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Compare the inguinal hernia repair under local anaesthesia versus spinal anaesthesia

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Abstract
Background: This work is designed to study that hernioplasty can be performed without trained anaesthetic staff by the operating surgeon and to study that Hernioplasty under local anaesthesia is an acceptable alternative to conventional hernioplasty using spinal anaesthesia.
Materials and Methods: This study is a Comparative Study conducted in 100 patients with inguinal hernia who are willing to take part in the study during the study period in department of general surgery, JNIMS.
Results: The time taken to finish hernioplasty under local anaesthesia was from 30 mins to 58 mins. But the time taken to finish under spinal anaesthesia was prolonged ranging from 50 mins to 96 mins. The mean at 0 hr, 6 hrs, 18 hrs and 30 hrs in group A was found to be 3.30+/-1.15, 1.4+/-0.99, 0.2+/-0.61 and 0.04 +/- 0.2 whereas in case of group B the mean at 0 hr and 6 hrs was 2.12+/-0.72, 0.28 +/-0.54 respectively. The post-operative pain in the group B was significantly less when compared to group A at 0 hr, 6 hrs and 18 hrs (p value < 0.05), there is no significant difference between two groups by the end of 30 hrs.
Conclusion: Inguinal hernia repair with local anaesthesia is quite safe and results in a good success rate.

Keywords: Inguinal hernia, local anaesthesia, spinal anaesthesia

1. Introduction
An inguinal hernia, characterised by a protrusion in the groyne area, is a longstanding medical condition believed to have existed from the beginning of human history [1]. A hernia is the condition when a viscus or portion of a viscus protrudes through an irregular hole in the walls of its enclosing cavity. Inguinal hernias are the most prevalent kind of hernias, and adult inguinal herniorrhaphy constitutes 15% of all surgeries in the field of general surgery. Hernia is best treated with surgery. Failure to have hernia surgery often results in complications and raises the rates of illness and death [2].
Inguinal hernias may be treated either as an outpatient operation or via conventional hospitalisation, when the patient has elective surgery. However, in certain cases, patients may be released shortly after the surgery or after they have fully recovered [3]. Traditionally, patients have been admitted to the hospital for all procedures and kept there until they are able to take care of themselves, walk independently, and until the stitches are taken out. This leads to a growing demand for hospital beds and an extended waiting list for hernia surgery. It exacerbates the financial strain on both the hospital (government) and the patients. Extended hospitalisation often results in problems [4]. Therefore, doing hernia repairs on an outpatient basis has been shown to be a cost-effective approach that improves the quality of surgical treatment and reduces the length of the waiting list.
A significant number of patients are unable to read or write and come from rural and semi-urban areas where the quality of primary services for post-operative care is inadequate. However, nowadays there is a practice of discharging patients from the hospital earlier than before [5]. The implementation of short stay surgery not only alleviates hospital waiting lists, but also offers economic advantages and specific social benefits for patients. Hernia repair may be performed with local, spinal, or general anaesthesia. Both general anaesthesia and spinal anaesthesia have their own set of problems [6]. The operating surgeon has the necessary skills and knowledge to handle prerequisites such as medical fitness, post-operative care, trained personnel, and field block method for hernia surgery.

The incidence of complications and the level of post-operative care required for local anaesthesia are minimal in comparison to typical spinal or general anaesthesia.

The use of day care surgery for inguinal hernia repair has made local anaesthesia crucial, since it effectively minimises both the cost and length of hospital supervision. Local anaesthesia may be used for hernial repair surgeries in regions where there is a shortage of skilled personnel and anaesthesia resources [7-9]. Multiple studies have shown that using local anaesthesia for hernia repair surgery may lead to shorter hospital stays, lower costs, and fewer problems. However, it is important to note that there is currently a significant waiting list for these surgeries. This research aims to investigate the feasibility of doing hernioplasty without the presence of trained anaesthetic professionals, with the operating surgeon taking on the responsibility [10]. Additionally, it aims to assess if hernioplasty under local anaesthesia is a viable alternative to the standard approach employing spinal anaesthesia. This research aims to examine the safety and cost-effectiveness for both patients and hospitals.

