



## Thyroidectomy Under Local Anesthesia in a Poor Resource Health Facility in Northeastern Nigeria

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### Abstract

**Background:** The provision of quality health care is one of the priorities of every government. The quality of such care is however, limited by the human and technical resources available. The varying types of thyroidectomy for goiters are often done under general anesthesia, unless, there is a contraindication such as, cardiopulmonary instability. Recently, there is increasing evidence that thyroidectomy could be done under local anesthesia with or without anxiolytics or opioid analgesia augmentation. This study reports on our experience of performing thyroidectomy under infiltrative local anesthesia.

**Objectives:** To evaluate the safety of performing thyroidectomy under infiltrative local anesthesia and compare the post operative outcome with that done under general anesthesia.

**Patients and Methods:** This is a descriptive case series of 59 patients that underwent thyroidectomy under field block with 1% lignocaine with adrenaline 1:200,000 dilutions. Dose was standardized for all patients at 4 mg/kg under monitored anesthesia. The period under study covered from October 2017, October 2019. The patients' characteristics analyzed were biodata, clinical diagnosis, patient's weight, type of surgery, duration of surgery and complications.

**Results:** The study population was 59 patients, 88.1% were females, and 11.9% were males, with female male ratio of 8:1. The mean age was 42.03( ± 3.5), simple multinodular goiter was the most common subtype 47.5%, toxic multinodular goiter 39%, diffuse simple goiter and diffuse toxic goiter 5.1% each. Malignant goiter 3.4% and all are papillary carcinomas. 54.2% off all the goiters are WHO grade III. The mean duration of surgery is 40 min and the average duration of hospital stay is 24 h to 48 h. There were 4 complications. 1) Subcutaneous hematoma (1.7%), 2) post-operative hypocalcaemia (1.7%), 3) colloidal scar (3.4%), and 4) surgical site infections (3.4%).

**Conclusion:** Thyroidectomy under infiltrative local anesthesia is safe if done by a trained surgeon, in a poor resource health facility.

**Limitation:** Patient's preference for general anesthesia and short-necked, obese patients.

**Keywords:** Thyroidectomy; Anesthesia; Poor resource centre

### Introduction

The pioneers in thyroid surgeries, particularly, surgery for thyrotoxicosis, performed their surgeries under local anesthesia [1]. The improvement in the knowledge of the pathophysiologic basis of thyroid disorders and the development of medical strategy for achieving euthyroid state allowed surgeons to perform surgery on patients with toxic goiters under general anesthesia with adequate relaxation and minimized the incidence of thyrotoxicosis related intra-operative complications [1]. The improvement in the safety profile of general anesthesia allowed surgeons to perform numerous procedures including thyroid surgeries almost exclusively on general anesthesia [2]. The presence of contraindication to general anesthesia in some patients forced surgeons to look for alternatives to general anesthesia. In developing countries like Nigeria, most rural hospitals lack facilities for general anesthesia and where the facilities are available, maintaining the system is usually cost inhibitive [3-6]. Patients with various types of thyroid pathologies stand the risk of not having their surgeries or have to travel to cities with more advanced health care system to have such operations. With out of pocket system of payment for services, inadequate NHIS coverage, and payment for such care for peasant citizens is quite difficult [6]. There is therefore, a need for assessing

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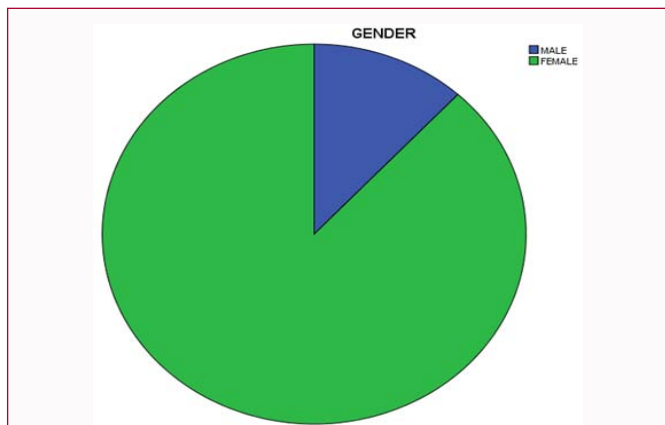


Figure 1: Showing the gender distribution of the patients.

