

Comparative Study of Safety, Effectiveness and Ease of Thyroidectomy under Cervical Epidural and General Anaesthesia

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Abstract: Introduction: cervical epidural anaesthesia is a regional anaesthesia technique which has been used for upper limb surgery, upper thoracic wall surgery, carotid artery surgery and neck dissections. anaesthesia for thyroid surgery can be complicated due to the altered functional status of the thyroid or its large size.

Objective: this comparative study was designed to evaluate of safety, effectiveness and ease of thyroidectomy under cervical epidural and general anaesthesia. **Materials And Methods:** A prospective study of total of 50 patients undergoing thyroid surgery from Department of Anesthesiology, MGM Medical College and Hospital, Jamshedpur. they were randomly allotted into CEA (cervical epidural) and GA (general anaesthesia) groups of 25 members each. **Results:** in the CEA group, postoperative comfort and economic feasibility were found to be better compared to GA group. the blood volume loss was lesser in the CEA group. the CEA group also offered the added advantage of vocal cord monitoring by voice contact during the surgery. both the CEA and GA group maintained hemodynamic stability. there were no complications in both the groups. **Conclusion:** even though thyroid surgery is currently being performed mostly under GA, CEA must be considered for thyroid surgeries routinely. CEA offers a number of advantages of GA in selected cases. this study has proved that CEA has distinct advantages over GA in thyroidectomies. considering the ease and effectiveness of CEA, it is as good as GA, if not better, even in routine thyroidectomies.

Keywords: cervical epidural anaesthesia, general anaesthesia, thyroid surgery.

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I. Introduction

Global prevalence of thyroid disease is estimated at more than 2 billion with more than 40 million in India.¹ Reports in literature have demonstrated the utility of cervical epidural in patients undergoing thyroid and parathyroid surgeries,² thyroplasty³ upper airway surgeries,⁴ carotid surgeries^{5,6} breast and upper thoracic surgery,^{7,8} head and neck surgeries,⁹ tracheostomy,¹⁰ combined neck and upper extremity procedures,¹¹ upper extremity procedures.^{12,13} Cervical epidural anaesthesia is preferred in thyroid surgeries for huge and long standing goiters associated with tracheal deviation, infiltrating carcinomas restricting neck movements and rendering intubation difficult. Thyroid surgeries are preferably being carried out under cervical epidural anaesthesia for patients with medical co-morbidities like cardiorespiratory insufficiency and oscillating thyroid profiles. Providing general anaesthesia to such patients is associated with perioperative complications. Cervical epidural anaesthesia is found to be a suitable alternative to general anaesthesia in such risk patients undergoing thyroid surgeries. Cervical epidural anaesthesia also allows the patient to be alert and warns the surgeon of any trespass on the recurrent laryngeal nerve.

II. Materials And Methods

A total of 50 patients undergoing thyroid surgery from MGM Medical College and Hospital, Jamshedpur were randomly allocated into two groups of 25 each. all patients informed consent was taken prior to procedure. all patients were subjected to relevant blood, urine, ultrasonography and fine-needle aspiration cytology investigations.

The first group underwent thyroid surgery under cervical epidural (CEA) and second group under general anaesthesia (GA). All surgeries were performed by the same surgeon. all patients were in euthyroid state preoperatively. All the thyroid surgeries done were performed by the same surgeon and supervised by senior staff from anesthesia department. The study was conducted in Department of Anesthesiology, MGM Medical College and Hospital, Jamshedpur from November 2016 to November 2017.

Technique of Cervical Epidural Anaesthesia: On arrival to the operation theatre, standard monitors were attached and all patients were positioned in the right lateral decubitus position with the neck flexed and chin on chest. The cervical epidural space was identified with an 18-Gauge Tuohy epidural needle, at the C7-T1 interspace using the loss of resistance to air technique via a midline cephalad approach. An end-holed epidural

catheter was then introduced 4 cm into the epidural space. After neGAtive aspiration, the catheter was secured in place and the patients were laid supine. The test dose of 3 mL of 1% lignocaine adrenaline was injected via an epidural catheter; vitals [Breathing, SpO₂, consciousness, heart rate (HR), noninvasive blood pressure and electrocardiogram] were monitored for 5 min for any sign of deterioration. In the absence of such signs 7 ml of lignocaine adrenaline was further infiltrated through the epidural catheter. The patients were kept in a state of conscious sedation with midazolam (mean dose, 0.05 mg/kg IV) throughout the surgery. Vocal cord functions were monitored intermittently by verbal contact with the patient. Any intraoperative discomfort in the neck or request for analgesic was managed by administering epidural top-up of 5 mL of 1% lignocaine adrenaline. Post-operatively, epidural top-ups were given on complaints of pain by the patient using 5ml of 0.125% of bupivacaine.

