Original Article

Outcome of thyroid surgery in the department of ENT- Head and Neck Surgery: three years experience

D. K. Baskota, B. K. Sinha, R. Prasad

Department of ENT-Head & Neck Surgery, TU Teaching Hospital, Kathmandu.
Correspondence to: (e-mail: dkbaskota@yahoo.com, dkbaskota@healthnet.org.np)

Introduction: A retrospective, cross-sectional, analytical study, to find out overall outcome of thyroid surgeries and correlation of fine needle aspiration cytology (FNAC) with histopathology of different thyroid lesions was recently carried out at the *Department of ENT-Head & Neck Surgery* of TU Teaching Hospital, Kathmandu, Nepal. Altogether 114 charts of patients underwent different thyroid surgeries from July15, 2002 to July14, 2005 for different thyroid lesions were analyzed, out of which 11 patients were excluded from the study due to lack of adequate information.
Results: Out of 103 analyzed cases female sex was found to be exclusively predominant 94(91%) and age group of 21-30 years was the most commonly affected group 36(35%). Clinically, solitary thyroid nodule was the commonest diagnosis 57(55.4%) made for these thyroid lesions and right lobe was commonly affected site 50(48.5%). Similarly, hemithyroidectomy was the most commonly performed surgery 63(61.2%) followed by lobectomy 18(17.5%) for the management of these lesions where as hypothyroidism 11(10.7%) and hypocalcaemia 9(8.7%) were the commonest observed postoperative complications respectively. Although 3 cases of malignancy were missed by FNAC, its diagnostic accuracy was still 97.09%.
Conclusion: The results of this study so far indicate that although FNAC is a good diagnostic tool for thyroid lesions, USG guided FNAC would have better option for further accuracy of the diagnosis. Likewise cytologically reported, as solitary thyroid nodule with cystic changes and follicular neoplasm should be taken into consideration as malignancy might be missed particularly in these lesions. Therefore it is better to do hemithyroidectomy in solitary thyroid nodule irrespective of FNAC report.

Introduction

Thyroid is a complex organ in which various disorders may develop from the beginning of intrauterine life to the entire course of life after birth. Among these various disorders iodine deficiency is perhaps the most important thyroid abnormalities worldwide, affecting an estimated 800 million persons of whom 190 million suffer from goiter.[1] Abnormalities requiring medical treatment are hypothyroidism, thyrotoxicosis, different types of thyroiditis and Graves disease whereas abnormalities requiring surgical treatment are thyroid nodule, multinodular goiter, thyroid cyst and various types of benign and malignant neoplasm. As this study is targated to analyze the outcome of surgeries done for different thyroid disorders, emphasis is given to those thyroid abnormalities, which require surgical treatment.

Thyroid nodules are found up to one half of middle aged older person in the United States, but most nodules are small, are not apparent on physical examination and don't cause thyroid dysfunction. Approximately 5% of women aged 50 years or older have palpable thyroid nodules, few of which are malignant or cause thyroid dysfunction. [1] The adenoma is the most common thyroid neoplasm. This usually present as a solitary thyroid nodule or as a dominant nodule in a multinodular goiter. These are most common in middle-aged females, are not premalignat and rarely become toxic.[2] Enlargement of the thyroid gland is common. Colloid and adenomatous goiters, characterized by multiple nodules of varying size and consistency are the types most often encountered. [2]

Malignant tumours of the thyroid gland can originate from any of the cellular components of the gland: follicular and para follicular cells, lymphoid cells and stromal cells. [2] Malignant tumours of thyroid gland represents less than 0.5% of all cancers in the UK but 80% of all head and neck

cancers. [3] Lin et al [4] in their recent study of 3657 thyroid swellings could detect only 2.98% thyroid malignancy. They were female predominant and f:m ratio was 2.5: 1.[3] Papillary carcinoma is common in adults where as rest of the malignant are common in elderly. Papillary carcinoma is the commonest one occupying almost 60% of the total thyroid carcinomas following follicular (18%), medullary (10%), anaplastic (5%) and lymphoma (5%).[3]

Diagnosis of the thyroid disorders is usually confirmed by thyroid function test, FNAC/FNAB, scientigraphy, USG neck and in selected cases CT/MRI besides history and findings of clinical examination. Among all these investigations FNAC is an effective and accurate technique for the diagnosis and further management of palpable thyroid nodules. [5] The likehood of malignancy in a cold nodule is about 10-20%. But if a cyst has been excluded on USG, then the likehood of a semisolid or solid cold nodule being malignant rises to about 50%.[2]

Surgery is the treatment of choice of all thyroid swellings: nodules, colloid goiter, cysts and neoplasm. Surgery ranges from simple enucleation of cysts to lobectomy, hemithyroidectomy, subtotal thyroidectomy, near total thyroidectomy, and total thyroidectomy with or without different types of neck dissection. But the need to discover malignancy is the most challenging dilemma in the management of thyroid nodules; the most common endocrine disorders affecting 4-5% of the general population. [6]

Hypothyroidisms, hypocalcaemia, recurrent laryngeal nerve palsy, haemorrhage and wound infection are the commonly encountered complications of thyroid surgeries. Prognosis of all thyroid lesions after a radical surgery is good except anaplastic and some variants of medullary ca.

