A Comparative Study Of Thoracic Epidural Anaesthesia Using Bupivacaine And General Anaesthesia For Elective Breast Surgeries.

Manoj Sahu[1], Ladhu Lakra[2], Usha Suwalka[3], Azzizul Haq[4]
[1] Junior Resident 3rd Year, Department Of Anaesthesiology, [2] Associate Professor, Department Of Anaesthesiology, [3] Professor And Head Of Department; Department Of Anaesthesiology, [4] Assistant Professor, Department Of Anaesthesiology, Rajendra Institute Of Medical Sciences Ranchi 834009, India

ABSTRACT

Introduction And Aim: Major surgery induced profound physiological changes in the perioperative period, characterized by increases in sympathoadrenal and other neuroendocrine activity and also increased cytokine production. Because epidural anesthesia can attenuate this "stress response" to surgery, improve the quality of postoperative analgesia in comparison with systemic opioids, and hasten recovery of gut function, it has been suggested that conducting surgery under epidural anesthesia (either as the sole anesthetic or in combination with general anesthesia) may reduce perioperative morbidity and mortality compared with general anesthesia alone. This clinical study was therefore under taken to evaluate the usefulness of employing the thoracic segmental epidural blocks for various breast surgeries.
Method: The study included 60 patients of elective breast surgeries of age group 20 to 60 years after approval from institutional ethic committee. Informed written consent from all patients was taken. After thorough pre anesthetic check up and premedication in 30 patients of group T Epidural catheter was inserted at T5-6 level and 10 CC of 0.25% bupivacaine were injected for all patients and in 30 patients of group G conventional general anesthesia were given. The parameter studied were 1.Intra operative hemodynamic changes 2. Post operative analgesia 3. Post operative side effects – shivering, nausea and vomiting, backache and respiratory effect 4. Recovery time and 5. Duration of hospital stay.
Result: Baseline demographic variables were similar in two groups. Intra operative hemodynamic changes were significant in early perioperative period in both groups. There was higher incidence of post operative side effects and intravenous analgesic requirement in group G compared to group T. Recovery time and duration of hospital stay were also higher in group G compared to group T.
Conclusion: Thoracic epidural anesthesia compared to general anesthesia has different sets of intra operative hemodynamic changes. In both type of anesthesia this intra operative hemodynamic changes are easily manageable. Thoracic epidural has better postoperative outcome with much better post operative pain management which leads to decrease in recovery time and duration of hospital stay. So it can be considered that thoracic epidural anesthesia is better alternative for elective breast surgeries than general anesthesia.

Key words: thoracic epidural, bupivacaine, elective breast surgery

Corresponding author address: Dr. Manoj Sahu Hostel No.7 Room No.30 PO-RMC Campus RIMS, Bariatu Jarkhand-834009 **E-Mail:** manojbjmcpune@gmail.com **M:** 9570048068,

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INTRODUCTION

Major surgery induced profound physiological changes in the perioperative period, characterized by increases in sympathoadrenal and other neuroendocrine activity and also increased cytokine production. Because epidural anesthesia can attenuate this "stress response" to surgery, improve the quality of postoperative analgesia in comparison with systemic opioids, and hasten recovery of gut function, it has been suggested that conducting surgery under epidural anesthesia (either as the sole anesthesia or in combination with general anesthesia) may reduce perioperative morbidity and mortality compared with general anesthesia alone.1

In addition thoracic epidural anesthesia provides pain relief and sympatholysis of such magnitude that allows patient to cough, breath deeply, drink and mobilize which can contribute to enhanced post operative outcomes such as improved respiratory function, reduction in ileus and protein sparing.2,3

Thoracic epidural block is frequently used in plastic surgeries of the breasts and postoperative analgesia of thoracotomies, and there are also a few reports on its use in oncologic surgeries of the breasts. This study was conducted to know the effectiveness of thoracic epidural anesthesia as an alternative method to conventional general anesthesia for breast surgeries.

AIM:

This study was conducted to compare the efficacy of thoracic epidural anesthesia using 0.25% bupivacaine versus general anesthesia with respect to following parameter –

1. Intra operative hemodynamic changes
2. Post operative analgesia
3. Post operative side effects – shivering, nausea and vomiting, backache and respiratory effect
4. Recovery time
5. Duration of hospital stay.

MATERIAL AND METHOD:

After approval from institutional ethic committee, written informed consent was obtained from 60 patients of age group 20-60 years and ASA grade I and II divided in two groups group G and group T undergoing Elective breast surgery. Group allocation was achieved by a computer generated randomization list.

