ORIGINAL ARTICLE

Intercostal Nerve Blockade Versus Local Anaesthetic Wound Infiltration for Postcholecystectomy Analgesia

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Objective: To compare the efficacy of local wound infiltration and intercostal nerve block for pain control after cholecystectomy.
Design: Quasi experimental
Place and duration: Deptt of Anaesthesiology, Sh. Zayed Hospital**,** Lahore Aug 2005 to Mar 2006.
Material and methods: A total of 100 patients (n=100) who underwent open cholecystectomy were included. There were 86 females and 14 males (Female to male ratio was 6.1:1). They were divided into two equal groups (n=50). Each group was studied for postoperative pain control using two different techniques i.e. local anaesthetic wound infiltration in group I and intercostal nerve block in group II. The relief of pain in both groups was assessed by Visual Analogue Score (VAS). Statistical significant difference was seen in mean VAS at intervals of 30 min, 02 hours , 04 hours, and 24 hours {p<0.05). Mean VAS was high in group I but quite low in group II. Other variables of the study (vital signs) showed no significant difference at different postoperative intervals (p>0.05)
Conclusion: Intercostal nerve blockade provides better pain control than local anaesthetic wound infiltration after cholecystectomy.
Keywords: Pain, postoperative, cholecystectomy, nerve blocks, intercostal, infiltration, bupivacaine.

INTRODUCTION

Pain management is the foundation on which modern anaesthesiology and critical care medicine are based. Post operative pain control is a challenge for whole surgical team since birth of surgery. The severity of pain depends on the site of operation, being most marked following thoracic and upper abdominal surgery, and less severe in other parts of body[1]. Attenuation of postoperative pain, by using certain types of analgesic regimens may decrease perioperative morbidity and mortality, decreases hospital stay and thus can ensure overall satisfaction of patient[2]. Local and regional anaesthesia techniques depend on a group of drugs called local anaesthetics that produce transient loss of sensory, motor and autonomic function when the drugs are injected. Pain is exacerbated by many factors which contribute to a vicious cycle of pain, anxiety and sleeplessness[3]. There are many modalities for pain relief and the medical literature is increasing day by day in the field of pain management[4]. Gall bladder disease continues to be one of the most common digestive disorders encountered by surgeons. Cholecystectomy in fact, is the commonest surgical procedure in the abdomen worldwide. Today, despite many recent innovations in the treatment of gallstones, cholecystectomy remains the treatment of choice for symptomatic cases and is associated with significant morbidity[5,6]. Intercostal nerve block is claimed to provide an excellent intra-operative and postoperative analgesia in cholecystectomy yet does not significantly disrupt autonomic functions. Requirements of other systemic analgesics are also reduced[7,8].

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MATERIALS AND METHODS

This quasi-experimental study was conducted in the Department of Anaesthesiology, Sheikh Zaid Hospital, Lahore from August 2005 to March 2006 after approval from Institutional Review and Ethical Committee of the Hospital. One hundred patients undergoing elective open cholecystectomy were included with convenient non-probability sampling study after written informed consent and were divided into two equal groups (n=50). The demographic distribution of patients is shown in table 1. The exclusion criteria were: patient refusal to treatment, patient with history of allergy to local anaesthesia, mentally handicapped patient, patient with neuropathies, laparoscopic cholecystectomy. The patients underwent elective cholecystectomy by Kocher's (Subcostal) incision and were randomly allocated to any of the following two groups comprising of 50 patients each. Group I was allocated for local wound infiltration. Twenty ml of 0.25% bupivacaine was infiltrated in the wound margins. Group II patients had intercostal nerve block. In this group 6^{th}, 7^{th} 8^{th} 9^{th} and 10^{th} intercostal

nerves on R side in the postaxillary line were blocked with 4ml of 0.25 % bupivacaine in each space.

The patients were extubated and shifted to postoperative recovery room where intensity of pain was recorded by response from the patients using 100 mm linear visual analogue (VAS) ranging from 0 to 100. The pain scoring was done at 30 minutes, 2 hours, 4 hours and 24 hours postoperatively. Data were entered into SPSS ver 12 and were analyzed as mean±SD where appropriate. Statistical analysis of data which included age, weight, gender, VAS, pulse rate, systolic, diastolic blood pressure and respiratory rate were performed by using unpaired (two sample) "t" test. Probability value (p-value) less than 0.05 was considered statistically significant.

RESULTS

In this study, we divided 100 adult patients into two equal groups (n=50). The parameters of study included VAS, pulse rate, systolic, diastolic blood pressure and respiratory rate. The pain score (VAS) in the postoperative period at different intervals in both groups were compared using t test for equality of means. There was a significant difference in VAS of two groups (table 2). The table 3 shows trend **in** of pulse rate in the two groups. There was no statistically significant difference between the two groups regarding changes in the pulse rate. Trends of blood pressure and respiratory rate in the postoperative period were compared and no significant difference was found between the two groups Table 4, 5,6.

