ORIGINAL ARTICLE

Comparative outcome of Open hernia repair with and without Local infiltration of Bupivacaine in tertiary care hospital

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ABSTRACT

Aim: o compare the outcome of open hernia repair with and without Local infiltration of 20ml of 0.25% inj. bupivacaine in terms of post operative pain, mobilization and recovery
Design: Randomised control trial
Place and duration of study: Department of Surgery, Fatima Memorial Hospital, Shadman, Lahore, from September 2014 to September 2016.
Methods: Hundred patients coming for open inguinal hernia repair were randomized by convenient sampling. Patients were divided into 2 groups, 1 and 2, with local infiltration of 20ml of 0.25% bupivacaine solution and without, respectively. Patients were assessed for intensity of pain using the categorical visual pain scale, on demand analgesic dose, mobilization, complications and hospital stay by investigator .The results were analyzed on SPSS 12 computer program. Student's T test and Chi-square test applied for statistical analysis. The P-value will be considered significant of less than 0.005.
Results: In the study, group (1) as compared to the group (2), patients remained free of pain at 2 hours (84%) and 6 hours (74%) and required less systemic analgesics. They were mobilized with in twenty hours (90%) after the procedure; therefore, 80% were discharged from hospital within two days.
Conclusion: Wound infiltration with long acting local anesthetic Bupivacaine results in low pain scores, early mobilization and hence early return to work after open inguinal hernia repair
Key words: Inguinal Hernia, Post operative pain, Bupivacaine

INTRODUCTION

Pain is the subjective cultural experience influenced by cultural learning, the meaning of situation, attention and other psychological variables. Many, if not most of the ailments of the body cause pain and especially it is common consequence after surgery[1]. Every individual has a different response and threshold for the same amount of pain stimulus[2]. The alleviation of post operative pain is primarily provided to reduce adverse influence on organs and to allow more rapid recovery and early return to normal activities[3].

NSAIDs have analgesic, antipyretic and anti-inflammatory properties. But, they can cause gastrointestinal irritation, bleeding, and changes in the immune response, changes in the function of the renal, hepatic, and Nervous system and may interfere with the process of parturition and clotting. Intramuscular route is associated with the formation of abscesses[4].

Opioids are given by several routs and effects than may interfere with rapid recovery after surgery include paralytic ilieus, urinary retention and mental impairment[5,6]. Opioids administration is limited by respiratory suppression, hemodynamic instability, cost of apparatus, catheter related sepsis, and dependence[7,8].

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Local anesthesia as a group has an established place in the management of post-operative pain[9]. Local blocks are increasingly popular reducing surgical stress and morbidity[10]. They have been used topically for pain control. Bupivacaine has a longer duration (6 to 8 hours) of action and has been used in Breast lump excision, minor gynecological laparotomy and inguinal hernia repairs[11,12]. It has also been used through intraperitoneal administration for control of post operative pain after abdominal surgery and has been effective in Cholecystectomy and thoracotomies[13,14]. Wound infiltration with a local anesthetic is a simple, safe, and easy technique with good analgesia and less systemic toxicity[15,16].

As the local agent used should have minimal toxicity and prolonged analgesic effect; the liposomal encapsulation of bupivacaine significantly prolongs the duration of action with greatly decreased systemic toxicity. Local bupivacaine has got no effect on plasma cortisol and plasma glucose levels. It does not prevent the inflammatory response to surgery. Its infiltration during inguinal hernia operations has been found to be simple, safe and effective.

Present study highlights the role of local infiltration of bupivacaine in control of postoperative pain, early mobilization and recovery after surgery.

MATERIALS AND METHODS

This study was conducted at the department of general surgery, Fatima Memorial Hospital, Lahore confining 100 patients that were operated for inguinal

hernia between September 2014 and September 2016. After getting approval from hospital ethical committee all the selected patients were informed about the procedure. All the patients were male and randomly selected from out-patient department. Patients with any co-morbid condition like hypertension (HTN), Diabetes Mellitus (DM), ischemic heart disease (IHD) and hypersensitivity to agent used were excluded from the study. Randomization was done by lottery methods in two groups: group 1 for local infiltration and other as group 2 without local infiltration. Each group contained 50 patients. Written fully informed consent was taken before operation.

All the patients were given routine pre-medications. The anesthesia was induced by propofol and Suxamethonium intravenously. It was maintained with sevoflurane and Oxygen, with nitrous oxide gas. All the patients received Nitrous oxide gas as analgesic during surgery, it's effect is short lived once further administration is stopped. After that no analgesia was given to the patients at the end of the surgical procedure, as it could mask the effect of bupivacaine in study group and could interfere with comparison between two groups.

