Clinicopathological Features and Complications of Thyroid Operations: A Single Centre Experience

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Abstract Thyroid surgery evolution is important with a lots of hurdles faced by many surgeons to reach the present stage. The complications from the olden days reduced with improvement in understanding the disease process, development of antibiotics, anaesthesia and now restricted mainly to hypoparathyroidism and recurrent laryngeal nerve injuries. A retrospective analysis of thyroid surgeries performed at BP Koirala Institute of Health Sciences centre from 2007 to 2011 Clinicopathological features and complications were analyzed. Among 203 patients who underwent surgery for thyroid operations, 53 were malignant and 150 were benign cases. Hemithyroidectomy was the most common procedure performed (118 cases). Papillary thyroid cancer was the most common malignant lesion and colloid goiter the most common benign lesion. Postoperative complications occurred in 12 patients—infection in two patients, bleeding requiring reexploration in one patient, hypocalcemia in 6 (5-transient and 1-permanent) and hoarseness of voice in three patients (2-temporary and 1-permanent). FNAC is an easy, cost effective, reliable investigation in experienced hands. Reoperation, primary stage of the tumor and central node dissection are associated with increased complication rates.

Keywords FNAC of thyroid nodule · Thyroid nodule · Complications of thyroid operations

Introduction

Ever since first thyroidectomy was performed in 952 AD, there is continuous advances in anatomy, surgical approaches, surgical technique and treatment modalities. There was initial friction to accept thyroid surgery and was condemned in Germany and France, and they called these operations as “foolhardy performances”. From such a situation, thyroid surgery was pioneered by “the magnificent seven” surgeons—Bilroth, Kocher, Halsted, Mayo, Crile, Lahey and Dunhill [1]. Kocher for his pioneer work in thyroid surgery received noble prize in the year 1909. Kocher performed 5,000 operations with a mortality rate of 0.5 % [2]. The main complications present day associated with thyroidectomy are hypoparathyroidism and recurrent laryngeal nerve after we have overcome the complications of bleeding, sepsis and hypothyroidism after a long journey from the start of this operation.

The prevalence of thyroid nodules varies from 4–8 % in adults by palpation and 13–67 % when detected sonographically. Autopsy studies have shown a prevalence of thyroid nodules in 50 % [3, 4]. The prevalence increases in endemic areas, women and with increase of age. Only five percent of thyroid nodules will have cancer [5]. The risk of malignancy does not differ either in solitary nodule or multinodular goiter. Fine needle aspiration biopsy is the best technique to diagnose thyroid nodules with diagnostic accuracy of 98 % and <2 % false positive and false negative results [6].

The risk of postoperative complications depend on the extent of thyroid disease, surgeon’s experience and extent

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Fig. 1 **a** Thyroid cancer with skin ulceration. **b** Multinodular goiter patient with previous surgery—arrow showing the scar

of resection. The prevalence of complications varies from 5–27.5 % in different studies [7–11]. Halsted in his article “The Operative Story of Goiter: the author’s operation” quoted “The extirpation of the thyroid gland for goiter typifies perhaps better than any other operation the supreme triumph of the surgeon’s art [12].”

In this study we would like to share our experience in thyroid surgery at our institute, analyzing the indications for surgery, complications and the risk factors associated with them.

Materials and Methods

Our study is a retrospective analysis of hospital records and the operative records of patients who underwent thyroid surgery at our institute from the period between 2007 and 2011. Clinicopathological characters of the patient were analyzed and the complications developed were assessed in comparison with risk factors.

Results

During the study period 203 thyroid operations were performed at our centre. The mean age was 35.98 years with a range of 14–86 years. The clinicopathological features were described in Table 1. They were 4.48 times more common in females compared to males. Usual clinical presentation was a dominant thyroid nodule. One patient presented with hoarseness of voice and found to have left vocal cord paralysis. Two cases had skin ulceration and eight cases of multinodular goiter were recurrent cases (Fig. 1). Two cases of multinodular goiter had retrosternal extension and one case showed calcification on radiogram (Fig. 2). Fine needle aspiration cytology (FNAC) was used to diagnose the thyroid lesions. FNAC was performed using 22 guage needle. The FNAC results were categorized as Unsatisfactory/

inadequate specimen, benign, Follicular lesion (indeterminate), suspicious and malignancy like the classification given by British Thyroid Association (BTA).

