A Comparison of Bupivacaine Instillation and Ultrasound Guided Field Block for Post-Operative Pain Relief in Inguinal Hernia Repair

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ABSTRACT:

BACKGROUND:

Postoperative pain is a common problem after inguinal hernia repair. Postoperative pain may delay the return to normal activity and delay hospital discharge. Various techniques have been employed to provide postoperative analgesia, by the use of regional anesthetic technique, local anesthesia or traditional analgesic technique: opiates, non-steroidal anti-inflammatory drugs (NSAIDs) or combinations.

OBJECTIVE:

To compare the postoperative pain relief provided by simple bupivacaine wound instillation and ultrasound guided inguinal hernia field block.

PATIENT AND METHOD:

A single blind, prospective, randomized controlled clinical trial for 72 male patients who were undergoing elective unilateral inguinal hernia repair. In 37 of them 10 ml of 0.5% plain bupivacaine was instilled (irrigated) into the wound by the surgeon for 1 minute. In another 35 patients, ultrasound guided field block performed using 20 ml of 0.25% plain bupivacaine at the end of surgery. Vital signs, numerical pain score and analgesia requirement were recorded at recovery (zero hour), 1st, 2nd, 4th& 8th hours postoperatively.

RESULT:

By applying null hypothesis, using the t-student test of two independent samples, pain score and request for analgesia show significant difference only at the first two hours with p-value <0.05, otherwise there was no significant differences in the following hours. For vital signs there was no significant difference for both groups

CONCLUSION:

Bupivacaine instillation is as effective as ultrasound guided field block for inguinal hernia repair pain. We recommend this technique in places where ultrasound machine is not available especially in many developing countries.

KEYWORDS: bupivacaine, inguinal hernia, field-block, ultrasound.

INTRODUCTION:

Post-operative pain is a common problem. Uncontrolled postoperative pain may produce a range of detrimental acute and chronic effects [1] Attenuation of postoperative pain, with certain types of analgesic regimens, may decrease perioperative morbidity and mortality[2]. Chronic postsurgical pain (CPSP) is a largely unrecognized problem that may occur in 10% to 65% of postoperative patients (depending on the type of surgery), with 2% to 10% of these patients experiencing severe CPSP [3]. Poorly controlled acute postoperative pain may be an important predictive factor in the development of CPSP [4,5].

Inguinal hernia repair is associated with post-operative pain that may continue as a chronic pain. Parenteral and enteral analgesia are usually used in the management of postoperative pain following hernia repair.

In this study we evaluated and compared bupivacaine instillation and Ultrasound guided field block. Field block in this study refer to the use of local anaesthetics to block Ilioinguinal Nerve, Iliohypogastric Nerve and genital branch of Genito-Femoral Nerve.

PATIENTS AND METHODS:

A single blind, prospective, randomized clinical trial was carried out in General Surgery theatres of Baghdad Teaching Hospital. A series of seventy two consecutive ASA I and II patients,

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over the age of 16 who required elective inguinal hernia repair were enrolled into the study.

All patients refused to participate, has a history of neurological or psychiatric disorder, local anaesthetic allergy, or presented for bilateral inguinal hernia were excluded from the study.

All patients were seen by an anaesthetist preoperatively, study protocol explained and informed consent obtained. The study was approved by the ethical committee of the scientific council of anesthesia and intensive care.

Data were collected using a pre-designed proforma and a detailed history was taken from each patient. Clinical examination was performed to include general examination and vital signs measurement.

All patients received 50mg Ranitidine, 10 mg Metoclopramide, 8mg Dexamethasone and 0.02mg/kg Midazolam at pre-induction.

Anesthesia was induced with 1µg/kg Fentanyl , 2-3 mg/kg of Propofol and tracheal intubation (with size 7.0-8.0 ID endotracheal tube) was facilitated with 0.5 mg/Kg of Atracurium. Anesthesia was maintained with halothane 0.6-1.0% in Oxygen. Neuromuscular blockade was maintained with incremental doses of 0.1mg/kg Atracurium.

Patients were randomly divided into two groups:

Group A: 37 patients, Who received bupivacaine instillation of 10ml 0.5% bupivacaine before closure of the wound layers, where bupivacaine irrigated in the wound and kept for 1 minute then the surgeon continued the procedure.

Group B: 35 patients, who received ultrasound guided field block at the end of the procedure by using 20ml of bupivacaine 0.25% concentration. Bupivicaine 0.25%, 8ml used for ilioinguinal nerve block, 8ml for iliohypogastric nerve block and 4 ml for genital branch of genitofemoral nerve.

In both groups, Paracetamol 1g, QDS and Ibuprofen 400 mg , TDS were prescribed and breakthrough pain was treated with Tramadol 100 mg.

Pain was assessed by numerical analog scale from zero to 10, zero indicates no pain and 10 indicate most severe pain.

Post-operatively, data, including pain score, the need for analgesia, pulse rate, blood pressure and respiratory rate, were recorded at immediate post-operative period and considered as (zero hour "0h"), then the same data were taken and reported in the data sheet (figure 5) at1st,2nd,4th&8th hours (1h, 2h, 4h &8h) post-operatively.

Statistical analysis: Data were analyzed using SPSS (statistical package for social sciences) version 20/IBM. Descriptive statistics were expressed as mean ±SD (standard deviation).

Student's paired *t* - test was used for comparison among vital signs, pain score and the need for analgesia within groups, Student's independent *t*-test was used to compare variables in between both groups.

