



**Research Article**

**SUPERFICIAL CERVICAL BLOCK IN THYROIDECTOMY IN LOCAL ANAESTHESIA**

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**ABSTRACT**

Thyroidectomy is traditionally performed under general anaesthesia with endotracheal intubation. Local anesthesia techniques are now used in patients deemed too ill to undergo general anesthesia because of severe comorbidity and or to those who live in extremely resource poor locations. In the last few decades there has been renewed interest in thyroidectomy under local anesthesia. The aims of this study were to assess the feasibility, safety, effectiveness and patients acceptability of bilateral superficial cervical plexus block for thyroidectomy in our hospital. This is a Retrospective study of all consenting adult patients who presented with goiter, thyroid malignancy had underwent thyroidectomy in LA. The study included 52 Patients above the age of 15 years who presented with thyroid swelling and had elective thyroidectomy done. Out of 52, there were 44 female and 8 were male, female to male ratio of 7.5:1. The mean age of the patients was 42.5 years, with a range of 15 to 55years. Types of goiter included 35(67%) simple goiters, 13 MNG, and 4 malignant cases (2 follicular and 2 papillary). Total thyroidectomy was done in 5 patients and subtotal thyroidectomy done in 10 patients. 98% of the patients found the anaesthesia satisfactory. Varying degrees of pressure symptoms during mobilization of the gland, and postural aches were common intra-operative problems encountered 98% of the patients found the anaesthesia satisfactory and would not mind recommending or having the same anaesthetic technique for a similar procedure. Two (2%) of the patients expressed dissatisfaction with the anaesthesia, they became extremely apprehensive during the surgery. Mean duration of surgery was 2 hours. Bilateral superficial cervical plexus block is a useful anaesthetic option for thyroidectomy, in most cases been the lack of anaesthetic facilities/or personnel, and surgeon's preference, and associated cardiac or pulmonary disease. Cervical plexus block has also been found useful for thyroidectomy because it is feasible, safe, effective and easy to perform.

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**INTRODUCTION**

Thyroidectomy is traditionally performed under general anaesthesia with endotracheal intubation. In ancient times, it was performed in local anaesthesia but the results were not good [1]. However, neither general anaesthesia nor endotracheal intubation is an absolute requirement for thyroidectomy [2]. In selected patients local and regional anaesthesia can be used and some data shows successful result of LA and RA. Indication of these type of procedure: lack of anaesthetic facilities/or personnel, and surgeon's preference, patient's preference and associated comorbidity like cardiac or pulmonary disease, patients not fit for GA. The aim of this study are to assess the feasibility, safety and effectiveness of bilateral superficial cervical plexus block for thyroidectomy in our hospital and to assess any associated complications specifically related to the procedure.

**MATERIALS AND METHODS**

This retrospective study was undertaken on 52 patients who underwent thyroidectomy under cervical plexus block for a period of 5 years from January 2012 to December 2017 in Department of Otorhinolaryngology, Sir Sunderlal Hospital, Banaras Hindu University, Varanasi. The hospital record of 52 patients including demographic characteristics, signs and symptoms, laboratory and imaging data, diagnosis, procedure, complication and outcome were taken. The Patient's age above 18 years who presented with goiter, thyroid malignancy like follicular and papillary carcinoma were included in the study. The exclusion criteria includes: patients with large goiter, previous neck surgery, sleep apnea, coagulopathy, severe claustrophobia or anxiety, morbid obesity, preoperative recurrent laryngeal nerve paralysis, retroesophageal or retrotracheal goiter, need for sternotomy, concomitant cervical lymphadenopathy, known or suspected locally invasive cancer, patient preference for general anaesthesia, and allergy to local anaesthesia. The study was approved by the Institute Ethical Committee. Informed consent was taken

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from all the patients. Surgeon and anesthesiologist must also be prepared to convert to general anesthesia at any time during the procedure. Reasons for conversion from cervical plexus block to general anesthesia include unexpected intraoperative pathology, patient discomfort, and toxic reaction to lidocaine.

In the preoperative holding area, the patients were sedated with intravenous midazolam 2mg and pentazocine 15-25mg. This was followed by bilateral superficial cervical plexus block performed by the consultant anaesthetist under aseptic conditions.

**Relevant anatomy**

The Cervical Plexus is formed from the ventral rami of the first four cervical nerves. The components of the plexus are:

1. The cutaneous (superficial) branches of the plexus
2. The Ansa Cervicalis
3. The Phrenic nerve
4. Contributions to the accessory nerve.
5. Direct muscular branches.

By blocking only the superficial branches of the plexus, (C2, C3, and C4), the phrenic nerve is spared, while anaesthesia is effected in the neck. The cutaneous (superficial branches) of the plexus are: greater occipital, greater auricular, transverse cervical and supraclavicular nerves.