2. Materials and Methods

This study is a Comparative Study conducted in 100 patients with inguinal hernia who are willing to take part in the study during the study period in department of general surgery, JNIMS. This study is conducted for 2 years between 1st August 2018 to 31st July 2020. All the cases with age more than 18 years having uncomplicated Inguinal hernia were included. Patients with recurrent and bilateral hernia, Patients with irreducible and incarcerated hernia, Patients with obstructed and strangulated hernia and Patients not willing to participate in the study were excluded.

The study is approved by the ethics board of the Institute and ICMR guidelines for conducting a study. Informed consent is taken from all patients as per annexure 2. The workup protocol for patients with undergoing hernioplasty includes thorough history, meticulous physical examination, routine blood tests and trans-abdominal ultrasonography (USG), ECG, CXR- PA view. Based on this, the treatment modality has been decided. Patients who had inguinal hernia were taken up for hernioplasty after taking the patient's consent. Patient was monitored for intra op and post op events.

All data are entered on a personal computer in Microsoft Excel and transferred to SPSS, 22 versions and analysed.

3. Results

The youngest patient in the group A was 21 years old and in group B was 22 years old. The oldest patient in group A was 71 years old and in group B was 70 years old. The mean age was 45+/-13 years in group A and in group B was 41+/-11 years. Under local anaesthesia, 43 males and 7 females are included and under spinal anaesthesia, 46 males and 4 females are included in the study. The incidence of indirect inguinal hernia was high compared to direct hernia in both the groups. In group A 32 (64%) patients had indirect inguinal hernia and 18(36%) patients had direct hernia. In group B 35 (70%) patients had indirect inguinal hernia and 15(30%) patients had direct inguinal hernia.

The incidence of right sided hernia is higher in LA group compared to SA group while left sided hernia is higher in SA group than LA group. Group A has 36 (72%) patients with right sided hernia and 14 (28%) patients with left sided hernia. Group B has 33 (66%) patients with right sided hernia and 17 (34%) patients with left sided hernia.

The time taken to finish hernioplasty under local anaesthesia was from 30 mins to 58 mins. But the time taken to finish under spinal anaesthesia was prolonged ranging from 50 mins to 96 mins. The mean surgery duration in Group LA is 45 minutes and in Group SA is 66 minutes. Thus the taken for the spinal anaesthesia was significantly prolonged. Hence local anaesthesia was a better choice. (p value < 0.05).

