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The Effect of Adjuvant Local Anaesthesia on Post-Operative Outcomes in Inguinal Hernioplasty: A Randomized Controlled Study

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Abstract

Inguinal Hernia Repair (IHR) is a common surgical procedure which can be performed under general, regional, or peripheral nerve block anaesthesia. The choice of anaesthetic technique for IHR depends on various factors such as the preference of the surgeon and anesthesiologist, the feasibility of the technique, intraoperatively and postoperative pain control, the complexity and expected duration of the procedure, postoperative morbidity, recovery time, and cost-effectiveness. Immediate postoperative pain and its management are vital for early mobilization and early discharge of the patient. In view of the above consideration, this clinical study was performed to evaluate the feasibility of using a potent local anaesthetic (ropivacaine) as an adjuvant to spinal anaesthesia and its implications on the post-operative course.

- Sixty-two patients underwent inguinal hernia under spinal anaesthesia which was selected randomly
- Patients understudy group were comfortable post-operative with regard to pain
- None of the patients had postoperative surgical complications
- Patients in the study group were discharged earlier when compared to the control group

Our data in this prospective study has confirmed that using an adjuvant local anaesthetic along with spinal anaesthesia has a better outcome, speedy recovery early mobilization and shorter duration of hospital stay. Moreover it is cost effective as well.

Keywords: Hernia • Anaesthesia • Hernioplasty • Morbidityy

Introduction

Elective inguinal hernia repair is the most commonly performed operation in General Surgery. Patient safety and provision of optimum operating condition are the main criteria for the choice of anaesthetic technique. Inguinal hernia repair can be performed by using a variety of anaesthetic techniques such as general anaesthesia, regional anaesthesia in the form of spinal or epidural anaesthesia, paravertebral block and local anaesthesia. General and regional anaesthesia cause hemodynamic changes during induction and maintenance. However, in developing countries like India, General Anaesthesia and Regional Anaesthesia are commonly used [1].

Immediate post-operative pain is an important issue that can delay ambulation and return of gastrointestinal motility, therefore, delaying hospital discharge [2]. Besides, the presence of chronic pain after hernia repair surgery, which can affect up to 50% of patients, is a growing concern [3,4]. This is related to inadequate post- operative pain management and becomes a fundamental duty of the surgeon to control post-operative pain. Despite several methods of analgesia, the management of post-operative pain is oftentimes unsatisfactory. Opioids, non-steroidal anti-inflammatory drugs, and analgesics are routinely used to alleviate post-operative pain, but they are associated with several undesirable effects and do not seem to be completely effective on preventing and treating postoperative pain [5].

Adjuvant local anaesthesia has been found to be advantageous when used along with spinal anaesthesia for inguinal hernia repair. Studies have shown that the adjuvant local anaesthesia provides increased safety for patients, better postoperative pain control and shorter recovery period, reduced duration of hospital stay and decrease in incidence of chronic pain and surgical site infection to some extent [6]. Hence, adjuvant local anaesthesia is acceptable and can be used for inguinal hernia surgery.

Objectives

To compare the peri-operative analgesic requirement and duration of hospital stay in patients undergoing inguinal hernioplasty with and without adjuvant local anaesthesia (ilio-inguinal, ilio-hypogastric block and wound infiltration) using Ropivacaine.

Methodology

The present study was a prospective, randomized, double-blind study. The Institutional Ethical Committee clearance was obtained.

Source of data

Data will be collected from patients admitted to Department of General Surgery, Vydehi Institute of Medical Sciences and Research Centre who presented with unilateral uncomplicated inguinal hernia and underwent hernioplasty during the study period (Oct 2018-Sept 2020).

Method of collection of data

Data was collected from a case recording proforma pertaining to patient's particulars, history, clinical examinations, investigations, diagnosis and surgical procedures.

Diagnosis of inguinal hernia was confirmed using clinical examination and investigations like ultrasound abdomen. A total of 62 patients who underwent hernioplasty were randomly selected based on computer generated numbers and divided into 2 groups.

Study group (31 patients): Patients undergoing hernioplasty with

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adjuvant local anaesthesia using ropivacaine.

Control group (31 patients): Patients undergoing hernioplasty under spinal anaesthesia only.

Comparison of patients undergoing surgery with and without ropivacaine infiltration was done using a pre-designed proforma. Data was analysed using the Students t-test, Chi-square analysis and p-value of <0.05 was considered significant.

Inclusion Criteria: Patients with uncomplicated inguinal hernia, who underwent hernioplasty and consented for the study.

Exclusion Criteria:

- Bilateral inguinal hernia
- Irreducible / Strangulated / Obstructed inguinal hernia
- Technique of Infiltration of Local Anaesthesia

Technique

After induction of anaesthesia, patient positioning and draping the surgical field, 0.20% Ropivacaine at a dose of 2mg/kg will be used for wound infiltration, subdermal, submuscular and sub aponeurotic injections using standard techniques and sterile precautions before skin incision.