Among unsatisfactory lesions, FNAC was repeated again with the help of ultrasound guidance, if it fails patient was considered for surgery. Of all the 4 patients who had inadequate sample, all underwent hemithyroidectomy and the final histology was benign. In 115 benign lesions, two patients with multinodular goitre had malignancy in final histopathology (1.7 %). In 16 patients where FNAC showed follicular lesion, 4 patients has follicular carcinoma (25 %) and rest 12 had follicular adenoma. In 31 patients with suspicious carcinoma as FNAC report, 10 had malignancy detected in histopathology. All the patients (37) reported as malignancy had malignant pathology (Table 2).

The most common surgery performed was hemithyroidectomy (132). 14 patients had malignancy on histological examination who further underwent completion thyroidectomy. Near total thyroidectomy was performed in 31 patients of multinodular goiter. All the patients who were diagnosed preoperatively as malignant underwent total thyroidectomy. One patient underwent esophageal repair as the longitudinal fibres were involved which was excised and primarily sutured (Fig. 3). Two patients underwent isthmectomy for nodule at isthmus. Skin involvement was present in two patients which was excised and sutured.

Histological examination revealed benign lesions in 150 patients of which 79 patients had colloid nodule. Among malignancy, papillary carcinoma was the most common variety in 39 patients. Eight patients had medullary carcinoma thyroid, five had follicular carcinoma and one had hurthle cell carcinoma.

Surgical site infection had occurred in two patients (0.98 %), one patient with skin ulceration and the other who had underwent reexploration for bleeding. Of 53 cases of malignancy, 11 cases had palpable lateral neck nodes, 40 had no palpable neck nodes and two cases are incidentally detected malignancy after surgery for multinodular goiter

Table 1 Characteristics of patients

Characteristics	Number of patients (Total <i>N</i> = 203)
Age	
Mean	35–98 years
Range	14–86 years
Sex (F:M)	4.48 [166/37]
Clinical presentation	
Solitary thyroid nodule	134
Multinodular goitre	66 (7 cases recurrent)
Diffuse goitre	3
Fine needle aspiration Biopsy	
Unsatisfactory	4
Benign	115 (2 cases of multinodular goitre had follicular carcinoma)
Indeterminate	16
Suspicious	31 (21 cases turned out benign)
Malignant	37
Surgeries performed	
Hemithyroidectomy	118
Hemithyroidectomy → completion thyroidectomy	14
Near total thyroidectomy	31
Total thyroidectomy	37
Total thyroidectomy + esophagus repair	1
Isthmectomy	2
Histopathological examination	
Malignant	53
Papillary carcinoma	39
Follicular carcinoma	5
Hurthle cell carcinoma	1
Medullary carcinoma	8
Benign	150
Colloid cyst	11
Colloid nodule	79
Hashimotos thyroiditis	9
Multinodular goitre	34
Toxic nodule	5
Follicular adenoma	12
Complications	
Infection	2
Bleeding	1
Hoarseness of voice	3 (2 recovered and one permanent vocal cord palsy)
Temporary hypocalcemia	5
Permanent hypocalcemia	1

(Table 3). All patients with preoperative diagnosis of carcinoma underwent central neck node dissection (51 patients). Five patients (12.5 %, 5/40) of clinically N0 neck had positive central neck nodes, all had papillary thyroid cancer. 11 patients had palpable lateral neck nodes at presentation (two cases of medullary thyroid cancer, eight-papillary thyroid cancer and one-follicular carcinoma). Of eight patients with medullary carcinoma thyroid, two patients had ipsilateral palpable lateral lymphnodes and they underwent modified radical neck dissection type 3 along with central neck dissection.

One patient developed postoperative bleeding for which, the wound was re-explored and the bleeding was from branch of inferior thyroid artery. This patient developed permanent vocal cord paralysis. Three patients developed hoarseness of voice of which one had permanent vocal cord palsy, in the patient who underwent reexploration for bleeding. But the opposite cord later on compensated well. Six patients developed hypocalcemia, five cases temporary and one permanent. Five patients developed transient hypocalcemia which recovered within 6 months and one patient developed permanent hypocalcemia which was a case of medullary carcinoma thyroid.