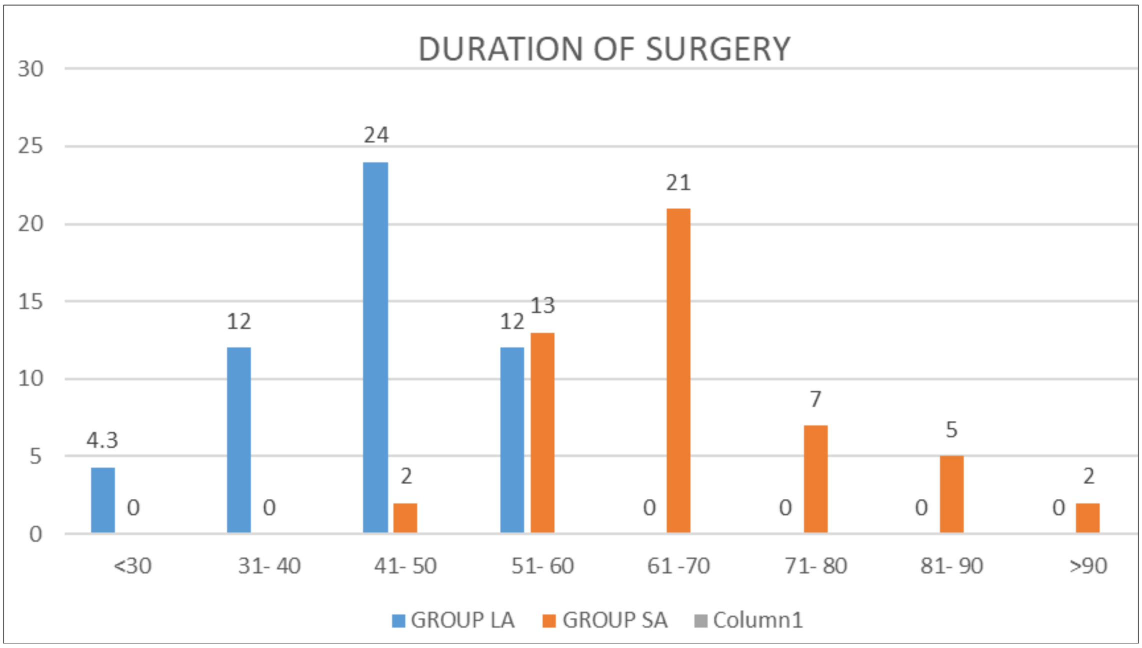

Fig 1: Duration of surgery

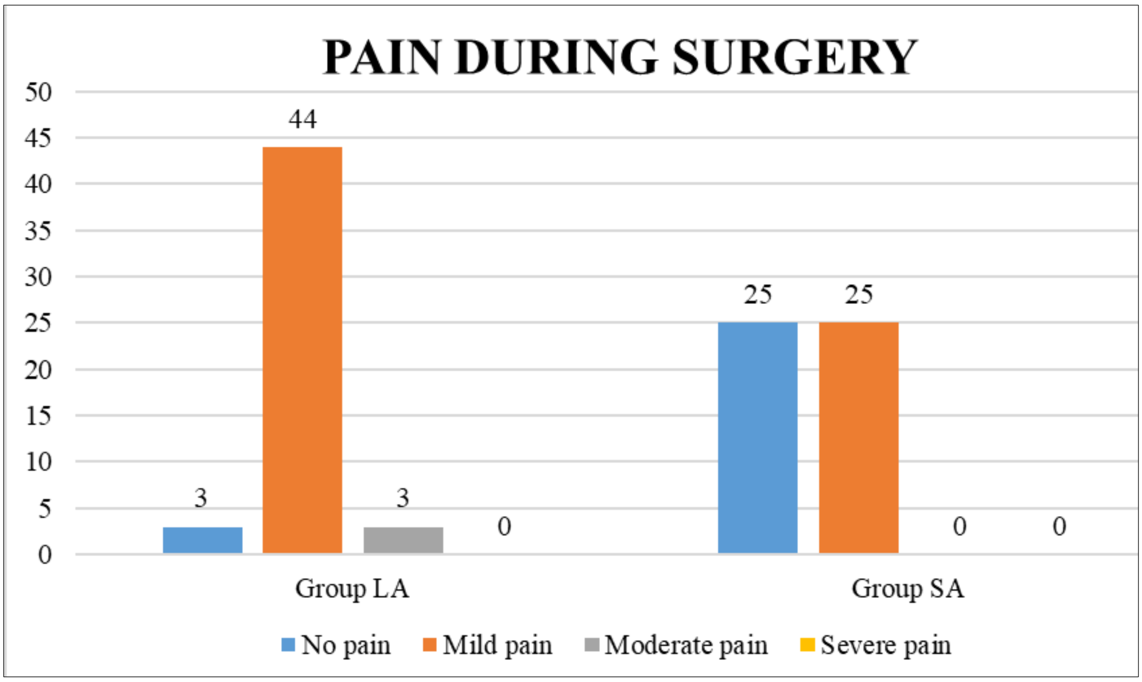

Fig 2: Pain during surgery

Pain was calculated during the surgery and 44 patients (88%) had mild pain in group A and 25 patients (50%) in group B. 3 patients (6%) in group A and 25 patients (50%) in group had no pain. 3 patients (6%) in group A had moderate pain whereas no patients in group B suffered from moderate pain. Severe pain was not felt by any of the patients in group A and group B. Pain was significantly less in group B patients when compared to group A. (p value <0.05) Intra op pain was seen more among the patients who received spinal anaesthesia though severe pain was seen only in one patient who received local anaesthesia.

