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Cervical epidural anaesthesia for carcinoma breast surgery as the sole anaesthesia modality

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Abstract

Objective: The study is aimed to evaluate the feasibility and safety of cervical epidural anaesthesia as the sole anesthetic technique for modified radical mastectomy done for carcinoma breast.

Method: Thirty six breast cancer patients of ASA (American Society of Anaesthesiologists) grade I and II underwent MRM under CEA from February 2012 to December 2016. Anesthesia was induced with 12 ml of 1% lignocaine with adrenaline, administered through an 18-gauge cervical epidural catheter placed at C(7)-T(1) epidural space. Top-up dose was given after 1 hour 15 minutes to all the patients with 6ml of 0.25% Bupivacaine and 50 microgram of Fentanyl injection. All patients were given intravenous sedation with midazolam. Oxygen supplemented nasally. In one patient as a planned procedure, an additional lumbar epidural block was given to raise skin graft to fill the defect. In another patient where skin grafting was unplanned, Injection Ketamine 100mg was used. The mean operative time was 123.71± 24.96 minutes. Postoperative analgesia was maintained with Diclofenac Sodium Injection 75 mg at the end of surgery followed by Tramadol injection through the epidural catheter for the first 24 hours according to VAS score. The parameters considered were pulse, blood pressure, oxygen saturation, Supplementation or conversion to GA, blood loss, post-op analgesia and nausea vomiting.

Results: One patient was excluded from the study due to blood tap during catheter placement. Three patients had bradycardia and four patients had hypotension which was treated accordingly. No patient required blood transfusion. No nausea or vomiting in the intra-operative or post operative period. Supplementation or conversion to general anesthesia was not required in any patient. All patients were started on a liquid diet 4 hours after surgery and were mobilized early. Post-operative analgesic requirement was also found to be less.

Conclusion: In this study cervical epidural anaesthesia has been found to be not only feasible but also safe and can be used as sole anesthesia modality in cases of carcinoma breast surgery, but it needs to be studied in larger sample population.

Keywords: Cervical epidural, Anaesthesia, Breast surgery, Ketamine, Lignocaine, Adrenaline,Bupivacaine

Introduction

General anaesthesia (GA) is still the anaesthesia of choice for carcinoma breast surgery. However, epidural anaesthesia has been used as an alternative anaesthetic modality in carcinoma breast patients with co- morbid conditions, who are either unfit or they are at a high risk for general anaesthesia (ASA grade III and IV). In this study, the same method has been extrapolated to be used for the routine low risk patients of ASA grade I and grade II with the view that if it can be employed for unfit patients for general anaesthesia, then why it can't be used as the first choice of anaesthesia in other patients after subjecting to proper screening and counseling. Cervical epidural anaesthesia is less practiced as it requires a certain degree of skill and also due to the fear of complications. Probably, this modality of anaesthesia needs to be studied and applied in more number of patients for it to be accepted as not only good alternative to GA but also as the first choice of anaesthesia for carcinoma breast surgery. This can be very beneficial for the patients especially in developing countries with limited resources. The aim is to study the feasibility and safety of using cervical epidural anaesthesia as the first choice of anesthetic technique in surgery of carcinoma breast.

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Method

This is an observational case series study done over a period of 4 ½ years (February 2012 to December 2016) in private hospital setting, wherein patients of carcinoma breast who underwent Modified Radical Mastectomy were included. All the patients underwent surgery under cervical epidural anesthesia. There were thirty six patients in the age group between 32 years to 73 years, with mean age 56 years. The associated co-morbid conditions have been depicted graphically in figure 1.

All the hypertensive and diabetic patients were well controlled by medication. One asthmatic patient was using bronchodilator

