IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 16, Issue 5 Ver. IV (May. 2017), PP 110-113
www.iosrjournals.org

Bilateral Superficial Cervical Plexus Block: An Alternative to General Anaesthesia for Thyroid Surgery

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Abstract:
Background*: General Anaesthesia with controlled ventilation is the conventional technique for thyroid surgery. But this surgery can also be performed under regional anaesthesia with conscious sedation.*
Aim- *To observe the operative condition and patient safety for thyroid surgery performed under regional anaesthesia with conscious sedation.*
Method*: This prospective observational cross-sectional study was done in 50 patient undergoing thyroid surgeries with bilateral superficial cervical plexus block (BLSCPB) with 12ml of 0.25% Bupivacaine for each side. Injection Midazolam 0.05 mg/ml was administered for conscious sedation.*
Results: *Thyroidectomy was successfully performed in 44 patients under local anaesthesia. One patient experience seizure during infiltration of local anaesthetic and five patients needs conversion to general anaesthesia for inadequate block.*
Conclusion*: Thyroidectomy can be safely performed by BLSCPB without any significant complications*
Keywords: *Bupivacaine, Superficial cervical plexus block, Thyroidectomy*

I. Introduction

General anaesthesia with controlled ventilation is the conventional technique for thyroid surgery. The major problem anaesthesiologists face during administration of general anaesthesia in this surgical procedure is establishment and maintenance of airway. Airway obstructions, recurrent laryngeal nerve injury, haematoma formation, tetany and thyroid storm are the major postoperative complications of thyroid surgery. Historically, local anaesthesia was routinely used for thyroidectomy in patients having thyrotoxicosis, [1, 2] large goiters [3] and to avoid the mortality risk imposed by general anaesthesia on elderly or medically compromised patients.[4] Surgical procedures with local anaesthesia are no longer widely used. As hyperthyroidism is adequately controlled by newer drugs and safer anaesthetic agents are available, general anaesthesia is widely used for thyroid surgery. Though this technique remains the primary method in current surgical endocrine practice, monitored local anaesthesia (MAC) has been reintroduced for thyroid procedures. [5, 6] The aim of our study is to observe the operative condition and patient safety for thyroid surgery performed under regional anaesthesia with conscious sedation

II. Material And Methods

This prospective, observational, cross-sectional study was performed 2 years extending from June 2009 to May 2011 in tertiary care centre. After obtaining ethics committee clearance and informed consent from each 50 patients aged between 20-50 yrs of ASA-PS-I undergoing elective hemi-thyroidectomy were selected for our study. Patients having retrosternal goiter, recurrent laryngeal nerve palsy, oesophageal or tracheal compression due to swelling, known or suspected malignancy that might need cervical neck node clearance, allergy to local anaesthetics and preference for general anaesthesia were excluded from our study.

All patients underwent through clinical examination, followed by ultrasonography of neck and preoperative FNAC examination to arrive at a diagnosis. During preoperative visit, the patients were evaluated clinically for any evidence of hyper or hypo- thyroidism. All patients were euthyroid in our study. The thyroid swelling was also examined carefully regarding its size, shape, site, margin, consistency, mobility. Investigations like haemoglobin, total leucocyte count, differential leucocyte count, erythrocyte sedimentation rate, fasting blood sugar, blood urea nitrogen, creatinine, chest-X-ray-postero-anterior view, X-ray soft tissue neck (anterio-posterior and lateral), 12-lead Electrocardiogram(ECG), serum ionised calcium estimation, functional status of thyroid gland (serum T_3, T_4, TSH), fine needle aspiration cytology (FNAC) were done.

Position, mobility, any evidence of metastasis of vocal cord was evaluated by indirect laryngoscopy. We explained the technique of block to the patients during pre-operative visit.

