

COMPARISON OF EFFECTIVENESS, SAFETY AND EASE OF THYROIDECTOMY UNDER CERVICAL EPIDURAL AND GENERAL ANAESTHESIAShilpashri A. M¹, Santosh U. P², Priodarshi Roychoudhury³**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: Cervical epidural anaesthesia is found to be a suitable alternative to general anaesthesia in thyroid surgeries where difficult endotracheal intubation is anticipated due to huge goiters, or restricted neck movements due to infiltrating carcinomas. Epidural anaesthesia is also preferred in high risk patients with cardiorespiratory insufficiency and oscillating thyroid profiles. In this present prospective study involving 30 patients undergoing elective lobectomy, hemithyroidectomy, subtotal thyroidectomy or total thyroidectomy in our institute we compared the ease, efficacy and safety of thyroid surgeries done under cervical epidural anaesthesia and general anaesthesia. The ease, efficacy and safety of thyroid surgery were found to be better under cervical epidural anaesthesia as compared to general anaesthesia.

KEYWORDS: Cervical epidural anaesthesia, General anaesthesia, Thyroid surgery.

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.

MATERIALS AND METHODS: After institutional committee approval and written informed consent, 30 patients aged 18-60 years, with primary diagnosis of thyroid goiter, who needed thyroidectomy over a span of 1yr, were enrolled in this prospective study conducted in JJMMC DAVANAGERE.

The study population was divided into two groups with 15 patients in each group. Based on detailed history thorough clinical examination, FNAC and USG neck, the diagnosis of thyroid goiter is made. X-ray neck AP and lateral view were taken when suspected tracheal deviation was present.

The patients were subjected to the required preoperative blood and urine investigations. After ensuring fitness for surgery, elective lobectomy, hemithyroidectomy, subtotal thyroidectomy or total thyroidectomy was performed depending on the thyroid pathology.

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Cases were allotted to either groups of elective thyroidectomy alternatively under cervical epidural anaesthesia (CEA) and general anaesthesia as per the preplanned protocol.

Preoperative size of thyroid, medical co-morbidities like hypertension, respiratory system and CVS morbidities and difficult intubation were evaluated before the surgery. Considering its advantages of stable haemodynamic and respiratory status, control of pain extending into postoperative period and early ambulation with reduction in stress response, blood loss and postoperative morbidity,^{2,14} we used cervical epidural anaesthesia as sole anaesthetic technique for thyroid surgery.

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.

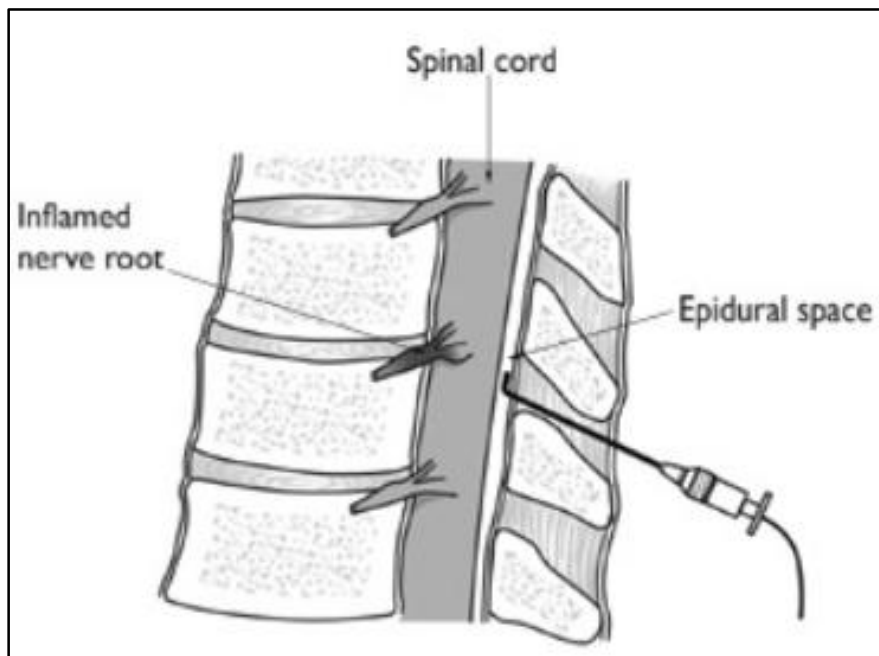


Fig. 1: Identification of epidural space

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Fig. 2: Patient with large sized goiter



Fig. 3: Epidural catheter insitu goiter



Fig. 4: Patient maintaining on nasal prongs intra operatively

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.