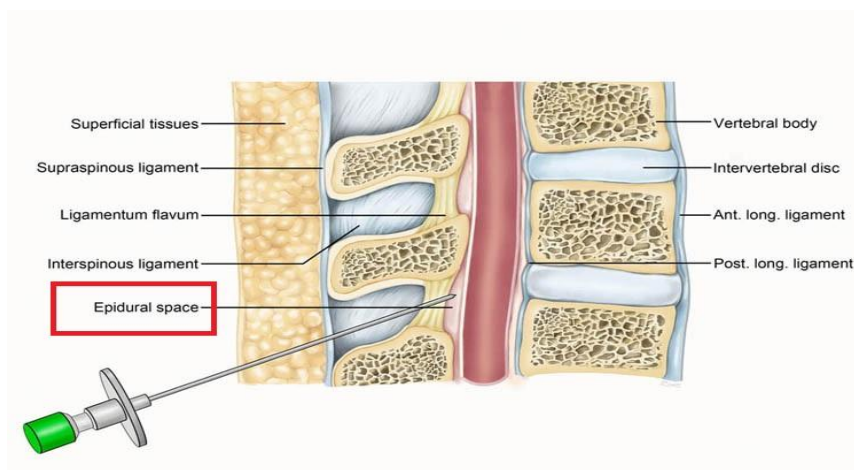


Figure 1: Epidural Space

General Anaesthesia: After usual premedication with i.v glycopyrrolate and midazolam, induction was done using i.v thiopentone. iv succinylcholine was used for relaxation and airway was secured using endotracheal tube. Patient was maintained on isoflurane and i.v vecuronium/ atracurium, nitrous oxide and oxygen. ketamine and halothane were avoided. Patient was reversed with neostigmine and glycopyrrolate and extubated. In CEA the onset and extent of sensory blockade was assessed by response to pinprick method in an ascending fashion starting from the T12 dermatome. The onset of sensory block was defined as the time to loss of sensation to pinprick in the C3 dermatome. Haemodynamic parameters were monitored before and after the blockade. All the patients were observed for any complications like bradycardia, hypotension and diaphragmatic paralysis. Throughout the perioperative period, pulse rate, blood pressure, respiratory rate, electrocardiogram and SpO₂ were monitored.

III. Results

The CEA for thyroid surgeries (Figs 3 to 5) revealed the following findings. No patient reported pain from the procedure. The upper margin of sensory block was assessed in C2 dermatome in all patients and the median of the lower margin of sensory block was T2 (minimal extent C2-T1, maximal extent C2-T10). The patients were not in distress during surgery and did not complain of dyspnea during the procedure (Graphs 1 to 5). The patients were able to take orally in the immediate postoperative period. Pain, nausea, and vomiting were significantly reduced in this group. The patients were motivated to initiate ambulation early and were eager to be discharged as soon as the drain was removed. There was no case of accidental dura mater puncture or blood in the catheter.

The patient in the GA group suffered greater intensity of pain compared with the patients in the CEA group (Graph 6). There was increased incidence of vomiting. The patients in the GA group had increased duration of hospital stay (Graph 7). The patients in the CEA group had lower amount of blood loss (Graph 8).

