"Comparative Study to Evaluate Post Operative Pain in Management of Open Inguinal Hernia Repair With and Without Inguinal Nerve Block"

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Abstract

Background: Inguinal hernia repair is most frequently preformed surgeries by most of the general surgeons worldwide. Pain is the most common symptom post operative in both immediate and chronic phase. Pain management in these patients, especially in the immediate post operative time, is major concern for both patients and the medical fraternity.

Material & Methods: A comparative study to evaluate the post operative pain in management of open inguinal hernia repair with and without inguinal nerve block was conducted at Dept. of General Surgery in Santosh Medical College and Hospital, Ghaziabad on patients admitted in Dept of General Surgery from September 2020 to August 2021. All patients underwent Lichtenstein tension free mesh repair for inguinal hernia. Half the patients randomly selected were given inguinal nerve block using 0.25% levobupivicaine.

Results: Nerve blocks have been used for chronic pain managements in past in post op inguinal hernia repair surgeries. Present study deals with pain management in immediate post- operative pain management. It shows significant difference is noted in patients receiving the nerve block not only in pain but also comfort levels, post operative mobility, day of discharge and retention of urine.

Conclusion: Use of nerve blocks in patients undergoing open inguinal hernia repair is beneficial for the patient with improved outcome.

Keywords: Inguinal hernia, Pain, Nerve Block, Lichtenstein.

INTRODUCTION

The saying goes "The history of hernia repair is the history of surgery". The history of open hernia repair has gone through many stages of development beginning from the times of Greek, Romans and Egyptians. The history of hernia in toto is as old as human race. Quite interestingly, the inguinal hernias are recorded since 1500 BC by the ancient Greeks. The history of hernia is history of surgery. HERNIA in Latin means to TEAR or RUPTURE. The incidence of inguinal hernia is reported to be around 5% - 7%(1)of which approximately 96% of all groin hernias are inguinal hernias, and is estimated that 25% of men and 2% of women develops inguinal hernia during their lifetime. Hernias are bilateral in 20% of cases. The most common abdominal wall hernia is an inguinal hernia with a male to female preponderance of 9 to 1(1). Based on a surgeons' point of view, inguinal hernias are one of most common problems encountered and is repair is considered to be one of the most commonly performed procedures in most of the surgery centres globally.Inguinal hernia repair is one of the most common procedures performed in most of the surgery centers(2). Earlier studies have reported that even though it is not a very extensive surgery, it causes about 60% incidence of moderated to severe postoperative pain(3). Furthermore, this acute postoperative pain has 18% to 60.9% of chances for the development to chronic pain(4). Incisional pain is an essential part of post-hernia surgery pain, and various medications and non-pharmacological techniques have been adopted for postoperative analgesia(5). However, an optimal pain management technique is still undetermined.Tension-free mesh based repairs are the most common method of inguinal hernia repair today, whether done by open method or laparoscopic, because meshes have been shown to reduce the recurrence rates by up to 50%(4). Though the pain is often mild in nature, the quality of life studies have shown that chronic pain, irrespective of severity, can significantly interfere with normal daily activities(4,5). Furthermore, complications noticed ranges from

