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Patient Comfort and Multimodal Analgesia: Effects of Preoperative Ibuprofen

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Patient Comfort and Multimodal Analgesia:
Effects of Preoperative Ibuprofen

by

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A capstone project submitted to the faculty of
Gardner-Webb University School of Nursing
in partial fulfillment of the requirements for the degree of
Doctorate of Nursing Practice

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2013

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Approval Page

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Abstract

Multimodal therapy for surgical patients is explained by use of a combination of a non-steroidal anti-inflammatory and an opioid to control visceral pain by decreasing both inflammation and pain transmission. Perioperative or postoperative use of multimodal therapy has been shown to provide adequate surgical pain relief while decreasing the total dose of opioids required. This project demonstrated that preoperative use of ibuprofen for women undergoing total laparoscopic hysterectomy decreased the total dose of opioids consumed in a 24-hour period, and increased the likelihood of the patient reaching her pain goal target at discharge. This finding adds to the literature support for multimodal therapy by demonstrating the efficacy of preoperative ibuprofen.

Keywords: multimodal, opioid, ibuprofen, surgery

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CHAPTER I

Introduction

Postoperative pain is inadequately treated in more than 80% of surgical procedures with 71% of the patients reporting moderate to severe pain (Apfelbaum, Chen, Metha, & Gan, 2003). Postoperative pain is linked to a significant negative impact on patient recovery including decreased ambulation and increased cardiac complications (Apfelbaum et al., 2003). Understanding the impact of postoperative pain, along with patient concerns, helps the healthcare provider improve postoperative care as it relates to pain control (Apfelbaum et al., 2003). With the development of new technology and advances in medications, it is very important for healthcare providers to stay current and incorporate new ways to manage pain (Young, Horton, & Davidhizar, 2006). The purpose of this project is to evaluate the effectiveness of ibuprofen administered preoperatively to decrease the amount of opioid consumption in the postoperative phase and increase patients' comfort and satisfaction scores.

Many patients undergo surgical procedures every day with pain being the primary concern postoperatively. When nociceptors are stimulated, in addition to immediate perception of pain, the chemical substances prostaglandins and leukotrienes are released from the damaged tissue, causing pain. Peripheral receptors are stimulated by the increase of prostaglandins and leukotrienes making them more sensitive to stimuli (Kelly, Ahmad, & Brull, 2001). A multimodal approach is often used in multiple centers of surgical excellence to reduce postoperative pain. The concept of multimodal analgesia was developed to help reduce opioid related side-effects (Buvanendran & Kroin, 2009).

Pain is an unpleasant sensation resulting from actual or evolving tissue damage. Pain signaling is carried by nerve fibers to the brain, where it is modified by various factors and localized (Pugh, Werner, & Filardo, 2000). Pain may resolve quickly after the stimulus is removed or it can persist during the healing process, sometimes even becoming permanent (Morgan & Mikhail, 2008). Pain is categorized according to its duration, severity, anatomic location, body system, and cause (Morgan & Mikhail, 2008). Surgical procedures produce pain in the category of nociceptive pain often referred to as visceral or deep somatic pain, originating from an organ as opposed to direct damage to the central or peripheral nervous systems, or emotional responses, as in neuropathic and psychogenic pain (Mumm, 2010). The precipitating cause of visceral pain is surgical cutting or removing of tissue from the body (Morgan & Mikhail, 2008). Opioid analgesics are the mainstay of management of surgical pain, but they have been shown to include numerous side-effects including respiratory depression, urinary retention, nausea, and itching (Buvanendran & Kroin, 2009).

The opioid-sparing benefits from non-steroidal anti-inflammatory drugs (NSAIDs) include improved respiratory function, reduction in nausea and vomiting, and reduction in sedation (Moote, 1992). This promotes a faster recovery and shorter hospital stay as well as a shorter period of convalescence. This concept is effective due to the alteration of pain transmission by two different mechanisms of action: decrease in inflammation and inhibition of pain signals at the opioid receptors.

A goal of healthcare is to control surgical pain adequately. The preemptive use of analgesics helps to decrease pain transmission that causes postoperative pain (Mumm, 2010). The use of NSAIDs before total knee arthroplasty has demonstrated a decreased

use of pain medications postoperatively. These patients also had faster and more productive rehabilitation in the first week after surgery. In addition to decreased pain, there is an accompanying anti-inflammatory effect (Mumm, 2010). In general surgery, the use of non-steroidal anti-inflammatory drugs may be used either preoperatively or intraoperatively to provide relief of moderate to high intensity pain. NSAIDs have demonstrated effective use in conjunction with opioids to decrease postoperative pain from procedures like hemorrhoidectomy (Joshi & Neugebauer, 2010). The main goal of both opioids and NSAIDs is to decrease the transmission of pain at rest and in activity (Mumm, 2010).

