

Original research article

General anaesthesia and thoracic epidural anaesthesia in female patients with cardiovascular disease undergoing breast cancer surgeries: Hemodynamic changes

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Abstract

Routinely breast cancer surgeries are being performed under general anesthesia. However, it is associated with surgical stress response and the need for drugs to culminate postoperative pain. General anaesthesia may cause undesirable side effects such as nausea, vomiting, respiratory depression, and sedation. The present clinical study included 100 adult female patients of ASA III & IV undergoing elective MRM surgeries in Government General Hospital, for 2 years from the date of approval of the ethical committee. The study was a prospective, randomized, double blind control study. Mean \pm S.D age of overall patients was 48.57 ± 11.38 , while in group A, and B was 44.10 ± 12.23 and 53.03 ± 8.53 , respectively. Majority of the patients belongs to the age group (36– 45) years. In our study hypotension, hypertension and bradycardia were significant in group A & B with p-value 0.0038, 0.0257 and 0.0391 respectively.

Keywords: General anaesthesia, thoracic epidural anaesthesia, hemodynamic changes

Introduction

Most frequent cancers among women in our country is breast cancer. Incidence of breast cancer, as well as the need of surgical treatment has increased probably. Due to increased awareness and improved diagnostic tools which resulted in favourable surgical outcome and early diagnosis ^[1].

Thoracic epidural provides excellent pain relief without impairing respiration. It allows usage of local anesthetic in incremental doses by preserving respiratory function. The technique of thoracic epidural requires skill and expertise to avoid potential complications like an inadvertent dural puncture, epidural hematoma/abscess, spinal cord trauma ^[2].

Routinely breast cancer surgeries are being performed under general anesthesia. However, it is associated with surgical stress response and the need for drugs to culminate postoperative pain. General anaesthesia may cause undesirable side effects such as nausea, vomiting, respiratory depression, and sedation ^[3].

Thoracic epidural blocks cardiac sympathetic fibers selectively and this offer benefit by attenuation of the stress response during surgery, improvement of oxygen balance in the myocardium and stabilization of hemodynamic parameters ^[4].

Other regional anesthesia techniques such as thoracic paravertebral blocks, intercostal nerve blocks, pectoral nerve blocks type 1 and 2 [ultrasound guided] are some of the other modalities which can be used in the mastectomy cases.

We compared general anaesthesia and thoracic epidural anaesthesia in female patients with cardiovascular disease undergoing breast cancer surgeries with axillary exploration posted for modified radical mastectomy.

Methodology

The present clinical study included 100 adult female patients of ASA III & IV undergoing elective MRM surgeries in Government General Hospital, for 2 years from the date of approval of the ethical committee. The study was a prospective, randomized, double blind control study.

After obtaining approval from the ethics committee and acquiring written informed consent from all the patients, patients randomly divided into two groups of 50 patients each according to computer generated random allocation as Group A, and Group B. Patients of Group A received Thoracic Epidural Anaesthesia, Patients in Group B received General Anaesthesia.

Inclusion criteria

1. Female patients with breast carcinoma having cardiovascular disease undergoing elective Modified Radical Mastectomy surgeries.
2. ASA category III & IV.
3. Patients who gave written informed consent.

Exclusion criteria

1. Age < 25 yrs.
2. Patients not giving consent.
3. Patients with benign breast diseases.
4. ASA category I & II.
5. Patients with a history of known sensitivity to the drugs used.
6. Patients with gross spinal deformity.
7. Peripheral neuropathy or having any contraindication to neuraxial block, local/systemic infections, coagulation disorders.

Methods

The preoperative visit has done on the previous day of surgery, a detailed history of the present, and past complaints and General and systemic examinations of the cardiovascular, respiratory and central nervous system. Routine laboratory investigations like complete blood picture, Renal function tests, blood sugar, serum electrolytes, ECG, bleeding time and clotting time done. All patients instructed to remain nil orally after 10 PM.