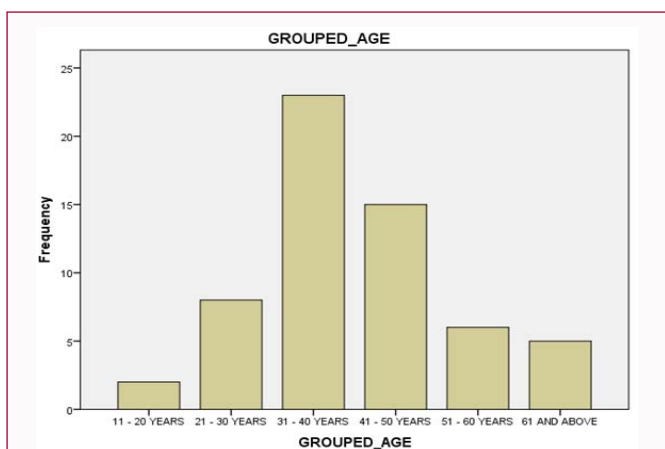


Figure 2: Showing the grouped age distribution of the patients.

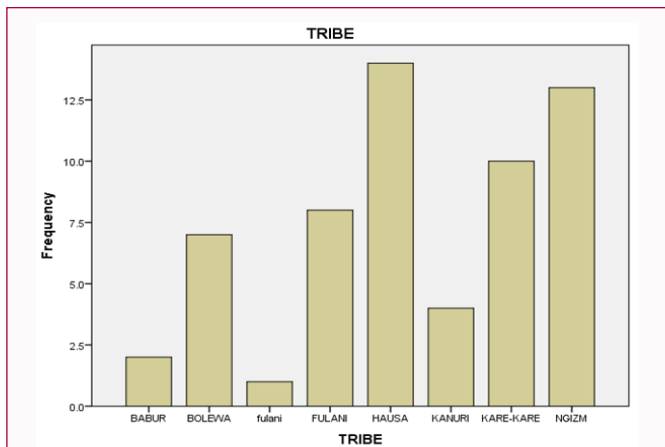


Figure 3: Showing the ethnic distribution of the patients.

the possibility of doing such thyroid surgeries under the relatively cheaper and more readily available infiltrative local anesthesia. This should however be done cautiously. Patients should be meticulously assessed for medical suitability for such procedure to reduce avoidably high surgically related morbidities and mortalities. Local anesthesia has the added advantage of lack of general complications associated with general anesthesia, such as nausea, vomiting and altered consciousness. The use of adrenaline containing lignocaine minimizes bleeding and the need for transfusion and improves surgical field visibility. The analgesic effect continues postoperatively.

This is thought to reduce the intensity of the systemic inflammatory response to the stress of surgery and ensures early post-operative recovery and probably, shorter hospital stay [4]. It will also enhance hospital economy, as thyroidectomy and other surgical procedures may be done as Day Case Surgeries [4]. We, therefore, designed this study to assess the safety of thyroidectomy under local infiltrative anesthesia and to compare its morbidity profile with thyroidectomy under general anesthesia in carefully selected patients. We attempt to analyze patients' characteristics and evaluate outcome measures such as hospital stay and post-operative complications and compare these with those seen in thyroidectomy under general anesthesia. We hope to elucidate the safety of performing thyroid surgeries under infiltrative local anesthesia and possibly allow hospitals consider doing thyroid surgeries as day case procures.

## Patients and Methods

### Patients

This prospective descriptive case series was done on 59 patients between October 2017 to October 2019 at the Surgery Department of General Hospital Potiskum, Yobe State, Nigeria. The hospital has a 3 operating theatre tables but, no single functional anesthetic machine or oxygen cylinder for intra-nasal oxygenation (Figure 1). All the patients that were recruited were clinically assessed for symptoms of toxicity, recurrence and malignancy. All toxic goiters were chemically rendered euthyroid and all malignant goiters were clinically and radiologically assessed for loco-regional advancement. All locally advanced malignant goiters, those with failed medical control of toxicity, those with poor glycemic control and those who declined consent were excluded (Figure 2). Basic preoperative hematological and biochemical parameters were ensured to be within normal range. Pre-operative indirect laryngoscopy, neck and thoracic inlet radiographs were taken to assess vocal cords integrity and to rule out tracheal abnormalities. Detailed counseling on the procedure was done, covering the need for patients to keep communication with the operating room, swallow any accumulated saliva and to alert the team if there is undue pain or respiratory problems. Previously successfully operated patients were often involved in the counseling to demonstrate safety and allay anxiety. All the participants gave informed consent and additional consent was sought from few to take their pictures with the faces showing to demonstrate the state of wakefulness (Figure 3).