Discharge criteria included complete motor recovery, ability to urinate, absence of nausea and vomiting, bleeding, and excessive pain.

Result

The results of the analysis of data on 62 patients who underwent hernioplasty with and without adjuvant ropivacaine infiltration are as follows:

The mean age of the patients in both the study group and the control group was 38 years. The incidence of indirect inguinal hernia was high compared to direct hernia in both the groups. In study group, 24 (77.4%) patients had indirect inguinal hernia and 7 (22.6%) patients had direct hernia.

In control group, 28 (90.3%) patients had indirect inguinal hernia and 3 (9.7%) patients had direct inguinal hernia. In our study, all patients in both the groups were male with 100% preponderance incidence of indirect and direct inguinal hernia. In both the groups, the incidence of indirect inguinal hernia was high. In study group, 24 patients had indirect inguinal hernia and 7 patients had direct inguinal hernia. In control group, 28 patients had indirect inguinal hernia and 3 patients had direct inguinal hernia. The incidence of indirect inguinal hernia was common in the age group of 21 to 45 years in study group and 22 to 49 years in control group.

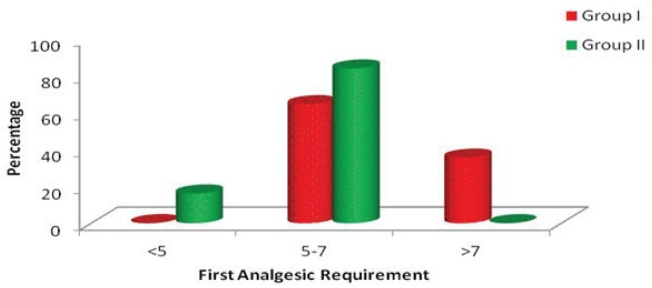
Around 16 patients in study group had left sided hernia and 10 patients in control group, had left sided hernia. Therefore, right sided hernia was more common among the study groups.

Pain was measured using visual analogue scoring and a score of more than 5 was taken as significant. Patients under study group was comfortable without pain up to >5 h when compared to patients in control group who required early analgesic dose post-operatively with a significant p-value (p<0.001).

Post operatively analgesics (intravenous paracetamol) were given on demand to patients who complained of pain. Pain was measured using visual analogue scoring and a score of more than 5 was taken as significant. Patients who were given adjuvant ropivacaine infiltration had lesser post-operative pain as compared to those did not have adjuvant local anaesthetic infiltration. This study showed significant difference between the two groups in post-operative pain (p-value <0.050) (Graph 1).

In study group, 43 (69.4%) patients were discharged within 4 days when compared to control group where 19 (30.6%) were discharged after 5 days (Table 1).

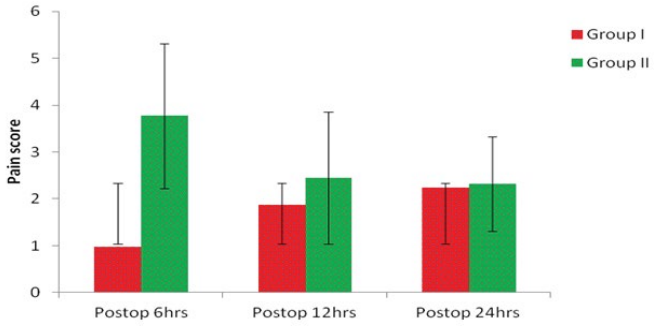
During 12 hrs post-op in study group, three patients had no pain and twenty five patients had mild pain and three patients had moderate pain. In control group, two patients had no pain, twenty one patients had mild pain and eight patients had moderate pain. During 24 hrs post op in study group, one patient had no pain and twenty four patients had mild pain and six patients had moderate pain. In control group, twenty seven patients had mild pain and four patients had moderate pain.



Graph 1. Bar graph showing first analgesic requirement distribution in two groups of patients studied.

Table 1. Duration of hospital stay distribution in two groups of patients studied.

Duration of hospital stay	Group I	Group II	Total
0-1 days	0 (0%)	0 (0%)	0 (0%)
2-4 days	29 (93.5%)	14 (45.2%)	43 (69.4%)
>5 days	2 (6.4%)	17 (54.9%)	19 (30.6%)
Total	31 (100%)	31 (100%)	62 (100%)
Mean ± SD	21.52 ± 64.75	43.39 ± 138.03	32.45 ± 107.49
p<0.001**, significant, Fisher Exact test			



Graph 2. Bar graph showing comparison of pain score in two groups of patients studied.

The mean at 6 hrs, 12 hrs and 24 hrs in study group was found to be 0.97 ± 0.80, 1.87 ± 1.15, 2.23 ± 1.15 whereas in case of control group the mean at 6 hrs, 12 hrs and 24 hrs was 3.77 ± 1.54, 2.45 ± 1.41, 2.32 ± 1.01 respectively. Here in our study, the postoperative pain in the study group was significantly less when compared to control group during 6 hrs post-operative (p-value < 0.001) (Graph 2).

