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General Anaesthesia Versus Paravertebral Anaesthesia with General Anesthesia in Mastectomy: Comparative Surgical Outcome

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Abstract

Introduction: Paravertebral nerve blocks provide excellent pain relief and inhibit the neuroendocrine stress response to surgical trauma, which suggests that a very high quality afferent block can be affected. Aim was to assess the efficacy of paravertebral block use in conjunction with general anaesthesia for better postoperative pain management in comparison to general anaesthesia alone.

Materials and Methods: As per the criteria total of 120 patients were included in the study. Group A received general anaesthesia only and group B patients received paravertebral block long with general anaesthesia. All patients underwent preoperative assessment prior to surgery. The patients were instructed on the use of the Visual Analogue Scale (VAS 0–10) and Numerical Rating Scale (NRS 0–4).

Results: When VAS score of both the groups are compared the score in group B was found to be lower than in group A. When NRS score of both the groups are compared the score in group B was found to be lower than in comparison to group A.

Conclusion: Paravertebral block reduces incidence of postoperative nausea and vomiting in comparison to general anaesthesia alone. Paravertebral block leads to significantly reduced consumption of opioids in the postoperative period in comparison to general anaesthesia alone.

Keywords: Anesthesia; Breast Cancer; Paravertebral; Mastectomy.

Introduction

The major concern with the general anaesthesia is the peri operative stress. To reduce the requirement of analgesia and anaesthetic agent combination of regional anaesthesia with general anaesthesia is used.[1] The advantage is better achievement of hemodynamic stability and suppression of immunologic, metabolic and endocrine response. Due to advancement of the diagnostic field it has lead us to increase frequency in detection of breast cancer cases. Majority of the patients after the confirmed diagnosis undergo lumpectomy or mastectomy.[2]

The most important medical problem with the women gender is the breast cancer. Approximately about one from ten women do suffer from breast cancer in life time.[3] When there is proper control of pain during and after the surgery of breast cancer will not only enhance the post operative recovery of the patient but also lead to prevention of post operative pain. There are varieties of regional anaesthesia that may play an important role in pain management during breast surgery however

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the gold standard technique is the thoracic paravertebral block.[4,5]

Among the various analgesic techniques aimed to reduce post breast surgery, thoracic paravertebral block (PVB) combined with general anaesthesia (GA) stands out for the good results and favourable risk.[6] Benefits include reduced prolonged postoperativ relief, decreased opioid consumption nausea/vomiting and increased potential for ambulatory discharge. The paravertebral space contains dorsal and ventral rami and the sympathetic chain.[7] Hence, infiltration of this space results in unilateral sensory, motor and sympathetic blockade. Paravertebral block has been used to relieve acute chest wall pain from rib fractures, herpes zoster, pleurisy, to manage acute and chronic post thoracotomy pain and as an anaesthetic technique for surgery of the chest and shoulder.[8]

After one year of surgery there are chronic symptoms like pain in the operated area and ipsilerated arm. After breast conserving surgery there is more common occurrence of chronic pain as compared to radical surgery. The intensity of acute postoperative pain, the type of operation, involvement of regional lymph nodes and radiotherapy have been considered the most important treatment related factors predisposing to chronic pain in patients with breast cancer.[9]

Good immediate postoperative analgesia is achieved by providing preincisional PVB in patients undergoing breast surgery for cancer. Good acute pain relief is associated with a lower risk of development of chronic pain in the operative area.[10] Paravertebral nerve blocks provide excellent pain relief and inhibit the neuroendocrine stress response to surgical trauma, which suggests that a very high quality afferent block can be affected. This study was conducted to assess the efficacy of paravertebral block use in conjunction with general anaesthesia for better postoperative pain management in comparison to general anaesthesia alone.

Materials and Methods

The present study was done at a hospital care. The ethical committee was informed about the study and the ethical clearance certificate was obtained. All the patients who were diagnosed with breast cancer and were scheduled to undergo modified radical mastectomy under general anaesthesia were included in the study. The patients were between the ages of 20 to 70 years.

