Original Article

Post-operative pain and analgesic requirements in breast surgery: Comparative study of combined general anaesthesia with paravertebral block versus general anaesthesia alone

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Abstract

Background: Patients undergoing breast cancer surgery frequently experience chronic postoperative pain. The primary objective of this randomized study was to determine if thoracic paravertebral block (TPVB) reduced the incidence of chronic pain after a modified radical mastectomy (MRM) when compared with general anesthesia (GA).This study was undertaken to compare analgesic efficacy and complications of combined general anaesthesia with paravertebral block versus general anaesthesia alone in breast surgery. **Material and Methods:** A total of 60 patients for elective breast surgery were grouped as Group A (General anaesthesia with paravertebral block) and Group B (General anaesthesia alone) and compared for analgesic efficacy and complications. **Results:** Duration of postoperative analgesia in group A was 17.63 ± 2.34 versus 5.47 ± 1.63 in group B. Patients in group A (PVB + GA) didn't required any rescue analgesics as compared to group B (GA) where 28 patients received rescue analgesics. Incidence of PONV was significantly lower in group A as compared to group B. **Conclusion:** Para vertebral block when used with general anaesthesia induces excellent anaesthesia and greater postoperative pain relief and lower incidence of PONV and other complications.
Keywords: Paravertebral block, general anaesthesia, analgesia, complications.

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INTRODUCTION

Surgery for breast cancer is associated with postoperative pain, nausea and vomiting. Effective management of postoperative pain has been of fundamental importance in surgical patient care. General anaesthesia used for surgical treatment of breast cancer is associated with considerable post-operative pain, nausea and vomiting (PONV). Poor postoperative pain control in turn leads to greater incidence of nausea and vomiting and prolonged hospitalisation[1,2]. Among the various analgesic techniques aimed to reduce post-operative pain after breast surgery, thoracic paravertebral block (PVB) combined with general anaesthesia (GA) stands out for the good results and favourable risk–benefit ratio. Benefits include reduced prolonged postoperative pain relief, decreased opioid consumption, postoperative nausea/vomiting and increased potential for ambulatory discharge[3,4]. Therefore, we undertook a prospective trial to study the postoperative pain and analgesic requirements of combined general anaesthesia with paravertebral block versus general anaesthesia alone in breast surgery.

MATERIAL AND METHODS

In this prospective study 60 patients belonging to ASA I, II and III physical status scheduled for elective breast surgeries which included modified radical mastectomy, simple mastectomy with axillary dissection, simple

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mastectomy without axillary dissection, lumpectomy were included after approval from the Hospital Research Ethics Committee and written informed consent from all the patients. Patients with local infection, anatomic deformities of the spine, coagulation disorders, allergy to local anaesthetics, patient refusal, severe respiratory or cardiac disorders, pre-existing neurological deficits, liver or renal insufficiency, pregnancy or breast feeding and breast reconstruction surgery were excluded. During the pre-anaesthetic assessment, patients were instructed on the use of the Visual Analogue Scale (VAS 0-10: 0 being no pain, 10 being worst pain imaginable educated about reporting pain on the 11-point verbal rating scale (VRS)[5]. Patients were randomly grouped between two equal groups as Group A with patients receiving combined paravertebral block with general anaesthesia (GA+PVB) and Group B with patients receiving general anaesthesia alone (GA group). On arrival to the operating room, monitoring lines were established for non-invasive blood pressure measurements, continuous electrocardiography and pulse oximetry. On the day of surgery, after the arrival of the patient, paravertebral block was performed with patients of Group A in a sitting position. Tuohy's epidural needle was inserted perpendicular to the skin to contact transverse process at 2-4 cm depth. Syringe prefilled with air was connected to the Tuohy's epidural needle. Then the needle was manipulated to walk off the superior or inferior aspect of the transverse process, until loss of resistance to air could be elicited. Insertion was limited to less than 2 cm past the transverse process. Syringe was detached from the needle and epidural catheter was threaded in and epidural needle was withdrawn over the catheter carefully. Catheter port was attached and catheter was fixed to skin using adhesive tapes. After careful aspiration, test dose of 3cc 2% lignocaine was given and then 0.4ml/kg of 0.5% bupivacaine was injected. Patient was then made to lie down supine .Onset of sensory anaesthesia occurred 10 - 15 minutes after the injection. After confirming sensory anaesthesia following PVB, GA was induced. Patient was induced with propofol 2 mg/kg IV. succinylcholine 1.5 mg/kg IV was given to facilitate tracheal intubation. After intubation patient was maintained with isoflurane 0.2-1.5% with 60 % nitrous oxide in oxygen. Neuromuscular blockade was achieved using vecuronium 0.08 mg/kg IV. All patients in group B were provided with intraoperative analgesia with tramadol. Heart rate, non-invasive blood pressure, arterial oxygen saturation and three lead ECG were monitored.The residual neuromuscular blockade was antagonised with IV neostigmine 50 µg/kg and glycopyrolate 8 µg/kg. After surgery, patients were observed in the postoperative room for two hours and then shifted to their respective wards. In both the groups, rescue analgesia was given with tramadol (2mg/kg) to patients with VAS scores of four or more.