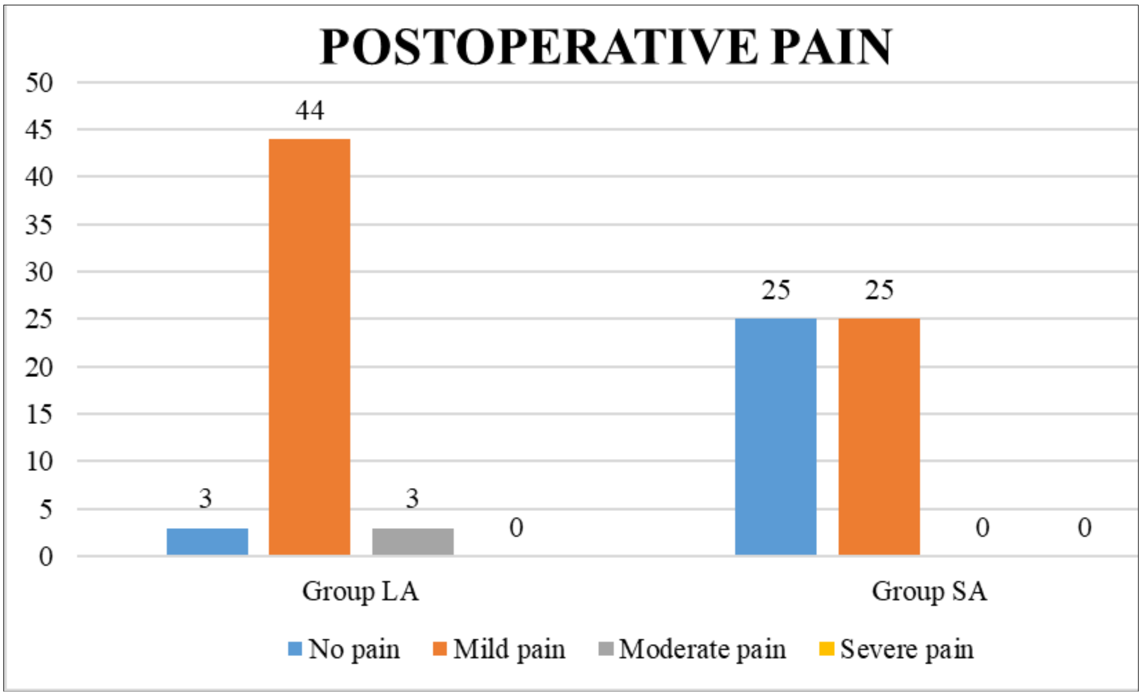

Fig 3: Postoperative pain

Post operative pain was recorded at 0 hour, 6 hours, 18 hours and 30 hours after operation by using visual analogue scale (VAS) pain scoring system. Mean pain was significantly less in group B as compared to group A (p value <0.05). Post op pain score at 0 hr, 6 hrs and 30 hrs was more among the patients who received local anaesthesia. Post op pain was significantly less in group B when compared to group A.

