

# Effect Of Pre-Emptive Bupivacaine Infiltration On Post Thyroidectomy Pain

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## Abstract

45 patients undergoing thyroidectomy were randomly divided into three groups; A, B and C. The protocol for induction and maintenance of general anaesthesia was similar for all three groups. Group A patients received 10 ml of 0.5% bupivacaine infiltration five minutes before skin incision, and 10 ml of 0.9% saline infiltration at the end of surgery. In group B saline infiltration was done before surgical incision, and 10 ml of 0.9% bupivacaine was infiltrated at the end of surgery. In group C (control group) 10 ml of 0.9% saline was infiltrated both before and end of the surgery. Post-operative pain was evaluated at 30 min, 2, 4 and 24 hr after surgery by 10 mm visual analogue score (VAS). Time for first analgesic request and total amount of pethidine consumed in 24 hr were recorded.

Group A patients made first analgesic request after  $125.3 \pm 42.5$  min, in group B was  $207.0 \pm 8.36$  minutes and in group C was  $34.5 \pm 26.6$  min. The difference between these groups was statistically significant  $P$  value  $< 0.05$ . By the end of 24 hr, total consumption of pethidine in group A was  $125.3 \pm 42.5$  mg, in group B was  $143.3 \pm 44.2$  mg and in group C was  $191.6 \pm 54.6$  mg. There was no statistically significant difference in total consumption of pethidine between group A and B. But the difference between C and two groups A and B was significant. Group C patients showed higher pain intensity on VAS both clinically and statistically. We conclude that preemptive 0.5% bupivacaine infiltration improved the quality of post operative analgesia, but larger sample size study is required to prove statistical significance.

## INTRODUCTION

Peripheral tissue injury results in functional disturbances in the nervous system. There is peripheral sensitization by reducing the threshold of tissue noiception (hyperalgesia) and a central sensitization by increasing the excitability of spinal neurons. These two changes together contribute to the tissue injury pain, which manifests as hypersensitivity state found after peripheral tissue injury (1). Inhibition of these changes (pre-emptive analgesia) has possible role in prevention of post-operative pain (2).

There are only fewer clinical trials published in relation to the prevention of post thyroidectomy pain. To the best of our knowledge, the effect of pre-emptive bupivacaine infiltration on post thyroidectomy pain has never been published before.

The purpose of this study was to test the hypothesis that subcutaneous infiltration of bupivacaine, before skin incision diminishes post-operative thyroidectomy pain as compared to post incisional bupivacaine infiltration or placebo.

## METHODS

After obtaining ethical committee approval, 45 ASA physical status I – III patients aged 16 – 67 years, weighing 54-92 kilograms, undergoing elective thyroidectomy under general anaesthesia were studied. The study was performed as prospective, randomized, double blind, placebo controlled study. Each patient was explained the use of standard 10 mm visual analogue score (VAS) for scoring pain during pre-operative visit. All patients had a standard anaesthetic. Pre-medication was given as lorazepam 2 mg, metoclopramide 10 mg and ranitidine 150 mg orally two hours before surgery. General anaesthesia was induced with propofol 2 mg/kg, fentanyl 2 micrograms/kg and cisatracurium 0.15 mg/Kg. After endotracheal intubation, lungs were ventilated with oxygen, nitrous oxide and isoflurane. Fentanyl and cisatracurium were repeated as required. No opioid was used at the time of emergence. At the end of procedure effect of muscle relaxant was reversed and trachea was extubated.

All patients were divided randomly in three groups. Group A patients received 10 ml of 0.5% bupivacaine infiltration five

minutes before skin incision, and 10 ml of 0.9% saline infiltration at the end of surgery. In group B saline infiltration was done before surgical incision and 10 ml of 0.5% bupivacaine was infiltrated at the end of surgery. In group C (control group) 10 ml of 0.9% saline was infiltrated, both before and after the surgery. All syringes were blinded to surgeon and anesthetist.

Post-operative pain was evaluated at 30 minutes, 2, 4 and 24 hours after operation using 10 mm VAS by the nurse, unaware of the treatment group. All patients received analgesia on demand. Observations were made regarding time for the first analgesic request, total dose of analgesic drug and VAS pain intensity.

**RESULTS**

The study enrolled a total number of 15 patients in each group. Only one patient excluded as she was ventilated post operatively. Demographic findings in all three groups were in similar statistical range.

In group A, first analgesic request was made after  $314.6 \pm 76.7$  minutes. In group B this time was  $207.0 \pm 8.36$  minutes. In group C patients made this request visibly early, in  $34.5 \pm 26.6$  minutes. The statistical difference between all three groups was significant ( $P < 0.05$ )

Group A patients consumed  $125.3 \pm 42.5$  mgs of pethidine by the end of 24 hours. Group B patients consumed  $143.3 \pm 44.2$  mgs of pethidine. There is no statistically significant difference between these two results. Consumption of pethidine in group C (controlled group) was raised up to  $191.6 \pm 54.6$  mgs. The difference between group C and other two groups A and B was statistically significant ( $P < 0.05$ ).

