

ORIGINAL RESEARCH

A PROSPECTIVE STUDY OF EPIDURAL ANALGESIA WITH BUPIVACAINE AND MORPHINE IN POSTOPERATIVE PATIENTS

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ABSTRACT

Background: Epidural analgesia has been shown to be superior to intravenous analgesia for postoperative analgesia after thoracic, abdominal and lower extremity surgery. However it is unclear which opioid is optimal for epidural analgesia. Morphine has potential advantages, yet there was little to establish its efficacy and safety. Thus we prospectively monitored our patients receiving epidural analgesia with Bupivacaine combined with Morphine postoperatively.

Patients and Methods: A prospective study was conducted in 100 adult patients of either sex of age between 20 and 65 years belonging to ASA grade I and II. The study was conducted for relief of pain, amount of sedation and incidence of side effects like nausea, vomiting, pruritus and retention of urine in post operative patients receiving epidural analgesia when 0.125% Bupivacaine is combined with morphine. Lumbar epidural analgesia was initiated after central neuroaxial anaesthesia, with 0.125% Bupivacaine combined with 0.25mg/ml of morphine.

Results: The addition of Morphine to 0.125% Bupivacaine given epidurally resulted in good analgesia in the post operative period. It also yielded sedation, especially after the second dose with minimal minor side effects.

Conclusion: The addition of Morphine to Bupivacaine increases the duration of post-operative analgesia and it is more marked with the second top-up dose of Morphine and Bupivacaine.

Keywords: Epidural Analgesia, Bupivacaine, Morphine, Postoperative

INTRODUCTION

Patients suffering from pain are a common sight in the post-operative ward. More than 60% of all post-operative patients suffer from pain. Methods of relieving pain are many; but most of them are either unsatisfactory or invite complications. So we chose a technique- the neuroaxial line-which is easily approachable by the anaesthesiologists. We delivered two long acting drugs-Bupivacaine and Morphine-in lower concentrations. Our aim is to seek a technique which is effective, reliable, safe and has a prolonged duration of action.

After approval of the ethical committee, 100 patients aged between 20 and 65 years of either sex belonging to ASA grade I and II were selected for study. A written, informed consent was obtained from them.

PATIENTS AND METHODS

Patients posted for general surgery - Herniorrhaphy (which includes epigastric, umbilical and inguinal), appendicectomy, Trendlenburg operation, Gynaecological surgery (total abdominal hysterectomy, Ward- Mayo operation), urology (TURP, PCNL, Bladder repair) and

orthopaedic surgeries of the lower limb were studied. So the surgeries were abdominal, pelvic and lower limb surgeries.

Patients with contraindication to epidural analgesia, allergy to local anaesthetic agents, Morphine, pregnant women and children were excluded from the study.

After starting an intravenous drip with ringer lactate and monitors attached, in the operating room 18G epidural catheter was inserted in the L2-L3 space. 18-20ml of 0.5% Bupivacaine was given for the surgery. A syringe loaded with 3mg Morphine and 0.125% Bupivacaine in 12ml was attached to the catheter.

Postoperatively patients were given 0.125% Bupivacaine and 1mg Morphine after eliciting or after patient complains of pain.

Monitoring was done in the post operative period for pulse rate, SpO₂ and blood pressure. Patients were also observed for any side effects. Depending on the type of surgery, analgesia lasted for 3.5 to 6 hours. A second dose of the same drug was given, after wearing off the first dose. The duration of analgesia with the second dose was approximately twice that of the first dose, i.e., 6 to 12 hours.

Post operatively patients were observed for Pain relief by Visual analogue score; Sedation (0- awake, 1-drowsy but responding to verbal stimuli (mild), 2-responding to moderate touch (moderate), 3- responding to firm touch (severe)); and Incidence of side effects

OBSERVATIONS

Table 1: Sex Distribution (in percentage) of Patients participated on the study

Speciality	Patients	Male	Female
Gynaecology	40	0	40
General surgery	30	20	10
Urology	5	5	0
Orthopaedics	25	15	10
Total	100	40	60

All figures are in percentage

Table 2: Average Duration of Analgesia

Speciality	1 st dose(hrs)	2 nd dose(hrs)
Gynaecology	4.75	9.25
General surgery	4.8	10.8
Urology	5	10
Orthopaedics	4	8.7

Table 3: Incidence of Side Effects

Side effect	Percentage of patients developed
Pruritus	1
Retention of urine	6

It was observed that pain relief was good in all the patients. The duration of analgesia was more with the patients undergoing general surgery and gynaecological operation compared to orthopaedic patients.