The patients have given respective anaesthesia techniques-

Group-A: Thoracic epidural block performed in the sitting position. An 18G Tuohy needle inserted in the midline at the level of T6-T7 intervertebral space. The LOR (Loss of Resistance) method was to identify the thoracic EDS Catheter is introduced into the epidural space 3-5cm with the Tuohy insertion of needle. 2-3 ml test dose of Adrenaline 1:200000 in combination with 2% lidocaine is given for identification of intrathecal & intravascular injection. Securement of catheter, and 12ml to 15ml of local anaesthetic used is bupivacaine 0.5% with 50mcg fentanyl used in 5ml divisions to identify level, (adequate analgesia from the lower border of the clavicle to inferior costal margin). Whenever necessary, supplementary doses of midazolam (1mg) administered for sedation. Oxygen 3-6lit/min administered during surgery. General anaesthesia administered to any patient who experienced discomfort. If the patient experienced pain or discomfort during axillary exploration, the area infiltrated with an adequate local anaesthetic agent-an Epidural catheter used for postoperative analgesia with 5ml of 0.25% bupivacaine.

Group-B: All patients of general anaesthesia were given premedication by inj Glycopyrrolate 0.2mg, inj Ondansetron 4mg, IV 60 minutes prior to surgery and induction was with inj fentanyl 2mcg/kg along with inj PROPOFOL 2-3mg/kg IV. Endotracheal intubation done by giving inj succinylcholine 1-2mg/kg. Anaesthesia maintained using sevoflurane along with combination of O₂ and N₂O. Maintenance is by usage of 0.5mg/kg of ATRACURIUM IV.

Reversal: Neostigmine 0.05mg/kg with glycopyrrolate 0.01mg/kg, IV.

Results**Table 1:** Age Distribution

Age Group Yrs	Group A		Group B		Total	
	No. of Patients	%	No. of Patients	%	No. of Patients	%
< 35 Years	10	33.3	1	3.3	11	18.3
36 - 45 Years	10	33.3	7	23.3	17	28.3
46 - 55 Years	5	16.7	9	30.0	14	23.3
56 - 65 Years	4	13.3	12	40.0	16	26.7
> 65 Years	1	3.3	1	3.3	2	3.3
Total	30	100.0	30	100.0	60	100.0
Mean Age	44.10 ± 12.23		53.03 ± 8.53		48.57 ± 11.38	
Chi-square	$\chi^2 = 13.036^*$; (p = 0.011); df= 4;					

The Mean ± SD age of overall patients was 48.57 ± 11.38, while A GROUP & B GROUP was 44.10 ± 12.23 and 53.03 ± 8.53, respectively. Majority belongs to the age group {36-45yrs}. About 18.3% patients belongs to age group <35yrs, 23.3% to (46-55yrs), 16% to (56-65yrs), 3.3% to >65yrs. P-value was 0.011, hence not significant.

Table 2: Intra Operative Hemodynamics

	Group A	Group B	P-value	Sig.
Hypotension	19 (63.3)	7 (23.3)	0.0038	**P<0.01
Hypertension	1 (3.3)	8 (26.7)	0.0257	*P<0.05
Bradycardia	12 (40.0)	4 (13.3)	0.0391	*P<0.05
Tachycardia	4 (13.3)	7 (23.3)	0.5062	@P> 0.05

Note: Fisher Exact Test

Hypotension, hypertension and bradycardia were significant in both the groups with P-value 0.0038, 0.0257, and 0.0391 respectively.

Table 3: Post-Operative

	Group		Mean Difference	t-value (p-value)	Sig.
	Group A (n=30)	Group B (n=30)			
	Mean ± S.D	Mean ± S. D			
MAP	71.30 ± 9.37	94.53 ± 15.43	-23.233	7.048** (0.000)	P<0.001
	75.63 ± 15.26	85.67 ± 17.64		2.356* (0.022)	
HR	75.63 ± 15.26	85.67 ± 17.64	-10.033	2.356* (0.022)	P<0.05
	15.26	17.64			

**significant at 0.001 level; *significant at 0.05 level.

Mean ± SD of MAP and HR was more in group B. MAP in group A was 71.30 ± 9.37, and in the group B was 94.53 ± 15.43. HR in group A was 75.63± 15.26, and in the group B was 85.67 ± 17.64. Both MAP and HR were significant in both the groups.

Discussion

Mean ± S.D age of overall patients was 48.57 ± 11.38, while in group A, and B was 44.10 ±12.23 and 53.03 ± 8.53, respectively. Majority of the patients belongs to the age group (36– 45) years. About 18.3% patients belongs to age group <35yrs, 23.3% to (46-55yrs) and 16% to (56-65yrs), 3.3% to > 65yrs. P-value was 0.011, hence not significant.