Problem Statement

To date, no studies have clearly defined the best multimodal approach to women undergoing total laparoscopic hysterectomies (TLH). Therefore, opportunity exists to determine whether the administration of ibuprofen preoperatively to women undergoing TLH would decrease the amount of opioids administered postoperatively in the first 24 hours of surgery. Concurrently, need exists to determine whether the administration of ibuprofen preoperatively helps meet women's pain predictor scores after TLH.

Justification of Project

Pain is now considered the fifth vital sign reviewed by The Joint Commission that reflects institutional performance (Reuben, 2007). In a survey conducted by Apfelbaum et al. (2003), a random sample of 250 adults who had undergone surgery completed a telephone questionnaire about their postoperative pain experience. Patients were surveyed about postoperative pain, medications, and their understanding of the treatment. Of those, 86% of the patients experienced moderate to severe postoperative.

This project evaluated the effectiveness of a multi-modal analgesic regimen, with the intent of assuring all patients within the facility have appropriate pain control management with minimal harmful side-effects from opioid use. With the increased number of ambulatory procedures being done today (Apfelbaum et al., 2003), decreasing the total opioid consumption has the potential to significantly improve outcomes and satisfaction for these patients undergoing TLH with minimal opioid side-effects, such as decrease respirations, nausea, and decreased alertness.

The use of ibuprofen in studies of multimodal analgesia demonstrated improved pain control in the postoperative period (Hariharan, Moseley, Kumar, & Raju, 2009). Most of the randomized controlled studies performed utilized a multiple set of agents for the trials (Buvanendran & Kroin, 2009). The agents used range from multiple drug sets to multiple procedure groups. The data was considered specific to its population of surgical patients. The outcomes from these studies have an organizational impact in terms of patient satisfaction (Reuben, 2007). The fear of pain is significant for most surgical patients prior to treatment (Mumm, 2010). Ibuprofen in multimodal therapy may help to decrease, and in some cases alleviate the intensity of the pain, thereby increasing patient satisfaction with their overall surgical experience. This project evaluated patient outcomes related to pain control for women undergoing TLH.

Purpose

The purpose of this project, Multimodal Analgesia: Effects of Preoperative Ibuprofen, is to facilitate clinical change as it relates to pain control in surgical patients. An understanding of the mechanism of action of opioids and NSAIDs administered in combination will facilitate their effective use in a preemptive role. The same concept

applies to the reduction of postoperative nausea and vomiting (PONV). It is believed that the blockade of receptor sites prior to being stimulated will help to reduce the incidence of PONV. In current practice, the use of NSAIDs with surgical patients is not widely used. There have been multiple approaches used in recent literature, with postoperative interventions being well defined and frequently utilized. This project will evaluate the effectiveness and feasibility of routine use of NSAIDs given preoperatively.

Project Questions

What is the effect of ibuprofen given preoperatively to women undergoing TLH on the amount of opioids administered postoperatively?

What is the effect of ibuprofen given preoperatively to women undergoing TLH on the reported post-operative pain level?

Concepts and Definitions

Multimodal Therapy: the use of multiple agents/drugs for pain relief that affect different areas of the nervous system.

Opioid Analgesic: pain relievers with an opioid base, such as morphine, fentanyl, hydromorphone, codeine, and oxycodone.

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs): analgesic medication, such as such as ibuprofen or ketorolac, which are not based on steroid or opioid compounds.

Preoperative: the immediate preparation time before a surgical procedure.

Postoperative: the immediate time period after emergence from anesthesia and during the period of post anesthesia care.

Summary

Many patients undergo surgical procedures every day with pain being the primary concern postoperatively. With the development of new technology and advances in medications, it is important for healthcare providers to stay abreast of and incorporate new methods to manage pain (Young et al., 2006). One of these new approaches is multi-modal therapy and administration of an NSAID preoperatively. This project evaluated the effectiveness of ibuprofen administered preoperatively on the amount of opioids used in the postoperative phase and on patient comfort.

CHAPTER II

Research Based Evidence

In 2000, the Joint Commission for Accreditation of Healthcare Organizations, now The Joint Commission, introduced pain management as the fifth vital sign (Reuben, 2007). Failure to address pain was identified as one of the major causes of patient dissatisfaction in our healthcare system (Reuben, 2007). The control of pain during and after surgical procedures is a crucial point in the practice of anesthesia.

The use of multimodal therapy in the post anesthesia care unit (PACU) was described by Rocca, Chiarandini, and Pietropaoli (2005). The concept of multimodal therapy is to use a combination of analgesics that act on different sites in the nervous system. The combining of these analgesics cause a synergistic effect lowering the incidence of side-effects from one analgesic alone (Buvanendran & Kroin, 2009). The primary focus is the use of NSAIDs and their role in multimodal therapy. These drugs act by blocking the synthesis of prostaglandins in both the central and peripheral nervous systems (Buvanendran & Kroin, 2009).