**Technique of the Block**

**Superficial Cervical Plexus block**

The midpoint of the posterior border of the sternomastoid was identified. From this point, local anaesthetic (10ml 2% Lignocaine with adrenaline) was infiltrated along the border of the muscle 3cm cephalad and caudal. A further 3-5ml of the solution was also infiltrated superficially above the muscle to block the transverse cervical branch of the plexus. The block was performed on both sides of the neck using a size 24 gauge hypodermic needle. Superficial cervical plexus block is a field block, requiring all the branches of the plexus to be bathed in local anaesthetic solution. It thus relies on local anaesthetic 'volume' to be effective [Fig. 1]. Since thyroidectomy is a superficial procedure which do not demand significant muscle relaxation.

**Transtracheal block**

This block is useful to provide topical anaesthesia to the airway mucosa, supplied by branches of the vagus nerve (i.e. the internal branch of the superior laryngeal nerve, which provides sensation to both surfaces of the epiglottis and laryngeal structures to the level of the vocal cords, and the recurrent laryngeal nerve which provides sensation to the mucosal surface distal to the vocal cords). With the patient's head absolutely straight and the neck extended, the cricoid cartilage was palpated. A 25 gauge needle attached to a syringe containing 4 ml of 2% plain lignocaine was inserted in the mid-line, just above the cricoid, and advanced gently through the cricothyroid membrane. The aspiration of air confirmed the position of the needle tip in the trachea. The patient was then instructed to take a deep breath and then to cough. At peak inspiration, the drug was injected rapidly and the needle withdrawn. The cough would ensure that the local anaesthetic spread to the area above the cords supplied by the internal laryngeal nerve. Transtracheal block was not possible in two of

the patients due to a significantly enlarged isthmus lobe of the thyroid gland, which made identification of landmarks difficult.

**Intraoperative management**

Patients were positioned supine with a shoulder pad to extend the neck, and the head was supported on a head ring. Drappings were applied in such a way to leave a portion above the chin free to facilitate intubation if required, and to allow proper facial aeration and prevent a feeling of suffocation. During surgery, patients were sedated with intermittent intravenous administration of midazolam and pentazocine as required. The doses of these drugs were titrated to ensure a minimally depressed patient who was able to maintain airway independently and responded appropriately to verbal command. The anaesthetist maintained communication with the patient throughout the surgery. The surgeon was aware of the intact swallowing reflex, and the need for gentle manipulation and dissection to minimize traction on the trachea. The pulse rate and oxygen saturation were monitored continuously with non-invasive blood pressure.

**Postoperative assessment:** Hospital stay was shorter, and the incidence of postoperative complications was observed to be similar to thyroidectomy under general anesthesia. A follow-up to this study examined the outcomes and cost of local anesthesia versus general anesthesia for thyroidectomy, and found that morbidity was similar, but that actual total costs were higher for thyroid surgery performed under general anesthesia compared with thyroidectomy under local anesthesia, local anesthesia was associated with longer surgery time, but with significantly reduced costs and incidence of laryngotracheal injury resulting from introducing the laryngoscope and or anesthesia probe.

**RESULTS**

Out of 52, there were 44 female and 8 were male, female to male ratio of 5.5:1. The mean age of the patients was 42.5 years, with a range of 15 to 55 years. Types of goiter included 35(67%) patients had simple goiter, 13 had MNG and 4 had malignant cases (2 follicular and 2 papillary). Total thyroidectomy was done in 5 patients and subtotalthyroidectomy in 10 patients. The demographic, diagnosis and procedure details are shown in Table 1.

**Table 1** Patients demographic, diagnosis and procedure

Variables	
Age (years), Mean±SD - range	42.5±18.0
Sex (F/M)	44/8
Type of goiter	
Simple goiters	35
MNG	13
Follicular thyroid cancer	2
Papillary thyroid cancer	2
Type of procedure	
Total thyroidectomy	5
Subtotal thyroidectomy	10
Duration of surgery, hours (mean±SD)	2.5±1.0

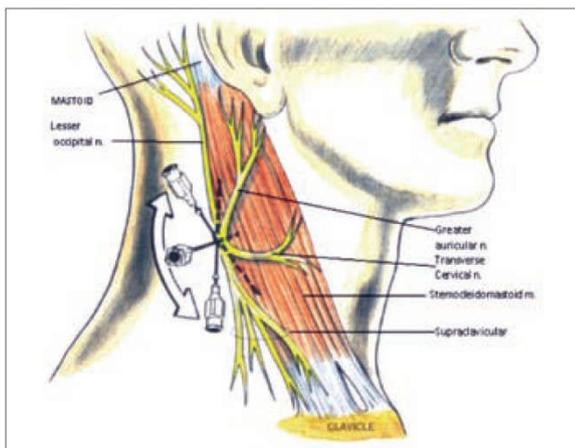
Ninety eight percent of the patients found the anaesthesia satisfactory and would not mind recommending or having the same anaesthetic technique for a similar procedure. Two (2%) of the patients expressed dissatisfaction with the anaesthesia, they became extremely apprehensive during the surgery. The duration of surgery ranged from 1 hour to 3 hours (mean

duration was 2.5 hours). The intraoperative and postoperative complications are shown in Table 2.