bleeding, pain, urinary retention in immediate post operative period to seroma, scrotal oedema, wound infection in later periods and prolonged hospitalisation due to the above complaints thus adding to the financial burden over the patient and the institute(6). Late complication may also present asrecurrence, chronic pain and testicular atrophy. Inflammatory processes beyond the optimum foreign body reaction may entrap the contiguous structures leading to complications such as chronic groin pain, discharge and wound complications. Most often, the condition can sometimes be debilitating and treatment is often difficult and challenging. Routine surgical teaching dictates that ilioinguinal nerve encountered during the surgery has to be preserved at all times during repair because of the supposed morbidity associated with cutaneous sensory loss and chronic groin pain following nerve injury.Though the inguinal hernia is a very common ailment amongst surgical patients,irreducibility, obstruction and strangulation are its commonest complication encountered in surgical practice and acute emergency as well. The identification of risk factors such as age, type of hernia, presenting symptoms and associated pre-existing medical illness would help in giving priority in admission to such patients. The delay in surgery in a case of complicated hernia would increases the morbidity and mortality in such patients. Even though the open inguinal hernia repair is widely accepted system, still there is no concrete consent in using the optimum anaesthesia for this technique. Several advantages and disadvantages have been identified on using the general, spinal, epidural, and local anaesthesia (7). Therefore, there is a general perception that blocking the ilioinguinal and iliohypogastric nerves with the use of local inguinal field block as it blocks the surgical stress might provide a better hemodynamic stability, extended analgesia, early ambulation and is associated with low risk of complications as well (9). Inguinal nerve block was first described in the year 1900 by Havery Cushing and William Halsted (10), since then many surgeons and anaesthiologists have conducted several studies to demonstrate its efficacy and safety. A detailed seven step procedure to perform hernia repair with the use of such inguinal nerve blocks has been described in detail by Joseph L. Ponka in the year 1963(11). Inflammatory processes beyond the optimum foreign body reaction may entrap the contiguous structures leading to complications such as chronic groin pain, discharge, wound complications.Pain is the most common immediate symptom post procedure for the initial 24-48hours locally at the incision site and the ipsilateral scrotum pain. Acute pain is experienced immediately after surgery (up to 7 days) and pain which lasts more than 3 months after the injury is considered to be chronic pain. Acute and chronic pain can arise from cutaneous, deep somatic or visceral structures. The reported incidence of pain after inguinal hernia repair varies from 0% to 37%(4).Pain affects the recovery of the patient as it disturbs sleep, appetite and also mobility, thus increasing morbidity, delayed recovery, hospital costs and mortality (5). In extreme cases shallow breathing and reduced cough reflex leading to pulmonary complications. Postoperative chronic pain is a special entity within the domain of chronic pain. The chronic pain after inguinal hernia repair has been extensively studied; however, the management is still difficult. Around the globe, millions of inguinal hernia repairs are conducted annually (6) and 8%–16% of these patients experience chronic pain to a degree that impairs their daily lives 6 months postoperatively (7,8). Transient neuralgia involving sensory nerves can occur and usually self limiting and resolve within few weeks after surgery. There may be a significant correlation between worst pain at 48 hours and return to normal activity within seven days. There may be a risk that patients cannot return to normal activities within seven days because of worst pain experience at 48 hours after day surgery. Effective postoperative pain management including patient's comfort and their satisfaction, earlier mobilization, lesser pulmonary and cardiac complications and reduction in the risk of deep vein thrombosis, faster recovery with very minimal chances of the development of neuropathic pain, and reduced cost of postoperative care.Use of intravenous and oral NSAIDS and opioids help with management of post operative pain. Inguinal nerve block has shown better results in postoperative pain management of patients undergoing open inguinal hernia repair(10). Peripheral use of local anaesthetics for postoperative pain relief after open hernia repair which improve early pain control and minimize the need for opioids(11). Local anesthetics have been used subcutaneously into the incisional site, into the muscle and parietal peritoneum to provide pain relief. The injection block the A and C fibers and prevent transmission of pain impulses from surgical incision site to the brain. Different studies have used long acting LA like bupivacaine, ropivicaine or levobupivicaine to provide pain relief(12). In these studies dosage and concentrations used were also variable.However, some of the reports suggested that elective excision of ilioinguinal nerve causes minimal morbidities and was significantly not considered incapacitating by most patients(13,14). In addition to this, ilioinguinal neurectomy is a well-documented effective treatment of relieving chronic groin pain following open hernia repair, achieving more favourable outcomes than nerve block or mesh removal alone(15-17). More recently, retrospective studies have shown that elective excision of ilioinguinal nerve during hernioplasty were associated with a lower incidence of chronic groin pain of after the operation(18-20).Nerve blocks used in inguinal hernia can be pre-operative, intra operative and post operative. Peripheral nerve blocks such as transversus abdominis plane (TAP) block, abdominal field blocks, and ilioinguinal/iliohypogastric (IIIH) nerve blocks have been described in the literature as means to alleviate pain due to abdominal wall incision(21). Studies have revealed the efficacy of blind as well as ultrasound-guided TAP block and IIIH nerve block with wound infiltration in providing adequate postoperative analgesia in patients who have undergone inguinal hernia repair when compared to routine parenteral and oral analgesics(21, 22).VAS score (at rest and on coughing): visual analogue scale consists of a 10 cm scale representing varying intensity of pain from 0 (no pain) to 10 (worst pain).Comfort primarily defined as the performance of the patient after receiving the treatment, medical or surgical, thus helping the doctor to assess the performance of the patient and further course of treatment.