A systemic review of the literature was performed, utilizing the following databases: PubMed, Cumulative Index for Nursing and Allied Health Literature (CINAHL), and Wake Forest University Medical School Cory Carpenter Library, health, medical, and nursing databases. The search terms used were non-steroidal anti-inflammatory drugs (Motrin/Ibuprofen), postoperative, and analgesia. The search was narrowed to surgery, then gynecology, then further to preoperative. The use of the term multimodal narrowed the search to greater than 50 articles with surgical procedures as the primary focus. Most articles were scientific evidence based on practice in the medical

community today. The time period discussed was limited to the last 10 years utilizing the best evidence of the multimodal concept. Strength of the evidence was assessed using the principles evidence based practice by Dr. Archie Cochrane (Tymkow, 2011).

A systemic review of random clinical trials and surveys by Rocca et al. (2005) found the major component used in the PACU for postoperative pain control was NSAIDs. Trials demonstrated that NSAIDs were used solo and in combination with opioids. When evaluating this report according to Cochrane's best practice principles, the study was determined to be a level one for the systemic review and the controlled trials used in clinical testing, and provided significant support to the position and use of Non-Steroidal Anti-inflammatory Drugs in our day-to-day practice.

In 2006, Diaz and Flood presented different strategies for effective postoperative pain management. Citing clinical trials, they proposed that adjunct analgesic medications provide a synergistic effect in combination with opioids. This report was significant in that the preoperative use of NSAIDs decreased postoperative pain and opioid requirements. According to Cochrane (Tymkow, 2011), this study demonstrates a level one rating for using clinical trials.

Reuben (2007), investigated the effects of preoperative versus postoperative administration of NSAIDs to patients undergoing arthroscopic knee surgery using the same dosing. This study found that short-term NSAID administration reduces opioid-related side-effects and contribute to improved functional outcomes. This study was replicated using a larger randomized group with similar results. Utilizing Cochrane's rating, the use of a randomized control group gives this report a strong level one rating. The role of NSAIDs in the acute pain management phase relates to its use in other

procedures. In addition, the use of NSAIDs supports the project goals by showing a decreased use of opioids postoperative and increased patient activity.

In 2009, Hayes et al. conducted a survey on the prescribing practice and use of NSAIDs in pediatric scoliosis surgery. This survey based its results on opinions of anesthesiologists in the clinical arena. According to Cochrane (Tymkow, 2011), this type of survey would normally be given a level seven rating but, due to the clinical trials done on medications with valid support on side effects, this study is significant. The concern over delayed bone healing found with the use of NSAIDs prompted this group of clinicians to make practice change more applicable to the population served. As a study which demonstrated the use of NSAIDs in the multimodal concept in the pediatric setting, this gives support to this project setting which involves a very well defined group with specific dosing intervals.

The multimodal approach in post-caesarean pain management utilizing some common opioid-based methods with supporting non-opioid methods was reviewed by McDonnell et al. (2009). This systemic review included evidence supporting non-opioid methods. The trials reviewed in this review are from controlled, but non-randomized, trials making it a level two or three according to Cochrane (Tymkow, 2011). The use of NSAIDs as reported in this systemic review supports the postoperative pain management of the current project with the goal of practice changes. The changes brought about from the findings of McDonnell's review gives increased support to the use of NSAIDs in the surgical patient.

Buvanendran and Kroin (2009) stated the need for new drug combinations to meet the goals of multimodal anesthesia. This level one report emphasized the increase need

for more randomized, double-blind clinical trials to be carried out to achieve the goals of superior analgesia. The report reviewed multiple combinations of medications, in intravenous and local administration, in random groups compared to placebo groups. The significance of this report to the current project was to support the need of pain control and decrease opioid consumption in the increasing number of ambulatory surgeries done today.

A double blind randomized study on the effect of preemptive analgesia on postoperative pain relief in women undergoing abdominal hysterectomy was described by Hariharan et al. (2009). This study utilized four groups that were randomly selected to either receive local anesthetic or not with patient-controlled analgesia. According to Cochrane's criteria, this study meets level one standard due to the utilization of controlled trials and is directly related to the current project as it demonstrates the preemptive use of NSAIDs to decrease opioid use postoperatively.

Ahmad, O'Flynn, Attarbashi, Duffy, and Watson (2010) completed a systemic review of 24 randomized control studies with 15 included in a meta-analysis on pain relief for outpatient hysteroscopy patients. They reviewed a small number of subjects to conclude that the effects of NSAIDs given preoperatively helped to decrease pain from uterine distention and cervical manipulation. According to Cochrane's criteria, the study is level three with the evidence based on controlled trials. The application of Ahmad et al. (2010) findings to practice supports the current project's goal of practice change.

