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A Retrospective Study Analysis of Complications Following Completion Thyroidectomy for Differentiated Thyroid Cancer

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ABSTRACT

Introduction: The main concern in modern thyroidectomy procedures is to minimise the risk of major complications like airway injury, RLN palsy and permanent hypoparathyroidism while not compromising on the outcome. When compared to unilateral thyroid lobectomy, total thyroidectomy comes with significant risk of damaging all 4 parathyroid glands and both recurrent laryngeal nerves. On the contrary completion thyroidectomy offers little risk when attempted as a second step procedure in cases of multinodular goitre with indeterminate FNAC. This study aims to assess the complications following completion thyroidectomy for differentiated thyroid cancer.
Objective: To determine the complications following completion thyroidectomy in cases of previously performed hemi thyroidectomy and with post-operative histopathology report as differentiated thyroid cancer.
Methodology: Retrospective study of 36 cases of completion thyroidectomy done in 4 years in the department of ENT HNS , BGS Global Institute of Medical Sciences, Bengaluru.
Results: A total number of 36 patients required completion thyroidectomy over the last 4years. Transient hypoparathyroidism as the most common complication was seen in 6 cases and no case of permanent hypoparathyroidism was seen. Transient unilateral RLN weakness was seen in 4 cases whereas one patient had permanent RLN palsy. Minor complications like seroma was seen in 3 which recovered over a period of time.
Conclusion: Completion thyroidectomy is not so preferred operation often thought to carry a significantly increased risk of morbidity. However recent studies suggest that completion thyroidectomy can be performed with minimal morbidity. The complication rate of the procedure in our study was no higher than in most of the previous studies. With the advent of newer technologies like nerve monitor, completion thyroidectomy is definitely a safe procedure, can be performed with minimal morbidity and with adequate time interval after primary hemithyroidectomy.

Keywords*: completion thyroidectomy, hypoparathyroidism, RLN palsy.*

INTRODUCTION

Diseases of thyroid gland is frequently encountered by otorhinolaryngologists and head and neck surgeons in routine practice. There are many surgical techniques that have been described and mentioned in literature over the years for differentiated thyroid cancers (DTC), some of the surgical techniques has become obsolete where as some of the techniques like total thyroidectomy (TT) and completion thyroidectomy (CT) are still widely used. However, choice of procedure depends on many factors like patient's overall condition, morbidity factors and size and grade of primary lesion. The main concern in modern thyroidectomy procedures is to minimise the risk of major complications like airway

injury, recurrent laryngeal nerve (RLN) palsy and permanent hypoparathyroidism while not compromising on the outcome. When compared to unilateral thyroid lobectomy, total thyroidectomy comes with significant risk of damage to all 4 parathyroid glands and both recurrent laryngeal nerves. On the contrary completion thyroidectomy offers little risk when attempted as a second step procedure in cases of multinodular goitre with indeterminate fine needle aspiration cytology (FNAC).Many studies has reported a significantly lower incidence of temporary hypoparathyroidism in patients undergoing CT than that of TT [1,2].The objective of our study was to determine the complications following completion thyroidectomy in cases of previously performed hemi thyroidectomy and with post-operative histopathology report as differentiated thyroid cancer.

MATERIALS AND METHODS

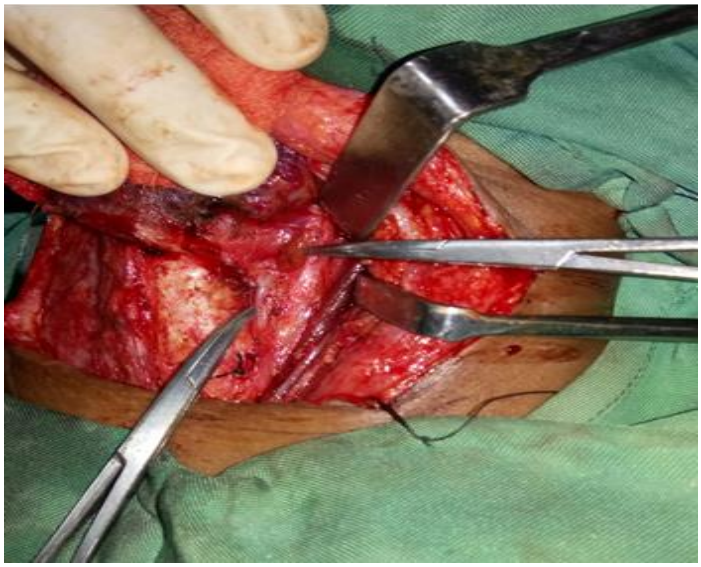
A retrospective study was conducted in the department of ENT-HNS, BGS Global Institute of Medical Sciences, a tertiary care hospital situated in Bangalore. A total of 36 patients were operated for CT from January2021 to December 2025. All patients were operated by single surgeon and one department. The data was collected from patient records, medical records department and analysed. Patients who underwent CT after the histopathological diagnosis of DTC were included in the study. All the procedures were done under general anaesthesia and investigations like contrast enhanced computed tomography (CECT) or magnetic resonance imaging (MRI) neck was used selectively for the patients, other investigations included complete blood profile, triiodothyronine (T3), thyroxin (T4), thyroid stimulating hormone (TSH) levels, serum calcium levels, and neck ultrasonography was done in all the patients. Different parameters which was studied were patient's age, history of previous surgery, histopathology of cancer, recurrent laryngeal nerve palsy (unilateral or bilateral), superior laryngeal nerve palsy, hypocalcaemia (transient or permanent), airway injury, haematoma and surgical wound infection. Intra operatively if accidentally suspicious parathyroid like tissue if removed, it was implanted in ipsilateral sternomastoid muscle after confirmation that it was not of metastatic lymph node. Post operatively levels of ionised and total serum calcium concentration was monitored. Levels of ionised calcium less than 4.5 mg/dL and total serum calcium concentration less than 8.5mg/dL was considered as hypocalcaemia and calcium supplementation was given to the patient accordingly. If there was prolonged requirement of calcium supplements and permanent hypocalcaemia was suspected, intact Parathyroid Hormone levels was done and monitored. When iPTH and serum calcium levels was regularized under the span of 6 months after discontinuation of calcium supplementation the condition was termed as transient hypoparathyroidism, and if the patient requires calcium supplementation more than 6 months postoperatively the condition was termed as permanent hypoparathyroidism.Postoperatively 1st day, movement of bilateral vocal cords was seen on fibre optic laryngoscopy and a note of injury to recurrent laryngeal nerve or superior laryngeal nerve was made. Descriptive and interferential statistical analysis was used in this study, significance is assessed at 5 % level of significance, collected data was analysed.

