail of chemical mediators. This mixture causes an abridged nociceptor threshold. Consequently, this situation triggers an increased response to primary hyperalgesia or a painful stimulus. Meanwhile, central sensitization describes the central nervous systems' response that involves continuously releasing C-nociceptors. After some time, this process results in a patient experiencing increased chronic pain.

Postoperative Pain Management Practices. The importance of effective acute pain relief and management to every physician treating patients during and after surgery could never be over-emphasized. Pain relief medication results in considerable psychological benefits. This explains why monitoring and managing patients' pain gradually becomes a critical postoperative measure of quality. The objective of managing postoperative pain is to reduce and, if possible,

eliminate discomfort and pain using methods that will result in minimal side effects. Acute pain, in this case, can be defined as the pain felt by a patient following a surgical procedure. So important is pain management that the World Health Organization (WHO) labels it a human right. When postoperative pain is improperly managed, a patient may develop complications that may require prolonged rehabilitation. Also, uncontrolled acute pain causes chronic pain, reducing the quality of one's life.

Meanwhile, appropriate pain relief can result in a shortened stay at the hospital, reduced healthcare costs, and increased patient satisfaction levels. Today, various agents, both opioids and nonopioids, modes, when needed and patient-controlled, and routes, intervenors, oral, regional, and neuraxial modes of treating postoperative pain exist. Opioid-related compounds are a popular prescription for treating pain due to their high efficiency in releasing pain and relaxing the mind concurrently.

Opioid Utilization. Although opioids are a standard prescription for pain, not all situations are suitable for opioid consumption. Physicians examine several factors when determining if the pain warrants the use of opioids, and among these factors is the severity of the pain. Opioids should always be reserved for severe pain. Nonopioid pain medications, including ibuprofen, are often sufficient to subdue the pain when the pain warrants medication. For example, individuals who undergo the removal of their wisdom teeth can manage the resultant pain by taking a combination of acetaminophen and ibuprofen. Nevertheless, oral surgeons and dentists often prescribe days or weeks or opioid therapy, depending on the patient's complaints of pain.

Physicians also examine the type of pain when determining if opioids are needed. Patients experiencing severe discomfort originating from consequential injuries or following

major surgeries benefit from the intake of opioids taken for a few days; Sun et al.[8], agree that surgeries constitute a significant risk factor for opioids. The opioid-based medication is, on many occasions, necessary to handle excruciating discomfort and pain caused by cancer. Nevertheless, patients experiencing nerve damage pain, impingement, or neuropathic discomfort do not respond very well to opioids. In other words, opioid medicines do not offer to rely upon the expected levels. These individuals are more likely to find comfort for their pain from other medication types. An excellent type of alternative medication is those that have been manufactured to control seizure disorders.

Physicians also consider a patient's duration of pain perception when determining whether a patient needs opioids. There is sufficient evidence that indicates that opioids are effective for treating severe pain over the short term. However, little evidence supports the effectiveness of long-term opioid therapy for chronic pain. As noted earlier in this paper, chronic pain is any pain that lasts for at least three months. While some individuals may benefit from long-term opioid treatments, the risks of such medicines often outweigh the benefits.

Opioids should not be used for chronic non-cancer pain.[8] Chronic pain indicates that the individual's nervous system is skewed. Feeling some pain or discomfort for some days or weeks is nothing out of the normal, especially if the individual has had a laceration or gone through a surgical procedure. Such pain is a short-term response that indicates tissue contusion and the progress of the healing process. In contrast, chronic pain does not have any biological or functional role for the body. Though not very common, some individuals will experience pain that may turn chronic. This is because the trauma stage has already passed; however, their nervous systems are yet to reset and stop sending pain signals. Under these circumstances, rather than the nervous systems indicating the location of pain, they now transform to an origin of pain.

Since chronic pain can considerably impact underlying health mechanisms, one is functioning and their quality of life, it is now categorized by physicians as a health condition or disease.

Nevertheless, there are instances where opioids may be necessary for treating patients with chronic pain. These situations include cases when the process has realistic and specific goals. In addition to these requirements, it is vital that both the patient and physician concur and are ready and willing to halt further treatments should they realize that the treatment's objectives are not being satisfied. Moreover, it would be helpful for both parties to weigh the benefits and drawbacks of opioid-based mediation before settling for them. Finally, including a regular review as part of the treatment process is crucial to help the patient avoid addiction and, even worse, an overdose.

Pharmacology. There are more than ten forms of medical opioids in the US market. They are also manufactured and sold under various distinct brand names. While some products contain pure opioids, others are amalgamated with other substances, perhaps to improve their potency. An excellent example of a drug made by combining opioids with other substances is Percocet. Percocet pills combine opioids oxycodone with acetaminophen compounds. Acetaminophen is the active ingredient of another potent drug known as Tylenol. Apart from improving potency, the other purpose for combining these drugs is to archive more significant pain relief than each would relieve pain alone.

Opioid Side Effects. The side effects of using opioid-based medications vary from mild to severe. Interestingly, all opioids share the same side effect spectrum, but not all individuals who consume opioids will experience all these signs. Some may experience them but to a varying extent. Some of the bothersome side effects of opioids include constipation, itching, and nausea. Constipation results from the effect that opioids have on the intestines. Sometimes,

constipation is accompanied by other symptoms such as bloating, reflux, spasm, urinary obstructing, and ramping.[13] Shanthanna et al.[2] observed that these side effects could result in more extended hospitalization and more medical costs. Most patients on opioid medication will benefit from regular exercise, maintaining hydration, and taking stool softeners to prevent constipation from developing. However, once the patient begins constipating, they can seek reprieve from enemas and laxatives for the shorter term because the effectiveness of stool softeners tends to be minimal for conditions triggered by opioid medication use. In rare cases, constipation experienced by these patients can transform into impaction, which could, in turn, result in hospitalization.

Itching is the other side effect associated with using opioid medication. Patients can, however, treat itching with ondansetron, an anti-nausea medicine. A patient using opioids may also develop nausea, particularly while taking the first few doses. However, anti-nausea medicine should be sufficient to subdue nausea.