RESULTS: 15 procedures were successfully performed under CEA. The median time of duration of surgery was 75 min (45–90 min). No patient reported pain during 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 T3 (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 and in the postoperative period. There was no case of duramater puncture or blood observed in the catheter.

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Patients were comfortably maintained sedated but awake during the procedure with no untoward effect.

Monitoring of the vitals was carried out and all patients maintained these parameters without additional support. Other 15 procedures were performed under GA following normal induction and intubation.

AGE DISTRIBUTION: 50 percentage of the patients in the study were in the age group between 18 to 30 years. The youngest patient was of 19 years and oldest was of 58 years. The oldest was taken in cervical epidural group.

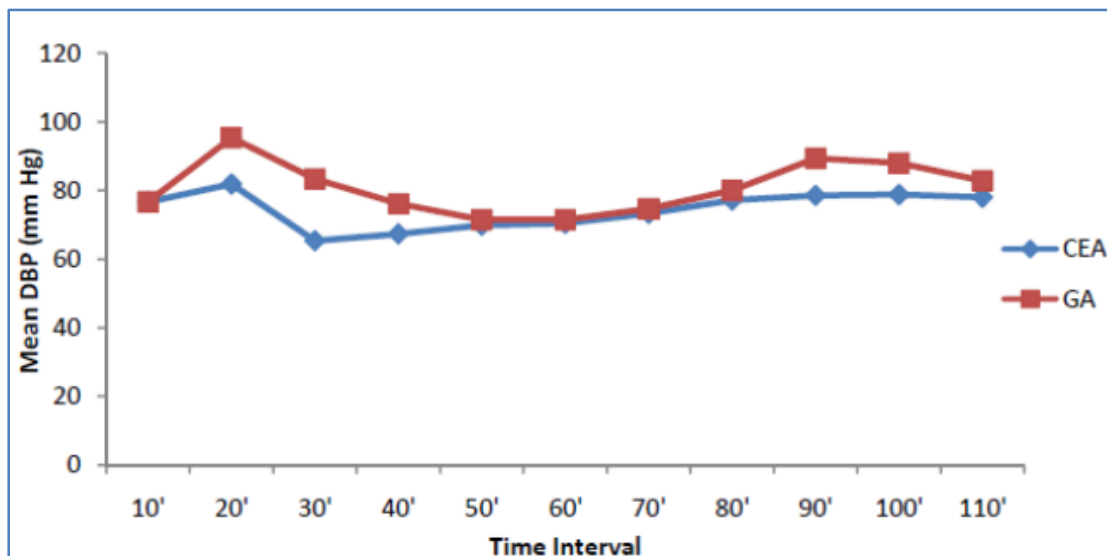
EFFICACY: 7(2.3%) cases underwent total thyroidectomy under cervical epidural anesthesia, 6 (2%) cases underwent hemithyroidectomy under cervical epidural anesthesia. 9(3%) cases underwent hemithyroidectomy under general anesthesia, no complications were encountered in either group. Total thyroidectomy could be performed as effectively as hemithyroidectomy under cervical epidural anesthesia.

Even the median time to onset of sensory block was significantly shorter with just 5-10 min duration.

BLOOD LOSS: The mean intraoperative blood loss in cervical epidural anesthesia group was 61ml versus 106ml in general anesthesia group. Hence there was significant reduction in blood loss in cervical epidural anesthesia group.

DIASTOLIC B. P: Preoperative diastolic blood pressure was found to be normal in both the groups. The mean Diastolic blood pressure in the cervical epidural anaesthesia group to be 74.3 ± 9.1 mm of Hg and general anaesthesia group was 74.3 ± 10.17 mm of Hg. Blood pressure in both the groups remain within normal limits.