All data were presented in tables, figures or paragraphs and in all statistical analysis and procedures level of significance was set at p-value (sig.) 0.05 to be considered as significant difference

RESULTS:

In this study it was found that bupivacaine instillation was better than field block in all times by number of patient that required analgesia post operatively, but statisticaly it was found that it was significant only in the first 2 hours where the P-Value was significant (below 0.05).There was no significan difference between the2 groups (p value more than 0.05) in the 4th and 8th hour for pain score and analgesia required. There was no significant difference between the 2 groups in PR, SBP, DBP,& RR as shown in the tables and the graphs below.

Table 1: Comparison of pain scores in both groups.

	group	Mean	Standard Deviation	P-Value
Pain 0h	Bupivacaine instilation	0.5714	1.09237	.0136
	Field block	1.0270	1.25801	
Pain 1h	Bupivacaine instilation	0.8000	1.08322	.0176
	Field block	1.5676	1.11904	
Pain 2h	Bupivacaine instilation	2.0857	1.03955	.009
	Field block	2.3243	1.29216	
Pain 4h	Bupivacaine instilation	2.7143	1.52569	. 649
	Field block	2.8108	1.86842	
Pain 8h	Bupivacaine instilation	1.4857	1.56000	.822
	Field block	2.1351	2.02981	

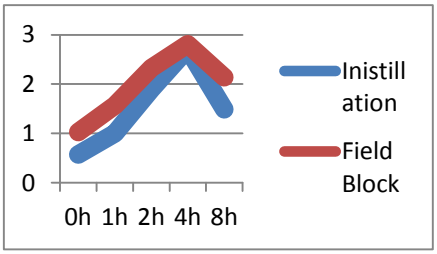

Figure 1: Numerical pain score (0-10)

Table 2: Comparison of analgesia required in both groups.

	Group	Mean	Standard Deviation	P-Value
Analgesia 0h	Bupivacaine instilation	.0541	.22924	.028
	Field block	.0286	.16903	
Analgesia 1h	Bupivacaine instilation	.0541	.22924	.066
	Field block	.1143	.32280	
Analgesia 2h	Bupivacaine instilation	.1081	.31480	.012
	Field block	.0571	.23550	
Analgesia 4h	Bupivacaine instilation	.2703	.45023	. 079
	Field block	.3714	.49024	
Analgesia 8h	Bupivacaine instilation	.1622	.37368	.245
	Field block	.1143	.32280	

Table 3: Comparison of pulse rate in both groups.

	group	Mean	Standard Deviation	P-Value
PR 0h	Bupivacaine instilation	81.8378	9.82489	.766
	Field block	81.7714	8.75512	
PR 1h	Bupivacaine instilation	80.8649	8.34720	.298
	Field block	81.1429	9.50895	
PR 2h	Bupivacaine instilation	81.6216	7.61341	.808
	Field block	80.6857	8.01385	
PR 4h	Bupivacaine instilation	83.3514	8.81985	.527
	Field block	83.6571	9.57307	
PR 8h	Bupivacaine instilation	82.5405	8.33532	.224
	Field block	80.5143	7.81165	

DISCUSSION:

Inguinal hernia repair is a common day case performed operation. Postoperative pain may delay the return to normal activity and hospital discharge. Various techniques have been employed to provide postoperative analgesia. These are regional anesthetic technique and/or traditional analgesic technique (opiates, NSAIDS or combinations)

This study shows that bupivacaine instillation is effective in the first two hours as compared to field block with significant difference (p-value < 0.05) for analgesia requirement and pain score.

There was no significant difference in next 6 hours where the p-value was > 0.05. The study shows that 27% in Group A (instillation group) required additional analgesia in the 4th hour postoperatively compared to 37% of patient do so in Group B (field block group). This was statistically not significant (P- 0.079). The same was found in the following hours after operation.

Local anaesthetic techniques have been studied extensively. Different local anaesthetic techniques have been used to manage post-operative pain following inguinal hernia repair.

M J Spittal and S J Hunter showed in their study that the perioperative instillation of bupivacaine produces good postoperative analgesia, demonstrating no evidence of a difference in effect compared with an inguinal field block [6]

Marcelo Cameiro da Silva et al showed that there is no statistical difference between simple bupivacaine instillation and caudal block for postoperative pain and duration of hospitalization in inguinal hernia repair in pediatric outpatients [7]

Suraseranivongse S et al showed that 0.5% Bupivacaine with epinephrine instillation for as short period as 20 or 60 seconds can provide a good analgesic alternative after herniorrhaphy and hydrocelectomy in pediatric patients [8]

Vanessa A. Givens et al showed that the continuous local anesthetic infusion system appears to be effective in reducing postoperative morphine use after cesarean delivery [9]

Brain fredman et al showed that bupivacaine wound instillation via an electronic patient-controlled analgesia device and a double-catheter system does not decrease postoperative pain or opioid requirements after major abdominal surgery [10]

Local anaesthetic instillation is a safe and simple technique that can be delivered by operating surgeons. There are no needs for equipment/ machines that make the technique cheap with no extra costs attached to it. The use of ultrasound guided local anaesthetic techniques may be hampered by the cost of the ultrasound machine. There are also costs of training and maintaining skills. These resources may not be available in many of the developing countries, or if available, limited to larger centers.

CONCLUSION:

Bupivacaine instillation is more effective than ultrasound guided field block for acute postoperative pain relief in inguinal hernia repair for the first two hours. Local anaesthetic installation is simple technique with no extra costs attached to its application. This is especially important in places where ultrasound machines are not readily available like in many of the developing countries. Addition of parenteral opioids will augment the effect of both ultrasound guided field block and instillation technique.

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