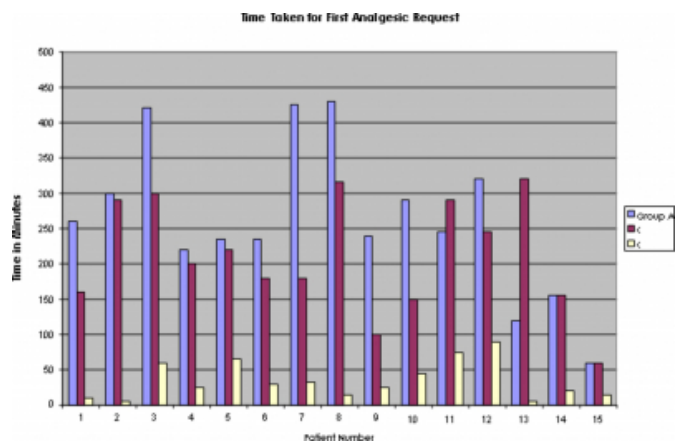
Group A patients showed lower pain score in comparison with group B patients at the end of 30 minutes, 2 hours, 4 hours and 24 hours, though the difference was not significant statistically. Group C patients showed higher pain intensity on VAS, both clinically and statistically.

**Figure 1**

Table 1

Demographic Data			
	Group - A	Group - B	Group - C
Number of Patients	15	15	15
Age	42±15.3	42.7±12.5	40.8±13.1
BMI	28.3±	28.1±2.6	27.3±2.3
Sex -M / F	3M / 12F	4M / 11F	3M / 12F
Duration of Surgery	176±24.0 min	177±27.7 min	188±22.5

**Figure 2**



**Figure 3**

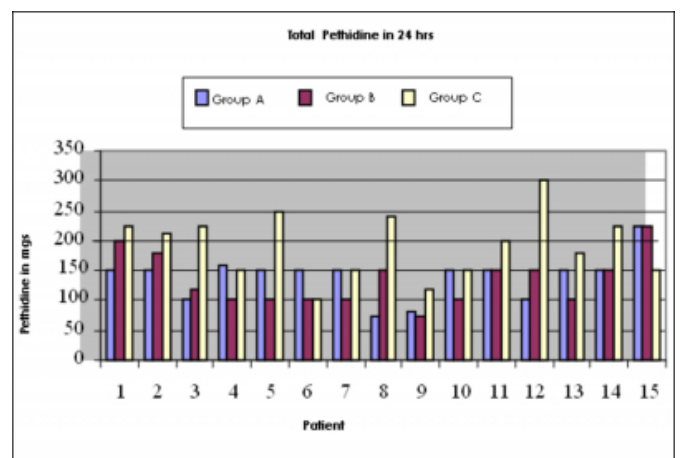


Figure 4

Table 2

Pain score ( VAS )				
Group	30 minutes	2 hours	4 hours	24 hours
Group A	3	3	5	1
Group B	5	4	5	2
Group C	7	7	6	1

**DISCUSSION**

The concept that, infiltration of local anaesthetic before the surgical trauma occurred can reduce the postoperative pain by reducing the central sensitization emerged in 1980s. (3) Since then the technique has widely studied in a vast range of surgical procedures, with conflicting results. Preemptive analgesia has been to be effective in limb surgery, arthroscopy, (4) and gynecological laparoscopy (5). It is found to be not so effective in appendectomy, (6) hysterectomy (7) and cervical spine surgery (8). It seems that results depend up on the anatomical location and depth of the structure (9). In some cases it can even attenuate post operative pain (10). Apart from local infiltration of surgical wound, NSAID, intravenous opioids, ketamine, intra-peritoneal instillation of local anaesthetic and epidural morphine also has been used to demonstrate preemptive analgesia. (11)

Postoperative analgesia for thyroidectomy has got special considerations. Use of NSAIDs in immediate post operative period may disturb haemostatic mechanism. Opioid medications may increase the incidence of nausea and vomiting (12). Most of the surgical teams would like to avoid such factors. Therefore preemptive infiltration of local anaesthetic at the site of incision can be an ideal technique. In addition it facilitates surgical dissection, and helpful in reducing intraoperative bleeding if epinephrine is added to the solution.

In this study we are able to demonstrate clearly that as compared to placebo, infiltration of Bupivacaine either before or after the surgical incision visibly improves post operative pain. Among those two groups who received infiltration of local anaesthetic pre incision (group A) and at the end of surgery (group B), former made fewer analgesic requests and the time for the first analgesic request was significantly later. This fact provides evidence that group A

Patients had better analgesic conditions. It was also confirmed by our clinical observation. However in terms of total consumption of analgesic medications we could not demonstrate the superiority of analgesic conditions in group A patients. In group A and group B, total consumption of pethidine and pain score lie in the same statistical range.

Pasqualucci has discussed in detail the methodological problems of studying preemptive analgesia (13). In our study it was the small sample size, which did not allow us to confirm our clinical observations that pre incision infiltration of bupivacaine provides better analgesic condition in thyroidectomy patients. A wider range of data is required to confirm the preemptive effect of bupivacaine infiltration in thyroidectomy patients in post operative period.

**CONCLUSION**

In conclusion, preemptive 0.5% bupivacaine infiltration provided better analgesic condition than post surgical bupivacaine infiltration for post thyroidectomy pain. However larger size sample is required to prove statistically significant difference between the two groups.

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