Bupivacaine is available as isotonic sterile solution in strength of 0.5% the pH of 4-6.5, containing 100mg in a 20ml vial. Strength of the solution was reduced to 0.25% by adding equal amount of isotonic normal saline. Bupivacaine was infiltrated in dose of 2mg/kg subcutaneously and in between the muscles before closure of skin.

All the data of the patients were recorded on a Performa designed for the study and variables were recorded. Postoperatively, pain at the incision was assessed at intervals of two hours and six hours by observers trained in using categorical visual pain scale.

On demand (as assessed by pain intensity on categorical visual pain scale) analgesic dose was recorded for each patient. This was given in the form of Diclofenac Sodium 3ml intramuscular in every case. Mobilization time was taken as return to normal activities (sitting up, getting out of bed, going to toilet without any support). This period was further subdivided into 10 hours, 10 to 20 hours and more than 20 hours intervals. Complications, especially related to pain, and duration of stay in hospital were recorded.

RESULTS

Age distribution was almost same in both groups (Table 1). Mean age of 39 years for group 1 and 38.5 years for group 2. At two hours, in group 1 (with bupivacaine infiltration), 84% patients (42/50) were pain free. In the remaining eight patients, 10% patients (5/50) experienced mild pain, 4% patients (2/50) had moderate pain and remaining 2% patients (1/50) had severe pain, on categorical visual pain scale (Table 2).

At two hours, in group 2 (without bupivacaine infiltration) none of the patients were pain free and neither was in category of mild pain also. Moderate pain was felt by 26% patients (13/50) and 74% patients (37/50) felt severe pain (Table 2).

Table 2 also shows the pain free patients in both the groups at six hours interval. For "No pain" assessment, difference between two groups was significant (P<0.001) after two and (P<0.001) after six hours. For mild pain assessment, difference between two groups was insignificant. For moderate and severe pain assessment there was significant difference between two groups after two hours (P< 0.005) and after six hours (P< 0.001) and (P< 0.002). In group-1 (with bupivacaine infiltration) 26% patients (13/50) were mobile within 10 hours while none was so among the group-2 (P< 0.001). Between ten and twenty hours, 64% patients (32/50) in group-1 and 14% patients (07/50) in group-2 were mobile (P<001). Among those patients who got mobilized after twenty hours, 10% patients (5/50) were in group-1 and 86% patients (43/50) in group-2 (P<0.001) (Table 3).

Table-1 Distribution of Age in Groups

Age (Years)	Group-1	Group-2
13-20	3(6%)	1 (2%)
21-30	8(16%)	11 (22)
31-40	20(40%)	22 (44)
41-50	11(22%)	9 (18)
51-60	6(12%)	4 (8)
61 & above	2(4%)	3 (6)

Table 2: Assessment of pain.

Pain Assessment	Severity	Group-1	Group-2
2 HOURS			
No pain	-	42 (84)	50 (100)
Pain	Mild	5 (10)	Zero
	Moderate	2 (4)	13 (26)
	Severe	1 (2)	37 (74)
6 HOURS			
No pain		36 (72)	50 (100)
Pain	Mild	7 (14)	17 (34)
	Moderate	4 (8)	21 (42)
	Severe	3 (6)	12 (24)

Table 3: Mobilization time

Time in Hours	Group-1	Group-2
<10	13(26%)	Zero
10-20	32(64%)	07(14%)
>20	05(10%)	43(86%)

Table 4: Hospital stay (days)

Day of Discharge	Group-1	Group-2
1st POD	Zero	Zero
2nd POD	40(80%)	02(4%)
3rd POD	03(06%)	21(42%)
>3rd POD	07(14%)	27(54%)

Table 5: Complications

Complications	Group-1	Group-2
Wound Infection	03	16
CNS Toxicity	01	0
Chest Infection	0	0
UTI infection	0	0
GIT disturbance	2	9

No patient was discharged on 1st postoperative day. In group 1 seven patients (14%) were discharged on 2nd postoperative day, forty patients (80%) on day three and only three patients (6%) were discharged after three days. In group-2 four (9%), twenty one (42%), and twenty seven (54%) were discharged from hospital on day two, three, and after three days respectively.

There was a significant difference in the two groups in the 2nd and 3rd post-operative day regarding their discharge from the hospital (P< 0.001). There was a significant difference (P< 0.001) between two groups in more than three post-operative days of hospital stay (Table 4). Complications were also less in study group-1 (Table 5).

