ISSN 2515-8260 Volume 09, Issue 07, 2022

ROLE OF EPIDURAL ANAESTHESIA IN IMPROVING POST OPERATIVE REHABILITATION AFTER PRIMARY DEFINITIVE FIXATION OF PERIARTICULAR KNEE FRACTURES FOLLOWED BY ORTHOPAEDIC TRAUMA

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ABSTRACT

INTRODUCTION:intra-articular fractures of the lower limb are one of the most common fractures associated with knee stiffness. Even after an adequate and rigid fracture fixation early rehabilitation is necessary to drastically improve the outcome and reduce stiffness. Lack of effective pain control postoperatively can significantly reduce participation in therapy regimens and thus contribute to reaccumulation of fibrotic tissue in the joint after artholysis. Hence, epidural anaesthesia through a lumbar epidural catheter is an established procedure to reduce post operative pain. 1 gm preservative free morphine and 2ml of 0.5 % Bupivacaine diluted with normal saline to make a total of 10 ml is the most commonly used protocol in top up after surgery for post operative analgesia.

MATERIALS AND METHODS:This is a prospective study. A total of 40 patients with peri-articular of distal femur and proximal tibia were included in the study. Patients were randomised into 2 groups. Group A was given spinal anaesthesia for surgery and Group B was given combined spinal plus epidural anaesthesia with a lumbar epidural catheter.

DISCUSSION: Main aim of medical science is to balance the wanted and unwanted effect optimally to provide patient safety as well as comfort and to facilitate rapid recovery and rehabilitation. Initial post-operative fear of pain affects the rehabilitation after discharge because of constant fear of pain.There are several ananlgesic option for post operative pain managementDespite its widespread benefits epidural analgesia carries potential risks such a dural perforation, epidural hematoma and infection etc. pruritis, nausea, vomiting, urinary retention and respiratory depression are associated with epidural opioids but our study did not show any such complications

INTRODUCTION.

Role of epidural analgesia is well established in the literature and practice. Epidural anaesthesia is a very common procedure of anaesthesia for induction of lower limb orthopaedic cases. None the less its use post operative after an orthopaedic procedure of lower limb is increasing in frequency. Considering the intra-articular fractures of the lower limb, they are one of the most common fractures associated with knee stiffness. Even after an adequate and rigid fracture fixation early rehabilitation is necessary to drastically improve the outcome and reduce stiffness. Lack of effective pain control postoperatively can significantly reduce participation in therapy regimens and thus contribute to reaccumulation of fibrotic tissue in the joint after artholysis. Hence, epidural anaesthesia through a lumbar epidural catheter is an established procedure to reduce post operative pain. 1 gm preservative free morphine and 2ml of 0.5 %

Bupivacaine diluted with normal saline to make a total of 10 ml is the most commonly used protocol in top up after surgery for post operative analgesia. Epidural anaesthesia brings with it many honouring benefits and they include not only decrease in postoperative pain (subsequently reducing opioid consumption and associated adverse effects) but also decrease in nausea and vomiting, improvement in mobilization and recovery of gastrointestinal function, decrease in length of stay (LOS), reduction in surgical stress response, and potentially, significant reduction in morbidity and mortality.(1) They are therefore commonly used to improve quality of patient care and have also been commonly used as a vital component of many enhanced recovery protocols (ERPs).It has also shown to decrease cortisol levels, expedite the return of bowel function, decrease the incidence of PE and DVT in the postoperative period, and shorten lengths of in-hospital stay(24) It may decrease the surgical risk and morbidity of certain patient populations, for example, patients with ischemic cardiac disease(25)Despite the broad evidence base demonstrating the benefits of epidural analgesia, one must not forget to consider the adverse effects such technique.It also has shown to decrease post-op lung complications(25,26). The side effects or complications might be related to procedure or the drug used and they include dural perforation, epidural hematoma, meningitis, infection at catheter site, urinary retention, hypotension, pruritus and respiratory depression. The aim of this study is to evaluate wheter this method of post operative analgesia can be helpful in improving rehabilitation after peri-articular knee injuries.

MATERIALS AND METHODS.

This is a prospective study. A total of 40 patients with peri-articular of distal femur and proximal tibia were included in the study. Patients were randomised into 2 groups. Group A was given spinal anaesthesia for surgery and Group B was given combined spinal plus epidural anaesthesia with a lumbar epidural catheter. Site chosen was L1-L2 /L2-L3 for epidural analgesia and site for spinal analgesia was L3-L4 was used(in case of combined spinal epidural). The Dose for CSE (combined spinal epidural) consisted of a spinal dose of 0.5% bupivacaine heavy 3cc with fentanyl (for approximately 2-3 hr procedure) and If procedure extend beyond this time we activated the epidural with 0.5% bupivacaine 5cc + 2% lox with adrenaline 4cc diluted to make up to 10 cc. The 1st top up for epidural was given immediately post-operatively in recovery room, 2nd dose was 6-8 hours Post operatively and 3rd dose was given 12-16 hrs after the 3rd dose. Catheter was kept for a maximum of 3 days. Post operatively knee ROM was initiated on day 1 in both the groups. Total knee ROM was recorded on Day 2, Day 10, Day 42 (6 weeks) and Day 90 (3 months). Assessment of knee ROM was done by a single observer who was blinded for the groups.

INCLUSION CRITERIA.

- Distal femur and proximal tibia peri-articular fractures with previously healthy joints.
- Closed fractures or compound fractures up to Gustilo Anderson grade II
- Adult patients of either sex

EXCLUSION CRITERIA.