Elvir-Lazo and White (2010) discussed the need for multimodal therapy in the ambulatory care setting. This report was significant in that it pointed out the complexity and potentially painful procedures done in outpatient centers today. The evidence

presented is from peer reviewed literature which supports the use of NSAIDs in the multimodal concept for ambulatory surgery. According to Cochran, Elvir-Lazo and White's report would be considered a review of literature giving it a level one rating. The role of NSAIDs in the ambulatory setting supports the current project in the timing of NSAID use.

Joshi and Neugebauer (2010) presented a randomized study on evidence based pain management therapy for patients undergoing hemorrhoidectomy surgery. Multimodal therapy utilizing NSAIDs in combination with opioids demonstrated a significant decrease in postoperative pain. According to Cochrane, this study meets the criteria for a level one rating due to the random controlled groups used.

Acute pain management and the role of intravenous (IV) NSAIDs in a randomized double blind study were presented by Sinatra and Jahr (2011). In this study the patients were randomly assigned to several groups for the clinical trials. The groups consist of orthopedic and general abdominal surgical procedures that were further divided into trial ketorolac and placebo groups. According to Cochrane, this study would be considered a level one due to the structure of the study groups. Sinatra and Jahr's study parallels the current project with the use of NSAIDs in the multimodal concept. The introduction of IV ibuprofen in the preoperative phase brings forward the preemptive practice in pain control with the decrease use of opioids early in postoperative care.

Gaps in Literature

The studies in the literature review demonstrated that use of multimodal therapy is a best practice to decrease the amount of opioids used postoperatively. Currently, this combination therapy is routinely started in the postoperative phase of care for surgical

patients. One of the major areas of practice not studied is the use of ibuprofen in the preoperative phase. The description of NSAIDs given prior to surgical incision is largely absent from the literature. This project addresses this gap in the literature to identify the benefit of early NSAID administration in a particular patient population.

Strengths and Limitations of Literature

Strengths in the literature include the recognized benefit of multimodal therapy in the postoperative period in numerous settings. Limitations were small numbers and reliance on expert opinion. However, the theoretical benefits of multimodal therapy to reduce postoperative opioid use were supported by literature.

Conceptual Framework

Katherine Kolcaba's nursing theory of comfort care provides a direction and framework to improve institutional outcomes (Kolcaba & Wilson, 2002). Relief, ease, and transcendence are the three forms of comfort described by this model. Most perioperative nursing units use this model of comfort care to meet the needs of their patients (Wilson & Kolcaba, 2004). Nurses carry out this process by addressing the needs of their patients in that setting; helping, consciously or subconsciously, move patients toward a state of well-being; and having institutional integrity by being professional healthcare providers. Many patients see this process in how nurses manage their pain with timely medication administration, positioning, and comfort in the environment. Using Kolcaba's three forms of comfort, nurses can relieve the state of specific discomfort, ease the mind with awareness of disease/diagnosis, and help the patient experience transcendence through inspiration, strength, and motivation (Wilson & Kolcaba, 2004).

The use of comfort care in the planning stages of surgical patients is very important. The preemptive use of NSAIDs to decrease postoperative pain helps to provide a better surgical outcome (Mumm, 2010). Using Kolcaba's theory allows the understanding of pain with surgery and the need for pain control to aid patients in their ability to adapt postoperatively. Physical assessments, pain scales, and patient feedback give us the necessary tools to guide practice. The use of multimodal therapy improves patient outcomes by increasing physical comfort.

Summary

The literature supports the use of multimodal therapy for patients undergoing surgical procedures. Kolcaba's (2010) comfort care theory suggests that nurses influence patient outcomes by anticipating and addressing comfort. The Joint Commission has identified pain control as an important aspect of patient care and comfort. However, the question of whether to use NSAIDs preoperatively to control surgical pain still remains unanswered. This project reviewed patient surgical and postoperative records to determine whether the use of the NSAID ibuprofen affected the postoperative doses of opiate analgesics in women undergoing TLH. This project used Kolcaba's comfort care theory to guide the use of NSAIDs preoperatively to decrease opiate analgesic use and improve pain control postoperatively.-

CHAPTER III

Project Description

This project examined whether the NSAID, ibuprofen, administered preoperatively to women undergoing TLH would decrease the total use of opiates in the first 24 hours of surgery and improve pain control.

Setting

The site for this project is the woman's center of a 900 bed metropolitan hospital in a county with population of approximately 350,000 and population density of 900 people per square mile in a mid-Atlantic state. The center performs approximately 250 gynecological procedures per month, with approximately 170 cesarean deliveries and 500 vaginal deliveries a year. The anesthesia section is specialized in supporting obstetrical and gynecological procedures. The department is actively involved in research with anesthesiologist professors and research nursing staff including certified registered nurse anesthetists (CRNAs) and registered nurses (RNs). The anesthesia section is self-contained with its own library and research resources. All the necessary equipment, computer access, patient records, and supplies needed for this project were available within the department.