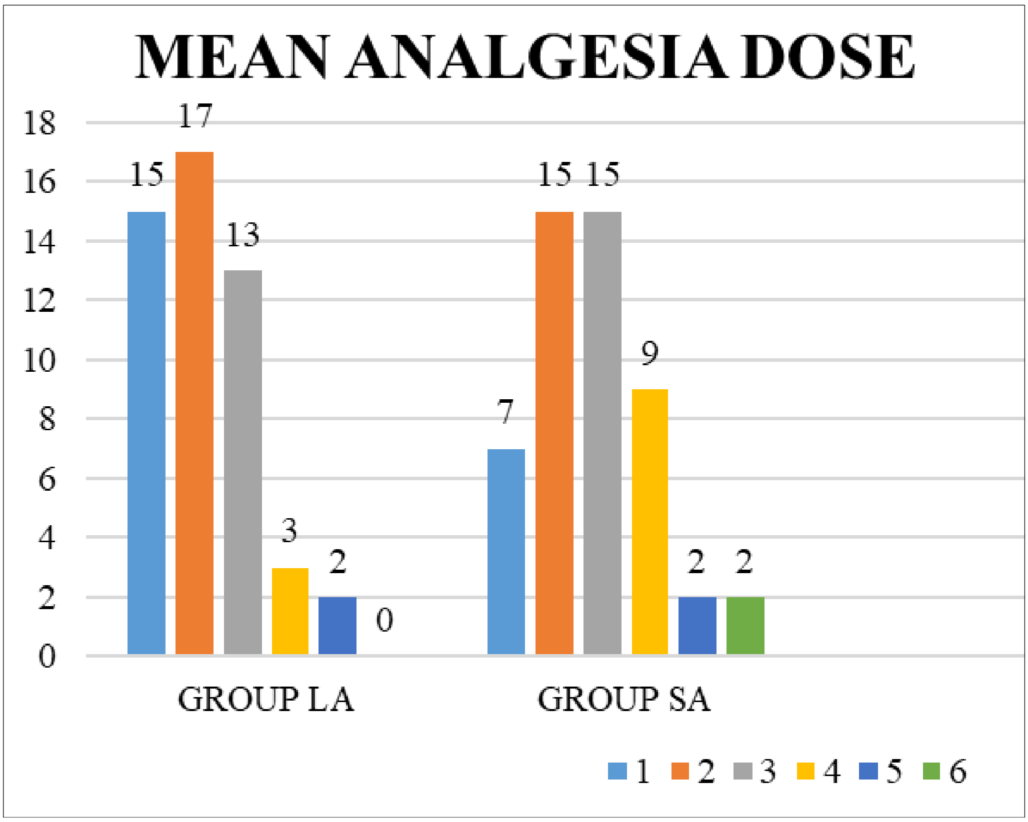

Fig 4: Mean analgesia used

Mean analgesic dose received was statistically significantly less in group A patients (2.2+/-1.17) as compared to group B patients (2.8 +/-1.17) (P value < 0.05). Group A patients received less no of analgesic doses compared to group B patients.