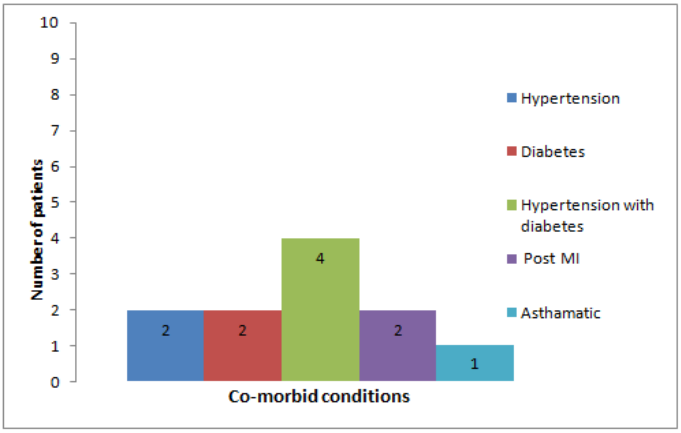

Figure 1: The associated co-morbid conditions depicted graphically

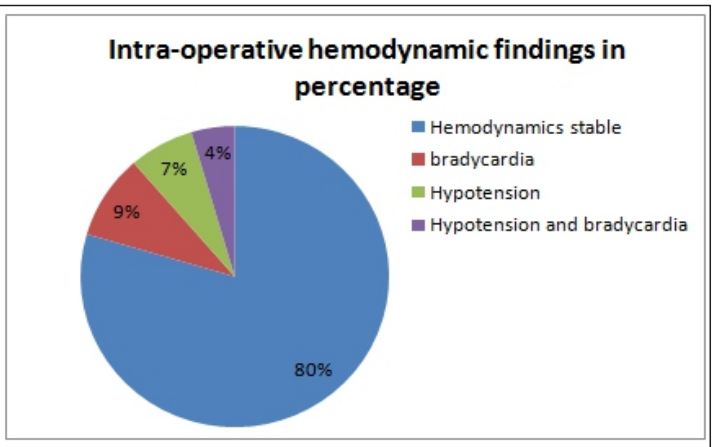

Figure 2: The intra-op hemodynamic changes represented graphically.

inhaler. Two patients had undergone appendectomy, two patients underwent fissurectomy and one patient had undergone, Cholecystectomy, in the past. In one patient there is history of allergy to Paracetamol. Two patients who had suffered cardiac event in the past were on Aspirin tablet. Patients having contraindication to regional anaesthesia were excluded from the study. One case was excluded from the study due to blood tap during placement of epidural catheter. As this is not a widely used technique, the patients and also the surgeon were explained fully the anesthetic procedure and informed consent was obtained. The parameters observed were pulse, blood pressure, oxygen saturation, Supplementation or conversion to GA, blood loss, nausea vomiting and post-op analgesia. The investigative work-up consisted of complete blood count, blood sugar, liver function tests, kidney function tests, Thyroid profile, coagulation profile, HIV, Australia antigen, blood grouping, electrocardiography, echocardiography, X-ray chest, USG abdomen and bone scan (to rule out secondaries). Pulmonary function test of the asthmatic patient was done which revealed good respiratory reserve.

Pre-operatively, the oral hypoglycemic drugs of all the diabetic patients were stopped 24 hours prior to surgery. The anti-hypertensive medications were continued and tablet Lorazepam was given to all the patients the previous night. In the operation theater, the baseline parameters were noted. An intravenous access was achieved and fluids started. Blood sugar of the diabetic patients was checked. An anti-emetic (Injection Metochlopromide), antacid (Ranitidine) and antibiotic (Cefoperazone + Salbactum) was given to all the patients. Injection Deriphylline was given prophylactically to the asthmatic patient. Patients were positioned on the left lateral position. A wheel with local anesthetic was raised below the skin at the level of C7-T1 in the midline. A Touhy needle of 18 gauze was used for epidural block and an epidural catheter was introduced. Once in the space, aspiration test was done to check for presence of CSF or blood and a test dose of 2 ml of 1% Lignocaine with adrenaline was injected. After waiting for 5 minutes, another 10 ml of 1% Lignocaine with adrenaline was injected through the catheter and patients were made to lie in supine position. Intra-op sedation was given to all the patients using 2 mg Midazolam injection. Three patients required additional 1mg of Midazolam injection. Throughout the surgery, oxygen at the rate of 2 liters per minute was supplemented through nasal cannula. First anesthesia top-up through the epidural catheter was given in all patients after one hour fifteen minutes using 6 ml of 0.25% Bupivacaine with 50 microgram of Fentanyl injection. In 5 patients second top-up epidural dose was given after 2 ½ hours.