DISCUSSION

Pain has many physiological, psychological, and behavioral effects but most important are limitations of respiratory efforts and suppression of cough, which prevent effective clearance of secretion after surgery leading to atelectasis and basal bronchial pneumonia. Immobility due to pain may lead to thromboembolism and muscle fatigue. Pain results in increased duration of hospital stay exposing the patient to nosocomial infections and imposing additional cost to patient[17,18].

Bupivacaine infiltration has been used for minor surgical procedures without side effects and with prolonged analgesia.[19] In patients undergoing surgery, with a mild to moderate extent of surgical stimulation, data suggests that wound infiltration with bupivacaine provides superior analgesia compared with the control group with or without placebo[20,21]. It is considered appropriate for day case surgery due to excellent post operative analgesia[22]. The recent trend is to employ combined, balanced, multimodal analgesia with NSAIDs, Opioids and local anesthetic agents[23,24].

Present study found that in group-1 (with bupivacaine infiltration), most of the patients were pain free during first three hours; 84% at 2 hours and 72% at six hours. This observation is clinically very significant as it translates into total avoidance of NSAIDs, with then systemic ill effects. No patient in group-2 remained pain free during six hours period. In the remaining patients of Group-1 (with bupivacaine infiltration), most were having only mild intensity pain, 62.5% (5/10) at two hours and 50% (7/14) at six hours. In the group-2, 74% patients were in severe pain at two hours, while at six hours; 42% patients were still experiencing moderate pain. Decreased pain intensity is clinically significant, as it decreases total amount of systemic analgesics.

Majority of patients in group-1 (with bupivacaine infiltration) remained pain free or had only mild pain; as a result 90% were mobile within 20 hours of surgery. The higher intensity of pain in group-2 resulted in delayed mobilization. Eighty six percent of patients became mobile only after twenty hours of surgery in this group. These observations are clinically important and have significant effect on recovery and complication rate.

No patient was discharged on 1st postop day (this is usual because of lack of community health services in Pakistan). In group-1 (with bupivacaine infiltration) ninety four percent of patients were discharged within 3 days after surgery. It included seven patients on 2nd postoperative day, forty patients on day three and only three patients (6%) were discharged after three days. In the group-2, twenty one (42%) and twenty seven (54%) patients were discharged from hospital on day three and after day three respectively. Pain free patients mobilized early this resulted in shorter hospital stay, which is clinically significant in reducing infection rate. This is also important in early return to work and partly off sets the cost of inj. Bupivacaine.

Complications were also less in group-1 (with bupivacaine infiltration), which were partly explained by better analgesia and early mobilization. These require further studies.

The aim is to treat pain preemptively rather than on need basis. Local anesthesia as a group has an established place in management of postoperative pain[9]. The Gate Control Theory of pain formed the theoretical basis for this study[22,25]. Two approaches to wound infiltration exist. One is pre-incision i.e., before starting surgery and the other is post-incision (at the end of surgery before closing the wound, as we have done in our study).The subcutaneous infiltration can be given as a single administration, as in this study, or in an intermittent fashion via an indwelling subcutaneous catheter. Later has more chances of wound infection[26].

The suggestion of preoperative wound infiltration was studied but the results of studies investigating the preoperative effect of the local infiltrations were discouraging[21]. Another study reported significant reduction in the dose of supplementary analgesia in the postoperative period when wound infiltration and bilateral inguinal nerve block performed after cesarean section[23].

Bupivacaine decreases the need for postoperative narcotic analgesia. Researchers concluded than many patients would benefit from intra-operative injection of local anesthetic. This information can affect patient care outcomes through

decreasing recovery time and reducing postoperative pain[25]. Instillation of bupivacaine during wound closure prolongs the first time to analgesia, reduces early postoperative Opioids requirements and lowers pain in males undergoing open hernia repair[27].

In randomized control studies involving minor surgical procedures, wound infiltration with local anesthetics provide superior analgesia, better pain scores and superior reduction in extra-analgesic consumption compared with control group. Long acting local anesthetics were preferred due to their better analgesic effects.

There have been newer advancements in the management of post operative pain relief as the surgical techniques are developing. Wound infiltration with long acting local anesthetic agent at the time of wound closure leads to subsequent benefits of early mobilization and early recovery due to better analgesic effects. Therefore we recommend this procedure for routine use in open inguinal hernia repair procedures.

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