Section: Anesthesia

Original Research Article

ANALYSIS OF EFFECT OF REGIONAL ANAESTHESIA VERSUS GENERAL ANAESTHESIA IN BREAST CONSERVING SURGERY (BCS) IN BREAST CANCER PATIENTS: AN INSTITUTIONAL BASED STUDY

Chandrashekhar Prasad[1], Mukesh Kumar[2], Krishna Murari[3], Arun Kumar Singh[4]

[1]Senior Resident, Department of Anesthesia, RDJM Medical College & Hospital, Turki, Muzaffarpur, Bihar, India.
[2]Senior Resident, Department of Anesthesia, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India.
[3]Assistant Professor, Department of General Surgery, Noida International Institute of Medical Sciences, Gautam Budh Nagar, Uttar Pradesh, India.
[4]Associate Professor, Department of General Surgery, VMMC & Safdarjung Hospital, New Delhi, India.

Received : 16/05/2023
Received in revised form : 07/06/2023
Accepted : 28/06/2023

Keywords:
Regional Anaesthesia, General Anaesthesia, Breast Conserving Surgery.

Corresponding Author:
Dr. Arun Kumar Singh,
Email: arun.aiims01@gmail.com.

DOI: 10.47009/jamp.2023.5.4.52

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (4); 251-254

Abstract

Background: The present study was conducted for evaluating the effect of regional anaesthesia versus general anaesthesia in breast conserving surgery (BCS) in breast cancer patient. **Materials and Methods:** A total of 100 breast cancer patients who were scheduled to undergo breast-conserving surgery followed by radiation were enrolled. All the patients underwent breast-conserving surgery without axillary lymph node dissection under either local (Group L; n=50) or general anesthesia (Group A; n=50). The permanent paraffin-embedded sections were examined to ascertain the ultimate margin status. After surgery, patients were encouraged to have check-ups every six months for the five years of follow-up. Local relapse, recurrence-free survival, and breast cancer-specific survival were the main objectives. All the results were recorded in Microsoft excel sheet followed by statistical analysis. **Results:** Mean age of the patients of Group L and Group A was 48.5 years and 50.7 years respectively. Mean operative time among patients of group L and group A was 68.4 minutes and 86.1 minutes respectively (p- value < 0.05). Mean hospital stay among patients of group L and group A was 11.8 days and 15.7 days respectively (p- value < 0.05). Non-significant results were obtained while comparing the recurrence-free survival among the two study groups. **Conclusion:** No correlation between the type of anaesthesia used during breast-conserving surgery and the prognosis of breast cancer over the long term was found.

INTRODUCTION

Breast cancer ranks among the leading causes of female cancer-related deaths in the world. Surgical management remains the standard of care for non-invasive and localized invasive breast cancer, which may get combined with systemic endocrine therapy, chemotherapy, and/or radiation. With the publication of the National Surgical Adjuvant Breast and Bowel Project (NSABP) B-06 trial, which showed equivalent disease-free survival, distant disease-free survival, and overall survival amongst women undergoing partial mastectomy with irradiation compared to radical mastectomy, breast conservation therapy (BCT) became standard of care for patients with tumors under 4 cm.[1,2] Breast conserving surgery (BCS) with radiation therapy is today standard therapy for low grade Breast Cancer. It is safe and preferred therapeutic procedure in all early detected breast cancers, because it provides the same level of overall survival as mastectomy. Same survival rates as seen in patients treated with mastectomy, have been found by several prospective and randomized studies and number of clinical trials.[3-5] Over the last decade, a potential link between anesthetic techniques and the recurrence of breast cancer has been an important and controversial issue for anesthesiologists and breast surgeons.[6] Hence; the present study was conducted for evaluating the effect of regional anaesthesia versus general anaesthesia in breast conserving surgery (BCS) in breast cancer patient.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

MATERIALS AND METHODS

The present study was conducted for evaluating the effect of regional anaesthesia versus general anaesthesia in breast conserving surgery (BCS) in breast cancer patients. A total of 100 breast cancer patients who were scheduled to undergo breast-conserving surgery followed by radiation were enrolled. Complete demographic and clinical details of all the patients was obtained. All the patients underwent breast-conserving surgery without axillary lymph node dissection under either local (Group L; n=50) or general anesthesia (Group A; n=50). Fentanyl and propofol were used to induce general anaesthesia, and succinylcholine or a non-depolarizing muscle relaxant was used to aid with tracheal intubation. 1% lidocaine and adrenaline were used by the surgeons to administer local anaesthesia. If an intraoperative frozen section revealed a positive margin after the procedure, extra tissue was removed during the same procedure in accordance with the patient's surgical plan to produce a negative margin. The permanent paraffin-embedded sections were examined to ascertain the ultimate margin status. After surgery, patients were encouraged to have check-ups every six months for the five years of follow-up. Local relapse, recurrence-free survival, and breast cancer-specific survival were the main objectives. All the results were recorded in Microsoft excel sheet followed by statistical analysis.