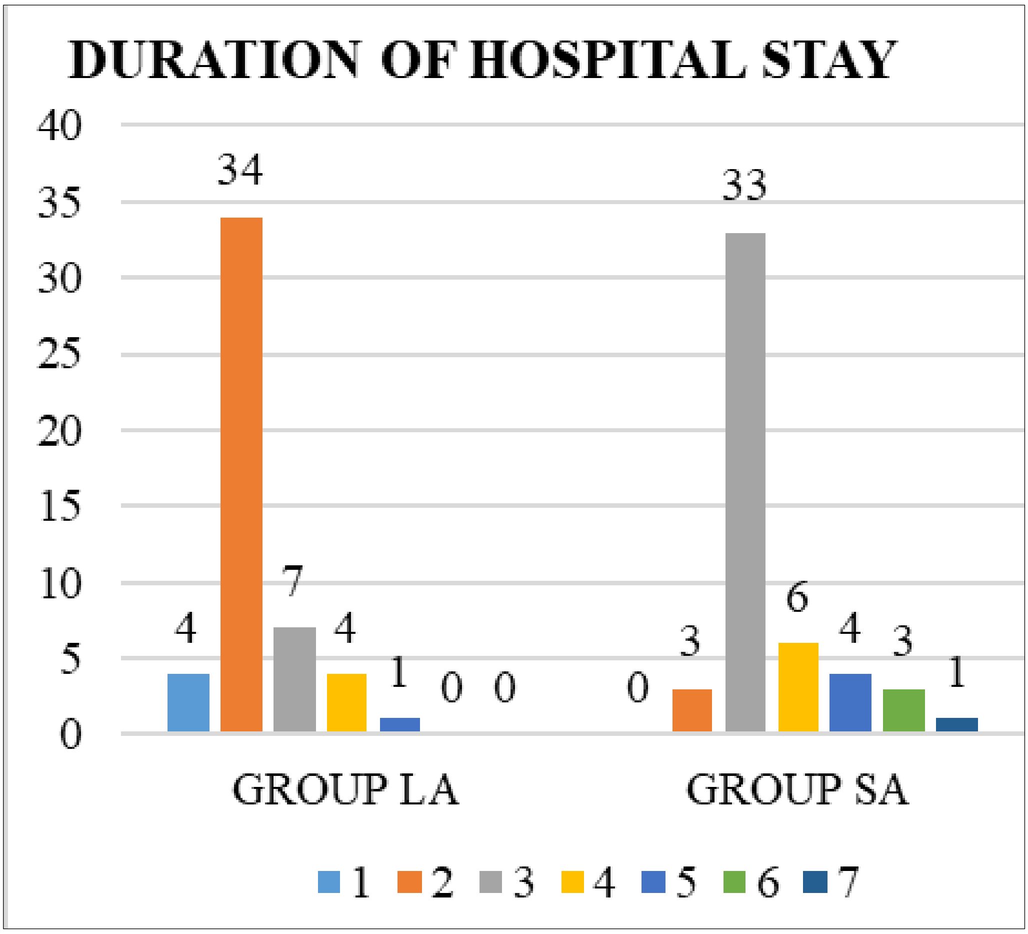

Fig 5: Hospital stay duration

Patients in group A were discharged on the 2nd post operative day whereas patients in group B were discharged on the 3rdand 4thpost operative day. No of days of hospital stay among group A patients was significantly less. The number of days of hospital stay was significantly less in group A when compared to group B (p value < 0.05).

Post op complications like urinary retention; hypotension and post spinal headache was seen more among patients who received spinal anaesthesia. Patients who received local anaesthesia had much less complications compared to spinal anaesthesia.

None of the patients had troublesome haemorrhage during surgery.

Bradycardia noted in 4(8%) patients of LA group & 5 (10%) of SA group. They are treated with injection atropine 1mg iv& heart rate is converted into normal rhythm in 3(6%) patients. (p=0.727).

Hypotension is seen in 5(10%) patients of SA group and was treated with crystalloids & vasopressors. One patient in LA group (2%) experienced hypotension (p=0.022). 7 patients in SA group (14%) & 6 patients (12%) in LA group experienced nausea & Vomiting (p=0.766). 8 patients in SA group (16%) & none in LA group experienced retention of urine which required catheterisation. (p=0.003). 5 patients in SA group (10%) & one in LA group experienced post-operative headache. (p=0.022). 7 patients in SA group (14%) & 6 in LA group (12%) developed seroma in the wound. (p=0.766). 5 patients in SA group (10%) & 6 in LA group (12%) developed scrotal edema. (p=0.749). 3 patients in SA group (6%) & 6 in LA group (12%) developed haematoma in the wound. (p=0.749). 6 patients in SA group (12%) & 4 in LA group (8%) developed wound infection. (p=0.741). Recurrence was not seen in any of the groups.

4. Discussion

Out of studied 100 patients, the youngest patient who underwent hernioplasty under local anaesthesia was 21 years old and oldest was 71 years old. Among the patients who underwent surgery under spinal anaesthesia youngest was 22 years old and the oldest was 70 years old. The mean age was 45 years in group A and 41 years in group B. The incidence of age at presentation of inguinal hernia was maximum between 41-50 years of life (Lousies & Wendell, 47 delvin, 48 Bhola Singh Sidhu 49). These results are comparable with the present study.

In study by Ira 50, 90% inguinal hernia cases were in males & 10% were females, study by Lichtenstein 51 94% were males & 6% females. Occurring at any age males are more commonly affected then females. The study included 50 patients in group A including 43 males and 7 females as well as 50 patients in group B including 46 males and 4 females respectively.

In study by Lousies & Wendall 47, Palanivelu and BK52, the incidence of indirect hernia was more compared to that of direct hernia. In both the groups the incidence of indirect inguinal hernia was high. In group A 32 patients had indirect inguinal hernia and 18 patients had direct inguinal hernia. In group B 35 patients had indirect inguinal hernia and 15 patients had direct inguinal hernia. The incidence was indirect inguinal hernia was common in the age group of 21 to 45 years in group A and 22 to 47 years in group B. Direct hernia was seen in the age group of 47 to 71 years in group A and 39 to 67 years in group B. Direct hernia was common among the older age group as per the study.