A rare but severe side effect of opioid use includes getting sedated from depressant compounds in the drug. This sedation can affect cells in the brainstem. A significant level of sedation can also cause one to develop slower breathing. Slow breathing is among the first indicators of an overdose. Drug abuse is the other profound side effect and a significant problem that US society faces today. Finally, misuse occurs when a patient takes medication in a manner that the physician has not intentioned or recommended.

The other not-so-common side effects of opioid therapy include minor muscle spasms, which are medically christened myoclonus. A patient may experience these spasms if they increase their dosage of opioids. Urinary retention and reductions in sex hormones' levels are also rated side effects. Opioid therapy, when done for a lengthy period, can cause a paradoxical

pain hypersensitivity. Opioids may also affect the immune system by compromising immunity levels, exposing the body to a higher risk of infections. Research on these and other side effects related to opioid consumption are still ongoing.

The Psychological Impact of Opioids. Prescription opioids chemically resemble endogenous opioids, the neuromodulators, and neurotransmitters that the human body manufactures to inhibit the intensity of pain signal perception by interacting with opioid receptors in both the brain and the spinal cord. Various opioid-based medications derived from the opium poppy have been used to treat pain, diarrhea, and cough. Opioids are categorized into various groups depending on how they are manufactured.

The first category is natural opioids manufactured from the opium poppy, and these include codeine and morphine, the only natural opiate analgesics used for medicinal purposes. The second category is the semisynthetic opiates extracted from naturally occurring opium alkaloids such as hydrocodone from codeine, buprenorphine from thebaine, and hydromorphone from morphine. The third category is fully synthetic opioids such as methadone, fentanyl, and meperidine. These are synthesized from chemicals not found in opium. Given their significant influence on the brain areas that control emotions, opioid medications can produce pleasant experiences and euphoria that can cause an individual to continue misusing the drugs to develop dependence and abuse symptoms when taking them for extended periods or in high doses. Prescription opioid-based medication in the US includes oxycodone, hydrocodone, morphine, oxymorphone, codeine, and fentanyl. Hydrocodone and oxycodone are the most prescribed opioid-based medication in the US.

Both endogenous opioids and opioid medications interact with opioid receptors on neuronal membranes distributed throughout the peripheral nerves, spinal cord, and many other

supraspinal sites. Endogenous and exogenous opioids modulate the pain transmission path by activating receptors in the superficial layers of the dorsal horn within the spinal cord, thereby reducing the release of excitatory neurotransmitters from primary affront terminals while at the same time depolarizing the second-order neurons in the dorsal horn. This activation of receptors in the supraspinal areas also results in the analgesic effect of opioids. Opioids activate the descending system that controls the nociceptive transmission through the pain modulatory system, including the hypothalamus, cortical lobe regions, the rostral ventromedial medulla, and amygdala, and the projections to the periaqueductal gray.

Opioids also provide relief to discomfort and pain by reducing affective dimensions of pain. The analgesic effect of opioids occurs in part through the central autonomic network's modulation, including the hypothalamus, the cingulate cortex, and the anterior insula. These regions regulate emotional attention and the neurovisceral integration process. Also, by activating the mesolimbic dopaminergic reward system, opioids can enhance the dopaminergic reward system. They can contribute to positive and reward, which contributes to the reduction of pain receptors. By inhibiting the neurotransmitter γ-aminobutyric acid [14] in the nucleus accumbent, opioids contribute to the dopamine liberation and the activation of the reward system. The transient activation of the reward system and the cognitive impairment are believed to contribute to the initiation of addiction patterns among particular individuals who use opioids.

Because of the diversion of prescription opioids and their misuse and abuse potential, some pharmaceutical companies have developed new abuse-deterrent and tamper-resistant opioid formulations. Examples do these drugs include Oxycodone DETERx and OxyContin OP. New formulations aim to prevent the tablet, capsule, or patch alteration by rendering t inactive

during attempted use via snorting or injection. Despite these efforts, individuals have still found ways of altering them for misuse. Hence the opioid epidemic continues.

Opioid Epidemic. The opioid crisis in the US has resulted from the excessive utilization of drugs both illicitly and legally at unprecedented levels. Roughly two million US individuals are suspected of having opioid use disorder (OUD), which results from prolonged use of prescription medication such as heroin, prescription opioids, and other illegal opioids.[7] Unfortunately, OUD is a life-threatening condition primarily associated with a significant increase in the risk of early death due to overdose, suicide, trauma, and even infectious diseases. Lyden and Binswager[1] noted that the hospitalization rate of opioid-related cases increased by 64% from 2005 to 2014. They further observe that the death rates also increased significantly over the same period.

Mortality associated with opioid use disorder continues to intensify as this crisis gains momentum across the US, with opioid overdoses killing more individuals every year. Efforts to curtain opioid overdose are yet to make any significant headway in steaming this crisis, mainly because the tools that are available today, including evidence-based practices and medications, are not being rolled out to maximize their impact. Jones et al.[15] add that multiple parties contribute to the current epidemic. Medical specialty associations, multiple industries, and government oversight bodies all have a role to play in the current opioid epidemic.

During the late 20th century, pharmaceutical industries assured the general public, particularly the medical communities, that opioid-based pain relievers would not trigger addiction in patients. This assurance caused healthcare personnel to increase their prescriptions of these medications. The increased use of opioid-based pain relievers, in turn, contributed to widespread misuse and diversion of these drugs before it became apparent that these opioid-

based medications are highly addictive. The gradual increase of overdose rates sounded the first alarm as statistics indicated that close to 70,000 Americans were losing their lives every year from an opioid overdose.[5] The overdose cases included substances such as heroin, opioids, and illicitly produced synthetic opioids such as fentanyl.

The National Institutes of Health (NIH) has engaged in several measures to avert this crisis with little success. However, significant gains are being made nit that new methods of preventing the abuse of opioids while at the same time treating those with opioid disorders are being discovered. These methods include the use of quadratus lumborum and regional anesthesia.