AIMS AND OBJECTIVES:

The aim of study is to compare differences between with and without Ilioinguinal and Iliohypogastric nerve block for inguinal hernia repair in terms of:

1. Postoperative pain
2. Comfort
3. Post operative mobility
4. Time of discharge
5. Retention of urine

MATERIAL AND METHODS:

Study was conducted at Department of General Surgery, Santosh Medical College & Hospital Ghaziabad from September 2020 to August 2021 Study design - Prospective comparative study.Sample size – 40 (20 in each group).

Inclusion Criteria:All patients of age group 18-60yrs in both genders including primary, unilateral inguinal hernia, undergoing open inguinal hernia repair by Lichtenstein tension free mesh repair using polypropylene mesh.

Exclusion Criteria:

1. Patients' refusal
2. All hernias except inguinal hernia
3. Known case of neuralgia
4. Unfit for surgery
5. Recurrent hernia surgery
6. Emergency surgery
7. Morbidly obese BMI->40
8. Pt allergic to Local anesthesia

Methodology:After the approval by Institutional ethic committee of Santosh Deemed to be University, informed consent was obtained (in patients language) preoperatively on hospital admission. Before operation, a total of 40 patients divided randomly alternatively into two groups of 20 patients in each group to undergo post operative with nerve block using 0.25% levobupivicaine(0.75% levobupivacaine 7ml in 13ml NS) in group A or without nerve block in group B. Operations were all performed with the patients under spinal anesthesia.In postoperative period if difference of VAS score would be >2 then only it would be considered significant pain.VAS - visual analogue scale consists of a 10 cm scale representing varying intensity of pain from O (no pain) to 10 (worst pain).The comfort of the patient will be assessed using Karnofsky performance scale. Consisting of a 100 unit scale where "100" meaning no complains and symptoms and "0" meaning death. Following variables will be analyzing in the post-operative period patient will be assessed for pain by using visual analogue scale at 6 hours , 12 hours, at discharge, time of mobility, time of discharge, no. of days of admission

1. Age
2. Sex
3. Weight
4. BMI
5. Postoperative pain
6. Comfort
7. Mobility
8. Day of discharge
9. 1stbowel movement
10. Retention of urine
11. Inflammation
12. Catheterization post retention

RESULTS & OBSERVATIONS:

All most equal distribution of all patients across all age groups from 18 to 70+ with an average BMI of 24kg/m2 in both group A & B. Post op pain noted was mild in all the patients in Group A all throughout the hospital stay as compared to group B where pain was mild only` in 1 patient at 6hrs, 2 patients at 12hrs, 7 at 24hrs and only 13 patients at discharge, rest of the patient had pain of moderate intensity in group B at the said interval. All pain scoring was done on VAS scoring method. Similarly in comfort scoringat 6hrs only 2 patients in group A had comfort level of 51-70% as appose to 17 patients in group B and remaining 18 patients and 3 patients had comfort level of 71-90%in respective groups. At 12th hour all 20 patients in group A compared to only 13/20 patients in group B had attained 71-90% and remaining continued to have comfort of 51-70% in group B. At 24hrs 3/20 patients in group further improved to 100% comfort level where all 20 patients in group B improved to 71-90% comfort level. At discharge 12/20 patients in group A had 100% comfort levels as appose to only 4/20 patients in group B.In terms of mobility, at 6hrs 30% patients in group A were able to walk whereas only 1 patient in group B was willing for it. At 12hrs, 65% patients of group A were mobilised and only 45% of group B were mobilised. By the end of 24hrs, 90% were able to walk whereas 25% of group B still were having difficulty in walking. At the time of discharge 100% mobility was noted in group A whereas 15% were still having difficulty in walking in group B.

