

## Assessment of Complications following Thyroid Surgery

Sanjoy Das<sup>1\*</sup> Pranay Kumar Datta<sup>2</sup>

### Abstract

**Background :** Different diagnostic tools are available for assessment of post operative outcomes of thyroid surgery. This study was done to reach a consensus and to find out the best diagnostic tool for assessment of post operative complications of thyroid surgery.

**Materials and methods :** A cross sectional study was carried out in the Medical Centre Hospital Between July 2016 to June 2017. Total 50 patients were included in the study, where post operative complications of patients were assessed, studied and enrolled. To assess the post operative outcomes of patients undergoing thyroid surgery. Data were analyzed and presented as both qualitative and quantitative data as applicable using SPSS version 20. The quantitative data were analyzed by mean, standard deviation. The qualitative data were analyzed by Mc NEMAR test (Mc NEMAR  $\chi^2$  test). For all analytical test, the level of significance was set at 0.05 and p value equal or less than 0.05 was considered as significant, p value more than 0.05 was considered as not significant.

**Results :** Fifty patients were selected for the study who were treated by Thyroidectomy. The mean patient's age at the time of surgery was 40.9±9.1 years ranged from 10 to 60 years. Data were collected in a prescribed data collection sheet. Then all data were compiled and analyzed. Result: 14% of the patients had complications, of them 2% had transient hypoparathyroidism, 4% had haemorrhage, 2% had temporary Recurrent Laryngeal Nerve (RLN) palsy and 2% had permanent recurrent laryngeal nerve palsy, 2% had Superior Laryngeal Nerve (SLN) palsy & 2% had wound infection. Improved surgical techniques and proper management of complications reduce the postoperative morbidity and mortality of thyroid surgery.

**Conclusions:** Different types of complications may occur following thyroid surgery. In spite of all measures, keen observation in postoperative period is very important to find out the complications for early intervention.

**Key word:** Hypocalcemia; Recurrent laryngeal nerve palsy; Thyroidectomy.

1. Resident Surgeon of Otolaryngology & Head Neck Surgery  
Chittagong Medical College Hospital, Chattogram.

2. Associate Professor of Anaesthesia  
Chittagong Medical College, Chattogram.

**\*Correspondence:** Dr. Sanjoy Das  
E-mail: dr.sanjoydas1984@gmail.com  
Cell : 01716 62 10 35

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### Introduction

Thyroid surgeries are the most common endocrine surgeries performed now a day. In spite of improved techniques, every thyroid surgeon has come across complications associated with this surgery. This study aims to understand various complications after thyroid surgeries and the factors responsible for complications and discuss management techniques for those complications in brief. Abnormalities of the thyroid gland are extremely common affecting approximately 11% of the general population.<sup>1</sup> Surgery for thyroid gland abnormalities is quite common.<sup>2,3</sup> Thyroidectomy is one of the commonest operations for the Otolaryngology and Head-Neck Surgeons, General Surgeon & Endocrine Surgeon. Following thyroidectomy complications may develop, these are immediate and late complications, such as haemorrhage, dyspnoea, seroma, haematoma, recurrent laryngeal nerve paralysis, thyroid crisis, wound infection and hypoparathyroidism. The complication which is most feared is trauma to the recurrent laryngeal nerve estimated to occur in between 1 and 10% of operations.<sup>4-6</sup> The nerve may be out stretched or burnt, usually as a result of failure to recognize or dissect it properly. In unilateral paralysis of the RLN results in immobile vocal cord in the paramedian position which causes weak, cracked and breathy voice. Bilateral paralysis leads to severe airway obstruction necessitating an urgent tracheostomy in the majority of patients. The nerve is more prone to be injured on the right side for its anatomical variability.<sup>7-8</sup> The external laryngeal nerve is traumatized more often than one supposes. Its close relationship to the superior vascular pedicle and an occasionally aberrant course predispose it to damage.<sup>9</sup> Diathermy of the small vein which passed from the superior thyroid vein to the lateral part of cricothyroid muscle is a further cause of damage to this nerve, therefore it is suggested to clamp the upper pole of Thyroid gland after proper identification of superior laryngeal nerve or atleast close to the gland incase of nonidentification of nerve. Hypocalcaemia which

is uncommon after thyroidectomy may be the result of rough handling of the posterior aspect of the thyroid lobes or interruption of the terminal branches of the main divisions of the inferior thyroid artery. Hypocalcaemia is very common in total thyroidectomy. Hypothyroidism developing gradually over a period of months or year after operations is a common though acceptable complication of subtotal thyroidectomy and total thyroidectomy and is readily treated with Thyroxine.<sup>9,10</sup>