Sample

The sample for this project was determined by identifying common procedures performed at the facility with the fewest number of variables other than the surgeon. The most common procedure in the woman's center with the most consistency is the total laparoscopic hysterectomy (TLH). There were 101 records from procedures completed between September 2012 and January 2013 that were reviewed.

Protection of Human Subjects

This project was approved through an institutional review board (IRB) process to ensure protection of participants. All participants in the project were cared for per hospital standards and policies. Participants on operative schedule were not listed by name or medical record number on data collection tool. All standards set by the IRB committee of the healthcare facility and University were upheld and maintained.

Project Design

The intent of this project was to determine the effect of preoperative ibuprofen on total opiate dosage in the 24 hour postoperative period for women undergoing TLH. A second purpose was to examine whether preoperative ibuprofen administration affected the patient's achievement of their target pain goal. The project involved data extraction, exclusively by the project administrator, from the operative and postoperative records of women undergoing TLH from September 21, 2012 to January 8, 2013.

Instruments

A temporary collection tool (Appendix A) was used for reference to identify patients undergoing TLH within the project time period. This tool, to be used only if the project administrator needed to return to a record for further information, was disposed of per the hospital's confidential waste policy upon completion of the project. During the active phase of the project all records with pertinent information were maintained in a secured locked area with other obstetric anesthesia research materials.

The data collection tool (Appendix B) was used to record the following information from the patient's surgical and postoperative record after patient discharge.

Demographics and Ibuprofen Pre-operatively

All patients were females undergoing laparoscopic total hysterectomy. Patient age, length of surgery in minutes, and whether or not the patient received preoperative ibuprofen were documented.

Pain Scores

Pain scores reported by the patient using the 0 to 10 numerical rating score were documented from the post-anesthesia recovery unit (PACU) and from the nursing unit at eight, sixteen, and twenty-four hours post-surgery. The patient's self-identified pain goal was documented. The project administrator also determined whether the patient's pain score met hospital discharge criteria (less than or equal to five) at discharge.

Opioid Dose

The patient's total opioid intake, intraoperative and postoperative, during the first 24 hours was documented.

NSAID Postoperative

The medication administration record was reviewed for whether the patient received postoperative NSAIDs.

Data Analysis

Data were entered on an excel spreadsheet then input into Statistical Package of the Social Sciences (SPSS), version 19 (IBM) for analysis. Statistical analysis was completed by a Master of Science, research nurse. Descriptive analysis and t-test comparison of means were used to answer the project questions.

Timeline

Approval of the project proposal at both the academic and practice setting was completed by August 2012. Procedures completed after this approval, from September 21, 2012 through January 8, 2013, were included for data collection. Data was extracted in January and February 2013. Statistics were completed in February 2013.

Budget

The project did not involve patient cost nor require grant funding since the multimodal methodology was already being practiced by current physician staff. The expenses incurred by the project administrator were office supplies and statistical analysis.

Limitations

The primary limitation of this project was the number of eligible charts for review based on surgical schedule during that time period. The original dates for the project were extended to meet project goal for number of procedures captured.

Summary

Multimodal therapy, combining an NSAID with an opiate, has been used to improve management of surgically-induced visceral pain. Many studies in the literature focused on adding the NSAID postoperatively. The project administrator extracted data from patient records of women undergoing TLH at one hospital where preoperative ibuprofen is often administered. This project proposed to address the question of whether use of an NSAID, in this case ibuprofen, preoperatively, would affect total opiate dose or patient perception of pain relief in the first 24 hours post-surgery.

CHAPTER IV

Results

Multimodal therapy is used intra-operatively or post-operatively to decrease pain. Ibuprofen is given to many women undergoing total laparoscopic hysterectomy (TLH) at a hospital in a mid-Atlantic state, while some do not receive ibuprofen pre-operatively. This project involved chart reviews to determine whether pre-operative ibuprofen affected the dose of opioids used in the first 24 hours post-operatively and whether women achieved their pain target goal with multimodal therapy.

Sample Characteristics

The medical and surgical records for each women undergoing TLH between September 21, 2012 and January 8, 2013 were reviewed. There were 101 TLH surgeries in this time period. The mean age of the women was 43.1 years. There were 16 charts withdrawn from the project for incomplete or missing data, procedural change, or issues related to confidential status in the hospital medical records system. There were 85 charts with complete data. The mean age for these women was 43.6 years. Six women did not receive ibuprofen preoperatively; the remaining 79 women did receive ibuprofen preoperatively.

Major Findings

Total Dose of Opioids

Intravenous opioids included fentanyl, morphine, and hydromorphone. Oral opioids included oxycodone, formulated with acetaminophen as Percocet, and hydrocodone, formulated with acetaminophen as Norco. All IV and oral opioids were converted into an equianalgesic dose where 10 mg IV morphine, 100 ug IV fentanyl, 2

mg IV hydromorphone, 20 mg oral oxycodone, or 30 mg oral hydrocodone were assigned an analgesic equivalency of *one* (1). The mean 24-hour IV plus oral opioid doses for patients who received preoperative ibuprofen was 5.65 (SD = 1.84) and for patients who did not receive preoperative ibuprofen was 7.84 (SD = 3.22). This difference (Figure 1) was statistically significant, $t = 2.65$ (83), $p = .010$.

