

Comparative Study of Hernia Block with Bupivacaine Alone and Bupivacaine plus Dexamethasone as Adjuvant for Open Hernia Repair at Day Care Unit

Usha P.Patel^{1*}, Pritesh R. Patel²

¹Consultant Anaesthetist, Shree raj hospital, Drive in road & Bopal, Ex. Assistant professor AMCMET Medical College, Sheth L.G. General Hospital Ahmedabad, Gujarat

²Consultant surgeon, Shree Raj Hospital Drive in road and Bopal, Ahmedabad, Gujarat

***Corresponding author:** Usha P. Patel, Consultant Anaesthetist, Shree raj hospital, Drive in road & Bopal, Ex. Assistant professor AMCMET Medical College, Sheth L.G., General Hospital Ahmedabad, Gujarat; E-mail: drpiyushpujara@gmail.com; doctorushapatel@gmail.com

Abstract

Introduction: Continuous research were undertaken in past to see the effect of anesthetic agent with adjuvant agents to increase their effect. The addition of adjuvant substances as clonidine, Dexmedetomidine, tramadol, midazolam, opioids, adenosine, to the local anesthetic drugs in TAPB and their efficiency have been studied. Hence the aim of the present study was to check the effect of Bupivacaine alone and Bupivacaine plus Dexamethasone in hernia block.

Material & Methods: The total of 60 patients with age range from 30 to 60 years was included in the study. All the 60 patients were divided in to two groups, with 30 patients in each group. Group 1 consisted of 30 patients were administered with 20 ml of 0.5% bupivacaine in a TAP block performed at the same side of surgery to be performed. Group II consisted of 30 patients; were administered with 20 ml of 0.5% bupivacaine with 2 ml of dexamethasone in a TAP block performed at the same side of surgery.

Results: In the present study, the duration of analgesia was found to be significantly longer in the Group II when compared to Group I. VAS scores done 30 minutes after surgery were comparable between the 2 Groups. However the difference was found to be statistically significant.

Conclusion: Appropriate pain treatment protocols to reduce postoperative morbidity, improve the results of the surgery and decrease hospital costs. Adequate postoperative pain relief is associated with positive long-term effects for patients such as; reduced postoperative cognitive changes, better quality of life and reduced risk of chronic or persistent postoperative pain. On reviewing the literature it was found that local anesthesia has more advantages compared to other kind of anaesthesia. A potential advantage of local anesthesia realized without any monitoring or additional drugs administered intravenously.

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Introduction

Open Inguinal hernia is one of the most commonly performed surgical procedures in elderly. Treatment of this type of pathology is exclusively surgical and relies always on the contribution of local anaesthesia. This type of anaesthesia has significantly improved the treatment of inguinal hernia, which has significantly reduce the complications, recurrences, recovery time and can return to normal working activities^[1,2]. Most of the surgery involves a tension free mesh repair for the hernia. Patches are sewn over the weakened area in the abdominal (belly) wall after the hernia is pushed back into place. The patch decreases the tension on the weakened belly wall, reducing the risk that a hernia will recur^[3,4].

The surgery of the hernia is performed under different anaesthetic techniques as described as general or regional anaesthe-



sia, which is many times associated with post operative severe pain. The amount of pain experienced is related to the somatic pain signal which is derived from the abdominal wall. The anterior abdominal walls are supplied by sensory neurons which are derived from the anterior rami of spinal nerves T6 to L1^[5,6].

Post operative pain and swelling over the incision are the common complications encountered. Post operative pain leads to increased consumption of anesthetic agents, which increases the risk of adverse effects of anesthesia especially emesis, vomiting and respiratory depression; reduces the advantages of immediate surgery and increases the hospital stay^[7].

The transverse abdominal plane block first described by Rafi in 2001 is a peripheral nerve block designed to anesthetize the nerves supplying the anterior abdominal wall (T6 to L1). The introduction of ultrasound has allowed providers to identify the appropriate tissue plane and perform this block with greater accuracy under direct visualization^[8]. TAP block has also found clinical utility in procedures such as abdominal and inguinal hernia repair, radical prostatectomy, nephrectomy, and many different laparoscopic procedures in general. Very few contraindications exist to performing a TAP block. Absolute contraindications include infection at the site of injection, patient refusal or inability to cooperate, and allergy to local anesthetics.