Quadratus Lumborum Block. The concept of quadratus lumborum (QL) block is a procedure for managing perioperative pain. Currently, physicians perform QL block procedures to manage pain for a wide range of incidences, including adults, pediatrics, and even expectant mothers undergoing surgery. However, physicians are yet to reach a consensus on the most appropriate approach to using this pain management method. Perhaps its complicated nomenclature systems and the complex mechanisms involved could be responsible for this lack of consensus.

Physicians have yet to reach a consensus on the volume, type, and concentration of the local anesthetics required to carry out QL block. Nevertheless, the procedure is typically performed using 15 to 20 ml of local anesthetic on the right and left sides of the abdominal wall. Ropivacaine, levobupivacaine, and bupivacaine are common anesthetics used for this procedure. Some physicians recommend an additional dose of two to four milliliters of dexamethasone to each abdominal wall side to improve the effectiveness of the local anesthetic. Nevertheless, physicians have yet to agree on dexamethasone's effect on the duration of peripheral nerve block.

The QL block can be administered can be carried out postoperatively, immediately after the physicians wake up a patient on general anesthesia, on the operating table, in the intensive care unit, or even in the recovery room.

Quadratus Lumborum Block Indications and Efficacy. QL block is an ultrasound-guided procedure involving an anesthetic injected in an area adjacent to the QR muscle.[16] The objective of this procedure is to anesthetize the thoracolumbar nerves. QL block can provide postoperative analgesia for a wider variety of surgical procedures. It is effaceable following caesarian section surgery, abdominal surgery, gynecological laparoscopy, appendectomy, colostomy reconstruction, and gastrectomy. Research indicates that QL block is an excellent analgesic for managing and reducing pain. Patients who undergo QL block as part of their postoperative pain therapy experience reduced pain levels even when moving or resting. Thus, QL blocks are vital if the patient achieves early mobilization following a surgical procedure.

Interestingly, the analgesic impact is as practical as that achieved using opioids, and it does not come with vomiting and nausea side effects associated with opioid use. Following this discovery, the demand for morphine for handling postoperative pain is significantly reduced in patients. This is particularly the case for patients on QL block, paracetamol, and NSAID as analgesia compared to those on paracetamol and NSAID without the QL block. QL block also provides rapid and early relief to pain while allowing early ambulation in patients.[9] This is a vital measure in preventing thromboembolic and deep vein thrombosis complications. However, more research is required on this issue.

The Use of Regional Anesthesia. Regional anesthesia is usually used to numb a specific body section to allow physicians to perform surgical procedures. Several forms of regional anesthesia exist, and some of the most common include epidural anesthesia, subarachnoid block,

and nerve blocks. Other types of regional anesthesia include the midpoint transverse process, intercostal, and the rhomboid-intercostal sub serratus plane blocks.[16] Orthopedic surgeons typically use regional anesthesia on a foot, arm, leg, and hand. It is also for surgeries involving the male and female reproductive systems or operations involving the urinary tract and the bladder. Epidural analgesia is mainly used to ease the pain of childbirth, but physicians can also use it to help a patient manage the main following a myriad of surgical procedures.

The most common forms of regional anesthesia include spinal anesthesia, epidural anesthesia, and peripheral nerve blocks. Spinal anesthesia involves injecting local anesthesia into the patient's skin to numb the region. Next, the anesthesiologist places a small needle through to the subarachnoid space of the spine. This is also the area where the cerebrospinal fluid is. Next, the anesthesia is delivered to the cerebrospinal fluid to cause numbness. The numbness caused by this procedure usually begins at the feet and gradually moves upwards. The patient's height, type of anesthesia, and position dictate the rate at which the anesthesia moves upwards.

Epidural anesthesia is similar to spinal anesthesia but involves using a larger needle. Moreover, this needle does not reach the cerebrospinal fluid. Instead, the anesthesiologist places a catheter through the needle and uses this catheter to deliver longer-term anesthesia to cause pain relief.

Meanwhile, the peripheral nerve blocks work by blocking the spinal cord's nerve signals to various body parts. Using this procedure, the anesthesiologist can block signals at different areas along their paths to block motor function. The anesthesia provider delivers an anesthetic solution very close to the nerve but avoids entering the nerve. Instead, they locate nerves using portable ultrasound devices or nerve stimulators.

Souzdalnitski, Halasznski, and Faclier[17] observed that research is increasingly showing that regional anesthesia is superior to opioids regarding pain management and control, decreased perioperative mobility, and patient satisfaction. However, as observed earlier, opioids are not suitable for chronic pain since the drawbacks of their long-term use overwhelm any benefits. Thus, regional anesthesia is a preferable treatment for patients with chronic pain. In addition, regional anesthesia does not share the same side effects as opioid-based medications and rarely has any complications.

The opioid epidemic in the US continues to be a significant source of worry. Apart from the various side effects of using opioids, fatalities from drug overdose are a primary concern. Today, various types of opioid-based medication constate a significant part of postoperative treatment; nevertheless, the rising incidences of abuse prompt the need to seek alternatives. Physicians could use two pain relief treatments instead of opioid-based mediation: the Quadratus Lumborum block and regional anesthesia application. The QL block works by numbing thoracolumbar nerves and is already being used as anesthesia for various surgical procedures. QL block pain treatment is already showing promising results in helping postoperative patients recover quickly and feel less pain following their surgical procedures. The reduced intensity of pain reduces the need to take powerful pain killers, reducing the chances of developing an addiction. Regional anesthesia is also becoming a popular way to cause numbness in patients undergoing surgical procedures. As is the case with QL block, this method also promoted a faster healing process and less postoperative pain than using opioids-based medication. Given that both methods also do not have the undesirable side effects associated with opioids, they are a viable option to reducing and even eliminating the opioid epidemic in the US.

