
Descriptive Analysis of Epidural Analgesia in Postoperative Acute Pain Service

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ABSTRACT

Background: Epidural analgesia (EA) is an effective and safe approach in postoperative pain management performed widely with rare complications and high treatment outcome satisfaction. This literature presents epidural analgesia in postoperative acute pain service (APS), hence provides an epidemiological database and describes current trends in anesthetic practice predominantly in our hospital.

Methods: We performed retrospective analyses of all postoperative subjects with EA at Sanglah Public General Hospital Bali between April 2017 to 2018. The parameters being evaluated were baseline characteristic, diagnosis, type of surgery, anesthetic technique, drugs used in EA, multimodal analgesia used accompanying EA, duration of EA, as well as diagnosis categories, which divided into gastrointestinal, genitourinary, lower extremity, obstetrics-gynecology, spine, and thoracic.

Results: A total of 460 subjects were given postoperative EA, with slight female predominance (50.9%), mean age 51.6 years old. The majority of EA was done in lower extremity procedures (51.9%), with femur fracture was the most common diagnosis (n=105). The combination of local anesthetic and morphine was the most common drugs used in EA (92.8%). For 86% of subjects received multimodal analgesia instead of using EA only. Paracetamol and EA were accounted for 312 subjects, while others used NSAIDs or opioids. The mean duration of postoperative EA was three days, with a significant correlation between diagnosis and duration of EA $p=0.036$. LA and morphine were the combination of choice for gastrointestinal, spine, and thoracotomy procedures $p=0.005$ ($p < 0.05$).

Conclusion: This one-year statistical analysis reveals that EA is applicable in many different procedures while demonstrating the use of multimodal analgesia in our hospital's APS.

KEYWORDS: Analgesia, postoperative, pain management, regional anesthesia, epidural analgesia, multimodal analgesia.

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INTRODUCTION

The use of epidural analgesia (EA) in postoperative acute pain service (APS) has increased among medical professionals for proper pain management.¹ EA is a versatile approach, which is widely performed, to relieve postoperative pain after major surgery such as orthopedic surgery, abdominal non-obstetric surgery, urogenital surgery, and thoracic surgery. Many kinds of literature published the many benefits of using EA as postoperative pain therapy. EA is believed to give early mobilization and rapid reduction of visual analog scale (VAS) scores. After surgical insult, the stress response will result in neurohumoral and inflammatory

responses promoting tissue injury, while EA blocks the release of those stress responses directly from the dorsal horn of the medulla spinalis.^{2,3}

EA reduces postoperative adverse effects such as thrombotic complication, intestinal obstruction due to adhesion, respiratory problems such as postoperative hypoxemia, atelectasis, pneumonia, and cardiovascular morbidity after vascular reconstruction surgery.^{3,4} Combination of local anesthetic and opioid is the ideal mix commonly used with a high level of satisfaction after treatment.⁵⁻⁷ In a recent study, 92% hospital in Indonesia has used EA as postoperative pain management.⁸

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Despite the growing enthusiasm for EA in Indonesia, less attention is given to providing a representative epidemiological database for this technique.⁷ Therefore, this research was conducted to provide a trend analysis of EA as postoperative pain management in our hospital.

METHODS

We performed a retrospective study of all subjects in postoperative acute pain service using epidural analgesia. The parameters being evaluated were baseline characteristic, diagnosis, type of surgery, anesthetic technique, drugs used in EA, multimodal analgesia used accompanying EA, duration of EA, as well as diagnosis categories, which divided into gastrointestinal, genitourinary, lower extremity, obstetrics-gynecology, spine, and thoracic. Subsequently, all data into the SPSS table and descriptive analysis and Pearson Chi-Square cross tabs study were performed using SPSS 24.0 software.

Primary outcomes measured were frequency of EA used in postoperative pain management, distribution analysis in subjects with postoperative EA, forefront the type of

surgery, diagnosis categories mostly used postoperative EA, the duration is given, EA drugs combination, multimodal analgesia with postoperative EA, mean age of subjects with postoperative EA, duration of postoperative EA, and association analysis between variables.