### Materials and methods

This cross sectional study was carried out at Medical Centre Hospital July 2016 to June 2017. Fifty patients were selected for the study who were treated by thyroidectomy. The mean patient age at the time of surgery was 40.9±9.1 years ranged from 10 to 60 years. Data were collected in a prescribed data collection sheet. The data of each patients included age, sex, symptoms, signs, provisional diagnosis, preoperative investigations such as T3, T4, TSH, FNAC, ultrasonogram of thyroid gland, Thyroid scan, Cytological study, operative notes, histopathological examination and follow up. Then all data were compiled and analyzed. Statistical analysis was done by using appropriate statistical test.

### Inclusion criteria

- i) All the patient with thyroid swelling and clinical and sonological indication for FNAC and subsequent thyroid surgery.
- ii) Patient of all age group, sex & demographic distribution.
- iii) Patient with normal thyroid function test.

### Exclusion criteria

- i) Patient with abnormal thyroid function test.
- ii) History of previous surgery in the thyroid and para-thyroid region.
- iii) History of radiation in the head neck region in the past.
- iv) Diffuse goitre with indication for FNAC.

The risk and benefits were explained to the patients and their attendants. It was assured that all information and records will be kept secret. The procedure would be helpful for both patients and doctors in making rational approach of case management. Written informed consent from the patient is obtained. Finally ethical directives from the Managing Director of Medical Centre Hospital for this study was obtained.

## Results

**Table I :** Age distribution of the study

Age in Year	Number of Patient	Percentage (%)
20-20	04	8
21-30	14	28
31-40	16	32
41-50	09	18
51-60	07	14

**Table II :** Sex distribution of the study

Sex	Number of Patient	Percentage (%)
Female	44	88
Male	06	12

**Table III :** Types of Thyroid Disease in study population

Thyroid pathology	Number of patient	Percentage (%)
Solitary nodular goitre	28	56
Multi nodular goitre	12	4
Thyroiditis	2	4
Papillary carcinoma	3	6
Medullary carcinoma	1	2
Follicular Neoplasm	4	8

**Table IV :** Types of Thyroid surgery among study group

Disease	HT	ST	TT	NT	LT	Total
Solitary Nodular Goitre	26				2	28
Multi Nodular Gotre		2	8	2		12
Thyroiditis			2			2
Papillary carcinoma			3			3
Medullary carcinoma			1			1
Follicular Lesion	2		2			4

HT-Hemithyroidectomy, ST- Subtotal thyroidectomy, TT – Total Thyroidectomy, NT-Near Total Thyroidectomy, LT-Lobectomy.

**Table V :** Postoperative complication following thyroid surgery

Complication	Number of patient	percentage
Haemorrhage/haematoma	2	4
Airway Obstruction	0	0
Temporary Recurrent Larygeal	1	2
Nerve palsy		
Permanent Recurrent Laryngeal	1	2
Nerve Palsy		
Superior Laryngeal Nerve Palsy	1	2
Hypoparathyroidism	1	2
Wound infection	1	2
Total	7	14

### Discussion

In this study the age of the patient at the time of surgery ranged from 10 to 60 years. We observed in our study the maximum incidence is in third and fourth decade. Doriarajan and Jatashree<sup>5</sup>, mentioned in their study that the peak incidence is in third decade. In this series, out of 50 cases, 44 patients (88%) were female and 12 patients (24%) were male, with a female to male ratio was 7.33: 1. There was a female preponderance in this series but it was higher than that of the study of Sinna & Ezzat.<sup>9</sup> The incidence of thyroid diseases were quite higher in female patient in all age group. Twenty eight patients in this study presented with solitary nodular goiter (56%) twelve patients with multinodular goitre (24%), two patients with Thyroiditis (4%), 4 patient were diagnosed cytologically as Follicular lesion (4%) and Four patients with thyroid carcinoma without metastasis. Out of Four patients of thyroid cancer 3 had papillary carcinoma (75%) and 1 (25%) had Medullary carcinoma. Papillary carcinoma is the commonest thyroid malignancy, constituting 50 percent of all thyroid cancer with a male to female ratio is 1:36. In this series, commonest thyroid disorder was solitary nodular goiter with an overall incidence of 56%. Hemithyroidectomy was performed in 26 patients and Lobectomy were done for 2 Patients. Subtotal thyroidectomy was carried out in 2 patients of multinodular goitre. Total thyroidectomy was done in 8 cases of thyroid cancer and near total thyroidectomy was done in 02 case of multinodular goitre. Total thyroidectomy were carried out in 2 cases of Thyroiditis. For carcinoma thyroid cases total Thyroidectomy with Selective central neck dissection was carried out as there were no evidence of metastasis. For Follicular lesions hemithyroidectomy was done in 2 cases and total thyroidectomy was done in 2 cases. Out of 50 cases, 7 cases (14%) developed post operative complications. Of these, 2 patients developed post operative haematoma due to oozing from remaining thyroid tissue and wound surface which was managed by cauterization and ligation after exploration of wound. During operation, Substantial blood vessels in the operative field should be tied with fine silk ligature, whereas small vessels can be managed with the bipolar diathermy.<sup>10</sup> Khaky et al in his study showed that the overall complication rate for combined surgeries was 14.2% with

