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Comparative evaluation of thoracic epidural anaesthesia and general anaesthesia during the modified radical mastectomy

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Abstract
The present study compared general anaesthesia and thoracic epidural block in female patients undergoing oncologic surgeries of the breast with evaluation of the outcomes of the anaesthesia. The study is conducted in PatnaMedical College and Hospital in Surgery department from the duration of Nov 2016 to Jun 2017. Total 20 patients having are group of 40-70 year were enrolled in to the study.
The incidence of breast cancer has been increasing and, currently, it is the most common cancer in females. Surgery is the main treatment and the current tendency is towards less extensive procedure with axillary dissection for removal of lymph nodes to guide further treatment. In this situation, the anesthetic technique should provide adequate intraoperative anaesthesia and good postoperative analgesia without collateral effects and with the minimum hospitalization time.

Keywords: modified radical mastectomy, general anaesthesia, epidural anaesthesia

Introduction

When treating breast cancer, a doctor's goal is to remove all of the cancer -- or as much of it as possible. Surgery is one of the mainstays of treatment, and a procedure called modified radical mastectomy (MRM) is now a standard surgical treatment for early-stage breast cancers. This procedure leaves a chest muscle called the pectoralis major intact. Leaving this muscle in place will provide a soft tissue covering over the chest wall and a normal-appearing junction of the shoulder with the anterior (front) chest wall. This sparing of the pectoralis major muscle will avoid a disfiguring hollow defect below the clavicle. Additionally, the purpose of modified radical mastectomy is to allow for the option of breast reconstruction, a procedure that is possible, if desired, due to intact muscles around the shoulder of the affected side. The modified radical mastectomy procedure involves removal of large multiple tumor growths located underneath the nipple and cancer cells on the breast margins.

A modified radical mastectomy is a technique in which the complete breast is removed, including the skin, areola, nipple, and most axillary lymph nodes; the pectoralis major muscle is spared. Traditionally, a modified radical mastectomy was the principal method of treatment of breast cancer [1, 2]. As the treatment of breast cancer evolved, breast conservation has become more widely used [3, 4]. However, mastectomy still remains a viable option for women with breast cancer [5, 6].

It currently remains the patient's choice to undergo breast conservation or mastectomy with or without reconstruction. The European Organization for Research and Treatment of Cancer 10801 trial found no significant difference in the 20-year overall survival rate between women who underwent breast-conserving surgery and radiation and those who were treated with modified radical mastectomy, for stage 1 or 2 breast cancer. Overall survival at 20 years was 44% in the breast-conserving surgery group and 39% in the modified radical mastectomy group. Time to distant metastasis also did not differ significantly between the two groups, although the study did find that the 10-year locoregional recurrence of cancer was higher in the breast-conserving group than in the mastectomy patients (20% vs 12%, respectively) [7]. There are a few contraindications to breast conservation for which a mastectomy is recommended. According to the National Comprehensive Cancer Network guidelines [8], indications for mastectomy include the following:

- Prior radiation therapy to the breast or chest wall
- Radiation therapy contraindicated by pregnancy (except patients in the third trimester who can receive radiation postpartum)
- Inflammatory breast cancer
- Diffuse suspicious or malignant-appearing microcalcifications
- Widespread disease that is multicentric, located in more than one quadrant, and cannot be removed through a single incision with negative margins
- A positive pathologic margin after repeat re-excision and suboptimal cosmetic outcome

Relative indications for mastectomy include the following

- Active connective tissue disease involving skin (eg, scleroderma, lupus)
- Tumors greater that 5 cm in diameter
- Focally positive margin

Thoracic epidural analgesia remains a key component of anaesthesia-based acute pain services and is used to treat acute pain after: thoracic surgery, abdominal surgery, and rib fractures.1 TEA is warranted when a moderate-to-large thoracic or upper abdominal incision is anticipated. TEA can also be a useful adjunct in fast-track surgery by optimizing pain relief, attenuating the surgical stress response, and allowing early mobilization. TEA using local anesthetic is an

important component of fast-track colorectal procedures because it reduces the duration of postoperative ileus.