RESULTS

Four hundred sixty subjects were using epidural analgesia in postoperative acute pain service with a ratio of one every 8.4 surgeries (11.8%) with mean age 51.63 years old and slight female predominant (50.9%). Among all subjects with EA, lower extremity surgery contributes the most (51.9%), followed by gastrointestinal surgery, obstetrics and gynecology (obgyn), genitourinary, spine, and thoracotomy (Table 1). The top listed diagnosis using postoperative EA was femoral fracture accounts for 22.8% among all other diagnoses in 460 subjects and the other four most common diagnoses were osteoarthritis of knee/hip (6.9%), colon malignancy (6.7%), urinary tract stone (5.4%), and ovarian cyst (4.1%), respectively

Table 1. Frequency of postoperative AE in every diagnosis category

Diagnosis Categories	N	%
Gastrointestinal	83	18%
Genitourinary	46	10%
Lower extremity	239	51.9%
OBGYN	58	12.6%
Spine	29	6.3%
Thoracostomy	5	1.1%
Total	460	100%

In gastrointestinal surgery, EA was mostly used for colon resection procedures (3.7%), followed by cholecystectomy (3.5%) and laparotomy exploration (2%). Decompression, stabilization, and fusion surgery was dominant in the spinal surgery category (5.2%), open reduction internal fixation (ORIF) (19.1%), bipolar hemiarthroplasty (11.3%), total hip arthroplasty (THR) (6.5%), and total knee arthroplasty (TKR) (5.25%) were the most common surgery done in the lower extremity. While unilateral salpingectomy and oophorectomy (USO) procedures were superior to the other OBGYN surgery (3.5%), radical hysterectomy (3%) was the next in order, and the third was total abdominal hysterectomy (TAH) with bilateral salphingo-oophorectomy (0.7%). Percutaneous nephrolithotomy (PNL) was leading out of all genitourinary

surgery (1.7%), followed by ureterolithotomy (1.3%), bivalve nephrolithotomy (n=5; 1.1%), and penectomy (n=4; 0.9%). There was a vascular repair surgery using EA for postoperative acute pain management.

The drug used in EA usually were local anesthetic (LA) and opioid, while the popularity of both drugs was increased. The frequency of using LA alone was 2.8%, LA with morphine 92.8% (n=427), morphine alone (1.1%), LA with fentanyl 3.3%, as seen in Figure 1. The most favorable LA used in the postoperative EA regimen was bupivacaine, which accounts for 90.8% (n=418), while ropivacaine was used for only 42 subjects and seven subjects prescribed lidocaine 2%. Figure 2 displays the details of every LA dosage used in our subjects.

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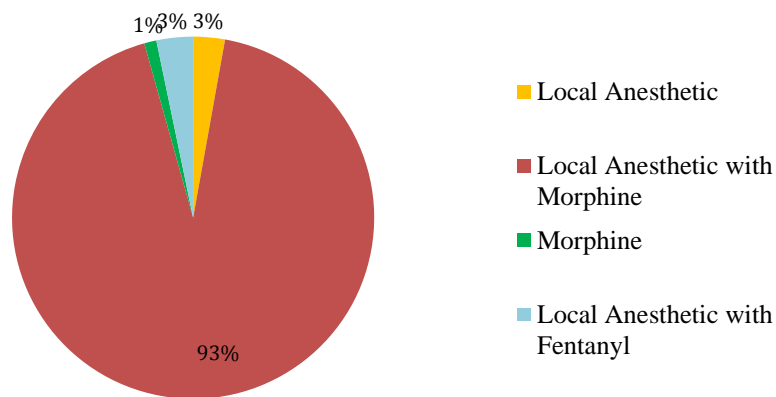