All the patients were given tab Diazepam 0.2 mg / kg orally the night before surgery and were advised to remain nil per oral after midnight. On the day of surgery in the operation

room, all monitors were attached including non invasive blood pressure, pulse oximeter ECG. . Basal vital parameter like pulse rate, blood pressure, ECG, oxygen saturation were recorded. A 20 gauge i.v. cannula was inserted and the patient was started with 500 ml Ringer Lactate solution. Patients were premeditated with metoclopramide 0.2 mg/kg, ranitidine 1 mg/kg, butorphanol 1 mg (excluded for group T patients) and glycopyrrolate 0.2 mg intravenously.

In group T, patients were positioned in sitting or lateral position under aseptic precaution the inferior angle of scapula which corresponds to T7 spine was palpated, T5 – T6 space was located. The skin was infiltrated with 2ml of 2% xylocaine, a 18 G Tuohy needle was introduced along the paramedian in T5 – T6 space and advanced obliquely with 450-600 to the skin till the needle was steady in the interspinous ligament. The stylet was removed and a 10cc syringe with normal saline was attached firmly to the hub of the needle. This unit was carefully advance with 450-600 angle and constant pressure applied on the plunger of the syringe. After confirmation of loss of resistance, 18G epidural catheter was threaded through the epidural needle into the epidural space in cephalic direction up to about 3 to 5 cm. After identifying the epidural space test dose of 3 ml of 2% Lignocaine with epinephrine was administered after negative aspiration for blood or CSF. The patient was observed for 5 minutes to ensure that the injection should not be into the subarachnoid space or epidural vessels. Then 10 CC of 0.25% bupivacaine was injected. Incremental dose was given as 3 ml SOS. Axilla was infiltrated with 3 to 5 ml of 0.5% Bupivacaine if required. Analgesic dose was given post-operatively 0.125% bupivacaine, 10 ml 8 hourly for 36 hours.

In group G, patients were given genereal anaesthesia, preoxygenated for 3 minutes, induced with thiopentone 5 mg/kg. After checking of ventilation, endotracheal intubation with suitable no. of endotracheal tube was done which was facilitated by succinylcholine 2 mg/kg. HR, BP, ECG and SP02 were recorded. Anesthesia was maintained with 33% oxygen and nitrous oxide, isoflurane and vecuronium bromide 0.08mg/kg and maintenance dose was repeated every 30 minutes thereafter or as required. The tidal volume and the respiratory rate was adjusted and intermittent positive pressure ventilation done with mechanical ventilation. End tidal carbon dioxide was maintained between 32-36 mm Hg. At the end of surgery residual neuromuscular block was reversed by inj. Neostigmine 0.05 mg/kg and inj. Glycopyrrolate 0.004 mg/kg intravenously. After extubation patients were transferred to recovery room.

Pulse, NIBP, SpO2 ECG were recorded at the start of procedure and at 5 min, 10 min, 15 min, 30 min, 45 min, 60 min thereafter at 30 min interval till patients were shifted from recovery room. If bradycardia occurred at any time (<50 beats /min), then 0.6 mg of injection atropine i.v. was given. If hypotension occurred then it was treated appropriately with i.v. fluids and vasopressors. Post operatively side effects were noted. Pain was measured with verbal rating score and categorized into no pain, mild pain, moderate pain and severe pain. Mild pain was treated with inj. Diclofenac 75 mg i.v. and severe pain was treated with inj. Tramadol 50 mg i.v. Post operative nausea and vomiting was treated with inj. Metoclopromide 10 mg. Respiratory depression was treated with O2 inhalation at 4 liter/min through facemask.

RESULT:

Demographic parameters in both groups were comparable. Intra operative hemodynamic changes showed significant difference in two groups. In group T, patients had significantly more bradycardia (5 out of 30 patients) and hypotensive episode (20 out of 30 patients) than group G while group G patients had significant tachycardia (19 out of 30 patients) and hypertensive episode (17 out of 30 patients) than group T. These hemodynamic changes in both groups were transient and easily manageable. Most significant difference was observed during post operative period in this study. In group G, 15 out of 30 patients had nausea and vomiting, 17 out of 30 patients had shivering and 8 out of 30 patients had respiratory depression while in group T, 3 out of 30 patients had nausea and vomiting, 7 out of 30 patients had shivering and no patient showed respiratory depression. Post operative analgesia was better managed in group T patients with epidural analgesia. In this group 12 out 30 patients demanded strong analgesia and 10 out of 30 patients demanded mild to moderate analgesia, some demanded one dose while some demanded two doses. Group G patients were managed with intravenous analgesics only. Five to seven doses of Tramadol and three to five doses of Diclofenac were required. Recovery time and duration of hospital stay was significantly shorter in T group. Recovery time was 51 ± 6.2 min in group T while it was 109 ± 23.9 min in group G. duration of hospital stay was 105 ± 24.2 hrs in group T while it was 137.9 ± 17.66 hrs.