### Methods

Infiltrative local anesthesia was with 1% lignocaine with adrenaline at 1:200,000 dilutions and a standardized dose of 4 mg/kg. The calculated dose was made up to 60 ml with 0.9% saline. A 10 ml syringe with 27G needle was used for infiltration and the field block. 20 ml of the reconstituted lignocaine was used for field block, extending from the supra-sternal notch below to the cricoid cartilage above and the lateral borders of sternomastoid muscles laterally. 10 ml was given along the incision line. 10 ml of lignocaine was injected under the investing layer of the pre-tracheal fascia after raising sub-platysma flaps (Figure 4). The remaining 20 ml is given at 5 cc at each of the thyroid poles to minimize discomfort during mobilization. Patients' position and operative field preparation is as in surgery under general anesthesia, but, draping is done in such a way to expose patient's mouth and nose to allow continued communication and spontaneous breathing. The communication assures the surgeon of the safety of the recurrent laryngeal nerves as no effort is made to search for it (Figure 5). The remaining operative steps are as outlined in standard

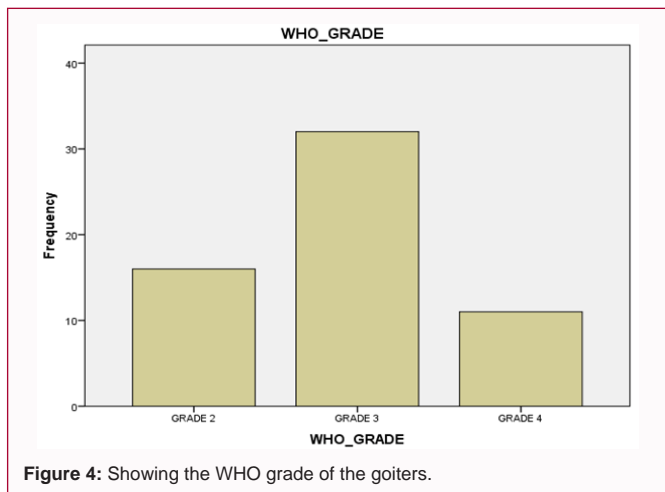


Figure 4: Showing the WHO grade of the goiters.

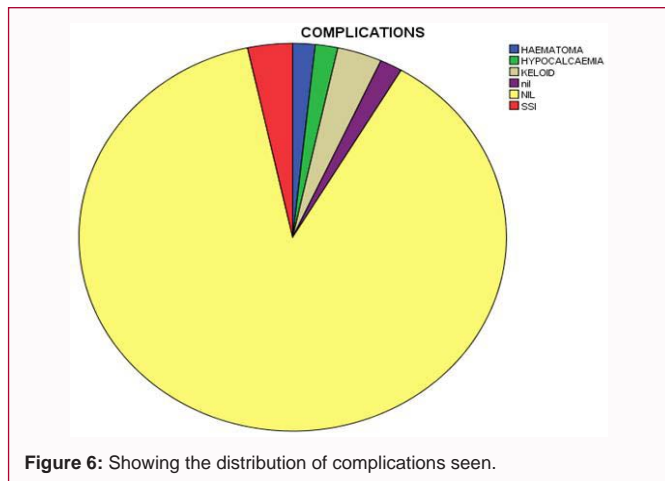


Figure 6: Showing the distribution of complications seen.