Thoracic epidural anaesthesia (TEA) has been established as a cornerstone in the perioperative care after thoracic and major abdominal surgery providing most effective analgesia [8, 9]. Beyond its analgesic properties, TEA's effects on the postoperative neurohumoural stress response, cardiovascular pathophysiology, and intestinal dysfunction have been in the focus of both clinical and experimental investigations for years [10-14] However, the use of TEA is related to specific complications and contraindications. 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.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 general anaesthesia and thoracic epidural block in female patients undergoing oncologic surgeries of the breast with evaluation of the outcomes of the anaesthesia.

Methodology

The study is conducted in Patna Medical College and Hospital in Surgery department from the duration of Nov 2016 to Jun 2017. Total 20 patients having are group of 40-70 year were enrolled in to the study. As per the classification of the American Society of Anesthesiologists I and II physical conditions were enrolled on to the study. All the patients are informed consents. All the patient's clinical history was collected. The approval of the institutional ethical committee is taken for the planned study.

The inclusion criteria are females undergoing the modified radical mastectomy. The patients having other infections, Coagulopathy and bleeding disorders were excluded from the study.

Before surgery, all the patients were instructed regarding benefits of thoracic epidural over general anaesthesia by surgeon and the anesthesiologist. General anaesthesia to group II patients having total 10 cases and thoracic epidural was given to patients in group I of 10 patients.

Group I:- All patients receiving general anaesthesia 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. Anaesthesia 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.

Group II: 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. 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 anaesthesia level.

Results & Discussion

The data from the both the group is collected and presented as below. The age and sex data is presented in below table.

Table 1

Groups	Group I : General Anaesthesia	Group II: Thoracic epidural Group
Age(yr)	48-65	51-66
Weight(Kg)	65-85	61-82
ASA Class I	6	3
ASA Class II`	4	7

The general anaesthesia patients were having the age group of 46 -65 years, with weight of 65-85 kg. There are 6 ASA Class I & 4 cases of ASA class II patients. In group II Thoracic epidural aesthetic patients are is 51-66 years with weight of 61-82 kg. There are 3 cases of ASA class I and 7 cases of ASA class II were observed.

Table 2: Patients Characteristics

Characteristics	No. of Cases in General Anaesthesia Group	No. of Cases in Thoracic epidural Group
Hypertension	3	0
Hypotension	1	5
Tachycardia	1	1
Bradycardia	2	2
Axillary Supplementation	2	1
Sedation	1	1

In General Anaesthesia Group there are 3 cases of hypertension, 1 cases of hypotension, 1 cases of tachycardia, 2cases of bradycardia, 2 cases of axillary supplementation and 1 case of sedation observed.

In Thoracic epidural Group there are no cases of hypertension, 5 cases of hypotension, 1 cases of tachycardia, 2 cases of bradycardia, cases of axillary supplementation and 1 case of sedation observed.

Table 3: Postoperative Observation

Characteristics	No. of Cases in General Anaesthesia Group	No. of Cases in Thoracic epidural Group
Nausea	4	1
Vomiting	6	1
Satisfied	7	9

Postoperative incidence of nausea and vomiting was more in general anaesthesia group.

The significantly faster recovery scores in thoracic epidural anaesthesia in comparison to the general anaesthetic technique has also been well established in other studies.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 anaesthesia in respiratory compromised patients [15]. It can provide adequate anaesthesia 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 anaesthesia with 0.2% Ropivacaine versus general anaesthesia for perioperative management of modified radical mastectomy and had similar results [16]. 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 anaesthesia with Ropivacaine or Bupivacaine in patients with severe obstructive pulmonary disease undergoing breast surgery and had similar results [17]. The patients undergoing regional anaesthesia were discharged earlier than general anaesthesia and is more cost effective.

The multimodal technique of postoperative analgesia using local anesthetic and spinal opioid and intravenous anti-inflammatory had better results; patients did not complain of very strong or strong pain and the request for supplementary analgesic was lower. Tramadol was not used in patients in the epidural block group. Adequate control of pain in this situation is important since it makes for a better postoperative period and early hospital discharge, and can have a long-term effect, decreasing complications such as chronic pain [18-19]. Prior administration of tenoxicam can be advantageous, as suggested by another study [20].

Conclusion

The incidence of breast cancer has been increasing and, currently, it is the most common cancer in females. Surgery is the main treatment and the current tendency is towards less extensive procedure with axillary dissection for removal of lymph nodes to guide further treatment. In this situation, the anesthetic technique should provide adequate intraoperative anaesthesia and good postoperative analgesia without collateral effects and with the minimum hospitalization time.

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