Table no 1.Demographic parameters

Parameter	Group G	Group T	Significance
Sex	M- 28 F - 2	M -29 F - 1	NO
Age (yrs)	42.2±13	45.1 ± 9.8	NO
Height(c.m.	157 ± 5.3	157 ± 6.0	NO
Weight (kg)	56.3± 7.9	54.0± 6.9	NO
Asa grade (%)	1 – 71.6 2 – 28.4	1 – 66.6 2 – 33.3	NO
Type of surgery MRM Lumpectomy Mastectomy	 23 5 2	 26 3 1	NO

Table no 2.Intraoperative hemodynamic changes

	Group T	Group G
Bradycardia	5 (16.3%)	3 (10%)
Tachycardia	6 (20%)	19 (63.3)
Hypotension	20 (66.6%)	4 (13.3%)
Hypertension	3(10%)	17 (56.6%)

Fig 1.Postoperative side effects

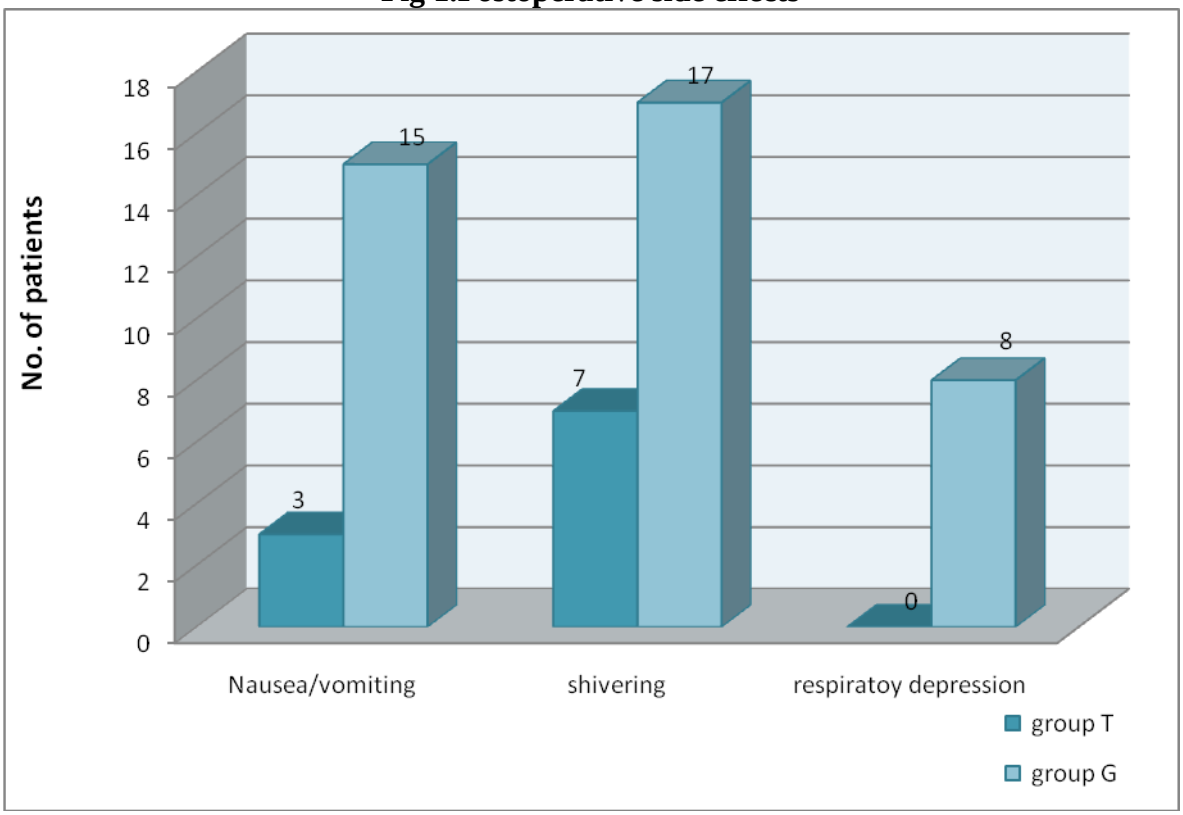

Table 3. Recovery time and Duration of hospital stay

	Group T	Group G
Recovery time (min)	51 ± 6.2	109 ± 23.9
Duration of hospital stay(hrs)	105 ± 24.2	137.9 ± 17.66

DISCUSSION

In a study conducted by **Mc Lean APH, (1967)[4]** they compared the different doses of bupivacaine in thoracic epidural anesthesia for the quality of anesthesia and duration of anesthesia in abdominal surgeries. They used 0.15%, 0.20%, 0.25%, 0.30% and 0.35% concentration of bupivacaine. They found that as concentration increases quality and duration of anesthesia increases but also hypotensive response increases. Optimal concentration that provides good quality and duration of anesthesia with least hypotensive effect was with 0.25% concentration.