In study by Bhola Singh Sidhu49 and Delvin53, incidence of right sided hernia was found to be higher than left sided hernia. In group A, around 36 patients had right sided hernia and 14 patients in had left sided hernia and in group B, 33 patients had right sided hernia and 17 patients in had left sided hernia. Therefore right sided hernia was more common among the study groups.

The time taken to finish hernioplasty under local anaesthesia was from 30 mins to 58 mins. But the time taken to finish under spinal anaesthesia was prolonged ranging from 50 mins to 96 mins. The mean surgery duration under LA is 45 minutes compared to that of 66 minutes under SA. Thus the time taken for the spinal anaesthesia group was significantly prolonged. Hence local anaesthesia was a better choice, when the time taken for surgery is considered. The results of our study are very similar to other studies conducted by Song *et al.* and Job *et al.* when mean operative time was considered.

Pain is the most common concerned factor to the patient undergoing surgery. Although pain is typically regarded as primary indicator of tissue damage, it does not always correlate with an identifiable causative injury. The perception of pain is supported by sensory neurons (nociceptors) and neural afferent pathways. The pain felt during surgery in this study was graded as no pain, mild, moderate and severe pain. The pain was due to dissection of sac and cord in case of huge hernias and chronic hernias where adhesions are usually found. Meticulous dissection of ilioinguinal nerve reduces the pain in patients postoperatively. The results were as follows. In group A around 3 patients had no pain, 44 patients had mild pain, 3 patients had moderate pain and no one had severe pain whereas in group B 25 patients had no pain, 25 patients had mild pain and no patients had moderate or severe pain. Hence the pain felt during surgery was significantly higher in patients who underwent repair under local anaesthesia compared to those under spinal anaesthesia.

The study conducted by Earle AS (1960) on 46 patients showed 23 (50%) patients experienced slight pain and remaining 23 (50%) felt no pain during inguinal hernia repair under local anaesthesia. Study done by Baskerville PA *et al.* (1983)37 on 129 patients operated under local anaesthesia demonstrated that 93% patients felt no pain during operation and 7% said operation was painful. Pain during operation is felt in case of large hernia operated under local anaesthesia, if dissection is difficult due to adhesions of the sac, and this may lead to conversion of local anaesthesia to general anaesthesia. If local anaesthesia is given by experienced surgeon, it is well accepted by the patients. Studies done by Wellword *et al.* (1998), Amid PK *et al.* (1998), Song D *et al.* (2000), Callesen T *et al.* (2001) demonstrated that conversion of local anaesthesia to general anaesthesia was because of pain during dissection or reposition of the hernia sac.

The post-operative pain in patients is due to excessive tissue handling, wound infection/hematoma, urinary retention, and traction on tissues. Post-operative pain in these patients was assessed based on the Visual Analogue Scale. Here in our study pain was assessed from (1-10) at 0 hr, 6 hrs, 18 hrs and 30 hrs. The mean at 0 hr, 6 hrs, 18 hrs and 30 hrs in group A was found to be 3.30+/-1.15, 1.4+/-0.99, 0.2+/-0.61 and 0.04 +/- 0.2 whereas in case of group B the mean at 0 hr and 6 hrs was 2.12+/-0.72, 0.28 +/-0.54 respectively. No pain was seen in any of the patients in group B at 18 hrs and 30 hrs. Here in our study though the post-operative pain in the group B was significantly less when compared to group A at 0 hr, 6 hrs and 18 hrs (p value < 0.05), there is no significant difference between two groups by the end of 30 hrs. Post-operative pain is due to traction on certain tissues particularly peritoneum, inadequate analgesia, urinary retention and wound infection. It follows the known distribution of the regional nerves including ilioinguinal, iliohypogastric and genital branch of genitofemoral nerve. It can be prevented by meticulously avoiding excess manipulation of the nerves. Post-operative pain was scored with visual analog scale. Pain immediately after operation was assessed by dosage of analgesic consumption.