RESULTS

No significant difference seen with respect to demographic data, baseline pulse rate,systolic and diastolic BP, mean arterial pressure and type of surgeries.VAS scores were recorded in the postoperative period at an interval of 3 hours for a period of 24 hours. VAS scores of Group A was found to be significantly lower than group B at all time intervals (Table 1).

Table 1: VAS scores in both groups

VAS	Group A	Group B	P value
	PVB + GA (Mean ± SD)	GA (Mean ± SD)	
3 hour	0.23 ± 0.63	3.80 ± 1.73	<0.0001
6 hour	0.60 ± 0.89	3.03 ± 1.67	<0.0001
9 hour	0.57 ± 0.90	4.00 ± 1.44	<0.0001
12 hour	0.53 ± 0.90	2.97 ± 2.01	<0.0001
15 hour	0.33 ± 0.76	2.13 ± 2.15	<0.0001
18 hour	0	1.70 ± 1.74	<0.0001
21 hour	0	1.40 ± 1.57	<0.0001
24 hour	0.07 ± 0.37	0.97 ± 1.16	<0.0001

Patients reporting a VAS score of four or more were provided rescue analgesia with Injection tramadol (2.0 mg/kg body weight).Patients in group A (PVB + GA) didn't required any rescue analgesics as compared to group B (GA) where 28 patients received rescue analgesics.Incidence of PONV was significantly lower in group A as compared to group B. The duration of analgesia was higher in group A as compared to group B (Table 2).

Table 2: Comparison of analgesia efficacy and side‑effects

	Group A	Group B
Duration of postoperative analgesia	17.63 ± 2.34	5.47 ± 1.63
Required rescue analgesic	0	28
VRS (24 hrs)	0.07 ± 0.37	0.97 ± 1.16
PONV	3	13

Patients were monitored in the intraoperative and postoperative period for 24 hours and observed for complications such as failure of paravertebral block, pneumothorax, hypotension, dural puncture related complications, transient Horner's syndrome, ipsilateral arm sensory changes, pulmonary haemorrhage, hematoma and local anaesthetic toxicity. However, no postoperative complications were noted due to the paravertebral block.

DISCUSSION

This study was undertaken to assess the efficacy of paravertebral block use in conjunction with general anaesthesia for postoperative pain relief and complications in comparison to general anaesthesia alone.

Except the technique of anaesthesia and analgesia both the groups were comparable in all demographic data and baseline parameters, thus, it can be presumed that any difference in the two groups with regards to the efficacy and postoperative complications was basically a result of the anaesthetic technique adopted for each group. In group A around 63% of the patient maintained stable hemodynamics at 0.2-0.4% isoflurane as compared to group B (1.2-1.5% isoflurane). Due to increased haemodynamic stability observed in group A chances of blood loss were reduced and clear operative field was obtained. Patel *et al*[6] also observed better hemodynamic stability with paravertebral block. Group A experienced significantly better post-operative analgesia as compared with Group B (VAS score at all time interval was lower in group A than B). Rescue analgesic with tramadol was required only in Group B. Earlier investigators have also observed a similar efficacy of PVB for breast carcinoma surgery[4,7,8]. PONV was also reported in more patients (13 Vs 3) receiving general anaesthesia alone. Kairaluoma *et al*[4] and Coveney *et al*[9] also observed that patients receiving PVB had comparatively lesser incidence of PONV. No complications were observed in patients receiving paravertebral block. Earlier studies also reported very few or nil complications[8,10,11]. To conclude, para vertebral block when used with general anaesthesia induces excellent anaesthesia and greater postoperative pain relief and lower incidence of PONV and other complications as well as greater haemodynamic stability intraoperatively.

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