

# Cervical Epidural Anesthesia for Sub-Total Thyroidectomy in a Patient with Aortic Incompetence

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S. Nadeem Ahsan ( Department of Anesthesiology and Critical Care, Liaquat National Institute of Medical Sciences, Karachi. )

Salman Faridi ( Department of Surgery, Liaquat National Institute of Medical Sciences, Karachi. )

Cervical Epidural anesthesia has been employed successfully for various types of surgical procedures involving the head and neck<sup>1,2</sup> and the upper extremities<sup>3</sup> and has been shown to be a safe and effective anesthetic modality. This, however, is the first reported case of thyroidectomy being performed under cervical epidural anesthesia. The biggest advantage to be gained from employing this technique lies in the avoidance of potentially arrhythmogenic inhalational anesthetics along with concomitant myocardial depression, as well as the problems associated with mechanical ventilation. The safety of cervical epidural procedures has been established by several studies. In modern practice, the cervical epidural space is accessed most commonly for pain management procedures and hence the biggest bodies of data on this subject are to be found in pain management literature<sup>4</sup>.

## Case Report

A 65 years old woman weighing 68 kg and 167 cm tall, presented to the surgical outpatient clinic with goitre which she had first noticed over ten years. After preoperative evaluation, she was scheduled to undergo thyroidectomy. She stated that she had of late been experiencing palpitations and that she could climb two flights of stairs without becoming overly short of breath. She denied syncopal episodes or chest pain. On physical examination she was found to have a 5 x 7 cm mobile infra-laryngeal mass, which extended laterally to the right from the midline. No evidence of tracheo-malacia was found. She had a Mallampati Class I airway with good neck and jaw mobility. Despite adequate exercise tolerance, she was found to have a loud (I/VI) systolic murmur in the aortic area and a softer (II/VI) early diastolic murmur left parasternally. Her ECG was consistent with LVH and a surface echocardiogram revealed the presence of moderately severe aortic stenosis and regurgitation, albeit with preserved myocardial function. Her blood counts showed a mild anaemia with normal electrolytes. Her coagulation profile was also normal. Her TFTs suggested a mild to moderately hypothyroid state, T3 0.3 ng/ml (0.8-1.8), T4 4.65 µg/dl (5.1-13.8), TSH >39 mU/l (0.23- 4). Radioiodine uptake scanning demonstrated a cold nodule in the right lobe of thyroid gland. Neck X-rays showed a normal trachea. FNA results were equivocal.

The patient refused further cardiac evaluation and requested to proceed with near total thyroidectomy to rule out neoplasia since preoperative investigations had failed to establish a definitive diagnosis of this cold nodule. She was explained the risks and benefits of the various anesthetic options available and informed consent for cervical epidural anesthesia was obtained. Given her hypothyroid state and her cardiac problems, this was deemed to be the safest anesthetic option for her particularly in the light of the fact that the involved anesthetic team employed cervical epidural procedures frequently in their pain management practice.

In the operating theater, routine non-invasive monitors, including capnography via nasal sampling were placed. After sedation with IV Midazolam and Pentazocine, the patient was placed in the sitting position. The cervical epidural space was easily accessed at C6,7 under local anesthesia with a 16 G Touhy needle, employing the hanging drop method. A 20-gauge catheter was placed through this needle to a depth of 11 cm and secured with Opsite™. The proper placement of the catheter was then tested

with a 3 cc injection of 2% Lidocaine with 5µc/cc epinephrine, which was followed by a 5 cc bolus of 0.5% Bupivacaine. No narcotic was injected into the epidural space. Surgery was commenced 15 minutes later after ensuring the efficacy of the sensory blockade. Her respiratory rate, blood pressure and heart rate remained very stable during the first hour of surgery. About 70 minutes after skin incision, the catheter was re-bolused with 5 cc 2% Lidocaine to re-establish sensory blockade after which no further local anesthetic injection were required. The intra-operative course was quite unremarkable except for the slight difficulty experienced by the surgical team due to the patient's respiratory excursions (thyroidectomies are usually performed under general anesthesia with muscle relaxation). At no point was the patient's airway jeopardized and she consistently maintained an oxygen saturation in excess of 98% despite pharmacologic sedation. About 90 minutes into the procedure, the patient's blood pressure gradually rose from a baseline of 148/68 to 190/98 for which she was given two 10 mg boluses of IV hydralazine. This brought the blood pressure down to near baseline, however, her heart rate concomitantly rose from a baseline of 70-80 to around 110 beats per minute. On questioning, the patient denied pain. The transient tachycardia responded well to a small dose of Esmolol and IV hydration. Intra-operative blood loss was estimated to be less than 150cc and the total operating time was 105 minutes.

Post-operatively the patient did remarkably well and her only complaint was that of mild hoarseness which was presumably secondary to recurrent laryngeal neuropraxia. The hoarseness resolved spontaneously and she was discharged from the hospital on the 4th post-operative day.

## Discussion

Cervical epidural anesthesia has been demonstrated to be a safe anesthetic modality for patients undergoing carotid endarterectomy<sup>5</sup>, shoulder surgery and surgery for head and neck neoplasms. The incidence of complications has been shown to be quite low<sup>6</sup> with only a handful of cases of post-dural puncture headache, vaso-vagal syncope<sup>5</sup> and cerebral pneumocephalus<sup>7</sup> having been reported as sequelae of cervical epidural instrumentation.

Cervical epidural anesthesia results in blockade of the cardiac sympathetic fibers and consequently mildly decreases heart rate, cardiac output and myocardial contractility. The mean blood pressure is unchanged or decreased, depending on the peripheral systemic vascular changes. Sympathetic blockade also decreases myocardial ischemia<sup>8</sup>. Respiratory compromise is usually minimal. Patients, such as the one described in this report, in whom general anesthesia is relatively contra-indicated due to concerns for myocardial depression and arrhythmias, cervical epidural anesthesia could be an excellent alternative, with the caveat that anesthesiologists attempting this procedure be highly skilled in the practice of this delicate technique.

The potential advantages of employing this technique for thyroidectomy in patients with COPD, cardiomyopathy, valvular heart disease, etc. are numerous. Respiratory and hemodynamic inhibition is only mild even with epidural narcotics<sup>9</sup>, the quality of analgesia is excellent, air pollution is obviated and anesthesia costs are minimized<sup>10</sup>. There is however, the distinct concern for airway problems in patients with pre-tracheal masses.

Sudden loss of airway due to surgical compression, tracheo-malacia, or bilateral severance of the recurrent laryngeal nerve is a finite possibility. We would therefore like to recommend that cervical epidural anesthesia be only undertaken in patients with good airways that could be quickly secured in an emergent situation and in patients with no evidence of tracheo-malacia. On the other hand, patients undergoing thyroid procedures awake may be able to report hoarseness immediately thereby alerting the surgeon of the proximity of retractors to the recurrent laryngeal nerve. Also, in situations where an elective tracheostomy is planned, cervical epidural anesthesia could be an excellent choice in

combination with upper airway nerve blocks.

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