Among all anesthetic agents bupivacaine is used as a local anesthetic and is available in sterile solution for injections via local infiltration and TAP block. However to increase the effect and to maintain longer duration of the anesthetic pain continuous research is undertaken, so that patient comfort can be increased^[9]. Continuous research was undertaken in the past to see the effect of anesthetic agent with adjuvant agents to increase their effect. The addition of adjuvant substances such as clonidine, Dexmedetomidine, tramadol, midazolam, opioids, adenosine, to the local anesthetic drugs in TAPB and their efficiency have been studied. Hence the aim of the present study was to check the effect of Bupivacaine alone and Bupivacaine plus Dexamethasone in hernia block.

Materials and Methods

The present study was carried out at the medical institute in Gujarat. Before the study, the ethical committee of the institute was informed and ethical clearance certificate was obtained. All the participating patients were informed prior to the study and informed consent was signed by all the patients. Only those patients who signed the informed consent were included in the study. The total of 60 patients with age range from 30 to 60 years was included in the study.

All the 60 patients were divided into two groups, with 30 patients in each group. Group I consisted of 30 patients who were administered with 20 ml of 0.5% bupivacaine in a TAP block performed at the same side of surgery to be performed. Group II consisted of 30 patients; were administered with 20 ml of 0.5% bupivacaine with 2 ml of dexamethasone in a TAP block performed at the same side of surgery.

Before the patients were undertaken for surgery, prior history was taken, clinical examinations of history recording was done. Routine lab tests were completed and recorded. All the patients were prior informed about the study and also the TAP block procedure. All the patients were asked to fast for at least 6 hours before surgery. Patient was pre-medicated with injection

midazolam 0.02 mg/kg body weight.

The needle was inserted perpendicular to the skin just above the highest point of iliac crest, in the posterior axillary line where a depression was felt. Needle was inserted slowly until a pop was felt - indicating the needle piercing the external oblique fascia. The needle was further advanced until a second pop was felt - indicating the needle piercing the internal oblique fascia and entering the transverse abdominal plane.

Before administration of the anesthetic agent, negative aspiration was checked to rule out the vascular involvement. After the confirmation of the negative aspiration 20 ml of 0.5% bupivacaine was administered into TAP in group I whereas in group II 20 ml of 0.5% bupivacaine with 2 ml of dexamethasone in a TAP block. Time taken for onset of sensory block is taken as the time gap between the end of injecting local anesthetic to loss of sensation above the injected site and time for complete sensory and motor blockade (T10 – L1) was recorded. Post-operative readings were taken every 2nd hourly, until the patient asked for first rescue analgesia. VAS (Visual analogue scale) score was also recorded at the time of rescue analgesia. All the patients were kept awake throughout the procedure. At the end of the study, following parameters were measured. For pain assessment, VAS scale was measured, Duration of analgesia, patient satisfaction and lastly any post operative complications.

Data were recorded and analysed with SPSS software. Qualitative data were described using number and percent. Distribution of qualitative data was done by Chi square test.

Results

Student t-test has been used to find the significance of study parameters on a continuous scale between two groups. Inter group analysis on metric parameters. Chi-square test has been used to find the significance of study parameters on a categorical scale between two or more groups. A total of 60 patients were included in the study. All the patients were divided into two groups namely: Group I: 30 patients and Group II: 30 patients. **Table 1** described the duration of analgesia in both the groups. In the present study, the duration of analgesia was found to be significantly longer in the Group II when compared to Group I ($p < 0.001$).

Table 1: Duration of analgesia.

Duration of analgesia (Hrs)	Group I n (%)	Group II n (%)
1 – 5 hrs	0	0
6 – 10 hrs	22 (73.3)	4 (13.3)
11 – 15 hrs	4 (13.3)	8 (26.6)
16 – 20 hrs	4 (13.3)	12 (40)
> 20 hrs	0	6 (20)
Total	30	30

A total of 60 patients were recruited for the study. Age and gender were comparable in between the groups. VAS scores done 30 minutes after surgery were comparable between the 2 groups. However the difference was found to be statistically significant. [Table 2]

In **Table 3** we have evaluated complications of treatment. In the first group I six patients experienced nausea, six vomiting, one itching, and one infection. Instead in the group

II, four patients experienced nausea, three vomiting, one itching and one infection. The difference between the two group was found to be statistically significant. In the **Table 4** overall satisfaction by the patient is evaluated. It was assessed using a scale of five levels. In group I twenty patients said they have been absolutely satisfied, six very satisfied, two moderately satisfied, two satisfied and no one has been disappointed. In the second group, twenty-five patients have been absolutely satisfied, three have been very satisfied, two satisfied moderately satisfied, no one disappointed. The difference was found to be statistically significant with $p < 0.05$.

