CHAPTER I
INTRODUCTION

1.1. Background

Pain is a common and expected complaint among postoperative patients. Its prevalence varies among regions, with figures from 45.5% in Denmark to above 90% in Uganda. (Mwashambwa et al, 2018) The American Pain Society (2016) states that more than 80% of patients who undergo surgical procedures experience acute postoperative pain. Among various surgical sites, a study shows that abdominal surgeries are one of the most painful (Murray & Retief, 2015).

Even though pain is common, it should not be disregarded. Inappropriate treatment of pain has been known to lead to increased infection rate, prolonged mechanical ventilation, prolonged opioid use, hemodynamic derangements, delirium, and compromised immunity (Gan, 2017; Skrobik, 2010; Puntillo, 2009). In the long term, it leads to conditions such as persistent post-surgical pain, depression, post traumatic stress disorder, increased morbidity, and ventilation-associated pneumonia (Gan, 2017; Kalanuria, 2014).

To reduce pain, multiple techniques of administration exist, from systemic to regional, from intramuscular to intravenous (Ramsay, 2000). For the longest time, regional techniques, namely epidural analgesia, have been considered the gold standard (Rawal, 2012). However, its safety is being questioned as serious complications, such as spinal hematoma, can arise during its catheter insertion (Ramsay, 2000). In recent years, intravenous patient-controlled analgesia (PCA) is seen as a more effective alternative due to the autonomy given to the patient. Though it can be expensive, PCA is said to result in higher patient satisfaction and earlier hospital discharge (Keïta et al, 2003).

However, studies show conflicting results between these 2 methods. Therefore, this study aims to summarise and measure the efficacy of patient-controlled epidural analgesia (PCEA) compared to intravenous patient-controlled analgesia (IV PCA) in patients undergoing abdominal surgery. In

addition, this study will discuss their safety and impact on length of hospital stay (LOS).

1.2. Question/PICO Formulation

In patients undergoing abdominal surgery, does intravenous patient-controlled analgesia, compared to patient-controlled epidural analgesia, decrease acute postoperative pain?

1.3. Description of the Condition

Epidural analgesia is a well-known technique used for recovery after abdominal surgery. (Rawal, 2012) Level I evidence shows that it can reduce pulmonary, thromboembolic, and cardiovascular complications. Moreover, surgical stress response and requirements for other analgesics are also reduced. (Nimmo & Harrington, 2014) However, despite its low incidence rate of serious complications, these complications are often very dangerous nevertheless. They include epidural hematoma (leading to neurological paralysis), epidural abscess, and postdural puncture headache. (Lourens, 2016)

It has a technical failure of 18.7% in the first 72 hours after administration, which mainly includes, Dolin et al (2002) list, premature catheter dislodgement, unsuccessful placement, unilateral block, and missed segments. This is worrisome, taking into consideration the fact that this is the period of time when an average of 80.3% of patients undergoing elective surgery experience severe pain at some time. (Svensson, Sjöström & Haljamäe, 2000)

1.4. Description of the Intervention

IV PCA was first performed in 1968 by Seczer, as having plentiful nurses try to meet the pain-relieving needs of many patients would be impractical. It was first marketed as the “Cardiff Palliator” (Grass, 2003). IV PCA is an infusion pump that can be electronically controlled with the push of a button. Therefore, patients can administer analgesia themselves when they feel pain. Morphine and fentanyl are several common opioids delivered through IV PCA. (Moran et al, 2013) Postoperative patients with acute pain

are one of the indications for IV PCA. Those who have difficulty with oral analgesia can also opt for IV PCA (RCH, 2019).

1.5. How the Intervention Might Work

Pain is a subjective and personal experience to every patient. (Fillingnim, 2018) With IV PCA, individual variability is highlighted. (Lehmann, 2005) There are 3 main elements to an IV PCA: the bolus dose, the lockout interval, and the background infusion. A negative feedback loop is also installed to prevent respiratory depression. The first element is the bolus dose. Also known as the demand dose, it is how much drug is released with the press of a button. (Pastino & Lakra, 2019) The standard bolus dose for opioid-naive patients is 1 mg morphine or 10-20 μg fentanyl. The second element is the lockout interval, measured in minutes and ranged between 5-10 minutes. The lockout interval prevents drugs from flowing into the catheter even though the button is pressed. The final element, the background infusion, remains controversial. Using a continuous infusion has no proof of improving pain outcomes and is even associated with side effects (Atchabahian & Gupta, 2013). It is done to maintain the minimum effective concentration (MEC) of a drug. However, it would be appropriate to administer a background infusion to opioid-tolerant patients.

Studies show that compared to epidural analgesia, IV PCA has a lower rate of failure in practice and yields higher patient satisfaction. (Mann et al, 2000) However, more trials need to be studied to determine the reduction in pain scores in these two methods and their clinical importance. (Salicath, Yeoh & Bennett, 2018)

1.6. Importance of This Review

Though many studies have shown the efficacy of PCEA and IV PCA respectively, none have comprehensively compared them for pain relief in patients of abdominal surgery. Moreover, little have focused on its effect on acute postoperative pain. Knowing the best analgesic method is beneficial theoretically to understand the risks and benefits of each analgesic administration, and clinically to increase the level of care and quality of life in patients.

1.7. Objectives

1.7.1. General Objective

To evaluate the efficacy and safety of PCEA versus IV PCA for postoperative pain relief

1.7.2. Specific Objectives

- To compare the decrease in pain intensity between PCEA and IV PCA
- To compare the incidence of adverse effects between PCEA and IV PCA