Discussion

Fine needle aspiration cytology has stood test of time for evaluating thyroid nodules. It's a simple, cost effective, less traumatic, reliable investigation which helps in diagnosis of most of the thyroid nodules. It helps in planning for further management. The limitations of FNAC, are it requires an experienced pathologist for better results and probability of false negatives and false positives to be kept in mind.

There are two different systems of reporting FNAC of thyroid nodules. They are the Bethesda system which has six classes and was proposed by NCI and "Thy" classification of BTA which has five results (Thy 1–Thy 5). Bethesda system includes Class III which is Atypia of undetermined significance or follicular lesion of undetermined significance (AUS) [13, 14]. The most common lesion in most of the studies were benign and most common was colloid goitre.

Papillary carcinoma was the most common type of malignancy in our study. The overall complication rate in our study was 5.9 % (12/203) which correlated with the reported complication rate in literature of 5–27.5 % depending on radicality of the surgery [7–11]. Surgical site infection had occurred in two patients (0.98 %) and is unusual after thyroid operations.

Fig. 2 **a** X-ray lateral neck showing coarse calcifications in a case of multinodular goiter. **b** X-ray PA view showing retrosternal extension of goitre

Table 2 Clinical, cytological and histological correlation of thyroid nodules

FNAC report	Number of patients (203)	Surgeries Performed	Final Histopathology
Unsatisfactory	4 (4-STN)	Hemithyroidectomy (4)	Benign (4)
Benign	115 (70-STN) (42-MNG) (3-Diffuse Goitre)	Hemithyroidectomy (81) Isthmectomy (2) Near total roidectomy (31) Total thyroidectomy (1)	Benign (81) Benign (2) Benign (30), Malignant (1) Malignant (1)
Indeterminate	16 (16-STN)	Hemithyroidectomy (12) Hemithyroidectomy → TT (4)	Follicular adenoma (12) Follicular carcinoma (4)
Suspicious	31 (28-STN) (3-MNG)	Hemithyroidectomy (21) Hemithyroidectomy → TT (10)	Benign [21(8-Hashimotos Thyroiditis)] Malignant (10)
Malignancy	37 (21-MNG) (16-STN)	Total thyroidectomy (37)	Malignancy (37)

The risk of hypocalcemia after thyroidectomy varied in different studies with a range of 2.43–35.49 % [10, 11, 15–18]. The factors predicting the risk of hypocalcemia include radicality of surgery, central neck node dissection and reoperation. In our study, transient hypocalcemia occurred in 7.2 % (6/83) patients who underwent near total/total thyroidectomy. Permanent hypocalcemia occurred in one patient (1.2 %) in a case of medullary carcinoma thyroid. Five patients who developed hypocalcemia underwent central node clearance with an incidence of 9.8 % (6/51) and one patient for reoperation for multinodular goitre.

Unilateral vocal cord paralysis can be temporary or permanent. The risk of permanent vocal cord paralysis in the literature varies from 0.2–5 % [16, 18]. In the present study, there were two cases with temporary vocal cord paralysis and one patient with permanent vocal cord paralysis (0.4 %, 1/203). The risk of vocal cord paralysis depends on radicality of the surgery, central neck node dissection, reoperation and experience of the surgeon. Here in our study, permanent vocal cord paralysis had occurred in a patient in whom an emergency reexploration was performed for bleeding where the spurter was from a branch of inferior thyroid artery.

Fig. 3 **a** Sutured esophageal muscle fibres after excision of thyroid cancer. **b** Left Recurrent Laryngeal nerve shown

Table 3 Stage of malignancy

Stage	No. of patients (53)
Well differentiated cancer	45
>45 years	9
Stage II	6
Stage IVA	2 (one case lateral neck nodes, one had esophagus involvement)
Stage IVC	1 (Bone metastases)
<45 years	36
Stage I	35
Stage II	1 (Bone metastases)
Medullary thyroid cancer	8
Stage I	1
Stage II	5
Stage IVA	2

Conclusion

Fine needle aspiration cytology is the most important investigation which acts as a guide for the management of thyroid cancer. In hands of experienced pathologist the chance of false positive results are very rare. Central neck node dissections are associated with increased complication rates.

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