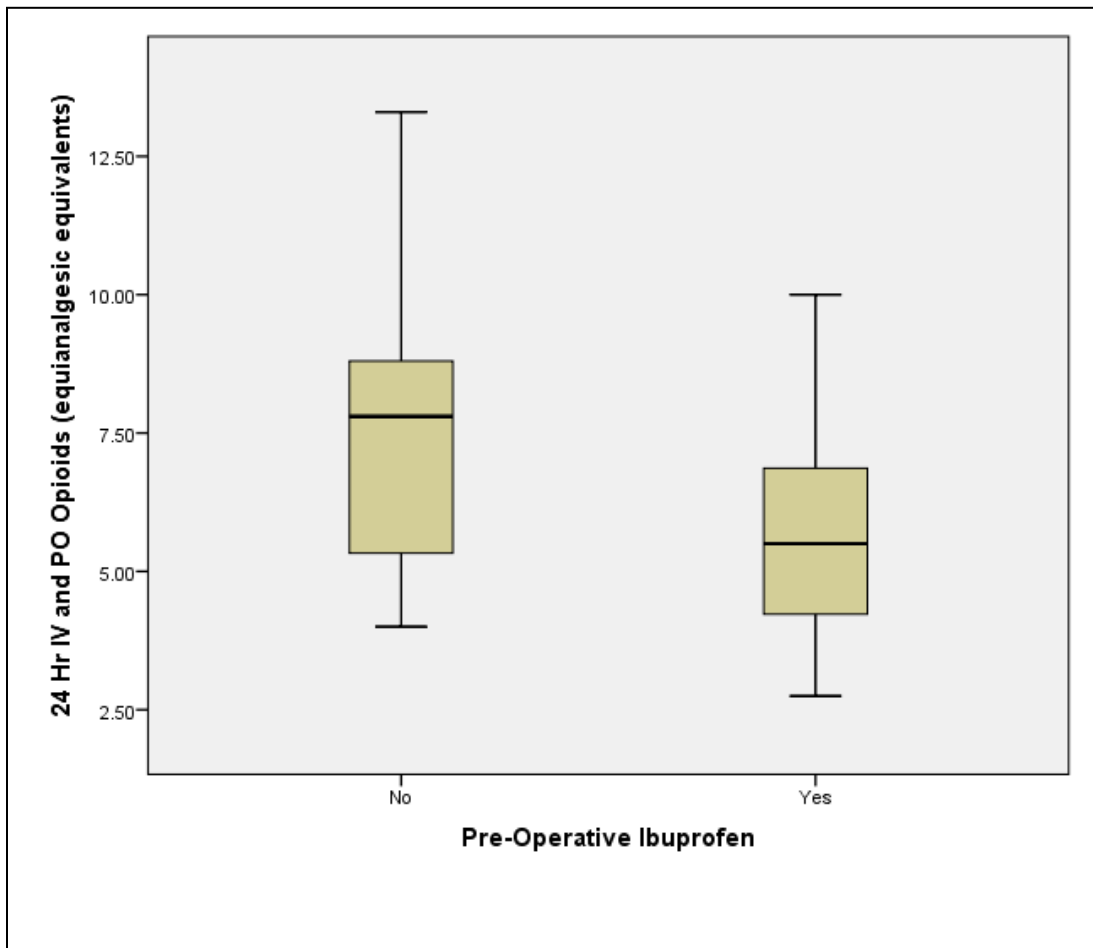


Figure 1. Total 24-hour Opioid Dose Related to Preoperative Ibuprofen

Effect of Preoperative Ibuprofen on Pain Scores

There was a statistically significant difference in PACU pain scores for those that received ibuprofen pre-operatively and those that did not receive ibuprofen pre-operatively $t= 2.41, p = 0.18$ (Figure 2).