Table 1: Literature Matrix

Author(s)	Purpose	Methodology	Sampling	Intervention(s)	Primary Results
Argoff (2020)	To provide an overview of opioid-induced constipation and its influence on disease burden and quality of life.	Narrative Review	Keywords used in the search include opioid-induced constipation, quality of life, and patient burden.	The study looked at first defining opioid-induced constipation—next, the patient and economic burdens. Then, treatment options were addressed as well as clinical trials. Finally, communication gaps were discussed.	The most common opioid-related side effect is OIC. Patients with OIC often experience substantial overall burden (i.e., increases in anxiety and depression, impairments in activities of daily living, low self-esteem, feelings of embarrassment) and economic burden (i.e., higher health care costs, more frequent doctor visits, increased out-of-pocket medication costs), which often causes patients to modify or

					discontinue opioid treatment despite the analgesic benefits.
Deng, W., Long, X., Li, M., Li, C., Guo, L., Xu, G., & Yu, S. (2019)	The study compared the quadratus lumborum block (QLB) method with the transverse abdominis plane block (TAPB) for postoperative pain management in patients undergoing laparoscopic colorectal surgery.	Clinical Research Clinical Trial and Experimental Study	Keywords used include laparoscopic colorectal surgery, postoperative analgesia, quadratus lumborum block, transversus abdominis plane block, and ultrasound.	Seventy-four patients scheduled for laparoscopic colorectal surgery were randomly assigned into two groups. After surgery, patients received bilateral ultrasound-guided single-dose of QLB or TAPB. Each side was administered with 20 ml of 0.375% ropivacaine. In addition,	Patients in the QL block group used significantly fewer opioids than the TAP block group at 24 48hours, but not at 6 hours after laparoscopic colorectal surgery. There were no significant differences in pain scale rating results between the two groups at rest or during movement. In addition, the incidence of dizziness in the QL block

				all patients received sufentanil as patient-controlled intravenous analgesia (PCIA). Resting and moving numeric rating scales (NRS) were assessed at 2, 4, 6, 24, 48 hours postoperatively. The primary outcome measure was sufentanil consumption at predetermined time intervals after surgery.	group was lower than in the TAP block group.

Elsharkawy, H., EL-Boghdadly, K., & Barrington, M. (n.d.)	The purpose of the study is to review the relevant anatomy, potential mechanisms, approaches, and techniques and summarize the clinical evidence for quadratus lumborum block.	Clinical Focus Review	Information was obtained specifically from institutional resources.	Understanding the relevant anatomy and technical aspects of the quadratus lumborum block is essential for its practical and safe use. In addition, cadaveric studies demonstrate that the iliohypogastric and ilioinguinal nerves are consistently involved. Therefore, Quadratus lumborum block approaches are named injection locations in	Current indications are based on a few existing randomized controlled clinical trials and case reports. Although the evidence base is weak and still growing, the data thus far suggest that quadratus lumborum block potentially results in extensive sensory blockade (T7–L2). In addition, Quadratus lumborum block may lead to dermatomal coverage required for abdominal surgery and hip surgery, representing future research avenues.

				relation to the quadratus lumborum muscle.	
Jan van Dam, C., Algera, M., Olofsen, E., Aaarts, L., Smith, T., Van Velzen, M., Salton, E., Niesters, M., & Dahan, A. (2020)	The study looks at opioids, the utility functions impacted by opioids, and how to achieve the most wanted effect while limiting unwanted effects.	Literature Review	Keywords include pain; opioid; benefit; harm; analgesia; respiratory depression (RD); utility; and utility function.	The creation of the utility functions and surfaces based on pharmacokinetic-pharmacokinetic modeling studies	Opioids will continue to play a role in postoperative care. Therefore, it is essential to understand the potential side effects. Also critical is staying up to date with current research and new opioids created for use.

Shanthanna, H., Ladha, K., Kehlet, H., & Joshi, G. (2021)	This article critically reviews perioperative opioid use, especially opioid-sparing versus opioid-free strategies.	Literature Review	The research was conducted using existing literature related to rational opioid usage in the perioperative period, focusing on opioid-reduction strategies.	The data indicate that opioid-free strategies, however noble in their cause, do not fully acknowledge the limitations and gaps within the existing evidence and clinical practice considerations. Moreover, they do not allow analgesic titration based on patient needs; they are unclear about optimal components and their role in different surgical settings and	Adequate perioperative analgesia is not only a humane necessity but is important to prevent short- and long-term complications. The focus should remain on minimizing opioid use with known, safe, feasible options adapted to individual patient needs. A framework that involves patient education, preoperative opioid minimization, use of multimodal analgesia strategies, and postoperative analgesia titrated to transitional pain needs can decrease the

				perioperative phases; and do not serve to decrease the risk of continued opioid use, thereby distracting us from optimizing pain and minimizing real long-term harms.	risk of persistent opioid use and persistent postsurgical pain.

PRIMARY DNP PROJECT GOAL

Regional Anesthesia will play a significant role in the future of healthcare due to the multitude of opportunities that its use affords to patients. Specifically related to the perioperative period during colorectal surgery, the use of Quadratus Lumborum (QL) blockade, as opposed to Transverse Abdominus Process (TAP) block, will help reduce the number of opioids administered to these patients.[9]

Many institutions currently utilize the TAP block as a mainstay for pain management during colorectal surgery, and most surgeries are performed below the umbilicus.[9] However, Mount Sinai Medical Center in Miami Beach, Florida, does not currently utilize QL blocks as part of their regional anesthesia or pain management for patients undergoing colorectal surgery. The facility does utilize the TAP block. Implementing the QL block in place of the TAP block can have a profound impact, positively, on this patient population.

It is being uncovered through continued research that local, regional anesthesia through the use of abdominal wall blocks, such as the TAP block, is having increasingly adverse outcomes in colorectal surgery.[18] The negative outcomes are believed to be because TAP blocks only provide analgesia for somatic pain.[18] The QL block, however, addresses visceral pain in addition to somatic pain.[16] Therefore, this study aims to determine how the use of QL blocks can decrease the number of opioids administered in the postoperative period while still providing adequate analgesia for patients undergoing colorectal surgery.

Goals and Outcomes

The goal objectives and outcomes were developed by using the acronym SMART. SMART details that the objectives are specific, measurable, achievable, realistic, and timely.

Specific

QL blocks will be utilized during the perioperative period during colorectal surgery to reduce the number of opioids administered in the perioperative period.

Measurable

The effectiveness of the administration of the QL block to reduce the quantity of opioids administered. This can be measured through tracking opioid administration after QL block is performed for this patient population.