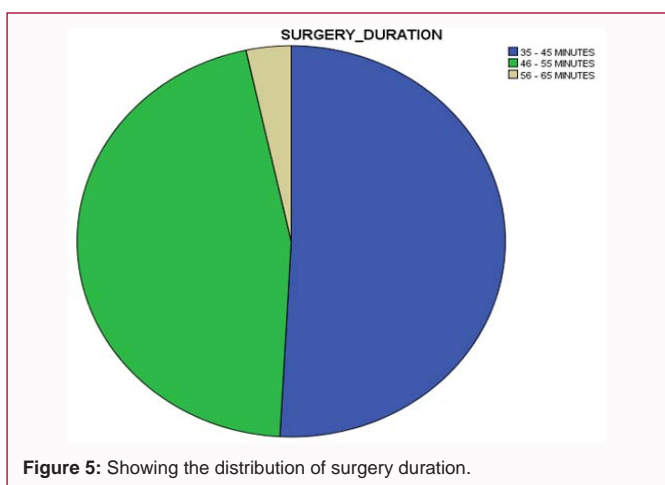


Figure 5: Showing the distribution of surgery duration.

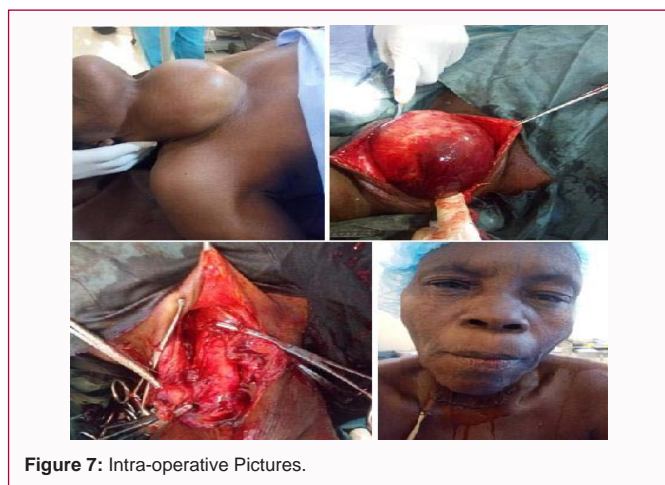


Figure 7: Intra-operative Pictures.

operative texts for thyroidectomy under general anesthesia and all had a passive drain left *in situ*. Only one of the patients required a salvage dose of opioid analgesia and anxiolytics due to agitation. None was given intra-operative antibiotic as the surgery is considered to be a clean procedure. All operated patients were kept under close observation at the recovery room for 30 min, monitored by manual assessment of their vital signs (Figure 6). Patients were then transferred to the surgical wards and drains were removed within 24 h to 48 h. All were discharged home to see the team at the Surgical Out-Patient Department for wound inspection, assessment for early post-operative complications and review of results of post-operative investigations and histopathology (Figure 7).

**Results**

A total of 59 patients were recruited for the study. 52 were females and 7 were males, giving a female to male ratio of 8:1. The mean age of the study population is 42.03, mostly between 31 to 40 years of age. Although Potiskum is a multi-ethnic society, most thyroid pathologies are seen within Hausa (27.1%) and Ngizm (22%) population (Table 1). Most patients presented with clinically and biochemically non-toxic multinodular goiter 47.5%, toxic multinodular goiters 39%, diffuses simple goiters 5.1%, diffuse toxic goiters 5.1% and malignant goiters 3.4% (Table 2). All the malignant goiters were of the papillary subtype. Majority of the patients had WHO grade III goiters (54.2%). 49.2% of the patients had sub-total thyroidectomy, 47.5% underwent near total thyroidectomy. Only those with malignant goiters (3.4%)

Table 1: Showing the distribution of thyroid pathologies.

Diagnosis	Diagnosis	
	Frequency	Percentage
SMNG	28	47.5%
TMNG	23	39%
Diff SG	3	5.1%
Diff toxic G	3	5.1%
Malignant Goiter	2	3.4%
Total	59	100%

were offered total thyroidectomy. The mean operative time was 40 min, with most surgeries finished within 35 min to 45 min (50.8%). Only one of the patients required salvage dose of 30 mg of pentazocine and 10 mg of diazepam because of agitation. None had undue primary hemorrhage that will require volume replacement or post-operative transfusion. One patient (1.7%) had reactionary hemorrhage with subcutaneous hematoma that was drained on releasing subcuticular sutures. One patient (1.7%) developed hypocalcemia tetany which resolved on administration of 10% calcium gluconate and maintenance dose of oral calcium preparation. Two patients (3.4%) developed superficial incisional surgical site infection and 2 others (3.4%) developed colloidal scars within 6 months of follow up visits. None of the patients had respiratory problems post-operatively and all had their passive drains removed within 24 h to 48 h. None has reported delayed onset of voice changes, recurrent toxic symptoms or