- Patients with prior external fixator
- Patients operated after 2 weeks post trauma
- Gustilo Anderson grade III fracture.
- Previous history of knee surgery.

- History of knee arthritis, knee stiffness, affected knee ROM.
- Associated tendon, ligament, muscle injury.
- Paediatric patients
- Intra-articular unstable fractures requiring post-operative immobilization.

RESULTS

A total of 40 patients were included in this study, out of which 9 were female and 31 were males. The mean age was 35 years. Patients were divided into 2 groups, Group A and Group B as mentioned earlier

Group A comprised of 7 distal femur fractures and 13 proximal tibia fractures. Out of 7 distal femur fractures 5 were intra-articular and 2 extra-articular fractures. 13 proximal tibia fractures were comprised of 3 extra-articular and 10 intra-articular fractures.

Group B comprised of 9 distal femur fractures and 11 proximal tibia fractures. Out of 9 distal femur fractures 6 were intra-articular and 3 were extra-articular. 11 proximal tibia fractures comprised of 2 extra-articular and 9 intra-articular fractures. Both the groups were assessed and found comparable.

Mean knee range of motion for group A was 20 degrees on day 2, 45 degrees at Day 10, 90 degrees at 6 weeks and 120 degrees at 3 months whereas the mean knee range of motion for group B was 40 degrees on day 2, 70 degrees at Day 10, 110 degrees at 6 weeks and 130 degrees at 3 months.

FRACTURE	**Group A**	**Group B**
	(20 patients)	(20 patients)
Distal femur fracture		
Intra-articular	5	6
Extra-articular	2	3
Total	7	9
Proximal tibia fracture		
Intra-articular	10	9
Extra-articular	3	2
Total	13	11

Post-operative day	Mean knee range of motion in degrees (knee flexion)	
	Group A	**Group B**
Day 2	20	40
Day 10	45	70
6 weeks	90	110
3 months	120	130

DISCUSSION

Modern anaesthesia and pre-operative medicine is commonly entangled in the challenge to create optimum treatment regimens whereby the wanted and the unwanted effects are in optimal balance in order to provide pateint safety aswell as comfort and to facilitate rapid recovery and rehabilitation. It is well know that surgical pain is associated with stress responses in the intra-op period as well as post operative period and reduction in this stress postoperatively will lead to reduced postoperative organ dysfunction and thereby provide improved outcomes. (2)

Amongst the many available options for post-operative pain management, which one to choose depends on several factors such as experience of the anaesthetist, preference of anaesthetist, duration for which analgesia is required and patient preferences. (3)

Very often, post-operative pain restricts the patient from initiation of rehabilitation protocol. This initial post-operative fear of pain even affects the rehabilitation after discharge because of constant fear of pain. Hence, post-operative analgesia is an important factor for boosting the confidence of the patient to gain an expected rehabilitation or range of motion post-operatively.

Data from literature shows that continuous postoperative tunneled epidural analgesia gives promising outcomes in maintaining adequate pain control and facilitate rehabilitation postoperatively for several orthopaedic procedures including spinal surgery and adhesive capsulitis,periarticular knee fractures. Several studies in elective lower extremity orthopedic procedures have shown enhanced rehabilitation by post operative regional analgesia techniques. Continuous epidural analgesia has also shown to be a viable option for managing persistent stiffness after TKA.(4) Continuous infusion of local anaesthetic or opiod alone or in combination provide effective postoperative pain relief but the most effective ones alone or in combination, dose and route remain controversial.(5) Wu et al compared the effectiveness of systemic opiods, epidural opiod and epidural opiod-local anesthetic mixture. They found that epidural opiod was more effective than systemic opiods.(6)

In a meta-analysis on epidural versus systemic analgesia in various surgical procedures, epidural local anesthetic were found to reduce postoperative complications compared with epidural or systemic opioid techniques.(7) Postoperative epidural analgesia has been shown to decrease cardiac ischemia post operativly and postoperative epidural analgesia has been shown in a meta-analysis of a variety of surgical procedures to reduce the incidence of postoperative pulmonary complications. Local epidural anaesthesia have also shown reduction in post operative paralytic ileus and improved post operative cognitive function in elderly patients in various surgical procedures. (8-11)

Despite its widespread benefits epidural analgesia carries potential risks such a dural perforation, epidural hematoma and infection etc.(20) Chaney MA(21) reported classical side effects of epidural opiods being pruritis, nausea, vomiting, urinary retention and respiratory depression. Nonetheless he found that majority of them were dose dependant. A study by Stenseth et al(22) using epidural morphine found that 90 percent were completely satisfied with the course. Despite the positive results side effects like pruritis(11%), nausea and vomiting (34%) and respiratory depression (0.9%) was seen. Similarly Shafiq et al(23) in one study found that over all incidence of complications was 26.6 percent. Common complications were motor block, dural tap, accidental cathetar pullouts, ineffective pain control etc. Nontheless our study did not show any such complications.

There are certain limitations to the study. This study included combined patients of peri-articular knee fractures with both intra-articular as well as extra-articular. A more selective study is required for strengthening the study.

CONCLUSION:

Peri-articular knee fractures are a common cause of limitation in knee function despite proper surgery which can be due to inadequate rehabilitation. To address this problem, it is important to give a pain-free post-operative period to the patient to develop and initiate proper post-operative rehabilitation. This can be achieved by performing peri-articular fracture fixations using Epidural anaesthesia through which post-operative analgesia can be continued in a more effective manner which also increases overall outcome of the patient.

Conflict of Interest-

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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