Achievable

Patients and providers will be educated on the QL block and its role in decreasing opioid administration during the postoperative period. After adequate education, the QL block will be incorporated as a standard, for appropriate patients, in the care for patients undergoing colorectal surgery.

Realistic

Providers will be educated on the QL block and its potential role in caring for patients undergoing colorectal surgery. However, there is no guarantee that providers will be comfortable with or find the time to administer the block for every patient in this population.

Timely

The education can be completed over six months. As providers obtain the appropriate education and display adequacy with performing the block, implementation of the block for

patients undergoing colorectal surgery can be gradual. As blocks start to be utilized, analysis of the impact can begin to be recorded.

Program Structure

The program will be structured to evaluate the effectiveness of the QL block in decreasing the number of opioids administered in the perioperative period for patients undergoing colorectal surgery. To adequately perform this study, patients will be separated into three groups. The control group of patients who receive no regional anesthesia, patients who receive a TAP block, and the group of patients that receive a QL block. These groups will be analyzed for the number of opioids administered and the amount of analgesia achieved related to the number of opioids administered.

Strengths

Regional anesthesia offers tremendous pain control throughout the perioperative period and provides better outcomes for patients as the specialty evolves.[4] The QL block is an example of the advancement of the specialty. The strengths of this program are the ability to compare two existing approaches to the care of a patient undergoing colorectal surgery to a new approach using a more complex use of regional anesthesia.

Weakness

The structure of the program is specific to adequate analgesia. It is known that opioids have a profound effect in the perioperative period that extends beyond strict analgesia.[4] Therefore, the program structure can be expanded to include research into a potential decrease in complications related to opioids amongst the three groups.

Opportunities

Studying the use of the QL block while comparing it to the TAP block and an anesthetic technique without regional anesthesia allows for an in-depth comparison to see the best way to manage care for a specific procedure. If it is determined that there is a significant advantage to one technique over another, organizational change and a transition in practice can be made to better this patient population.

Threats

The main threat to implementing this research study is the resistance of providers and patients to trying a new technique. The TAP block has been used successfully, as have opioids, for the care of surgical patients. However, without appropriate education, there may be resistance to such a significant change in the approach to care. Providers must be educated on the QL block and how it explicitly impacts colorectal surgery so that patients are comfortable with this approach to their care.

Organizational factors

As with most organizations, cost and time will play a significant role in implementing this research study. QL blocks take time to perform, and there is a potential to delay surgery without adequate staffing. Additionally, existing protocols that specifically refer to colorectal surgery would have to be addressed or altered to include the potential use of a QL block. Most importantly, providers need to cooperate with the research study to ensure that an adequate amount of QL blocks are performed to ensure there is enough data to evaluate.

METHODOLOGY

Setting and Participants:

The setting of this study will be in the hospital and will start in the preoperative period and continue into the postoperative period. The leading participant in the study will be patients undergoing colorectal surgery. Also included will be anesthesia providers, nurses, and colorectal surgeons.

Description of approach and project procedures:

The study will be specific to patients undergoing colorectal surgery. Patients will be administered a Quadratus Lumborum block after induction of anesthesia but prior to the surgical incision. Patients will then be monitored throughout the immediate postoperative period to analyze the number of opioids received. This will be compared with patients who do not receive the Quadratus Lumborum blockade. Patients will have a similar medical history and outpatient medications. For example, it would not be appropriate to compare results when one person has chronic pain and takes medications at home to treat it to a patient who takes no medication at home.

Data Collection:

The number of opioids will be analyzed through the immediate postoperative period to determine if the quadratus lumborum blockade has a direct impact on decreasing the number of opioids administered to patients undergoing colorectal surgery. In addition, the comparison will be made to patients who did not receive regional anesthesia.

Data Management and Analysis Plan:

The data will be stored in a secure electronic database. The primary investigator will have exclusive access to the database to ensure that the study stays private. No specific patient

identifiers will be collected, and the results will be collected in aggregate. When comparing patients, the comorbidities and at-home medications will be generalized to the ASA classification and generic medication names.

RESULTS

Table 2: Pre-Test Demographics

Demographic	n (%)
Total Participants	10 (100%)
Gender	
Male	6 (60%)
Female	4 (40%)
Ethnicity	
Caucasian	1 (10%)
Hispanic	5 (50%)
Other	4 (40%)
Education	
Masters	2 (20%)
Doctoral	8 (80%)
Other	0 (0%)
Position/Title	
CRNA	8 (80%)
MD	1 (10%)
Other	1 (10%)

Years of Experience	
Less than 1 year	1 (10%)
1 to 5 years	3 (30%)
6 to 10 years	2 (20%)
More than 10 years	4 (40%)

Pre-Test Participant Demographics

There were 10 participants in the pre-test demographics, and all 10 completed the study. As expected, most of the participants were male (n=6, 60%), as opposed to female (n=4, 40%). There were also a range of ethnicities represented: Caucasian (n=1, 10%), Hispanic (n=5, 50%), and other (n=4, 40%). Information was obtained regarding the participant's role at the hospital. It was found that there were a mix of representatives: CRNA (n=8, 80%), MD (n=1, 10%), and Other (n=1, 10). The participants were questioned about their years of experience, finding that the practice period ranged: less than one year (n=1, 10%), 1 to 5 years (n=3, 30%), 6 to 10 years (n=2, 20%), and more than 10 years (n=4, 40%).

Pre-Test Common Beliefs/Knowledge about Regional Anesthesia

This section contains information regarding common beliefs about regional anesthesia. Many participants (70%) were aware that regional anesthesia is gaining popularity. There were slightly more participants (80%) who understood that regional anesthesia can help combat the opioid epidemic. All of the participants (100%) knew what procedures are included in regional anesthesia. Some of the participants (60%) could correctly define somatic pain as well as what describes pain. However, the majority (80%) could correctly identify the proper examination of

pain. Yet, only half (50%) of the participants knew how regional anesthesia directly impacts the healing process.