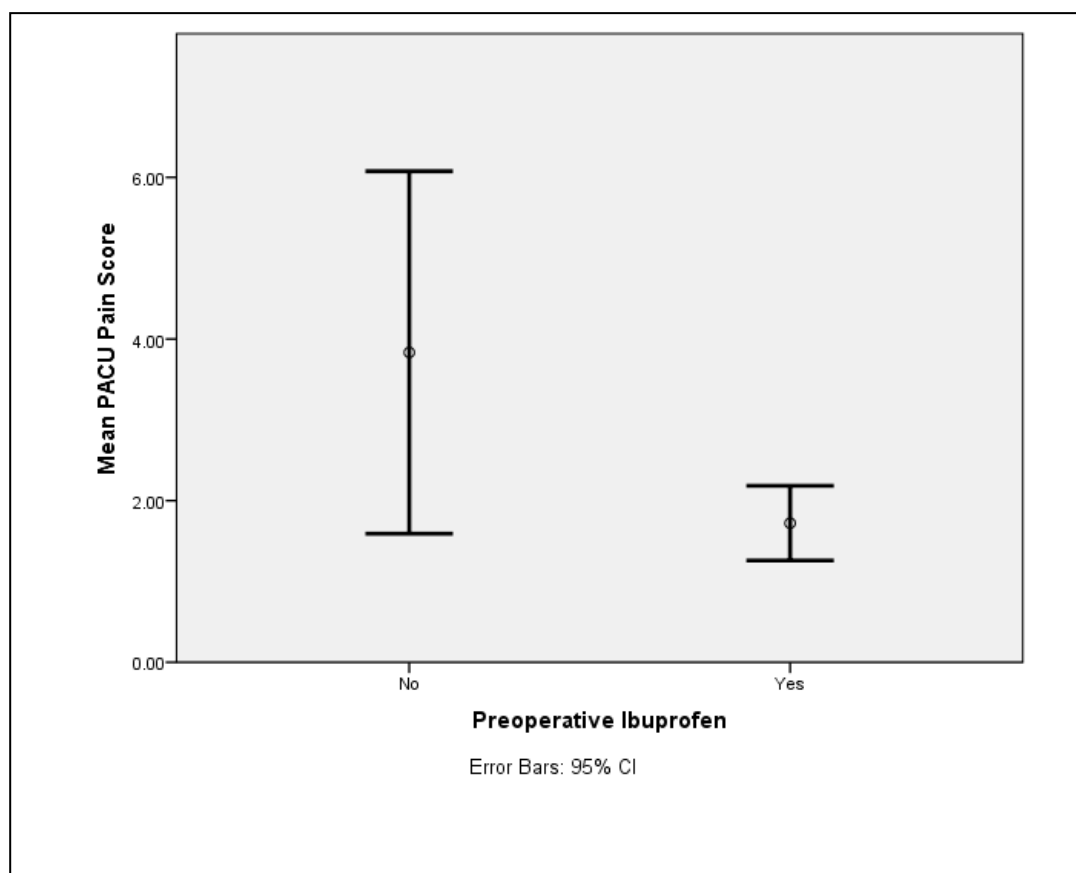


Figure 2. Preoperative Ibuprofen and Mean PACU Pain Score

Analysis of pain scores at eight hours and at sixteen hours postoperatively revealed no statistical significant difference between those receiving preoperative ibuprofen and those that did not. The difference in eight-hour postoperative pain scores of patients receiving preoperative ibuprofen ($M = 4.66$, $SD = 1.29$) and those not receiving preoperative ibuprofen ($M = 5.17$, $SD = 1.47$), were not statistically significant, $t(72) = .911$, $p = .366$. The difference in sixteen-hour postoperative pain scores of patients receiving preoperative ibuprofen ($M = 3.18$, $SD = 1.11$) and those not receiving preoperative ibuprofen ($M = 3.83$, $SD = 2.71$) were also not statistically significant, $t(71) = .586$, $p = .583$.

Summary

The purpose of this project was to evaluate the effectiveness of ibuprofen administered preoperatively to decrease the amount of opioid consumption in the postoperative phase and increase patient's comfort. The data collected consisted of patient identification number, age, length of procedure time, and preoperative pain score goal. The administration of ibuprofen in the preoperative phase was documented along with perioperative opioid total intake and postoperative opioid and NSAID administration. Patient reported pain scores were recorded post procedure and at eight hour intervals for 24 hours.

CHAPTER V

Discussion

It is well understood that ibuprofen given in conjunction with opioids lowers the consumption of opioids and aids in a patient's comfort level. Patient medical records of 101 women who underwent TLH were reviewed post-discharge. The data extracted were used to review the effects of ibuprofen given in the preoperative phase and its impact on the opioid consumption postoperative within the first 24 hours of the procedure. This project also examined whether preoperative ibuprofen affected achievement of the patient's discharge pain score goal.

Implication of Findings

Medical records for 16 patients were not included in the data analysis owing to incomplete data, patient confidentiality status for protective reasons, or the intended laparoscopic procedure being changed to an abdominal procedure. The remaining 85 charts were analyzed.

Total Dose of Opioids

The findings in this project were in agreement with the literature on postoperative use of opioids being diminished with multimodal therapy. In this project, when ibuprofen was administered preoperatively there was a significant reduction in the total dose of opioids consumed as compared to those patients for whom ibuprofen was not administered preoperatively. This finding adds to the literature as previous reports were related to administration of ibuprofen either perioperatively or postoperatively.

Relationship to Pain Goal

There was a weak relationship between administration of preoperative ibuprofen and achievement of the patient's pain goal. This relationship may have been more robust had there been more subjects who had not received preoperative ibuprofen.