RESULTS

Mean age of the patients of Group L and Group A was 48.5 years and 50.7 years respectively. Majority of the patients of the study group had tumor size of ≤ 2 cm. Lymph node involvement was negative in majority of patients of both the study groups. Mean operative time among patients of group L and group A was 68.4 minutes and 86.1 minutes respectively (p-value < 0.05). Mean hospital stay among patients of group L and group A was 11.8 days and 15.7 days respectively (p- value < 0.05). Non-significant results were obtained while comparing the recurrence-free survival among the two study groups.

Table 1: Comparison of variables

Variables		Group L (n=50)	Group A (n=50)	p- value
Mean age (years)		48.5	50.7	0.457
Tumor size (cm)	≤ 2	31	28	0.114
	More than 2	19	22	
Lymph node	Negative	46	48	0.724
	Positive	4	2	

Table 2: Comparison of operative time

Operative time	Group L (n=50)	Group A (n=50)
Mean (minutes)	68.4	86.1
SD	23.8	37.1
p- value	0.001 (Significant)	

Table 3: Comparison of hospital stay

Hospital stay	Group L (n=50)	Group A (n=50)
Mean (days)	11.8	15.7
SD	3.5	4.1
p- value	0.000 (Significant)	

Table 4: Comparison of odd ratios for recurrence-free survival

Group	95% CI	p- value
Group L	-1.23 to 0.38	0.1128
Group A	-0.98 to 0.68	

DISCUSSION

Advances in anesthesia and the de-escalation of breast cancer surgery have enabled the performance of breast-conserving surgery (BCS) and axillary lymph node (ALN) management techniques, such as sentinel lymph node biopsy (SLNB) and axillary lymph node dissection (ALND), in outpatient settings for patients with breast cancer. In addition, the paradigm shift from adjuvant chemotherapy to neoadjuvant chemotherapy (NAC) has not only improved the prediction of prognosis and treatment response, but also reduced the size of the resected area due to post-NAC downstaging of advanced breast cancer.[6]

Other factors that can cause immunosuppression during cancer surgery include surgical stress and opioid use. Surgical stress is limited by the size of the operative field, duration of the operation, and amount of blood loss. Opioids are commonly used in combination with inhalation anesthetics as analgesics and sedatives for GA, but non-synthetic and synthetic opioids can suppress CMI, depending on the dose and duration of use. In contrast, intravenous anesthesia (IVA) with propofol protects CMI, as does regional anesthesia (RA) with paravertebral block (PVB) or

ISSN (O): 2687-5365; ISSN (P): 2753-6556

epidural anesthesia. RA blocks afferent neurotransmitter pathways from peripheral nerves to the central nervous system and the efferent activation of the sympathetic nervous system (SNS), thereby reducing the release of neuroendocrine mediators such as glucocorticoids and allowing the minimization of opioid use.[7- 9]

Mean age of the patients of Group L and Group A was 48.5 years and 50.7 years respectively. Majority of the patients of the study group had tumor size of ≤ 2 cm. Lymph node involvement was negative in majority of patients of both the study groups. Mean operative time among patients of group L and group A was 68.4 minutes and 86.1 minutes respectively (p-value < 0.05). The study by Exadaktylos et al compared paravertebral anesthesia (PVA)/analgesia combined with general anesthesia (GA) against GA/postoperative morphine analgesia. The results suggested that the former resulted in 25% lower recurrence of breast cancer or metastasis compared to the latter. Surgical stress and anesthesia activate the neuroendocrine paracrine responses of the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system (SNS), leading to the suppression of cell-mediated immunity (CMI) by releasing neuroendocrine mediators such as catecholamines, cortisol, and cytokines. In turn, these mediators promote the progression and metastasis of tumors. It was proposed that the benefit of PVA is related to the afferent transmission pathway of endocrine mediators being blocked. Such mediators, including vascular endothelial growth factor (VEGF), matrix metalloproteinases, and interleukin (IL) 6 and 8, are endogenous regulators that promote tumor growth and angiogenesis, thereby reactivating micrometastasis. Therefore, PVA combined with analgesia reduces the recurrence of breast cancer because PVA prevents afferent neurotransmission from the central nervous system via the HPA axis and blocks efferent activation of the SNS through neuroendocrine stress responses during surgery. In contrast, opioids inhibit immune responses, and might support the survival and angiogenesis of tumor cells, as observed in animal and in vitro models.[10-12]