Post-Test Demographics

Table 3: Post-test demographics

Demographic	n (%)
Total Participants	10 (100%)
Gender	
Male	6 (60%)
Female	4 (40%)
Ethnicity	
Caucasian	1 (10%)
Hispanic	5 (50%)
Other	4 (40%)
Education	
Masters	2 (20%)
Doctoral	8 (80%)
Other	0 (0%)
Position/Title	
CRNA	8 (80%)
MD	1 (10%)
Other	1 (10%)
Years of Experience	

Less than 1 year	1 (10%)
1 to 5 years	3 (30%)
6 to 10 years	2 (20%)
More than 10 years	4 (40%)

Post-Test Participant Demographics

There were 10 participants in the pre-test demographics, and all 10 completed the study. As expected, most of the participants were male (n=6, 60%), as opposed to female (n=4, 40%). There were also a range of ethnicities represented: Caucasian (n=1, 10%), Hispanic (n=5, 50%), and other (n=4, 40%). Information was obtained regarding the participant's role at the hospital. It was found that there were a mix of representatives: CRNA (n=8, 80%), MD (n=1, 10%), and Other (n=1, 10). The participants were questioned about their years of experience, finding that the practice period ranged: less than one year (n=1, 10%), 1 to 5 years (n=3, 30%), 6 to 10 years (n=2, 20%), and more than 10 years (n=4, 40%). It is noted that everybody completed both the pretest and posttest.

Post-Test Common Beliefs about Regional Anesthesia

This section is about common beliefs regarding regional anesthesia. All the participants (100%) were aware that regional anesthesia is now gaining popularity. Additionally, all the participants (100%) could identify the correct types of regional anesthesia, the correct examination of pain, and that regional anesthesia directly helps administer less opioids. The majority of participants (80%) could correctly identify the definition of pain, as well as the

correct definition of somatic pain (90%). The majority of participants (70%) were also able to identify how regional anesthesia positively impacts the healing process.

Table 4: Correct Responses

Correct Responses	Pre-test	Post-test	Difference
True	8 (80%)	10 (100%)	20%
Duration, Pathophysiological Mechanism, Clinical Context	6 (60%)	8 (80%)	20%
It is restricted and occurs according to dermatomal design	6 (60%)	9 (90%)	30%
Examination of the type and duration of pain	8 (80%)	10 (100%)	20%
True	7 (70%)	10 (100%)	30%
Spinal Anesthesia, Epidural Anesthesia, Peripheral Nerve Blocks	10 (100%)	10 (100%)	0%
Faster Healing and Less Side effects	5 (50%)	7 (70%)	20%
All of the Above	7 (100%)	8 (100%)	10%

Difference in Pre- and Post-Test (Common Beliefs)

In Table 4, it was seen that there was a noted improvement from the pretest scores to the posttest score. There was no change noted in identifying the types of regional anesthesia. However, a 30% increase was noted in both the definition of somatic pain and understanding that regional anesthesia is gaining popularity. A 20% increase was noted in recognizing an increase in opioid related deaths, defining pain, proper opioid prescribing techniques, and comparing

opioid-based pain control to regional anesthesia during the healing process. Only a 10% increase was noted in identifying the patient populations who are eligible to receive a Quadratus Lumborum Peripheral Nerve Block.

Overall, the results show that there was a degree of difference from the pre-test to post-test. There was an increase every category except for basic knowledge of anesthesia. The implementation of the quadratus lumborum peripheral nerve block should rise in the future.

LIMITATIONS

Limitations of the study include the small sample size. The study was performed within a small group of anesthesia providers. A larger group would have been more preferrable in increasing the strength of the study. Time limitation was another barrier in the study as the post test was offered two weeks after the online intervention. A longer interval would have been more benefitable to the project. Another limitation was that the participant demographic was mostly established providers. Furthermore, the delivery method was limited since the project was asynchronous and was offered entirely online.

FUTURE IMPLICATIONS TO ADVANCED NURSING PRACTICE

As regional anesthesia continues to gain popularity, many new methods and types of peripheral nerve blocks will continue to be implemented into practice. Therefore, it is important as providers to maintain an open mind and try new techniques. Although many existing methods of regional anesthesia provide adequate patient outcomes, the overall goal continues to be to offer the best possible outcomes to patients. Healthcare advances in all aspects, regional

anesthesia included. In the future, the use of regional anesthesia should become standard practice in all appropriate situations.

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APPENDIX A

IRB Approval Letter

Dr. Valerie Diaz
Alexander Fukes
Elizabeth Juhasz, Ph.D., IRB Coordinator
March 23, 2022
Office of Research Integrity Research Compliance, MARC 414

"An Educational Module Explaining The Use Of Quadratus Lumborum Blockade To Decrease Opioid Usage During Colorectal Surgery: A Quality Improvement Project"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-22-0096 **IRB Exemption Date:** 03/23/22 **TOPAZ Reference #:** 111533

As a requirement of IRB Exemption you are required to:

1. 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2. 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.

3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A
For further information, you may visit the IRB website at http://research.fiu.edu/irb.

EJ

APPENDIX B

Miami Beach Anesthesiology Associates, Inc.

Mount Sinai Medical Center • Division of Anesthesia

S. Howard Wittels MD
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J.P. Mato DNP, CRNA
CRNA Director & SRNA
Coordinator

Paula Schultz DNP, CRNA
OB-Chief CRNA

February 1, 2022

Dr. Valerie Diaz, DNP, CRNA, APRN
Assistant Professor
Department of Nurse Anesthesiology
Florida International University

Dr. Diaz,

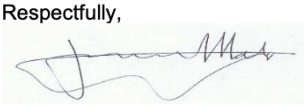
Thank you for inviting Mount Sinai Medical Center to participate in Doctor of Nursing Practice (DNP) project conducted by Alexander Fukes entitled "An Educational Module Explaining The Use Of Quadratus Lumborum Blockade To Decrease Opioid Usage During Colorectal Surgery: A Quality Improvement Project" in the Nicole Wertheim College of Nursing and Health Sciences, Department of Nurse Anesthesiology at Florida International University. I have given the student permission to conduct the project using our providers.