IV. Discussion

The patients under CEA group were maintained in a state of conscious sedation or sedoanalgesia with verbal contact. This ensured that there was no trespass on the recurrent laryngeal nerve by voice monitoring. Other noted advantages of the CEA group over the GA group were as follows:

1. Less bleeding
2. Early ambulation
3. Better pain control

4. Little or no nausea

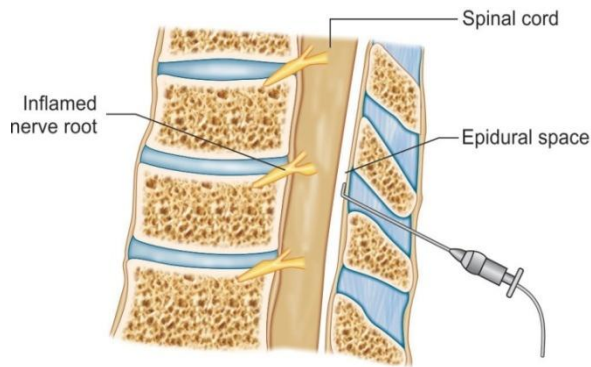


Fig.1: Epidural space



Fig. 2: Epidural catheter iplace

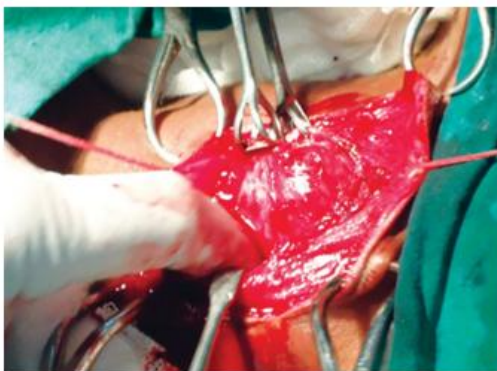


Fig. 3: Exposed thyroid gland under CEA



Fig. 4: Suturing under CEA

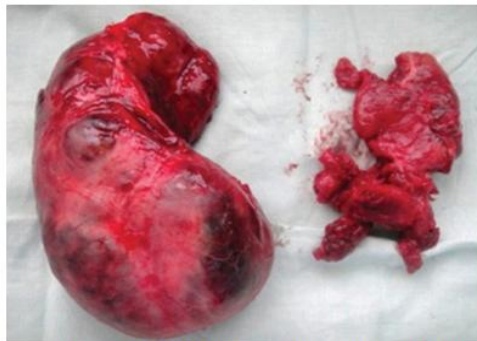
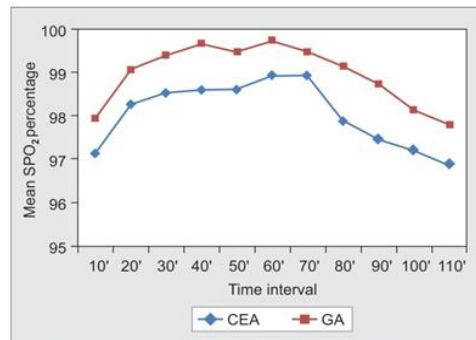
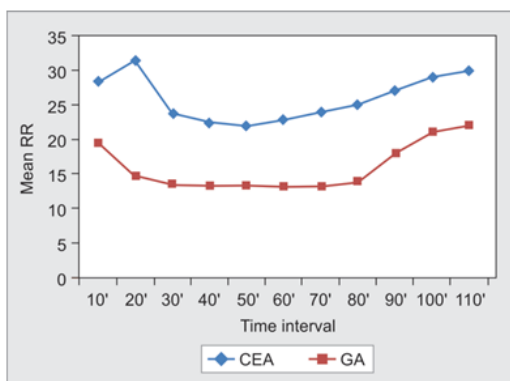


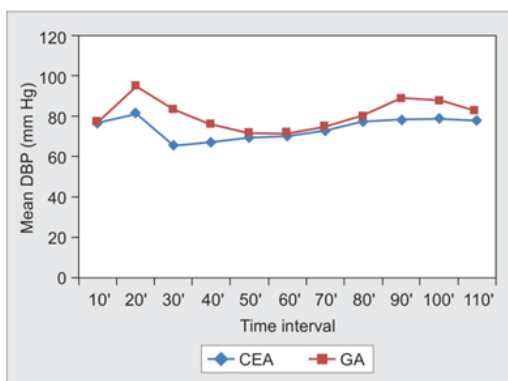
Fig. 5: A thyroid gland specimen excised under CEA