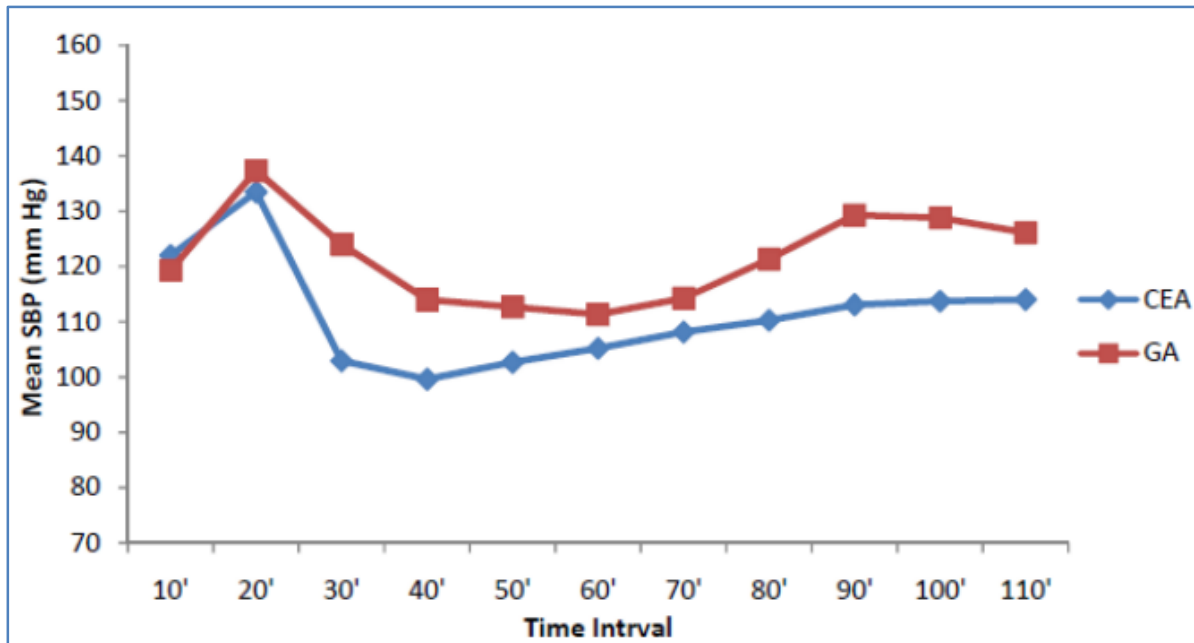
Towards the beginning and end of the procedure there was increase in blood pressure in the general anaesthesia group and was attributed to intubation and extubation.



Graph 1: Mean Diastolic B. P

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SYSTOLIC B. P: Preoperative systolic blood pressure was found to be normal in both the groups. The mean Systolic blood pressure in the cervical epidural anaesthesia group to be 111.37 ± 8.1 mm of Hg and general anaesthesia group was 121.67 ± 11.03 mm of Hg. Blood pressure in both the groups remain within normal limits. Towards the beginning and end of the procedure there was increase in blood pressure in the general anaesthesia group and was attributed to intubation and extubation.



Graph 2: Mean systolic b. p

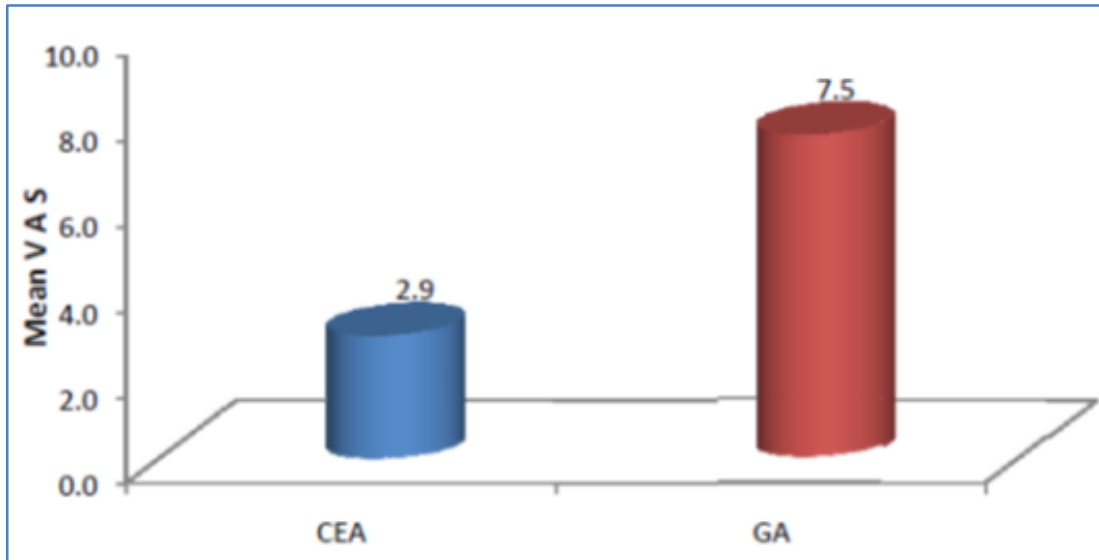
HEART RATE: Preoperative Pulse rate was found to be normal in both the groups. The mean pulse rate in the cervical epidural anaesthesia group to be 70.7 ± 8.1 per min and general anaesthesia group was 83.99 ± 10.48 per min. Mean pulse rate was found to be lower in the cervical epidural anaesthesia group but within normal limits. There was no need of any medical intervention.