In our study in Group T, 0.25% bupivacaine was used. Majority of the cases had a fall in blood pressure. At the start of surgery systolic BP was 127± 8.6 mmHg which declined to 109 ±13 mmHg at 30min and reached 122±8.5 mmHg at 120 min. Diastolic BP had a starting value of 77±6.7 mmHg which showed a decline to 65±8 mmHg at 30 min and gradually increased to 73±7.1 mmHg at 120 min which was slightly less than pre operative value. This result was similar to above study.

In a study done on 2312 patients by **Kevin KM, Chan and Kathleen JW (1997)**[5] they found that 46 patients developed bradycardia. In the presence of inhibition of cardiac sympathetic fibers, enhanced vagal tone decrease in central venous return can cause sudden onset of bradycardia and cardiac arrest. Similarly in our study change in HR were minimal. However 5 patients had bradycardia with heart rate < 60 beats / min. These patients were treated with 0.6 mg atropine I.V.

In a study conducted by **A. Miller Forbes, M.B., F. G. Dally, M.B (1970)**[6] in twenty-two normotensive patients anesthesia was induced with thiopentone, nitrous oxide and oxygen, suxamethonium. Laryngoscopy and insertion of an endotracheal tube were immediately followed by an average rise in mean arterial pressure of 25 mm Hg (Standard Error 2.2, range 2–45). There was no significant difference in this response between groups premedicated with morphine and with amylobarbitone. There was no evidence that this effect caused lasting damage in normotensive patients. Similarly in our study 19 patients had hypertensive episode and 17 patients had tachycardia.

In a study conducted by **Chun-Chang Yeh, Jyh-Cherng Yu et al (1999)**[7] on 64 patients undergoing modified radical mastectomy, they found significant lower VAS score 4.3 ± 0.4 versus 5.7 ± 0.6 and less number of pethidine injection 8/32 versus 24/32 in thoracic epidural group compared to general anesthesia group. Similar observation was found in our study.

In a review article published **by Alain Borgeat, M.D. et al (2003)**[8] elaborated that regional anesthesia compared to general anesthesia offers less post operative nausea and vomiting. In our study 15 out of 30 patients had nausea and vomiting in group G and 3 out of 30 patients had nausea and vomiting in group T.

In a review article published by **D. J. Buggy and A. W. A. Crossley (2000)**[9] showed that regional anesthesia is associated with less post operative shivering episode than general anesthesia. In our study 17 patients from group G had shivering episodes post operatively and 7 out of 30 patients had shivering episode in group T.

Sakura et al (1993)[10] have shown that thoracic epidural anaesthesia does not impair the vantilatory response to progressive isocapnic hypoxemia. Thus thoracic EA can be used in patients with COPD who are dependent on hypoxic drive for ventilation.

Pansard et (1993)[11] al in their study have shown that thoracic epidural anaesthesia increased the diaphragmatic contractility after major abdominal surgeries by preventing reflex inhibition of phrenic nerve activity due to pain. Thus thoracic epidural anaesthesia improves post operative ventilation and reduces respiratorycomplications.

Sérgio D. Belzarena, TSA, M.D. (2008)[12] in his study showed that the length of stay in the recovery room and the duration of hospital stay were smaller in the epidural block group. This is important since the patient can readily return to her family and social environment and can decrease the cost of the procedure. In our study mean recovery time in Group T was 51±6.2 min and in Group G mean recovery time was 109±23.9 min. and duration of hospital stay in Group T was 105±24.2 hrs and in Group G mean duration of hospital stay was

137.9±17.66 hrs. So the Group T had smaller recovery time and hospital stay duration. This result was comparable to above study.

CONCLUSION

To conclude thoracic epidural anesthesia compared to general anesthesia has different sets of intra operative hemodynamic changes. In both type of anesthesia this intra operative hemodynamic changes are easily manageable. Significant difference occurs in post operative period, where general anesthesia has high rate of complication compared to epidural anesthesia. Pain management is a very important aspect in deciding type of anesthesia employed. In general anesthesia requirement of opioid and non opioid analgesics are very high; use of these drugs are associated with high incidence of side effects. With thoracic epidural anesthesia these post operative complications are minimized, better pain management is instituted. Superimposed on this advantage with use of thoracic epidural anesthesia, there is significant early recovery and shorter duration of hospital stay. So it can be considered that thoracic epidural anesthesia is better alternative for elective breast surgery than general anesthesia.

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