**Table 2** Intraoperative and postoperative complications

Variables	No. of cases
Intraoperative complications	
No complication	43
Postural aches	9
Pressure symptom	7
Frequent coughing & spitting	3
Very apprehensive	5
Laryngeal spasm	2
Postoperative complication	
No complication	49
Laryngeal nerve palsy	2
Transient Hoarseness of the voice	1

Varying degrees of pressure symptoms during mobilization of the gland, and postural aches were common intra-operative problem countered. These problems were described by the patients as tolerable. The patient was one of the two in whom a transtracheal block was not done because of a significantly enlarged isthmus lobe of the thyroid gland. Two patients developed clinical features of recurrent laryngeal nerve palsy in the postoperative period. They were subsequently confirmed by indirect laryngoscopic examination to have left recurrent laryngeal nerve paresis. They both recovered within 6 to 8 weeks of conservative management.



**Figure 1** Areas of injection for superficial cervical block. Local anesthetic is injected posterior and deep to the sternocleidomastoid muscle at the approximate midpoint of a vertical line drawn from the mastoid to the level of C6 (needle).

## DISCUSSION

In the early days thyroid surgery was performed under LA techniques. Surgeons started performing thyroidectomies exclusively under GA when volatile anaesthetics became safer. However, A recent reports of thyroidectomy under regional or local anaesthesia (LA) found similar results to thyroidectomy under GA. LA can be used as the most common procedure for thyroid and carotid endarterectomy [3]. LA avoids the risks associated with GA (e.g. problems related to endotracheal intubation and untoward effects of anaesthetic agents). RA also allows intraoperative voice monitoring and provides excellent postoperative analgesia. RA technique may be suited for high risk patients whose cardiac status are compromised or those with obstructive symptoms secondary to large goiters to avoid the risks of difficult intubation under GA [4]. Techniques do have some disadvantages, including risk of having local anaesthetic toxicity, spinal or epidural injections, neuropraxis, hematoma formation etc. [5].

Surgical operation around neck in an awake patient can cause anxiety, amounting to fear and feeling of panic. To alleviate patient's anxiety, pre-operative psychotherapy and reassurance is paramount. Careful patient selection is important to exclude those who are temperamentally unsuitable. The role of adequate sedation to relieve fear and anxiety and minimize the discomfort caused by prolonged immobility on operating table cannot be overemphasized [3]. Thyroidectomy is not very stimulating to patients. Therefore a deep plane of anaesthesia is not necessary and no significant muscle relaxation is required. This conforms to the superficial nature of a straight forward thyroidectomy. In fact, when the needs for laryngoscopy and endotracheal intubation are removed, the two greatest stimuli in thyroidectomy are skin incision and manipulation of the gland around the larynx and trachea [6]. Since the superficial branches are sensory and the remainder of the cervical plexus is motor, a block of the superficial cervical plexus alone has been found adequate for thyroidectomy. The block takes care of the pain of skin incision and the necessary tissue dissection [7]. Superficial cervical plexus block is easier and safer than the combined superficial and deep cervical plexus block. Deep cervical plexus block often accompanied by at least subtotal phrenic nerve block, which might be dangerous in bilateral block [8]. Furthermore, the block places the needles near the vertebral artery, which may be affected by the local anaesthetic. As he needs to repeat the infiltration of local anaesthesia many times during surgery. So this is inconvenient and time consuming for surgeon. Furthermore, the technique may be uncomfortable and not tolerated well by most patients. Compared with superficial cervical plexus block, local infiltration technique runs a risk of using too much drug. Too much traction on the trachea during surgery and pressure effect of retractors is bound to stimulate the airway resulting in discomfort, coughing, choking, and even laryngeal spasm. Careful tissue handling, dissection and retraction, as well as gentle mobilization of the thyroid gland, ensured minimal traction and pressure on the trachea during surgery. Several methods are available to obtund airway sensitivity. A few earlier authors have found topical anaesthesia by transtracheal injection of local anaesthetic useful [6,9]. We also employed transtracheal block for our patients. The fact that we still encountered this problem in our patients could be attributable to the short duration of action of the transtracheal lignocaine due to rapid absorption from the airway mucosa. A repeat of the block has been suggested in a prolonged procedure, although this was not done for any of our patients. An alternative method for producing anaesthesia of the upper airway is to nebulise 3-4 ml of lignocaine 4% through an oxygen facemask. This process takes a longer time to work but is simpler, requires less expertise and may be better tolerated by patients. Although anaesthesia of the upper airway increases the risks of pulmonary aspiration, this was not a significant problem in our patients since they were all fasted elective patients with low risks of vomiting and regurgitation.

## CONCLUSION

Finally, we wish to conclude that superficial cervical plexus block is well suited for thyroidectomy. The technique is feasible, simple, safe, effective and cheap when compared to general anaesthesia and patients' acceptability as shown by our study was satisfactory and quality of operating condition as assessed by the surgeon was satisfactory. Careful patients' selection is mandatory to exclude unsuitable patients for this

procedure and proper sedation is necessary to alleviate the fear and anxiety of the patients and to minimize the discomfort caused by prolonged immobility. Gentle execution is also essential to minimize unnecessary pressure effects and traction on the trachea.

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