SPO₂: The mean SpO₂ in the cervical epidural anaesthesia group to be 98.02 ± 1.06 and general anaesthesia group was 98.95 ± 0.6 . There was no significant variation in oxygen saturation in both the groups. But the GA group maintained higher oxygen saturation compared to cervical epidural anaesthesia group.

RESPIRATORY RATE: The mean respiratory rate in the cervical epidural anaesthesia group to be 25 ± 3.75 per minute and general anaesthesia group was 15.93 ± 2.1 per minute. The mean respiratory rate was found to be higher in the cervical epidural group.

POST-OPERATIVE PAIN INCIDENCE (VAS) IN THE TWO GROUPS: Post-operative pain is comparatively less in cervical epidural group with visual analogue scale of 2.9 as compared to general anaesthesia group with visual analogue scale of 7.5.

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Graph 3: Visual analogue score

Post-Operative Hospital Stay: Post-operative hospital stay was 3 days in the cervical epidural anaesthesia group compared to 5.5 days in general anaesthesia group.

DISCUSSION: Thyroidectomy under GA, inpatients with goiter is associated with (1) Difficult and traumatic intubation in cases of tracheal deviation and compression. (2) Arrhythmias with the use of anaesthetic gases like halothane. Cervical epidural anaesthesia is found to be a suitable alternative to General anaesthesia in all the aforesaid problems. It has several advantages. Patients operated under Cervical Epidural Anaesthesia (CEA) can be maintained in a state of conscious-sedation. The possibility of monitoring the vocal cord movements using verbal contact in a conscious patient during surgery is a distinct advantage of this procedure.

Other noted advantages of epidural anesthesia are (1) Less bleeding (2) Lack of electrolyte imbalance (2) Early ambulation and recovery (3) No postoperative atelectasis of lung (4) Minimum blood pressure drop, without vasopressor drug in young patients. (5) Little nausea or vomiting (6) No vascular spasms or postoperative phlebothrombosis (7) little or no motor nerve block. The major concerns with Cervical Epidural Anaesthesia (CEA) include its effects on respiratory function especially phrenic nerve controlled diaphragmatic movements. However being mainly a motor nerve it is resistant to the effects of Lignocaine when it is used at a concentration of 1% and deployed in the epidural space. Hence we used 1% lignocaine for this study.

Stevens et al.,¹⁵ found a measurable reduction in bedside pulmonary function test after CEA. They found that the forced expiratory volume (FEV) and forced vital capacity (FVC) decreased by 12-16% after using 300 mg of Lignocaine but these changes were not clinically significant. They concluded that the motor block of phrenic nerve is incomplete after CEA.

Capdevila et al.,¹⁶ using ultrasonography found that the diaphragmatic excursion decreased from 5.6 to 4.4. cm after CEA.

However it has also been seen that continuous cervical epidural analgesia for postoperative pain in high risk patients can improve pulmonary outcome by decreasing the incidence of pneumonia

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and respiratory failure, improving oxygenation, decreasing the duration of mechanical ventilatory support while hemodynamic parameters remain normal.³

So we can use epidural anesthesia without being worried much about respiratory complications. The other major concern with CEA has been its effects on heart rate and hemodynamic stability.

CEA blocks the sympathetic cardiac accelerator fibres that arise at T1-T4 .Consequently decreases heart rate, cardiac output and contractility. The most frequently reported side effects of CEA are hypotension in 10.9% and bradycardia in 2.8%. Sympathetic block also decreases myocardial ischaemia. It is effective for treating pain of patients with unstable angina pectoris of acute MI.⁴

Some other Disadvantages of Epidural Anaesthesia:

1. Perforation of dura mater producing a total subarachnoid block.
2. Traumatic haemorrhage caused by needle or catheter in the epidural Space.
3. Severe post spinal headache should dural puncture occur.

In our study respiratory and hemodynamic functions were in normal limits and other complications were not observed, thereby proving that epidural anesthesia can be immensely useful as a sole anesthetic agent for thyroid surgeries.

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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