Observations recorded were hemodynamic changes (tachycardia, represented by a heart rate greater than 100 bpm; bradycardia, heart rate below 60 bpm; hypotension, defined as a 20% drop in baseline blood pressure; and hypertension, a 20% increase in baseline blood pressure), Oxygen saturation (Spo2 below 95%), supplementation or conversion to general anaesthesia, blood transfusion requirement. The mean operative time was noted. Post-operatively, the patients were shifted to the recovery ward except those having hypertension and diabetes, who were shifted to the high care unit. Oxygen supplementation was continued for two hours post-operatively. Analgesia was provided with Injection Diclofenac sodium 75 mg given at completion of surgery and Injection Tramadol 100 mg through the epidural catheter as required according to VAS score, in the post-operative period for the first 24 hours. Thereafter oral anti-inflammatory drugs were started. Blood sugar of the diabetic patients were monitored and controlled by Insulin injection.

Result

Of the thirty six patients, one patient was excluded from the study because of blood tap during epidural placement. Therefore the results of thirty five patients were analyzed statistically using percentages, mean and standard deviation to draw a conclusion. The procedure could be completed successfully under cervical epidural block in all the patients. The average onset of action of epidural block was seen at 12.91 ± 2.71 minutes. The upper level of anaesthesia extending upto C4 - C5 and the lower limit extending upto T8 - T10 which was adequate. The hemodynamics remained stable in most cases. The intra-op hemodynamics has been represented graphically in figure 2.

The patients who had bradycardia and hypotension were treated with Injection Atropine and Injection Mephentermine respectively. Oxygen saturation was maintained above 95% in all the patients. Two patients became anxious and complained of shortness of breath although their oxygen saturation was maintained. They calmed down after reassurance.

None of the patients required supplementation of anaesthetic drugs or conversion to general anesthesia. In one patient, where skin grafting was planned, lumbar epidural block was used to achieve anaesthesia at the donor site. In another

patient, Injection Ketamin 100 mg was given for raising skin graft, which was not planned. No blood transfusion was required in any of the patients. The duration of surgery ranged from 90 to 200 minutes and mean operative time of 123.71± 24.96 minutes. None of the patients had nausea or vomiting in the intra-op or post-op period and were started orally liquids after 4 hours.