Figure 1. Drugs used in EA

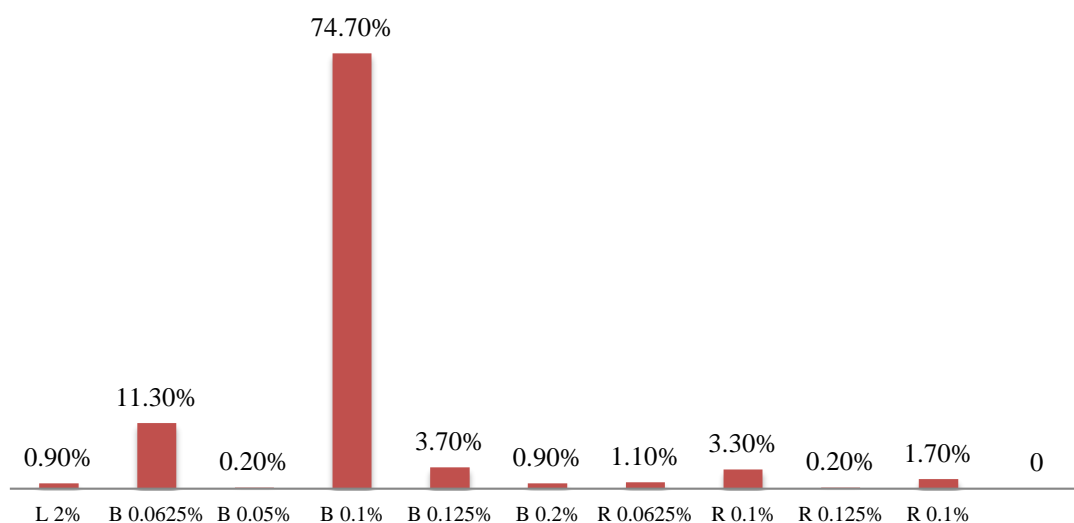


Figure 2. Bar chart of local anesthetic used in EA. B (Bupivacaine); R (Ropivacaine); L (Lidocaine)

The mean duration of postoperative EA in all subjects was three days, and statistics showed a significant association between diagnosis categories and postoperative EA duration ($p=0.036$). EA used after spinal surgery and thoracotomy were rarely given less than three days. A combination of EA using LA and morphine is always used in

gastrointestinal, spine, and thoracotomy procedures, with a strong association between surgical technique and EA drug combination ($p=0.005$). The most common drugs used besides EA were paracetamol, NSAIDs, and opioids (Table 2).

Table 2. Multimodal analgesia with EA in postoperative patients

Drugs	Subjects (N)
EA (Bupivacaine and morfin) + oral paracetamol	302
EA (Bupivacaine and morfin) + oral paracetamol + IV ketorolac	19
EA (Ropivacaine and fentanil) + oral paracetamol	10
EA (Bupivacaine and morfin) + IV ketorolac	7
EA (Ropivacaine and morfin) + oral paracetamol	7
EA (Morfin) + oral paracetamol	6
EA (Bupivacaine) + IV fentanil + oral paracetamol	4
EA (Bupivacaine and morfin) + IV fentanil + oral parasetamol	4
EA (Lidocaine 2%) + oral paracetamol	3

DISCUSSION

In our center, the principle of pain management in acute pain

service was using multimodal analgesia. The combination of LA and opioid are the most commonly used for postoperative

EA. Almost all anesthetists (97%) in developing countries use this technique.⁵ Using LA solely for EA can produce regression of sensory block, which can be managed with a combination of opioids in performing EA. The LA and opioid mixture significantly improve the quality of dynamic pain relief and reduce the opioid requirement.

Other adjuvants might be used to enhance the efficacy of epidural analgesia. The drug of choice of LA used in our center was bupivacaine, and the second most common was ropivacaine. Both drugs showed a safety margin, and in the case of ropivacaine, it has the advantage of less motor blockade. An additional opioid in bupivacaine significantly reduces bupivacaine's dosage every hour when using bupivacaine alone, which is applied often in our institution.

Multimodal analgesia refers to the administration of analgesic drugs with a different mechanism of action.⁹ The use of paracetamol and NSAID is usually applied for low-intensity pain. In contrast, for moderate and high-intensity pain produced by several procedures such as traumatic orthopedic procedures, decompression stabilization fusion, hip/knee replacement, hysterectomy, some major abdominal surgery, and several minor abdominal surgeries such as cholecystectomy and hemorrhoidectomy, thoracotomy, and extensive vascular surgery (aortic surgery) additional IV opioid along with paracetamol and NSAID were needed.⁹⁻¹¹ The majority of procedures in our institution fell into moderate-severe intensity pain categories (e.g., in the lower extremity, spine surgery, gynecological surgeries, cholecystectomy, thoracotomy, vascular repair, etc.); hence multimodal analgesia was applied. This study revealed that paracetamol and NSAID and IV fentanyl were the common drugs used as our multimodal analgesia approaches.

CONCLUSION

The mean duration of postoperative EA given was three days, except for spinal surgery and thoracotomy, which needed longer. LA and morphine were the most common drugs used in EA. Multimodal analgesia was conducted in our hospital by adding paracetamol, opioids, NSAIDs, or their combination, to EA.

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