 DOI: 10.18231/2394-4994.2017.0004

Comparative study between thoracic epidural and general anesthesia for modified radical mastectomy

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Abstract

Objective: Comparison between thoracic epidural and general anesthesia for breast surgeries.

Aim: The aim was to compare general anesthesia and thoracic epidural anesthesia in patients undergoing breast cancer surgeries on the basis of intra operative hemodynamic parameters, post-operative analgesic requirement and side effects such as nausea, vomiting, sedation and hemodynamic variability.

Method: A randomized double blind study was conducted on 60 ASA grade I, II and III females who received thoracic epidural anesthesia in group I (N=30) and general anesthesia in group II (N=30). Assessment of the block, vital monitoring and complications were noted.

Results: No significant differences were observed in both the groups. Hypotension and pruritus was more frequent in patients who underwent epidural anesthesia while hyper-tension was more common in patients with general anesthesia. Degree of patient satisfaction was similar in both the groups.

Conclusion: Thoracic epidural anesthesia is safe and reliable alternative to general anesthesia in women undergoing modified radical breast surgeries.

Keywords: Thoracic epidural; General anesthesia; Breast surgery; Cost effectiveness; Early ambulation

Introduction

Breast cancer is the most frequent tumor in women. The incidence of breast cancer, as well as the need of surgical treatment has increased probably due to increased awareness and improved diagnostic tools resulting in early diagnosis and favorable surgical outcome.

Routinely definitive breast cancer surgeries have been performed under general anesthesia. However general anesthesia does not eliminate the surgical stress response and the need for drugs to culminate post-operative pain may cause undesirable side effects such as nausea, vomiting, sedation and respiratory depression.[1-2]

Thoracic epidural allows utilization of incremental doses of local anesthetic agent which offers preservation of the respiratory function. It provides excellent pain relief without impairing respiration.[3-7]

It has beneficial effects to those who have difficult airway, compromised cardiac and pulmonary reserve and elderly patients.[8-10] Thoracic epidural selectively blocks cardiac acceleratory fibers and this offers attenuation of the surgical stress response, improvement of myocardial oxygen balance and preserves hemodynamic parameters.[11-12]

The technique of thoracic epidural requires special skill and expertise to avoid potential complications like inadvertent dural puncture, spinal cord trauma, and epidural hematoma/abscess.

The present study compared thoracic epidural block and general anesthesia in female patients undergoing breast cancer surgeries with axillary exploration.

Material & Methods

After obtaining informed consent, adult women patients from ASA I, II, or III were enrolled for the study. Before surgery, all the patients were instructed regarding benefits of thoracic epidural over general anesthesia by surgeon and the anesthesiologist. Thoracic epidural was given to patients in group-I (n=30) and general anesthesia to group II – (n=30).

All patients were preloaded with RL @ 10-20 ml/kg/h and mild sedation was given with 1-2 mg of injection midazolam. Hemoglobin was checked and ECG, saturation (SpO2) and non-invasive blood pressure were monitored regularly for every patient. After that patients were given respective anesthesia techniques. Group I: Thoracic epidural block was performed in sitting position. A18 G Touhy needle was inserted in mid-line at level of T6-7 inter-vertebral space. The loss of resistance technique was used to identify thoracic epidural space. An epidural catheter was introduced 3-5 cm into epidural space using Touhy needle. A test dose 2-3 ml of 2% Xylocaine with adrenaline 1:200000 was given to exclude the intravascular and intrathecal injection. The catheter was secured and15 ml of 0.5% bupivacaine was administered in 5 ml fractions testing the anesthesia level (adequate analgesia from the lower border of the clavicle to inferior costal margin). Whenever necessary supplementary doses of midazolam (1mg) were administered for sedation. Oxygen @3-6 L/ min was administered during the surgery. General anesthesia was administered for any patient who experienced discomfort. If the patient experienced pain or

discomfort during axillary exploration the area was infiltrated with adequate local anesthetic agent. Epidural Catheter was used for post-operative analgesia with 5ml of 0.25% bupivacaine. Exclusion criteria were patient refusal, infection at the site of epidural placement, coagulation disorder, and known allergy to bupivacaine.

Group-II:- All patients receiving general anesthesia were pre-medicated with injection glycopyrollate 0.2mg, injection ondanseteron 4 mg intravenously 60 minutes before surgery and induced with injection butorphenol 1 mg followed by propofol 2-2.5 mg/kg intravenously. Tracheal intubation was facilitated using succinylcholine 1-1.5 mg / kg. Anesthesia was maintained using isoflurane along with admixture of oxygen and nitrous oxide. Atracurium 0.5mg/kg was administered intravenously for muscle relaxation. Neostigmine 0.05 mg/ kg with glycopyrolate 0.01mg/ kg were injected intravenously for reversal of neuromuscular blockade. 75 mg of injection diclofenac was administered intravenously for post-operative pain whenever required.