Evidence-based practice's primary aim is to yield the best outcomes for patients by selecting interventions supported by the evidence. This proposed quality improvement project seeks to investigate and synthesize the latest evidence.

We understand that participation in the study is voluntary and carries no overt risk. All Division of Anesthesia providers are free to participate or withdraw from the study at any time. The educational intervention will be conveyed by a 15-minute virtual PowerPoint presentation, with a pretest and posttest questionnaire delivered by a URL link electronically via Qualtrics, an online survey product. Responses to pretest and posttest surveys are not linked to any participant. The collected information is reported as an aggregate, and there is no monetary compensation for participation. All collected material will be kept confidential, stored in a password encrypted digital cloud, and only be accessible to the investigators of this study: Alexander Fukes and Dr. Diaz.

Once the Institutional Review Board's approval is achieved, this scholarly project's execution will occur over two weeks. Alexander Fukes will behave professionally, follow standards of care, and not impede hospital performance. We support the participation of our Division of Anesthesia providers in this project and look forward to working with you.

Respectfully,



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SRNA Coordinator/Supervisor
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APPENDIX C

Proposed Method for Data Collection

Pre-Survey and Post-Survey

INTRODUCTION

The primary aim of this QI project is to improve the knowledge of CRNAs pertaining to the use of the quadratus lumborum peripheral nerve block to decrease opioid usage during colorectal surgery.

Please answer the question below to the best of your ability. The questions include demographic information and knowledge of methadone utilization in adult surgical patients. Questions are either in multiple choice or like style format and are meant to measure the CRNAs knowledge of the use of the quadratus lumborum peripheral nerve block to decrease opioid usage during colorectal surgery.

PERSONAL INFORMATION

1. Gender: Male Female Other_____
2. Age: _____
3. Ethnicity:

   Hispanic Caucasian African American Asian Other_____

4. Position/Title: _____
5. Level of Education: Associates Bachelors Masters Doctoral (DNP, DNAP, EdD, PhD) _____

6. Years of experience: Less than 1 year 1 to 5 6 to 10 more than 10 years

QUESTIONNAIRE

1. True or False: Opioid-related hospitalizations and deaths have increased since 2005:

   a. True

   b. False

2. Pain is defined by its. (Select all that apply)

   a. Duration

   b. Pathophysiological Mechanism

   c. Clinical Context

   d. History

3. Which of the following is true regarding somatic pain?

   a. It is related to peritoneal disturbance

   b. It is related to the smooth muscle surrounding tubular or viscous passages

   c. It is restricted and occurs according to dermatomal design

   d. It is best treated with opioids

4. Opioid prescribing should be based on?

   a. Patient request

   b. Examination of the type and duration of pain

   c. Pharmaceutical company advertisement and reimbursement

   d. Provider preference

5. True or False: Regional Anesthesia is gaining popularity:

a. True

b. False

6. Which of the following are considered Regional Anesthesia? (Select all that apply)

a. Spinal Anesthesia

b. Epidural Anesthesia

c. Intravenous opioid administration

d. Peripheral Nerve Blocks

7. Compared to opioid-based pain control, regional anesthesia offers?

a. Faster healing and less side effects

b. Slower healing and less side effects

c. Faster healing and more side effects

d. Slower healing and more side effects

8. The Quadratus Lumborum Peripheral Nerve Block can be performed on which group of patients?

a. Adult

b. Pediatric

c. Parturient

d. All of the Above

e. None of the Above

9. How likely are you to use the quadratus lumborum peripheral nerve block in place of the transverse abdominus plane?

a. Most likely

b. Somewhat likely

c. Somewhat unlikely

d. Most unlikely

10. How likely are you to utilize regional anesthesia to decrease opioid administration?

a. Most likely

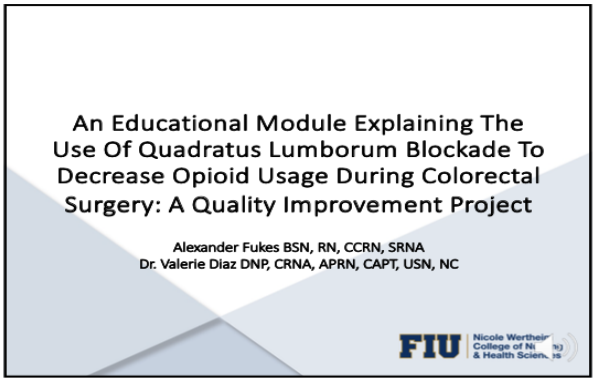
b. Somewhat likely

c. Somewhat unlikely

d. Most unlikely

APPENDIX D

Educational Module



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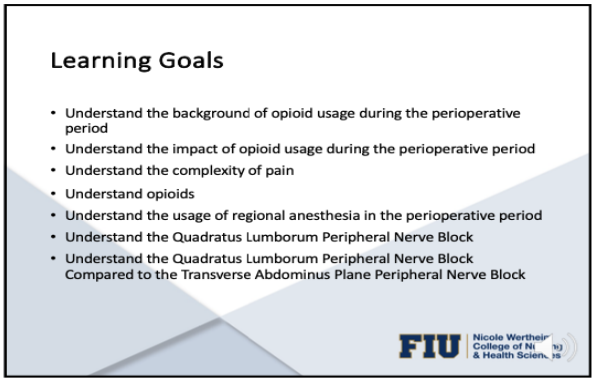

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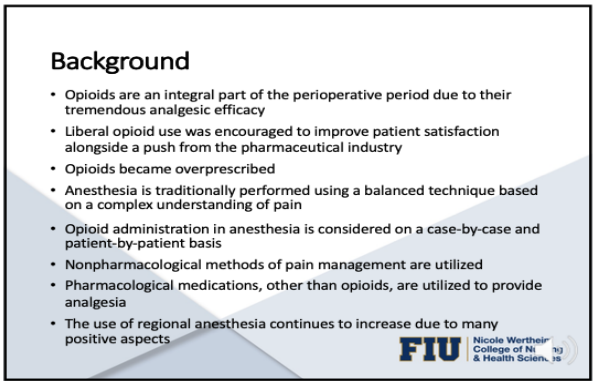