Patients having any other medical condition, allergy to local anaesthesia, presence of infection at injection site, patients belonging to category IV and V physical status were excluded from the study. As per the criteria total of 120 patients were included in the study. All the patients were informed about the study and the written informed consent was obtained from all patients. The included patients were divided in two groups as below: Group A received general anaesthesia only and group B patients received paravertebral block long with general anaesthesia. All patients underwent preoperative assessment prior to surgery. The patients were instructed on the use of the Visual Analogue Scale (VAS 0–10) and Numerical Rating Scale (NRS 0–4).

At the day of surgery, 45 min prior to the surgery premedication was given to all the patients. In group A the patients were administered with general anesthesia only and in group B patients the paravertebral block along with anesthesia was administered by attending ansthesiologist. 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 0.6 – 1% with 66 % nitrous oxide in oxygen. Neuromuscular blockade was achieved using vecuronium 0.1 mg/kg IV. Mastectomy was performed through transverse or oblique incision. Ondansetron 0.15µg/kg IV was given 30 minutes before extubation. The residual neuromuscular blockade was antagonised with IV neostigmine 50 µg/kg & glycopyrolate 8 µg/kg. After surgery, patients were observed in the postoperative room for thirty minutes and then shifted to their respective wards.

Following the surgery, the level of post operative pain was assessed using VAS scale starting from 0 – no pain to 10 – worst pain. The post operative assessment of vomiting and nausea was assessed with Numerical Rating Scale that range from 0 – no nausea to 4 – severe vomiting. The observations recorded in each group were compared using statistical analysis.

Results

The present study was done in the medical hospital care. A total of 120 patients were included in the study. The included patients were planned for breast cancer surgery with modified radical mastectomy. The total of 120 patients who were included in the study was divided into two groups.

Group A included patients were administered with general anaesthesia only whereas patients in group B were administered with GA with prevertebral anaesthesia. All the patients included in the study belonged to ASA I to III distribution, maximum of the patients belonged to ASA II group.

The patients who were included in the study were of age range of 20 to 70 years. When both the groups were compared for significance for age distribution the difference was not found to be significant. Next the weights of all the patients were compared in both the groups, the difference was not found to be significant.

The VAS score was compared for the patients included in both the groups. The VAS score was recorded in the post operative period at 1st hour, 2nd hour, 3rd hour and 6th hour. Patients whose score was four or more were administered with rescue analgesia with Inj. Fentanyl. When VAS score of both the groups are compared the score in group B was found to be lower than in group A. (Table 1)

Table 1: Comparison of VAS score in both groups.

VAS SCORE at time interval	Group A		Group B		P value
	Mean	SD	Mean	SD	
1st hour	3.5	1.54	0.54	0.89	<0.001
2nd hour	3.31	1.53	0.75	0.91	<0.001
3rd hour	1.87	1.30	0.46	0.71	<0.001
6th hour	0.43	0.84	0	0	<0.001

The NRS score was compared for the patients included in both the groups. The NRS score was recorded in the post operative period at 1st hour, 2nd hour, 3rd hour and 6th hour. When NRS score of both the groups are compared the score in group B was found to be lower than in comparison to group A. (Tabel 2)

Table 2: Comparison of NRS score in both groups.

NRS SCORE at time interval	Group A		Group B		P value
	Mean	SD	Mean	SD	
1st hour	1.54	1.05	0.05	0.15	<0.001
2nd hour	1.32	1.00	0.00	0.00	<0.001
3rd hour	1.08	1.10	0.00	0.00	<0.001
6th hour	0.45	0.16	0.00	0.00	<0.001

Patients complaining of postoperative nausea and vomiting were provided antiemesis with Inj. Ondansetron. NRS was used as the guiding parameter. Patients reporting an NRS score of two or more were provided antiemesis. Both the groups were compared for amount of antiemetic consumption .Group A was found to have significantly greater consumption of antiemetics than Group A.