Other Findings

There was a statistically significant relationship between ibuprofen being administered preoperatively and postoperatively on the unit. This may be suggestive of a surgeon's preference; if the surgeon is inclined to order preoperative ibuprofen, he or she may be more inclined to order postoperative ibuprofen. The surgeon's names were not extracted from the medical record, so this remains conjecture.

Neither the total 24-hour opioid dose nor post-operative ibuprofen was related with the patient meeting her pain goal at discharge. Achievement of pain goal was not related to patient age, length of surgery, or total opioid dose. The closest relationship to achieving pain target was the administration of preoperative ibuprofen which aligns with literature on multimodal therapy.

Application to Theoretical/Conceptual Framework

Katherine Kolcaba describes three forms of comfort care for nursing: relief, ease and transcendence. When this framework is applied to the administration of ibuprofen in the multimodal concept, the nurse carries out the need of the patient by providing consistent pain relief. This also helps to move the patient towards a state of well-being and supports hospital or institutional integrity. The use of comfort care in the planning stages of surgical patients is very important to alleviate their concerns about pain and ease them through a challenging time.

Limitations

Missing or inadequately documented data was one of the biggest limitations to this project. The medical record staff was very helpful with locating charts and preparing them in a timely fashion. However, some documentation was not retrievable due to challenges in the medical records department including misplaced records or those placed in restriction for limited viewing. Absence of complete documentation on paper charts was an unexpected limitation, especially with current use of computerized records. Physician and nursing staff were very supportive of this project, by not changing work habits so that a true evaluation was possible

Implications for Nursing

Pain management is an expectation of patients, their loved ones, and accreditation bodies. The significance of this project for nursing is that administration of preoperative ibuprofen may decrease a patient's pain, decrease the total dose of opioids and thus the side effects of opioids, and allow patients to regain their baseline activity level. Getting patients up and mobile sooner helps to decrease postoperative complications and returns them to a more normal state of being. This process also helps with patient's satisfaction with the overall surgical process.

Recommendation

This project demonstrated the benefit of multimodal therapy and the use of ibuprofen used as an adjunct agent. In situations where ibuprofen is not contraindicated, its use could be beneficial for pain control without unwanted side effects from opioids. The cost to both the patient and the institution is low and the benefit is high.

The next step in the process of multimodal therapy is the increased use of the IV formulation of ibuprofen in the preoperative phase to determine whether IV dosing has an even better impact on patient pain management, as this route eliminates the second pass effect of orally digested medications. Currently, data does not exist to support its use relative to its greater expense.

Conclusion

Multimodal therapy, consisting of non-steroidal anti-inflammatory agents plus opioids, helps control pain by two mechanisms of action: decreased inflammation and decreased transmission of pain. Strong support for this therapy in the literature has shown that perioperative or postoperative use of multimodal therapy helps provide adequate surgical pain relief while decreasing the total dose of opioids required.

Opioids have significant side effects including respiratory depression, constipation, and sedation, all of which can decrease a patient's return to baseline activities of daily living. One benefit of decreasing the total dose of opioids with multimodal therapy is that patients will experience fewer opioid-related side effects while maximizing pain relief.

This project demonstrated that preoperative use of ibuprofen for women undergoing total laparoscopic hysterectomy decreased the total dose of opioids consumed in a 24-hour period and tended to increase the likelihood of the patient reaching her pain goal target at discharge. This finding adds to the literature support for multimodal therapy by demonstrating the efficacy of preoperative ibuprofen. Nurses can demonstrate Kolcaba's comfort care theory in action when they advocate for multimodal therapy for their surgical patients. Certified Registered Nurse Anesthetists should consider

multimodal therapy when consulting with the patient and anesthesiologist on the best plan for pain relief for their surgical patient.

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Appendix A
Temporary Data Collection Tool

Temporary Data Collection Tool

Medical Record Number	ID Number	Procedure	Date
	1		
	2		
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		

Appendix B
Project Data Collection Tool

ID#	Age	Pre-op Dose /Order Ibuprofen	Length of procedure Minutes	Total Opioids perioperative	Pain Score PACU 1-10	Patient's Pain goal(preop) 1-10	Dose Opioid Floor 8/16/24hrs	Pain Score at 8/16/24hrs	Dose Ibuprofen Q6Hrs/	Pain Score Prior Post	24hrs total opioid /Ibuprofen	Pain score at 24 hours/ At Discharge
1		Y/N										
2		Y/N										
3		Y/N										
4		Y/N										
5		Y/N										
6		Y/N										
7		Y/N										
8		Y/N										
9		Y/N										
10		Y/N										
11		Y/N										
12		Y/N										
13		Y/N										
14		Y/N										
15		Y/N										
16		Y/N										
17		Y/N										
18		Y/N										
19		Y/N										
20		Y/N										