Discussion

Surgery for carcinoma breast (Modified Radical Mastectomy) is generally done under general anaesthesia. In our study we have tried to evaluate the feasibility and safety of cervical epidural anaesthesia as the sole anaesthetic technique in the cases of carcinoma breast who underwent modified radical mastectomy. Cervical epidural block extending from C4 to T8 provided adequate analgesia even for axillary clearance. Thoracic epidural block has been more commonly used for breast surgery. A problem of thoracic epidural block is, higher cervical nerve roots may not be adequately blocked and when dissection extends higher up in the axilla, supplementation of general anesthesia may be required [1]. This is the reason of using CEA in our study. Regional anaesthesia has been used in thyroid and neck surgeries [1-3], breast [4,5] and upper limb surgery [6]. This is especially useful in patients with associated co-morbid conditions like hypertension, Ischemic heart disease, Asthma, COPD etc. and carries higher risk under GA. A major concern is the effect on respiratory function, especially the effect on diaphragm due to blocking of phrenic nerve which supplies the diaphragm. Studies have shown that phrenic nerve being mainly a motor nerve gets incompletely blocked at a concentration of 1% Lignocaine and 0.25% Bupivacaine thereby retaining diaphragmatic function. Hence this concentration was used in our study. Also respiratory complications following prolonged GA is avoided which is especially beneficial in patients of COPD. In a study of lung function under high thoracic epidural anaesthesia (TEA) for ca breast surgery in COPD patients, Groeben H et al found that despite sympathetic blockade, high TEA doesn't increase airway obstruction [7]. A study by Stevens et al showed that cervical or high thoracic approach of epidural anaesthesia can decrease the FVC and FEV1 by 10-14% by causing motor block of the respiratory muscles [8]. However clinically it has not been found to be significant and this modality of anaesthesia has been used in patients of asthma and COPD safely [6,7,9]. A study conducted by Bonnet et al of 394 patients of carotid artery surgery under CEA revealed respiratory muscle paralysis in three patients [10]. The possible explanation could be use of higher concentration of Bupivacaine i.e. a concentration of 0.5% was used in their study. Also 10.9% of the patients developed hypotension. Most of the patients in present study remained hemodynamically stable. Epidural block can cause hypotension and bradycardia due to inhibition of the cardiac sympathetic fibres. However, Deepak Dhummansureet al[3] in their study of 50 patients for Thyroid surgery under CEA and Wenket al[4] in their study of 39 patients of MRM under CEA observed no respiratory and hemodynamic adverse effects [3,4]. The patients who are compromised in terms of hemodynamic condition and respiratory reserve due to associated co-morbid conditions, regional anaesthesia, that is either cervical or high thoracic epidural anesthesia is therefore a safe alternative. Singhet al [11] in their study of 50 patients of MRM under CEA reported no clinically significant variation in peri-operative pulse, respiration and no fall in mean arterial blood pressure and concluded this modality as safe, low cost and with minimal peri-operative morbidity [11]. Post-operative analgesia is also a consideration and is better maintained through the epidural catheter in patients operated under regional block [12,13]. Yeh et al.[13]in their study of sixty four patients who underwent MRM under TEA observed that after surgery a longer time elapsed before the first analgesic injection was needed in the TEA group (19.2 6 1.5 hours) (p , 0.001) than in the GA patients (7.6 6 2.5 hours). In our study also analgesic requirement in the post-op period was found to be much less. Blood loss was less during surgery under epidural anaesthesia and none of the patients required blood transfusion. Santpuret al[1] in their study of 2 cases of MRM with hypertension, COPD and diabetes observed that ca breast surgery under CEA provides stable parameter, less blood loss and good post-op analgesia. In patients with immunodeficiency, the choice of appropriate pain therapy should be carefully selected, considering that the interaction between anaesthesia and the immune system can lead to complications [14]. CEA on the contrary, provides good post-op analgesia and therefore has a salutary effect on the prognosis of the disease. Immunity depression after GA is a concern that has to be considered. In Colucci et al review article expressed that several immune functions are modified after anaesthetic drugs are administered by direct or indirect effects on stress responses. It is important in conditions, such as in cancer, considering that immune-suppression induced by drugs used for general anesthesia, which enhances progression of metastasis after tumour removal surgery [15]. Studies have shown that the patients who were operated under CEA or thoracic block were mobilized early leading to faster recovery and therefore beneficial economically [11, 16]. There is less complication of nausea and vomiting seen after regional anesthesia as compared to GA [16]. In our study there was no incidence of dural puncture. In one patient there was blood tap during epidural catheter placement, therefore the procedure was abandoned and patient was not included in the study. Manuel Wenket al reported 67% correct catheter placement in their study [4]. Also, probably there is fear of complications like respiratory compromise, damage to the epidural blood vessels, cord structure or neurological deficit due to hematoma etc. However, neurological complications are rare. Our study shows that it is feasible and safe to perform modified radical mastectomy for carcinoma breast surgery under CEA as sole anesthetic technique. However the limitations are that, it is a small sample study. The study being of single operator, will have it's limitations in term of replication of results which might vary in case of multiple operators. Although Oxygen saturation was maintained more than 95% in all the patients in our study, Etco2 was not measured, therefore cannot comment about CO2 retention. One more limitation of this study is epidural catheter insertion is by blind technique. Use of USG guided block will increase the safety by providing guidance for proper catheter placement. Another important issue is that the patient should be counseled properly and has to be co-operative enough to undergo awake surgery under CEA although sedation was used in all the patients in this study. There are many other safe options available as well which may also be considered like thoracic paravertebral block, pectoral nerve block, thoracic epidural block, local infiltration etc. However, use of regional anaesthesia for this surgery provides lot of advantages and also avoids all the complications of general anaesthesia.

Conclusion

From this study it can be concluded that cervical epidural anaesthesia has been found to be not only feasible but also safe and can be used as sole anaesthesia modality in cases of carcinoma breast surgery. It also offers many advantages over general anaesthesia. Although studies involving larger samples are required before pronouncing this modality as the first choice of anaesthesia for surgery of carcinoma breast and with more number of studies involving larger patient base and with a positive outcome, CEA can find more applicability and better acceptability.

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