Table 1 & Fig 1: Number Days on which Discharged at:

Day Discharge	Group A	Group B
Day 1	10	5
Day 2	10	10
Day 3	0	5

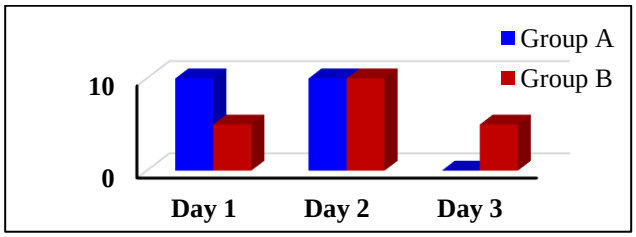


Table 2 & Fig 2: First Bowel Movement

First Bowel Movement	Group A	Group B
Day 1	15(75%)	8(40%)
Day 2	5(25%)	11(55%)
Day 3	0	1(5%)

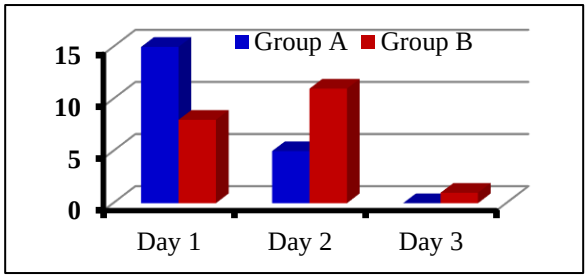
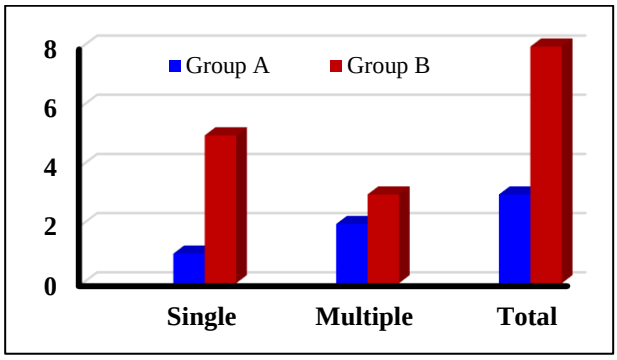


Table 3: Complication Observed at Discharge:

Complications at discharge	Inflammation at injection site	Furuncle at injection site	Inflammation at the site of surgery	Pain positive	Vomiting	Retention of urine	Catheterization post retention
Group A	1	1	0	0	1	2	0
Group B	0	0	3	1	7	7	5

Table 4 & Fig 3: Total patients with complications:

Complications	Group A	Group B
Single(S)	1	5
Multiple (M)	2	3
Total (T)	3	8



As noted only total of 3 patients of 20 in group A had some amount of noted complication as compared to 8 out of 20 patients in group B. Most noted complication noted in group B being vomiting and retention of urine with required active intervention in terms of antiemetics and catheterisation for respective complaints. There was only one patient with which developed inflammation followed by furuncle at the injection site of the nerve block in group A.

DISCUSSION:

The quality of life may be affected severely due to pain that happens due to uncontrolled post-surgical pain. It is reported that to reduce such postoperative pain or stress response and accelerate the time of recovery from surgery can be greatly achieved with the use of effective analgesia (23). Guidelines of European Hernia Society have recommended use local anaesthesia in case of an open inguinal hernia repair in adult patients (24). The current study was designed to determine the efficacy of using levobupivacaine, an inguinal nerve blocker by assessing the post-operative pain management of open inguinal hernia repair. The comfort of the patient was assessed after 6hr, 12hr, and 24hr after surgery using Karnofsky performance scale. Post-operative mobility, first bowel movement and time of discharge were also observed and recorded. Furthermore the post-operative complications including complications at discharge, inflammation at injection site, furuncle at injection site, inflammation at surgery site, pain positive, vomiting, retention of urine, catheterization post retention.Based on the results obtained from the current study it is observed that with the use of inguinal nerve block, levobupivacaine, the level of post-operative pain was significantly less at all the different time points when compared to the patients in the group B where no inguinal nerve block was used. It was also noted that the level of comfort, post-operative mobility were significantly higher with observed shorter time in the first bowel movement and time of discharge as well. Furthermore, it was noted that the other post-operative complication such as inflammation at surgery site, pain positive, vomiting, retention of urine, catheterization post retention were also less in the patients those who have been treated with the inguinal nerve block when compared to the patients in group B, where no inguinal nerve block was used. These observed effectiveness in cases of patients those who have been treated with inguinal nerve block might be due to the obtained analgesic effects with local infiltration due to the use of levobupivacaine. Additionally, the post-operative analgesia attained due to the local infiltration of levobupivacaine has been reported to be significantly more powerful and showed longer duration compared to without use of any inguinal nerve blockers. Since decades, it has been in practice that the use of inguinal nerve block which is one of the oldest techniques (25). The use of nerve block such as ilioinguinal and iliohypogastric would provide a somatic block all over the lower part of abdomen and thereby relieves the visceral pain which also gives supplemental local anaesthetics. Hence the regional nerve block techniques are considered to afford a good post-operative pain relief and thereby helping in fast recovery and early ambulation of the patient and further early discharge. It is also well known that the use of real time ultrasound would improve the quality and success rate of nerve blocks with fewer complications. However, Callesenet al., in 1996, reported that approximately 11% of patients are still experiencing mild to moderate pain during mobilization and at least 5% are facing the issues even at rest after 4 weeks of the surgery (26). Earlier report by The EU Hernia Trialist Collaboration in the year 2002 showed that at least 19% of the patients are experiencing pain to a certain extent, 6% of patients have moderate to severe pain and up to 28.7% were having chronic pain even one year after hernioplasty(27) that leads to some extent of functional impairment of the patients. Our study is in corroboration with the above study. In addition to the above study our results are also in agreement with Cunningham et al., 1996 and Poobalan et al., 2001 who have also reported that about 30% to 43% of patients experienced chronic pain out of which about 3% of patients were reported to have severe to very severe pain(28,29). Therefore it was assumed that tension-free repair of inguinal hernia with nerve blocks should lead to less post-operative complications and minimize the chronic pain and thereby leads to fast recovery and return to normal life. With this main focus the present study was designed to compare the efficacy of inguinal nerve block in postoperative pain management of open inguinal hernia repair and compare the results without the use of inguinal nerve blocks.Studies have also reported the advantages of using local anaesthesia with regards to