Table 2: VAS Score.

VAS score	Group I n (%)	Group II n (%)
0	6 (20)	3 (10)
1	6 (20)	8 (26.6)
2	8 (26.6)	14 (46.6)
3	10 (33.33)	5 (16.6)
Total	30	30

Table 3: Post-operative complications.

Complications	Group I n (%)	Group II n (%)	P value
Nausea	6 (26.6)	4 (13.3)	0.02
Vomiting	6 (26.6)	3 (10)	
Infection	1 (3.3)	1(3.3)	
Itching	1 (3.3)	1(3.3)	

Table 4: Degree of patient's satisfaction.

Patient's Satisfaction	Group I	Group II	P Value
Absolutely satisfied	20 (66.66)	25 (83/33)	0.03
Very satisfied	6 (26.6)	3(10)	
Moderately satisfied	2 (6.6)	2 (6.6)	
Satisfied	2 (6.6)	0	
Disappointed	0	0	

Discussion

Hernia is an abnormal protrusion of a viscus or part of it through a normal or abnormal opening in a cavity, usually the abdomen. They are most commonly seen in the groin; a minority are paraumbilical or incisional. In the groin, inguinal hernias are more common than femoral hernias^[10,11].

Inguinal hernia is one of the most common conditions met with in surgical practice. The male-female ratio is greater than 10:1. Life time prevalence is 25% in men and 2% in women. Two-thirds of inguinal hernias are indirect and nearly two-thirds of recurrent herniae are direct^[12]. Post-operative pain after inguinal hernia lead to the increased consumption of analgesics, delayed bowel function and increase the requirement for rescue analgesics which raises the risk of adverse effects especially respiratory depression, emesis and sedation, which can lead to increased duration of hospital stay and thereby reduce the advantages of fast-track surgery^[13].

Appropriate pain treatment protocols to reduce post-operative morbidity, improve the results of the surgery and decrease hospital costs. Adequate postoperative pain relief is associated with positive long-term effects for patients such as; reduced postoperative cognitive changes, better quality of life

and reduced risk of chronic or persistent postoperative pain^[14,15].

On reviewing the literature it was found that local anesthesia has more advantages compared to other kind of anaesthesia. A potential advantage of local anesthesia realized without any monitoring or additional drugs administered intravenously.

The aim of the present work is to evaluate the effect of pre-emptive dexamethasone added to bupivacaine on post-operative pain in patients, time of the first request for additional analgesia. Pain scores, post operative complications and patient satisfaction. The demographic data was matched between the two groups.

This study is the first to examine the effect of dexamethasone on plain bupivacaine for in patients with hernia. We observed that prolongation of block duration was 1.5 to 2 times when dexamethasone was added as an additive to plain bupivacaine. This block prolongation was also observed when dexamethasone was combined with mepivacaine. Similarly, K. C. Cummings 3rd et al., also observed that, dexamethasone significantly prolonged the duration of ropivacaine and bupivacaine when used for the interscalene block. However, the existing literature supports the clinically important benefit we observed in our study.

Elderly patients with hernia are more prone to delirium because of pain and medications. Adequate analgesia not only prevents delirium but also, allows increased mobility and shorter hospital stay. Third point, postoperative complications. In group I, 20% experienced symptoms such as nausea and / or vomiting, 5% itching, 2.5 % infection. In group II, 15% noted nausea and / or vomiting, 5% itching, 2.5% infection. Group I shows a significantly higher number of complications, as already demonstrated by previous studies.

Fourth point, overall satisfaction, patients in group II have been absolutely satisfied for 60 % 20% very satisfied. 10 % moderately satisfied, 10 % satisfied and 0 % disappointed. Instead patients in group II expressed 70% complete satisfaction, 20 % have been very satisfied, 10 % moderately satisfied, 10 % satisfied and 0 % disappointed. In neither of the two groups we have found any signs of toxicity by anesthetic agent.

Conclusions

Addition of dexamethasone to bupivacaine in patients receiving plain block guided for inguinal hernia repair result in, longer time till first opioids requirement, prolonged the duration of the block, less requirement for opioids, patients more satisfied and decreased the incidence of nausea and vomiting.

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