Similar to our study, Amit Bhardwaj *et al.*,^[5] in 2017, Mean group GA (n=30) was 58+9 and in Epidural Group was 63+6. P- 65 value was 0.20 (>0.05) hence not significant. Prabhakaran Vineetha *et al.*,^[6] in 2017, n=50, range was 25-65 years.

Rahul Rajan *et al.*,^[7] in 2016, the mean group T (Epidural group) patients was 54.8 ± 5.11, and Group G (General anaesthesia group) was 57.28±2.54. Not significant.

Octavia *et al.*,^[8] in 2015 showed no significant differences between the groups in terms of age. Rajesh Verma *et al.*,^[9] in 2018, GA age group of 46 -65 years. Group 2 TEA are 51-66 years.

In our study hypotension, hypertension and bradycardia were significant in group A & B with p-value 0.0038, 0.0257 and 0.0391 respectively.

Amit Bhardwaj *et al.*,^[5] in 2017, in GA group Hypertension was in 9(30%) patients, hypotension in 3(10%), tachycardia in 1(3%), bradycardia in 3(10%). In Epidural Group Hypotension in 18(60%), tachycardia in 3(10%), bradycardia in 12(40%). P-value was significant in Hypertension, Hypotension i.e. 0.0001, and Bradycardia p-value was 0.0153 (<0.05).

Prabhakaran Vineetha *et al.*,^[6] in 2017 total cases -45, 12 cases (24%) intraoperative hypotension and 2 cases (4.4%) postoperatively showed hypotension. 4 (8.8%) patients 1 episode decreased HR intraoperatively, injection ATROPINE is given for bradycardia.

In the study by Rahul Rajan *et al.*,^[7] in 2016, There was no statistically significant difference in the haemodynamic parameters of the two groups. In group T Hypotension in 8 (26.6%), and bradycardia in 6 (20%). In group G Hypotension in 3 (10%), Hypertension in 5 (16.6%), Bradycardia in 1(3.3%), Tachycardia in 9(30%).

Octavia *et al.*,^[8] in 2015, the intra-operative hemodynamic results were tabulated and compared. Hypertension frequent in GETA group (28.6% vs 0%), HYPOTENSION commom in CTEA (80% vs 57.1%). Tachycardia was frequent in GETA group (46.6% vs 0%). Meanwhile, bradycardia noticed among the CTEA group (40% vs 17.1%).

Rajesh Verma *et al.*,^[9] in 2018, GA group, hypertension 3 pts, hypotension 1, 1 tachycardia, 2cases of bradycardia. NO hypertension in TEA group, hypotension 5, tachycardia 1, 2 bradycardia.

Lahiry *et al.*,^[10] in their study shows that technique of epidural had an advantage of decreasing the stress response, thereby maintaining better hemodynamic variability. They observed that temporary

segmental sympathetic blockade was quite effective in handling the body's increased stress response to surgery, and this decrease in stress response helped maintain better myocardial and hemodynamic stability. The thoracic epidural technique increases the repolarisation and prolongs the myocardium's refractoriness, thus offering protection against arrhythmias, particularly of ventricular origin. By choosing this technique, we avoid intubation which causes much pain and stress response due to stimulation of laryngeal and tracheal mechanoreceptors.

In this current study, we did not come across any respiratory problems with thoracic epidural anaesthesia. Many studies have observed that TEA preserved a ventilatory drive to hypercapnia and did not alter the hypoxic drive.

Tenenbein *et al.*,^[11] concluded epidural group had reduced pain complaint postoperatively, improved respiratory functioning with no atelectasis who are going for CABG surgery. Schauer B *et al.*, GROEBEN H *et al.*,^[12] done a study in functions of lungs by high segmental epidural anaesthesia with bupivacaine/ Ropivacaine among the severe obstructive patients pulmonary disease undergoing breast surgery and had similar results.

Conclusion

Thoracic epidural anaesthesia can be safely used in the women undergoing modified radical mastectomy breast surgeries. Intra-operative hemodynamic results suggested that Thoracic epidural anaesthesia technique has no effect on inducing hypertension and tachycardia, but hypotension and bradycardia may occur. Epidural anaesthesia have showed good hemodynamics stabilization and better analgesia intraoperatively and postoperative period.

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