Mean hospital stay among patients of group L and group A was 11.8 days and 15.7 days respectively (p-value < 0.05). Non-significant results were obtained while comparing the recurrence-free survival among the two study groups. Zhang J et al, in a previous study, examined locoregional recurrence (LRR) in patients with breast invasive ductal carcinoma (IDC) receiving breast conservative surgery (BCS) under propofol-based paravertebral block-regional anesthesia (PB-RA) versus sevoflurane-based inhalational general anesthesia (INHA-GA) without propofol. All-cause death and distant metastasis were secondary endpoints. Patients with breast IDC receiving BCS were recruited through propensity score matching and categorized into INHA-GA with sevoflurane and PB-RA with propofol groups. Cox regression analysis was performed to calculate hazard ratios (HRs) and 95% confidence intervals (CIs). In the multivariate Cox regression analysis, the adjusted HR (aHR; 95% CI) of LRR for the PB-RA with propofol group was 0.67 (0.46–0.99) compared with the INHA-GA with sevoflurane group. The aHR of LRR for adjuvant radiotherapy was 0.60 (0.38–0.97) compared with that for no adjuvant radiotherapy. PB-RA with propofol might be beneficial for reducing LRR in women with breast IDC receiving BCS compared with INHA-GA without propofol.[13] In another similar study conducted by Gu, Chongshan et al, authors analyzed the data of 994 patients with hormone receptor-positive and Her2-negative tumors who underwent breast-conserving surgery without axillary lymph node dissection under local or general anesthesia. Of the 994 patients enrolled in this study, 367 received local anesthesia and 627 patients received general anesthesia. The median follow-up duration for all patients was 93 months. The Kaplan–Meier survival curves did not reveal significant differences between the recurrence-free survival of the two groups, with 5-year recurrence-free survival rates of 96.3% (95% CI, 94.3–98.3%) in the local anesthesia group and 97.3% (95% CI, 95.9–98.7%) in the general anesthesia group. The total cost of hospitalization in the local anesthesia group was significantly lower than that in the general anesthesia group (P <.001). The difference in the cost between the two groups remained significant, irrespective of the type of hospitalization, after excluding 165 patients receiving chemotherapy during their hospitalization.[14]

CONCLUSION

No correlation between the type of anaesthesia used during breast-conserving surgery and the prognosis of breast cancer over the long term was found.

REFERENCES

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018 Nov;68(6):394-424.
2. Fisher B, Bauer M, Margolese R, Poisson R, Pilch Y, Redmond C, Fisher E, Wolmark N, Deutsch M, Montague E. Five-year results of a randomized clinical trial comparing total mastectomy and segmental mastectomy with or without radiation in the treatment of breast cancer. N Engl J Med. 1985 Mar 14;312(11):665-73.
3. Newman A, Lisa and Kuerer M. Advances in Breast Conservation Therapy. J Clin Oncol. 2005; 23: 1685-1697
4. Schwartz GF, Veronesi U, Clough KB., et al. Consensus Conference on Breast Conservation. Seminars in Breast Disease. Milano, 2005: 178-185.
5. Singletary SE. Surgical margins in patients with early-stage breast cancer treated with breast conservation therapy. Am J Surg. 2002; 184: 383-393.
6. Kim, Ryungsa et al. Outpatient breast-conserving surgery for breast cancer: Use of local and intravenous anesthesia and/or sedation may reduce recurrence and improve survival. Annals of medicine and surgery (2012) vol. 60 365-371.
7. Tang F, Tie Y, Tu C, Wei X. Surgical Trauma-Induced Immunosuppression in Cancer: Recent Advances and the Potential Therapies. Clin Transl Med (2020) 10:199–223.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

8. Yardeni IZ, Beilin B, Mayburd E, Alcalay Y, Bessler H. Relationship Between Fentanyl Dosage and Immune Function in the Postoperative Period. J Opioid Manag (2008) 4:27–33.
9. Kushida A, Inada T, Shingu K. Enhancement of Antitumor Immunity After Propofol Treatment in Mice. Immunopharmacol Immunotoxicol (2007) 29:477–86.
10. Horowitz M, Neeman E, Sharon E, et al. Exploiting the critical perioperative period to improve long-term cancer outcomes. Nat Rev Clin Oncol 2015;12:213-26.
11. Kim R. Effects of surgery and anesthetic choice on immunosuppression and cancer recurrence. J Transl Med 2018;16:8.
12. Sacerdote P, Limiroli E, Gaspani L. Experimental evidence for immunomodulatory effects of opioids. Adv Exp Med Biol 2003;521:106-16.
13. Zhang J. Paravertebral block in regional anesthesia with propofol sedation reduces locoregional recurrence in patients with breast cancer receiving breast conservative surgery compared with volatile inhalational without propofol in general anesthesia. Biomedicine & Pharmacotherapy. 2021; 142: 111991
14. Gu, Chongshan et al. Effect of Local Versus General Anesthesia in Breast-Conserving Surgery on Cancer Recurrence and Cost. Cancer control: Journal of the Moffitt Cancer Center vol. 29 (2022): 10732748221083078. doi:10.1177/10732748221083078.

ISSN (O): 2687-5365; ISSN (P): 2753-6556