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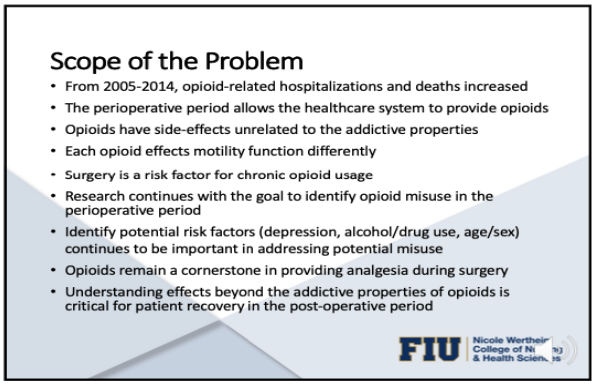

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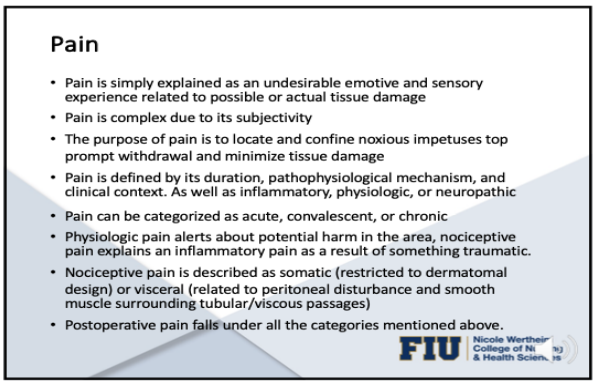

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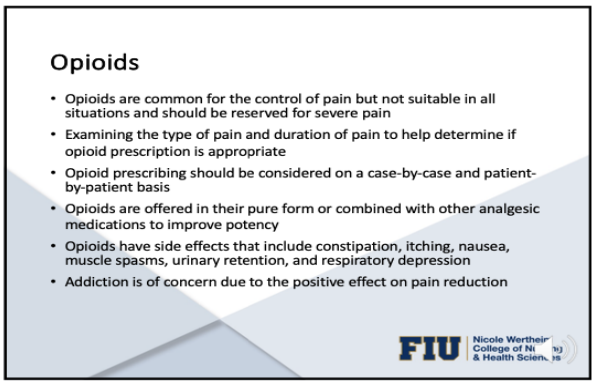

6

Regional Anesthesia

- Used to numb a section of the body to allow physicians to perform surgical procedures
- Includes spinal anesthesia, epidural anesthesia, and peripheral nerve blocks
- Research is beginning to show that regional anesthesia is superior to opioids regarding pain management , decreased perioperative mobility, and patient satisfaction
- Regional Anesthesia has fewer side effects than opioid-based medications
- Reduced intensity of pain associated with regional anesthesia decreases the need for opioids and helps address issues related to side effects and addiction
- Regional Anesthesia promotes a faster healing process and less postoperative pain than opioid-based pain control

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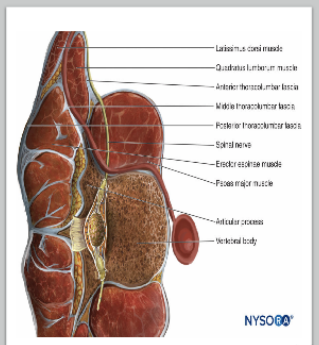
Quadratus Lumborum (QL)

- Can be used for adults, children, and parturient's
- Can be used for obstetric, gynecological, abdominal, and gastric surgeries
- Provides excellent analgesia, including while both moving or at rest
- Analgesic impact is as effective as using opioids without nausea or vomiting
- Reduces incidence of thromboembolic events due to rapid and early pain relief promoting early ambulation
- Research remains focused on finding a consensus on the volume, type, and concentration of local anesthetic required



8

Transverse Abdominus Process(TAP) versus Quadratus Lumborum (QL)

Transverse Abdominus Process

- Currently a mainstay in postoperative pain management for patients undergoing colorectal surgery
- Addresses only somatic pain sensation
- Negative outcomes related to using peripheral nerve blocks during colorectal surgery are due to lack of analgesia to visceral pain

Quadratus Lumborum

- Less popular in current practice due to complexity of block and learning curve associated
- Addresses both somatic and visceral pain sensations
- Colorectal surgery requires more analgesia to visceral pain

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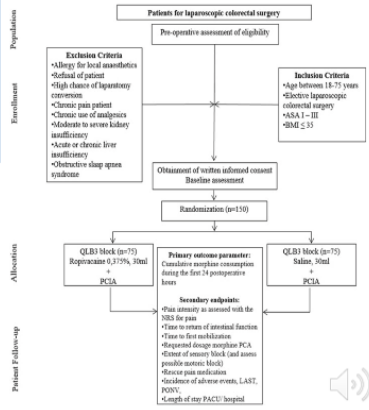
Theoretical Framework



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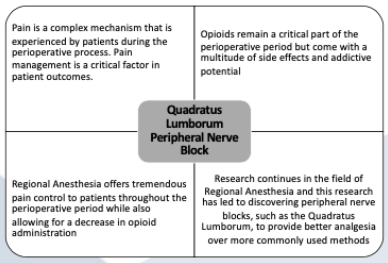
Take Home Points



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APPENDIX E

Citi Training

CITI PROGRAM

Completion Date 15-Jan-2022
Expiration Date 14-Jan-2025
Record ID 46602268

This is to certify that:

Alexander Fukes

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Basic/Refresher Course - Human Subjects Research
(Curriculum Group)
Biomedical Human Research Course
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Florida International University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w07a06ee8-ce57-4767-8146-88c4e5a6a201-46602268

CITI PROGRAM

Completion Date 08-Feb-2020
Expiration Date 07-Feb-2023
Record ID 35312850

This is to certify that:

Valerie Diaz

Has completed the following CITI Program course:

Basic/Refresher Course - Human Subjects Research (Curriculum Group)
Biomedical Human Research Course (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Florida International University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w4e8a4763-3494-44c6-9857-91f65cf90d0b-35312850