RESULTS

A total of 36 patients underwent CT over a period of 4 years. In the study population, 22 (61.1%) were females while the remaining 14 patients were males (38.8%). Mean age was 45.6 years (age range 18-70 years). Patients were studied for various parameters and complications were documented. All the patients who underwent CT had been previously operated for hemi thyroidectomy and CT was done as a second stage procedure after histopathological diagnosis. Papillary carcinoma was seen in 26 (72.2%) patients followed by follicular carcinoma, which was seen in 6 (16.6%) patients. 4 (11.1%) patients had hurtle cell carcinoma. Associated procedures like central compartment lymph node dissection was done in 14 (38.8%) patients and lateral lymph node dissection was done in 8 (22.2%) patients as repeat ultrasound suggestive of lymphadenopathy. Transient recurrent laryngeal nerve injury (RLN) was seen in 4 (11%) patients and permanent RLN injury was seen in 1 (2.7%)patient. Transient hypocalcaemia was seen in 6 (16.6%) cases and no cases of permanent hypocalcaemia was seen. In 3 (8%) patients seroma was observed in operative bed and was treated by conservative management. None of the patients had airway injury or any other complications related to surgery. All the patients underwent radioactive iodine therapy postoperatively. All patients had minimum one year follow up post operatively. No patients required revision exploration in view of residual thyroid tissue. No patient had recurrence in our study period.

1. Exposure of the gland in the post-operative bed.

2. Identification of the RLN and Parathyroid.



3. Saving the RLN and Parathyroid.

Demographics

Male	14	38.8%
Female	22	61.1%
Total	36	100

Histopathology

Papillary carcinoma	26	72.2%
Follicular carcinoma	6	16.6%
Hurthle cell carcinoma	4	11.1%

Complications observed

Transient recurrent laryngeal nerve palsy	4	11.1%
Permanent RLN injury	1	2.7%
Transient hypocalcaemia	6	16.6%
Permanent hypocalcaemia	0	0

DISCUSSION

The extent of surgery for multinodular goitre of thyroid is often confusing. Hemithyroidectomy restores the euthyroid state post operatively with less morbidity while removing the suspicious larger nodule. Total thyroidectomy carries its own significant risks of injuring both recurrent laryngeal nerves and damage to all four parathyroid glands. Even though risk stratification has been suggested by many thyroid associations still dilemma exists in some situations while managing differentiated thyroid cancers and solitary thyroid nodule in low risk category. So when hemithyroidectomy has been performed for solitary thyroid nodule or multinodular goitre and post-operative HPR suggestive of differentiated thyroid cancer, Completion Thyroidectomy becomes necessary. With the advent of frozen section, indication for second stage surgery is less needed in case of FNAC diagnosed previous benign nodules. But facility of frozen section is available in only few centres owing to the high cost of its maintenance. So in those situations where we need to wait for final Histopathology for the diagnosis, CT might become necessary. In places where frozen section analysis is available, the most common indication for completion thyroidectomy is a frozen section analysis of a thyroid lesion that is interpreted as benign follicular adenoma. Similarly CT might be needed in some cases of follicular neoplasm and few cases of DTC turning out to be high risk category post operatively.

CT often thought to carry more risks because of fibrosis and few surgeons may turn in favour of TT at the first sitting itself with its impending risks and consequences. Few earlier studies have shown more complication rates and advocate its use in limited settings [3]. This high rate of complications thought to occur during dissection of recurrent laryngeal nerve and the parathyroid glands in the scar tissue. We thought of evaluating the complications of CT. Few studies in the past have compared complications of CT and TT [1,2,4,5,6]. We did not have a comparison group of TT as the indications and situations of the tumors differ. Timing of CT is still controversial. One study evaluated similarly the complications of CT and divided into early and late CT depending on the time duration of operation [7]. In one study all CT was performed in between 3- 12 months after the initial surgery [4]. One study by Abdullah et al [8] grouped patients into two groups based upon the timing of CT surgery, Group 1 – 10 to 90 days and Group 2 – more than 90 days. They concluded that there was no statistically significant difference between the two groups in terms of complications after completion thyroidectomy. In our study we performed CT in between 4 to 6 weeks. In our study we found that complication rate with respect to the recurrent laryngeal nerve injury and permanent hypoparathyroidism were 2.7% and 0% respectively which were comparable to the complication rates of TT. We could not use nerve monitoring devices during the surgery wherein if its available chances of temporary and permanent recurrent laryngeal nerve palsy can be further minimised. One meta-analysis study in 2015 comparing the complications of CT and TT concluded that CT can be performed with acceptable morbidity in select cases of DTC who could not be properly diagnosed preoperatively or who recurred after less than total thyroidectomy [9].

In conclusion CT is a safe procedure to be done in a revision setting and it doesn't lead to increased rate of complications.

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