Recurrent Laryngeal Nerve (RLN) injury more common than hypoparathyroidism.<sup>11</sup> On the contrary a study showed in a series of 3089 thyroidectomy patients reported 0.5% Permanent RLN injury, 0.4% hypoparathyroidism and 0.9% definitive complication. In this series 2 patients had unilateral recurrent laryngeal nerve paralysis. Among 2 patients, 01 patient showed gradual improvement of voice in subsequent follow up and after 6 months his voice was almost normal by compensation of the opposite vocal cord. One other patient did not show significant improvement even after an average period of 6 months follow up. Transient paralysis may result from pressure on the nerve by oedema in which cases recovery can be anticipated. Iqbal et al found only one recurrent laryngeal nerve damage out of 111 cases of Thyroidectomy (0.9%).<sup>12</sup> Lalida et al, found the incidence of recurrent laryngeal nerve paralysis among 361 patients was 6.09%.<sup>13</sup> on the contrary Kraimps et al 1.8% patient presented with vocal cord alternation with a normal voice following surgery.<sup>14</sup> Transient paralysis occurs in about 3 percent of nerve at risk and recovers in 3 weeks to 3 months.<sup>2</sup> The intra-operative nerve monitoring with the purpose of identification of the recurrent laryngeal nerve is a safe and reliable method. Lalida found that, the failure in identifying the nerve did not show significant correlation with incidence of permanent recurrent laryngeal nerve paralysis.<sup>13</sup> The incidence of hypoparathyroidism is as high as 20 percent when total thyroidectomy and neck dissection is performed and as low as 0.9 percent for subtotal thyroidectomy.<sup>15</sup> But in this series only one patient (2%) developed transient parathyroid insufficiency on 2nd post operative day which was improved later on. It is rarely the result of inadvertent removal of all parathyroid gland but more commonly due to disruption of their blood supply. Devascularization can be minimized by careful ligation of branches of inferior thyroid artery on the thyroid capsule distal to their supply of parathyroid glands i.e maintaining subcapsular dissection. Parathyroid glands usually situated in the posterior border of the thyroid gland but Clark et al reasoned that parathyroid glands situated anterior to the thyroid gland are at highest risk of injury. Injury to the gland during dissection is usually accompanied by a change in colour of the gland from tan to black purple. If the gland

needs to be removed during surgery it must be sliced and should be transplanted into sterno-mastoid muscle or the forearm.<sup>16</sup> The incidence of hypoparathyroidism is also directly related to the surgeon's experience with thyroidectomy. The incidence of permanent hypoparathyroidism following total thyroidectomy ranges from 0.6 to 17% in reports. Bhattacharyy N et al observed in their study, postoperative hypocalcaemia is the most common immediate surgical complication of total thyroidectomy.<sup>17,18</sup> Out of 50 patients, 01 patient developed wound infection which was managed by exploration, wound debridement and secondary stitch. There was no death in this series.

### Limitation

The present study was conducted in a very short period of time. Small sample size was also a limitation. The study population was selected from single selected hospital in Chottogram. So that the result of the study may not reflect the exact picture of the country.

### Conclusion

Surgery of thyroid gland can be performed safely in the majority of patients. A thorough knowledge of potential surgical complications is mandatory for the thyroid surgeon. Successful surgical management of thyroid disease is also based on a sound knowledge of normal and pathologic anatomy and an unhurried, gentle operative technique. Hyperthyroidism and Goitre size are the 2 independent risk factors for the development of complications.

### Recommendation

Proper pre operative assessment, peri operative care may limit post operative complications. Even early post operative interventions may limit the reverse some complications completely. Study like this may be conducted in larger scale in future for the benefit of the patient.

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### Contribution of authors

SD - Conception, design, data analysis, drafting and final approval.

PKD - Acquisition of data, interpretation of data, critical revision and final approval.

### Disclosure

All the authors declared no competing interest.

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