It was also observed that the duration of analgesia with the second dose was longer, in the same patient, compared with the first dose.

Orthopaedic patients had short duration of analgesia compared to the patients who underwent surgery of soft tissues like abdominal and pelvic surgeries.

After the second dose was given, patients had good sedation apart from analgesia. None of the patients needed additional sedation.

Only six patients i.e., 6% had urinary retention incidentally all had undergone inguinal hernia. This may also be attributed to the type of surgery and 1% had pruritus after the first dose which was successfully treated.

None of the patients had other complications, like nausea, vomiting, respiratory depression etc.

The duration of analgesia depends exclusively on the type of surgery and not on the age, sex or other features.

4% of the patients had exceptionally long duration of analgesia with both doses – the first dose yielding 8 to 10 hrs and the second dose 16 to 18 hours.

DISCUSSION

Why do we need a post operative analgesia? Why pain management is necessary and which route? These are frequently asked questions. Post operative analgesia eases patient's discomfort resulting in early mobilization and is a widely accepted technique for post operative pain relief. Uncontrolled post operative pain may produce a range of detrimental acute and chronic side effects.

Many drugs have been investigated in epidural space and results showed improvement in duration, intensity of analgesia¹⁻⁵. We most commonly use local anaesthetics for post operative analgesia and many additives have been investigated like Clonidine⁶, Opioids¹⁻⁵, and Epinephrine^{3,7,8} which resulted in improvement in duration, intensity of analgesia and reduction in local anaesthetic dosage.

The current study determined the analgesic effectiveness, sedation, relief of pain and incidence of side effects like nausea, vomiting, pruritus and retention of urine in post operative patients receiving Bupivacaine and Morphine. The results showed encouraging clinical performance.

In the current study established the addition of Morphine to Bupivacaine increased the duration of analgesia and provided effective and safe post operative analgesia with duration of pain relief after first dose ranging from 3hours 30 minutes to 6hours which markedly increased after top up dose that is ranging from 8 hours to 12 hours with minimal side effects. This has been attributed to metabolites of Morphine like Morphine-6-Glucoronide which is more potent and long acting than Morphine.

The duration of analgesia in patients undergoing orthopaedic surgeries is shorter compared to other patients undergoing other surgeries. This has been attributed to the presence of deep somatic nociceptors which exist in muscle and joint capsule. They respond to mechanical, thermal and chemical stimuli and inflammation. Most other organs such as intestine are innervated by polymodal nociceptors that respond to smooth muscle spasm, ischemia and inflammation. These receptors generally do not respond to cutting, burning and crushing that occur during surgery¹².

Relief of pain by Morphine like opioids is relatively selective in that other sensory modalities are not affected and is not associated with loss of consciousness. The analgesic effects of opioids arise from their ability to directly inhibit ascending transmission of nociceptive information from the spinal cord dorsal horn and to activate pain control circuits that descend from the midbrain via the rostral ventromedial medulla to the spinal cord dorsal horn.

Morphine is phenanthrene alkaloid of opium and is μ agonist that acts by decreasing the conductance of voltage gated calcium channels or by opening of the inward flowing potassium channels¹⁰. Either of the above mentioned effects decrease neuronal activity. The local

anaesthetic Bupivacaine acts by blocking the voltage gated sodium channels. These effects may contribute to synergism observed between local anaesthetics and opioids and the reduced dosage of local anaesthetics.

Regarding adverse effects no statistically significant difference was seen. Incidence of nausea, vomiting, and pruritus was seen in only one case receiving epidural morphine and urinary retention seen in 6% of patients who underwent hernioplasty for inguinal hernia.

CONCLUSION

The addition of Morphine to Bupivacaine increases the duration of post-operative analgesia and it is more marked with the second top-up dose of Morphine and Bupivacaine producing significant sedation with minimal side effects which are mild and can be easily treated.

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