The patients were instructed to avoid solid food for 6 hr and clear fluid for 2hr prior the procedure. They were pre-medicatated with Tab. Diazepam (10mg) orally on the night before operation and Tab. Ranitidine (150mg) along with Tab. Metoclopramide (10mg) orally on the day of operation 1hr before procedure. No systemic analgesic was administered in pre-operative period. The patients were operated by same surgical team. The operative time was considered from skin incision to wound closure.

In the operating room, intravenous line with 18G cannula was established and infusion of ringer lactate was started at the rate of 4ml/kg per hour. Baseline pulse, blood presser, oxygen saturation (SPO_2), temperature were recorded. During BLSCB, patients were placed supine with a small towel under occiput and head turned to the opposite side to be blocked. The needle insertion point (X) is the mid-point of posterior border of sternocleidomastoid (SCM) muscle which usually corresponds to the point where external jugular vein crosses the posterior border of SCM or transverse process of the fourth cervical vertebra. After antiseptic dressing and draping preparation a skin wheal was made at the point X. Then a 5cm needle introduced through skin wheal and local infiltration was performed with 12ml 0.25% Bupivacaine along the posterior border of SCM 4cm above and 4cm below the level of the point X. This process was repeated on other side.[7] Incision line was infiltrated with 3ml 1% inj. Lignocaine with epinephrine (1:1, 00,000). Injection Midazolam 0.05mg/kg was given intravenously and oxygen 3ltrs/min was administered through nasal prong. Blood pressures, heart rate, ECG, SaO_2, temperature were monitored continuously. These parameters were recorded at 0 (after completion of block), 5, 10, 20, 30, 60 and 90 mints after completion of block. All surgical steps followed according to standard thyroid surgery guidelines. Average operative period for surgery in our study period was 85 minutes. Vocal cord examination was not routinely performed postoperatively by direct laryngoscopy. Then patients were sent to recovery room at the end of surgery.

III. Result

In our prospective study fifty patient were enrolled for thyroidectomy under local anaesthesia. Demographic profile was shown in table-1. The average duration was 85±22 (mean ± standard deviation) minute. Among those patient one patient experience seizure during infiltration of local anaesthesia needed general anaesthesia. Five patients needed general anaesthesia for inadequate block. Six patients had cough and forty four patient diglute during intra operative period, which were not creating any significant problem for surgery.

Table-1: Demographic data (Total no of patients- 50)

	No of patients
Sex	Male- 12
	Female- 38
ASA-PS-I	50
Body weight (mean ± sd)	56.23±7.67
Mean age (yr)	43 (23-47)
Operation time	85 (±22) mints

Table-2: Operative condition

Operative condition	**No. Of patients**
Complete block	44 (88%)
Incomplete block	5 (10%)

Total no of patient-50, one patient had seizure.

Table-3: Complication

Complecations	**No. Of patients (%)**
Seizure	1 (2%)
Diglutation	44 (88%)
Coughing	6 (12%)
Laryngospasm	0 (0%)

Fig 1-During injection of local anaesthetics

Fig 2- During the operation

Fig 3-At end of operation before closure

IV. Discussion

Though general anaesthesia remains the anaesthesia of choice, monitored local anaesthesia has been used as an alternative to general anaesthesia for thyroidectomy. In the last 50 years, results of approximately 1,500 patients undergoing thyroidectomy using local anaesthesia have been reported in the world literature. The largest reports of local anaesthesia for thyroidectomy during last 5 decades have been reported due to limited resources, no availability to deliver general anaesthesia, lack of supportive services for the critically ill, or in situations where patients could simply not tolerate general anaesthesia.[8] It has been reported that patient with diagnosis of amiodarone induced hyperthyroidism or severe Graves' disease which were usually associated with cardiac problem (arrhythmias) were successfully managed using local anaesthesia for thyroidectomy.[9] An interesting and unique application of LA involves a subset of patients with amiodarone-induced hyperthyroidism (AIT). In this series, all cases of AIT were treated with LA exclusively and comprised 9 of the 11 cases with ASA scores >3. Other series addressing thyroidectomy in AIT patients where GA was used and there were incidence of mortality related to anaesthesia. [10, 11]