the costs and other benefits such as there is no significant differences between the use of either regional and general anaesthesia or local anaesthesia where the outcome with local anaesthesia seem to be even better. Nordin et al., in the year 2001 have identified one of the potential advantages of using local anaesthesia as it does not require any additional intravenous drug administration and monitoring (30). Levobupivacaine has been identified as one of the local anaesthetics that can render long duration of its action. The mechanism of action of Levobupivacaine is mainly by blocking the nerve conduction of sensory and motor nerves by chiefly interacting not only with the voltage-gated channels, such as sodium channels in the cell membrane but also the potassium and calcium channels. Levobupivacaine also interferes with the transmission of the pulse and the conduction in other tissues where the effects on the central nervous system and cardiovascular system are the most important for the occurrence of clinical adverse reactions.In the levobupivacaine group, 100% of patients expressed only mild pain level even at 6hrs. In the control group, only 5% of patients were experienced mild pain and 95% of them with moderate pain after six hours of post-operative period. Even though slowly the pain level of the patients in group B was observed to be decreased to some extent, still at the time of discharge about 35% of them were having moderate pain and 65% with mild pain.The outcome of the level of comfort and first bowel movement observed in the present study showed, patients belongs to the group A, where the inguinal never block was used showed a better level of comfort start from the beginning and the first bowel movement and the mobility of the patients were faster compared to the control group B patients. The third observation from the current study related to complications during discharge including the inflammation at injection site, furuncle at injection site, inflammation at surgery site, pain positive, vomiting, retention of urine, catheterization post retention, patients in group B showed more complications compared to group A patients where the levobupivacaine was used as inguinal nerve blocker.Overall the results observed in our current study are in agreement with several other earlier studies where levobupivacaine's use have been demonstrated and recommended by Kakagia, et al., 2007; Burlacu and Buggy, 2008; Kuthiala et al., 2011(31-33).

CONCLUSION:

The results observed from the current study have clearly demonstrated that the level of post-operative pain was significantly less in the patients underwent for open inguinal hernia repair with nerve blocker "levobupivacaine" on compared with the patients underwent for the same procedure but without any never blocker. It was also identified that the comfort and mobility of the patients in the group with nerve blockers are significantly higher along with the early discharge and less post-operative complications compared to the other group of patients. Therefore, based on our study carried out in a tertiary care teaching hospital at Ghaziabad, we could conclude that the use of "levobupivacaine," a nerve blocker could protect the patients from pain in immediate post op management those who are undergoing for open inguinal hernia repair.

There has been no discrepancy with the results by any of the author and co-author.

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