**Table 2:** Showing the types of surgeries performed.

Surgery		
	Frequency	Percentage
Subtotal Thyr	29	49.2%
Near total Thyr	28	47.5%
Total Thyr	2	3.4%
Total	59	100%

**Table 3:** Showing the distribution of hospital stay.

Hospital Stay		
	Frequency	Percentage
24 h	29	49.2%
24-48 h	22	37.3%
More than 48 h	8	13.6%
Total	59	100%

clinical symptoms of hypothyroidism. Majority of the patients were discharge 24 h after surgery. 24 h (49.2%), 24 h to 48 h (37.3%) and 13.6% remained beyond 48 h (Table 3).

## Discussion

Undertaking thyroidectomy under regional anesthesia is not novel in the Nigeria or other African countries. Alufolhai E et al. [6] reported his experience with thyroidectomy for various thyroid pathologies and reported the use of augmented local anesthesia for thyroidectomy in poor resource rural hospital. The augmentation was mainly with sedatives/anxiolytics and the Wilson sedation score is often 1-2 [5]. Many authors have reported performing thyroidectomy under local anesthesia without any augmentation and they didn't find any statistically significant difference in safety when compared with those done under general anesthesia [7]. There were initial concerns on the safety and challenges associated with use of local anesthesia for thyroidectomy. The possibility of failure and the need for conversion to general anesthesia appear cogent and the consequence could be fatal if the needed requirements for the general anesthesia are unavailable. Careful selection of patients is therefore paramount. The potential risk of intravascular injection and subsequent cardiac or neurological complications like seizure were raised [8]. The untoward systemic effect however, will be dependent on the total administered dose, rate of vascular absorption, plasma concentration, bioavailability, pharmacokinetics and the efficacy of the body's metabolic and excretory functions [9]. Local anesthesia obviates the risks that are inherent in general anesthetic agents, risk of laryngeal spasm or edema on endotracheal intubation and the increased need for post-operative continued monitoring or even ICU admission [10]. The preponderance of female patients in our study, with a male-female ratio of 1:8 is in keeping with reports from other workers [1]. Although, almost half of our patients presented with large goiters, this didn't pose any challenge. Previous works have alluded to this observation also [6]. Majority of the benign goiters were treated with sub-total thyroidectomy except for those in the males and the elderly. We preferred near total thyroidectomy for the males because of the documented increased risk of malignant transformation in their goiters. Elderly patients with benign multinodular goiter were also treated by near total thyroidectomy. This is because of the reported risk of malignant transformation in the remaining thyroid tissue. Although, there is a shift towards total thyroidectomy for even multinodular goiters because of the above noted reason [11], we

preferred conserving some thyroid tissues in our patient. L-thyroxin replacement therapy following total thyroidectomy is often difficult in rural patients, as availability and affordability of the drug is often problematic. No statistically significant difference has been noted in the complication rates for thyroidectomy under local anesthesia when compared with those done under general anesthesia [11]. None of our patients suffered recurrent laryngeal nerve injury. The continuous communication intraoperatively and the avoidance of search for the nerve have been attributed to such [11]. One patient each, developed hypocalcaemia and subcutaneous hematoma. This was from the total thyroidectomy group. Bhattacharya reported similar complication rate [12,13]. Two patients developed superficial incisional surgical site infection. This is similar to the infection rate reported for thyroidectomy under general anesthesia [12]. The 87% of our patients were discharged home within 2 days of surgery. The decreased stay is related to decrease physiological changes associated with local anesthesia, early recovery and the absence of life threatening complications in our patients. It is evident from this study that thyroidectomy under local anesthesia can be safely done by a trained surgeon in a carefully selected cohort of patients. Surgeons practicing in the secondary tier health facilities can safely offer surgery to the retinue of their patients with thyroid disorders and those in tertiary health facilities can convert thyroidectomy to a day care procedure.

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