There are also reports of performing thyroidectomy safely under local anaesthesia in patients with personal or family history of malignant hyperthermia [12, 13] or other contraindications where general anaesthesia may put the patients at risk. Local anaesthesia is economical, simple to administer and several studies have reported cost saving up to 30% with BCPB compared to general anaesthesia.[9] [15] Regional anaesthesia helps avoiding the undesirable side effects and risks posed by general anaesthesia. We can avoid general anaesthesia related complications (nausea and vomiting, sore throat, etc) by regional technique. Pain is a significant post-operative problem. BLSCP provide excellent post-operative analgesia and decrease opioid demand.[14,15] Gozal et al measured the mean pain level at 69 mm (on 100 scale VAS), while Sonner et al. reported that 70% of the patients had pain levels above 40 mm (on the same scale).[14, 16] Most studies indicate that lower level of postop pain with BLSCPB. Regional nerve block may also contribute to decrease mechanical hyperalgesia induced by inflammation. In our study no post operative pain was complained. So postoperative analgesia was maintained with this block and opioid induced side effects (nausea, vomiting, respiratory depression, etc) were avoided.

Patient who are awake can cough and perform valsalva on asking, which helps surgeon to know about integrity and durability of haemostatic control. This is not possible to the same degree with a patient under General Anaesthesia. There was no incidence of post-operative haematoma formation as haemostasis was adequate. Awake patients are able to phonate; this allows immediate feedback to the surgeon regarding the integrity of the voice and pitch, which helps for exclusion of nerve injury. So we avoided direct laryngoscopic

evaluation of vocal cord during the procedure in our study which usually performed in anaesthetised patients. We found these beneficial effects in our study.

In recommending local anaesthesia for thyroidectomy, patient selection is very important: Spanknebel et al. reported local thyroidectomy procedure in high risk patients (ASA≥3), substernal goitre and obese patients. They found that substernal goitre and extensive cancer required conversion to general anaesthesia. They proved that conversion to general anaesthesia either electively or urgently were safe. While substernal goitre may also be treated using local anaesthesia, risk of conversion to general anaesthesia was similar as in locally advanced cancer.[9] So our exclusion criteria was retrosternal goitre, recurrent laryngeal nerve (RLN) palsy, oesophageal or tracheal compression due to swelling, concomitant cervical lymph node clearance, known or suspected locally invasive cancer. Thyroid surgery is performed after placing a rolled sheet under the shoulders and placing the patient's neck into extension. This position tends to be uncomfortable for the patients so, conscious sedation was given with injection Midazolam 0.05 mg/kg.

In our series, inadequate block was found in five patients (Table -2). These patients were converted to general anaesthesia for the operation. One patient experienced seizure immediately after the block, who was treated with injection Diazepam (10mg intra-venous) and surgery was completed under general anaesthesia. Patient have also reported a favourable experience, especially for those with an over whelming fear of general anaesthesia. Our study population were satisfied with anaesthesia procedure. Saxe and co-workers described an intense respiratory distress as a result of regional anaesthesia in patient with RLN palsy from undifferentiated thyroid cancer. [17] There was no incidence of nerve injury in our patients.

V. Conclusion

Thyroidectomy may be performed under regional anaesthesia. Patient selection is essential before administration of local anaesthesia. Successful local thyroidectomy also requires a motivated patient and skilled surgical team willing to work with a patient who is awake during the procedure. We can avoid all complications related to general anaesthesia. Accurate haemostasis, early recognition of RLN injury, maintenance of postoperative analgesia; less requirement of opioid, and cost effectiveness are the advantages of local anaesthesia. Thyroidectomy using bilateral superficial cervical plexus block appears safe and provides good operative condition during surgery.

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