Discussion

Inguinal hernioplasty is one of the most common procedures performed in general surgery. There has been a paradigm shift in the way hernia has been managed over the past years. The use of better mesh systems, refinement of surgical techniques have enabled surgeons to drastically improve surgical outcomes and today, inguinal hernioplasty can be performed as a day care procedure. There is strong evidence to perform inguinal hernioplasty under local anaesthesia with similar surgical outcomes as conventional practice thus helping in optimal utilization of hospital resources [1].

Effective pain management following surgery has a significant influence on postoperative recovery and hospital stay of the patients. The use of conventional analgesics is associated with accompanying side effects and

their efficacy in relieving pain is questionable. Also, many patients complain of chronic inguinal pain or discomfort after hernioplasty and this result in significant morbidity and dissatisfaction postoperatively and thus has a bearing on surgical outcomes [7].

To counter this aforementioned observation, local anaesthesia has come into vogue. Local anaesthesia administration reduces postoperative pain and current evidence shows that it reduces hospital stay and overall costs, improving patient satisfaction. 0.75% of Ropivacaine used alone as local anaesthesia has shown to reduce the postoperative pain without spinal anaesthesia. However, many surgeons are sceptical to use local anaesthesia in their day to day practice due to the concern for increased incidence of surgical site infections [1,2]. Hence, even though local anaesthesia is proven to improve surgical outcomes in inguinal hernioplasty patients, this has not translated to its incorporation in practice.

In an attempt to compare the effect of local anaesthesia on postoperative outcomes in inguinal hernioplasty we studied sixty two patients dividing them into two study groups; variables like age, sex, duration of hospital stay, first analgesic requirement and postoperative pain, the following are the observations made.

Post-operative pain

Aasbo et al. demonstrated that preoperative inguinal field block for hernia repair provides benefits for patients in terms of faster recovery, less pain, better mobilization and higher satisfaction throughout the whole first postoperative week [8].

Ding et al. showed that in adult outpatients undergoing inguinal hernia repair with local anaesthetic infiltration, use of an ilio-inguinal-hypogastric nerve block with bupivacaine contributed to a decrease in postoperative pain and reduced the requirement for oral analgesic medication after discharge from the day-surgery unit [5].

André Laranjeira de Carvalho et al. study concluded wound infiltration with ropivacaine was effective to control pain, with better results when done before incision. It has significantly decreased pain intensity and morphine consumption and has delayed rescue analgesia request promoting a more comfortable postoperative period [9].

In our study, the postoperative pain was graded as no pain, mild (1-3), moderate (4-6) and severe (7-10) pain. Pain scores during post op 6 hrs, 12 hrs and POD 1 was assessed which shows following results, during 6 hrs post op in study group nine patients had no pain and twenty two patient had mild pain and in control group one patient had no pain, ten patients had mild pain and twenty patients had moderate pain. This was statistically significant with p-value<0.001.

Duration of hospital stay

Currently, most inguinal herniorrhaphies are performed as outpatient surgery. Thus, the use of anaesthetic techniques that allow adequate postoperative analgesia as well as earlier recovery and hospital discharge is necessary [10]. Earlier hospital discharge was observed in the group of patients who underwent ilio-inguinal and ilio-hypogastric nerve block than in the control group. In fact, in another study, it was demonstrated that patients who received local anaesthesia had shorter hospital stay than those who underwent spinal anaesthesia only or general anaesthesia for inguinal herniorrhaphy [11].

In study group, 43 (69.4%) patients were discharged within four days when compared to control group where 19 (30.6%) had a duration of stay more than five days. Hence, most patients were discharged within 10 days of hospital stay with significant p-value <0.001.

Faster hospital discharge in the group that underwent ilio-inguinal and ilio-hypogastric nerve block can also be associated with the fact that we used ropivacaine, which causes shorter motor blockade than sensorial blockade. Despite observing a postoperative analgesia of shorter duration, the reduction in length of hospitalization in the presence of ilio-inguinal and ilio-hypogastric nerve block suggests that, whenever inguinal herniorrhaphy is performed under spinal anaesthesia, the use of this type of block could be an interesting strategy to reduce the length of hospitalization of those patients [12].

Conclusion

The adjuvant local anaesthesia has an additional advantage in inguinal hernioplasty now-a-days. When done under adjuvant local anaesthesia patient has a speedy recovery, less post-operative pain and duration of hospital stay decreases. The need for post-operative analgesics is all avoided and patient wound be benefited as acute postoperative pain.

Therefore, inguinal hernioplasty under adjuvant local anaesthesia is gaining immense attention because of the added advantages to the patient currently among the groin hernia repairs.

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