Table 1: Demographic data

	Group I (Mean±SD)	Group II (Mean±SD)
Age (yrs)	41.84±9.97	41.00±11.56
Weight (kg)	64.84±13.07	61.50±9.36
Gender (M/F)	9/41	5/45

Table 2: Pain score in the postoperative period (t- test for equality of means)

Postop period	VAS mm (mean±SD)	
	Group I (Mean±SD)	Group II (Mean±SD)
30 min	57.1±14.46	33.4±13.22
2 hours	62.2±13.2	32.9±09.90
4 hours	56.3±08.80	36.1±13.14
24 hours	27.0±08.80	21.2±07.11

Table: 3 Pulse rate in the postoperative period (Mean +SD)

Postop period value	Pulse rate (bpm)		P value
	Group-I	Group-II	
30 min	82.82±5.83	81.94±7.90	0.52
2 hours	81.26±6.45	80.72±6.62	0.68
4 hours	80.98±6.25	80.30±6.90	0.60
24 hours	76.32±4.33	76.44±6.11	0.91

Table: 4 Trend of SBP in post operative period (Mean +SD)

Postop period value	SBP(mmhg)		P value
	Group-I	Group-II	
30 min	123.72±14.74	125.04±10.96	0.61
2 hours	123.28±11.03	123.30±9.03	0.99
4 hours	121.42±9.57	119.58±9.33	0.41
24 hours	119.42±8.24	116.70±6.43	0.62

Table 5: Trend of DBP in post operative period (Mean +SD)

Postop period value	DBP (mm of Hg)		P value
	Group-I	Group-II	
30 min	78.52±8.81	76.08±8.32	0.15
2 hours	79.58±7.97	76.82±7.59	0.07
4 hours	77.06±7.22	78.26±7.03	0.40
24 hours	75.86±6.09	73.80±5.76	0.08

Table 6: Trend of Respiratory Rate in postop period (Mean +SD)

Postop period value	Respiratory rate		P value
	Group-I	Group-II	
30 min	15.34±1.40	14.82±2.01	0.138
2 hours	14.92±1.22	13.98±1.34	0.060
4 hours	14.56±1.10	13.98±1.34	0.07
24 hours	3.00±1.03	12.80±1.14	0.360

DISCUSSION

The response to pain is highly variable among persons as well as in the same person at different times[5]. Perception of pain depends not only on degree of tissue injury but also on modification of message by other simultaneously occurring sensory input. Pain perception is influenced by many factors including personality traits, cultural background, previous pain experience, fear, uncertainty, misinterpretation of events and helplessness[9].

There is paucity of literature to compare the efficacy of local wound infiltration and intercostal nerve block for postoperative pain control. There are however, many studies which compared the efficacy of local wound infiltration with opioids (Patient Control Analgesia (PCA) or intermittent bolus). There are many studies which compared the efficacy of intercostal nerve blockade and PCA with opioids. Non randomized data suggest that higher levels of post operative pain correlate with a decrease in postoperative quality of recovery. Even though it might be expected that analgesic techniques interfering with pain conduction might provide superior analgesia and improve postop quality of recovery[10].

In our study, wound infiltration of incised margins with 0.25% bupivacaine of subcostal incision has higher postoperative pain scores. This was supported by the study conducted by Cobby, Reid who revealed that subcutaneous infiltration of 0.5% bupivacaine alone into wound edges had no clinically significant effect in morphine consumption after Pfannensteil incision for lower segment C-section

and no effect after abdominal hysterectomy[9]. However, studies by Patel et al showed that infiltration of subcutaneous and intrafascial layers of the wound with 50ml 0.25% bupivacaine reduced postoperative opioid requirements in the first 03 days after cholecystectomy[11,12]. The same efficacy of local infiltration was reported by Zahid et al who stated that preincisional infiltration of subcostal incision with 0.5% bupivacaine reduced pain scores in the first post operative day[13]. Michaloliakou et al also used wound infiltration with local anaesthetics and NSAIDS to attenuate pain. This analgesic regime was associated with less postoperative pain, nausea and vomiting[14]. Intercostal nerve blockade with a mixture of bupivacaine and phenol for control of post cholecystectomy pain was done by Maidatsi et al and was compared with PCA. The patients who underwent intercostal blockade group showed lower VAS pain score[15]. Engberg showed better respiratory function in patients undergoing cholecystectomy and receiving intercostal nerve block than the patients receiving only centrally acting analgesics during the first 2 days postoperatively[16]. A study by Slavin and Nunn also reported excellent analgesia with 0.5% bupivacaine with adrenaline intercostal block before cholecystectomy through a sub costal incision. There were no complications in the series[17].

Illiteracy of the patients was the main confounding factor in this study. 86% patients were female and most of them were illiterate. Most patients had tremendous difficulty in understanding the linear visual analogue scale (VAS) rating. Another drawback was that VAS is a uni-dimensional instrument. Although it is universally reported in the analgesic trials, it may be misleading and may not capture the multi-dimensional complexity of acute pain. There is a need to develop new instruments/ techniques for the pain assessment. Despite the theoretical benefits of superior analgesia, there is a lack of high quality data on the effect of different analgesic techniques and regimens on patient reported outcomes such as health related quality of life, quality of recovery, and patient satisfaction. There is a strong need to institute structured training programme or curricula which encompass not only technical skills but also decision making, leadership, communication and behavioral skills.

CONCLUSION

We recommend that intercostal nerve blockade provides better pain control than local anaesthetic wound infiltration after open cholecystectomy. We also recommend its use for postoperative analgesia as it is safe and effective for providing analgesia.

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