Patients were monitored in the intraoperative and post operative period. Few complications were observed for following post operative complications in group A such as failure of block, hypotension, pulmonary haemorrhage, hematoma, local anaesthetic toxicity and ipsilateral arm sensory change. However no post operative complications were noted in group B where paravertebral block was assisted with general anaesthesia. Hence the technique can be considered safe.

Discussion

Surgical stress leads to reproducible physiological metabolic and hormonal responses, characterized by an altered carbohydrate metabolism, a net loss of protein and an increased lipolysis. Anesthesia for this group of patients can be challenging due to comorbidities, frailty, advancing age, and anxiety.[11] Whilst these are not absolute indications for TPVB with sedation rather than GA, many are relative contraindications to GA and were therefore contributory factors in the decision making process following full discussions with the patients before hand. Providing satisfactory operating conditions without GA whilst maintaining patient confidence, comfort, and dignity is potentially a problem, but our cohort demonstrates that it is possible with ongoing refinement of the anesthetic technique.[12]

Different types of treatment are available for patients with breast cancer. Standard surgical procedures include- lumpectomy, segmental mastectomy, total mastectomy, modified radical mastectomy and radical mastectomy.[13] General anaesthesia (GA) is currently the standard technique used for surgical treatment of breast cancer. However, the side-effects and complications of general anaesthesia preclude ambulatory surgery for most patients undergoing breast surgery.[13]

Regional anaesthesia using paravertebral block (PVB) is an ideal alternative to general anaesthesia for breast cancer surgery. The mechanism of action of paravertebral analgesia is by direct penetration of local anaesthetic into the intercostals nerve, including its dorsal ramus, the rami communicantes and the sympathetic chain. Benefits of paravertebral block include a reduction in postoperative nausea and vomiting, prolonged postoperative pain relief and potential for early discharge.[14,15]

To analyze the pain at rest at operated site and pain due to motion the patients were asked to analyze as per visual analogue scale to evaluate the condition.

Patients were asked to analyse the pain related to breast, arm or axilla. VAS score was recorded at interval at 1st hour, 2nd hour, 3rd hour, 4th hour and 6th hour postoperatively. The follow up shows that patient receiving prevertebral block along with general anesthesia experienced low VAS score as compared to the patients who received general anaesthesia alone. The result is in accordance with the result obtained by the other authors. In the study done by Kairaluoma et al.[16] involving sixty patients, out of the thirty patients receiving PVB prior to GA, only three patients had pain on the first postoperative day in comparison to the control group which had twelve patients with postoperative pain (p=0.007). Terheggen and colleague, in their study of thirty patients deduced that VAS scores for pain at 15,30,60,90 and 120 minutes in the postoperative period were significantly lower in the fifteen patients who received PVB. It was clearly observed that the Group A had significantly higher NRS scores in comparison to Group B. In a similar study conducted by Coveney et al, patients receiving PVB had comparatively lesser incidence of PONV. In another study involving 25 patients conducted by Greengrass et al, out of the seventeen patients receiving PVB, 13 patients had no nausea or vomiting in the entire postoperative period.

Patients complaining of postoperative nausea and vomiting (PONV) were provided medication with ondansetron (0.1mg/kg body weight) given intravenously. NRS was used as the guiding parameter. Patients reporting an NRS score of two or more were provided antiemetics. Both the groups were compared for amount of antiemetic consumption. Group A was found to have significantly greater consumption of antiemetics than Group B. In a similar study conducted by Pekka et al, patients receiving PVB with GA required lesser number of antiemetic doses (15) in comparison to patients receiving GA only.

Conclusion

Paravertebral block when used in conjunction with general anaesthesia provides superior analgesia in the postoperative period in comparison to general anaesthesia alone. Paravertebral block reduces incidence of postoperative nausea and vomiting in comparison to general anaesthesia alone. Paravertebral block leads to significantly reduced consumption of opioids in the postoperative period in comparison to general anaesthesia alone.

Conflict of Interest: None

Source of Support: Nil.

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