The number of analgesic doses received postoperatively was compared between both the groups in the study. In group A 15 patients (30%) received one analgesic dose, 17 patients (34%) received two analgesic doses post operatively and 13 patients (26%) received three analgesic doses, 3 patients (6%) received four doses and 2 patients received 2 analgesic doses post operatively. But in group B 7 patients (14%) received one analgesic dose, 15 patients (30%) received two analgesic doses, 15 patients (30%) received three analgesic doses, 9 patients (18%) received four analgesic doses, 2 patients (4%) received five analgesic doses and another 2 patients (4%) received six analgesic doses postoperatively. Therefore the mean analgesic dose received was statistically significantly less in group A (2.2+/-1.17) when compared to group B (2.8 +/-1.17) with (p value < 0.05). The post-operative analgesic dose required was less as the local anaesthesia given during the surgery had long postoperative analgesic effect. The incidence of post-operative complications like wound sepsis, hematoma, testicular pain, urinary retention, headache, recurrence was considered. Urinary retention was thought to be due to autonomic blockade which was common in spinal anaesthesia group. Mesh infection was less in group a compared to group B. (p value < 0.05) Therefore local anaesthesia is better anaesthesia in the modern day practice.

Post-operative recurrence was also not seen in any patient as proper surgical technique does reduces the chances of recurrence. Among group B 8 patients (16%) had urinary retention, 5 patients (10%) and 5 patients (10%) had headache which was not seen in any of the patients in group A and was found to be statistically significant. Other local complications like wound haematoma, scrotal edema, seroma, wound infection and systemic complications like bradycardia, nausea or vomiting was comparable in both the groups. Patients who had urinary retention was relieved by catheterisation in four patients. Hence post-operative complications were significantly less in group A when compared to group B (p value < 0.05)

According to the study performed by Shulman AG *et al.* there was no incidence of mesh infection in the patients.

In the study conducted by Kark AE *et al.* the mortality was reported to be nil and the overall sepsis rate was found be around 0.9% which was consistent with our study. In previous studies infection occurred in 7.8% cases (T.B Burke, 1978), 5.9% of cases (MaxemoDeysine, 1991), 1.2% of cases (B Millant 1993), upto8%of cases (Allen E Kark 1998), & 2% cases in (T Faish 2000). These are similar to the present study & are comparable with the previous studies. The number of days of hospital stay was compared in both the groups and among the patients who underwent hernioplasty under local anaesthesia 4 patients (8%) were discharged in 24 hours, 34 patients (68%) in 48 hours, 7 patients (14%) on day 3, 4 patients (8%) on day 4 and one patient (2%) on day 5. 39 patients in group A had no complications and had no pain after 24 hours and hence discharged. On follow up the post-operative period was uneventful and wound was healthy and there was no recurrence. Whereas in group B no patients were discharged on day 1, 3 patients (6%) on day 2, 33 patients (66%) on day 3, 6 patients (12%) on day 4, 4 patients (8%) on day 5, 3 patients on day 6 and one patient on day 7. So group B patients had to stay for a longer time in the hospital. This was related to the complication related to spinal anaesthesia which delayed the time of discharge in these patients. Urinary retention and headache seen in group B patients attributed to the longer stay in the hospital and the post-operative pain which was more in group B led to the delayed time of discharge. So the number of days of stay in hospital was significantly less in patients who local anaesthesia. When cost effectiveness of the procedure was considered the patients in group A had less complication, less analgesic doses required, local anaesthesia was used during the surgery, less number of days of stay in hospital.

5. Conclusion

Inguinal hernia repair with local anaesthesia is quite safe and results in a good success rate. Both local & spinal anaesthesia can be used for hernia repair on short stay bases, but spinal anaesthesia has higher complication rates compared to local anaesthesia. When short stay service is implemented there will considerable savings to hospital service & to the patients.

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