During the surgery, patient satisfaction, the need of supplementary sedation, hemodynamic variability (tachycardia, represented by a heart rate greater than 100 bpm; bradycardia, heart rate below 50 bpm; hypotension defined as 20% drop in base line blood pressure; and hypertension, a 20% increased in base line blood pressure) and other side effects such as pruritus, nausea and vomiting were recorded for both groups. Postoperatively quality of analgesia was evaluated by verbal scale that included very strong pain; mild pain, absence of pain and the analgesic consumption were recorded.

Statistical analysis was performed using statistical package of social sciences version 21. Quantitative parameters were performed using students' t-test whereas qualitative parameters are compared using Chi square test and fisher exact test. P value as less than 0.05 was considered statistically significant.

Demographic Data

Table 1

	GA Group	Epidural Group	P value
Age(years)	58+9	63+6	0.20 (>0.05)
weight(kg)	72+11	76+14	0.916(>0.05)
height(cm)	161+10	158+9	0.232(>0.05)
ASA			
I	12	15	
II	15	13	P >0.05
III	03	02	

Table 2: Intraoperative Patients Characteristics

	GA group	Epidural Group	P value
Axillary Supplementation	0	6(20%)	2.023 (>0.05)
Sedation	0	30(100%)	0.0001 (<0.05)
Hypertension	9(30%)	0	0.0001 (<0.05)
Hypotension	3(10%)	18(60%)	0.0001 (<0.05)
Tachycardia	1(3%)	3(10%)	0.6120 (>0.05)
Bradycardia	3(10%)	12(40%)	0.0153 (<0.05)
	30	30	

Table 3: Postoperative Patients Characteristics

Nausea	12(40%)	3(10%)	0.0001 (<0.05)
Vomiting	15(50%)	3(10%)	0.0015 (<0.05)
Discharge from recovery room (In Minutes)	116+12	50+20	
Satisfied	20	25	0.2326 (>0.05)

Table 4: Pain Severity

	Very strong		Strong		Mild		Absent	
	GA	EPI	GA	EPI	GA	EPI	GA	EPI
Recovery room	6	0	10	0	14	0	0	30
6h**	6	0	9	1	10	3	5	26
12h**	10	0	6	3	4	3	10	24

Results

Demographic data showed no significant differences in both groups. The length of surgery was similar in both the groups. Incidence of heart rate variability (tachycardia and bradycardia) was more common in thoracic epidural group as compared to general anesthesia group. Incidence of hypotension was more frequent in thoracic epidural whereas hypertension was more frequent among general anesthesia group. In epidural group all patients needed supplementary sedation, most of them before the beginning of surgery.

Postoperative incidence of nausea and vomiting was more in general anesthesia group. The intensity of pain and consumption of analgesics were lower in the thoracic epidural group.

Reduced length of hospital stay was reported in thoracic epidural group. Satisfaction with anesthesia was similar in both the groups. There was no incidence

of respiratory depression, back pain and urinary retention.

Discussion

Our study demonstrated that thoracic epidural has advantages over general anesthesia for oncologic mastectomies with axillary emptying over general anesthesia.[13-14]

The incidence of breast cancer has been increasing in females. Surgery is the main treatment and current tendency is towards radical procedures. The anesthetic technique should provide adequate intra-operative anesthesia and good post-operative analgesia without collateral effects and with reduced hospital stay.

Regional anesthesia has protective effect against the peri operative stress response and beneficial effects have been attributed to the changes in physiology used by neuraxial anesthesia and better pain management. Patients did not complaint of very strong or strong pain and request for supplementary analgesic was lower.

The practice of thoracic epidural has been increasing in recent years. High thoracic epidural can be used to avoid endotracheal intubation and offers less respiratory complications. Similarly Groeben H. et al studied the effect of high thoracic epidural and local anesthetic on bronchial hyper reactivity and concluded that thoracic epidural is safer than general anesthesia in respiratory compromised patients.[15] It can provide adequate anesthesia with minimal effect and without patient discomfort because surgery of breast does not require motor blockade. The incidence of hypotension was high (60%) however it was easily controlled by lower dose of vasopressor. Similarly Doss NW, IpeJ, Crimi T et al studied continuous thoracic epidural anesthesia with 0.2% Ropivacaine versus general anesthesia for perioperative management of modified radical mastectomy and had similar results.[8] Respiration was also not significantly effected demonstrating that thoracic epidural can be safely used in respiratory compromised patients.

Similarly Groeben H, Schuafer B et al studied lung function under high thoracic segmental epidural anesthesia with Ropivacaine or Bupivacaine in patients with severe obstructive pulmonary disease undergoing breast surgery and had similar results.[12] The patients undergoing regional anesthesia were discharged earlier than general anesthesia and is more cost effective.

Conclusion

Our study shows that thoracic epidural anesthesia can be safely used in women undergoing modifying radical breast surgeries. The thoracic epidural technique not only provides hemodynamic stability but also significantly enhances postoperative analgesia and improves overall satisfaction for patients undergoing modifying radical mastectomy.

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