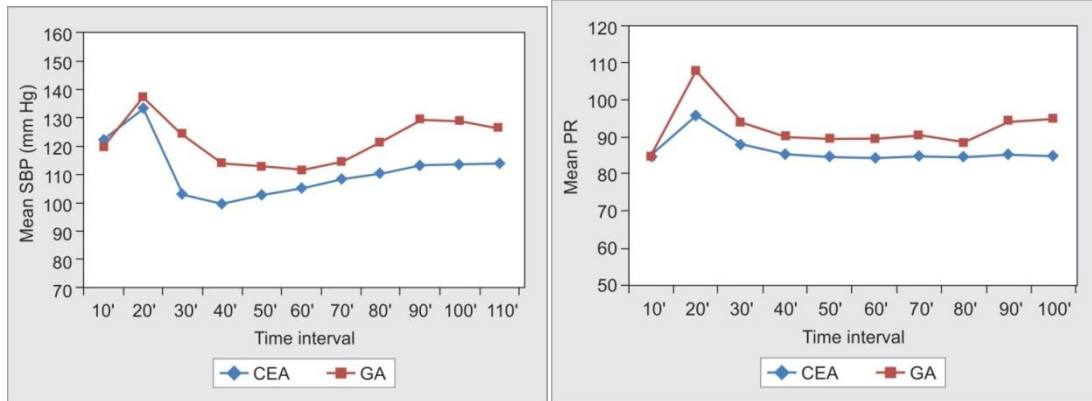
Graph 1: Variations in SPO₂ in two groups



Graph 2: Variations in respiratory rate (RR) in two groups (DBP) in two groups

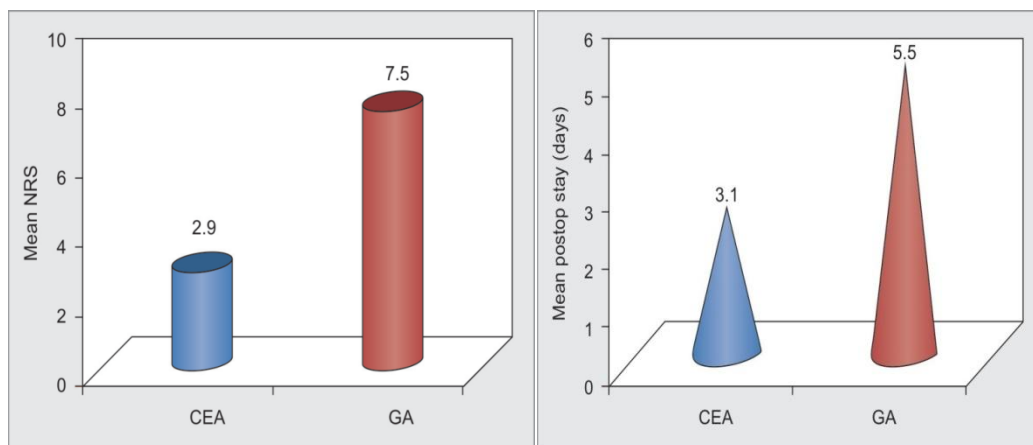


Graph 3: Variations in diastolic blood pressure (DBP) in two groups



Graph 4: Variations in systolic blood pressure (SBP) in two groups

Graph 5: Variations in pulse rate (PR) in two groups



Graph 6: Postoperative pain incidence numerical rating score (NRS) in two groups.

Graph 7: Postoperative hospital stay in two groups

These findings coincided with those of Ahsan et al and Agrawal et al.^{4,5}

Complications of CEA include its effects on respiratory function especially phrenic nerve controlled diaphragmatic movements and cardiovascular system. The other major concern with CEA has been its effects on heart rate and hemodynamic stability.

The most frequently reported side effects of CEA are hypotension and bradycardia. Other possible side effects are:

- Perforation of dura producing a total subarachnoid block.
- Traumatic hemorrhage caused by needle or catheter in the epidural space.
- Severe postspinal headache should dural puncture occur. None of these complications were encountered in our study. Apart from this, it avoids the commonly associated GA risks such as nausea or vomiting, sore throat, headache, shivering, and delayed return to normal mental functioning.

V. Conclusion

Considering the advantages of stable hemodynamic status and respiratory stability, control of pain extending into postoperative period and early ambulation with reduction in stress response, blood loss and postoperative morbidity, we conclude that Cervical epidural anaesthesia can be used as a safe alternative to general anaesthesia for thyroid surgeries, especially in patients with co-morbidities of respiratory system, cardiovascular system and deranged thyroid profiles.

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