Mountains occupy most of the territory of Nepal, hence the prevalence of iodine deficiency diseases is high. Due to the poverty and poor supply, access of iodized salt to the targeted people residing these mountain zones is still low, resulting development of many areas of endemic goitres. As a result the incidence of thyroid diseases is high in our country in compare to other countries and many of them require thyroid surgery. So thyroid surgeries are common in our context. Therefore the basic aim of this study is to analyze the common thyroid diseases those require surgery, to find out their cost effective and reliable diagnostic methods and to analyze the total outcome of surgeries done for these diseases.

Material and Methods

All patients having thyroid swelling, attending to the out patient clinic of the Department of ENT-Head & Neck Surgery of Tribhuvan University Teaching Hospital from July 15, 2002 to July 14, 2005 are included for the study. After proper history taking and clinical examination of all thyroid swellings following investigations were advised: (i) thyroid function test (Blood for T_3, T_4, and TSH), (ii) FNAC from the dominant thyroid swelling, (iii) USG of the neck and (iv) blood for R/E if inflammatory condition is suspected. After analysis of the investigations' report and their correlation with clinical findings, treatment modality of each & every patient was decided and those who were decided for surgical modality of treatment, they were appointed for surgery. Those who were found to have hyperthyroid, anti-thyroid treatment were started and by the time of surgery they were made euthyroid. Prior to surgery every case was re-assessed and findings were reconfirmed. Investigations regarding general anaesthesia were done as per protocol of anaesthesia department and all patients were admitted one day prior to surgery. On the following day surgeries were performed as per indication and surgical findings were noted in the operation note including findings of surgical specimen after which it was sent for histopathological examination.

Every patient was treated with IV antibiotics till the drainage tube was in situ (2-3 days) and after removal of drainage tube it was converted into oral route that was continued till the stitches were removed (6^{th} post op day). At the mean time complications regarding surgery were recorded during their hospital stay and even during follow-up period if any. Patients were discharged from the hospital after removal of stitches if there were no complications and advised for follow up with histopathological report. Further treatment and follow-up was decided as per histopathological report and complications developed.

In this study, we analyzed the chart of 114 patients who underwent different thyroid surgeries during above mentioned time period. Of these 114 patients, 11 patients were excluded from the study as they were lacking of adequate information for this study. Therefore finally findings of only 103 patients were included. Analysis of age, sex, site of the pathology, hormonal status, FNAC findings, USG findings, clinical diagnosis, types of surgery performed, surgical complications and findings of histopathology of every patient were noted. More emphasis was given to correlate the preoperative findings of cytopathology and postoperative findings of histopathology.

Results were derived by carefully analyzing the findings of these above mentioned variables and based upon the results of these variables conclusions and further recommendations were made. Regular follow up was done regarding outcome of the treatment provided and individual record keeping was maintained for further study especially for those cases who had carcinoma and who developed complications.

Results

The patients' cohort included 103 cases (9 *male and 94 female*) ranging in age 16 years to 69 years. The disease was predominantly found in female (male: female=1:10.4) and the age group ranging from 21 to 30 years was found to be the commonest age group 36(35%) among all. Solitary thyroid nodule was the commonest diagnosis 57(55%) made for these thyroid swellings followed by carcinoma 19(18.4%) and follicular neoplasm 18 (17.5%) respectively, which is shown in *(Fig 1).*

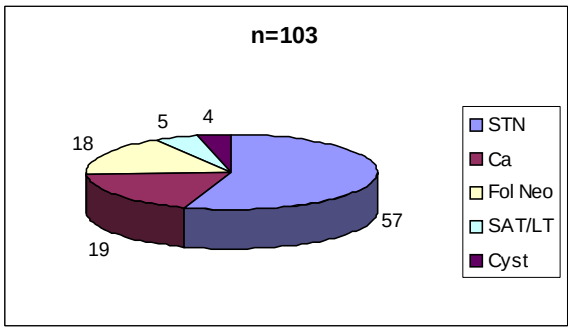

Fig.1. Clinical diagnosis.

STN:solitary thyroid nodule,Ca:carcinoma, FolNeoFollicularNeoplasm, SAT/LT: subacute thyroiditis lymphocytic thyroiditis

Likewise right sided pathology (50=48.5%) was the commonest pathological site for the thyroid swelling followed by left ((36=35%), bilateral (12=11.7%) and isthmus (5=4.8%) respectively.

Regarding hormonal status, majority of our patients were euthyroid (99=96.1%). Only four patients (3.9%) were hyperthyroid and not a single patient was hypothyroid. Pre operatively every patients underwent fine needle aspiration cytology (FNAC). Colloid goiter was the commonest diagnosis made cytopathologically for theses thyroid swellings that is shown in *(Fig. 2).*

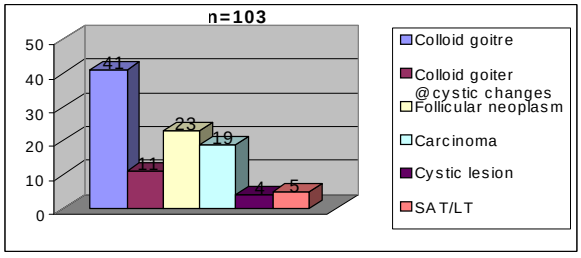

Fig. 2. Findings of FNAC:
SAT/LT: subacute thyroiditis/lymphocytic thyroiditis.

As mentioned earlier, all patients were managed surgically and among the surgical treatment hemithyroidectomy (63=61.2%) was found to be the commonest surgical procedures for the management of these thyroid swellings followed by lobectomy (18=19.5%) and subtotal thyroidectomy 7=6.8%) that is shown in *(Fig. 3).*

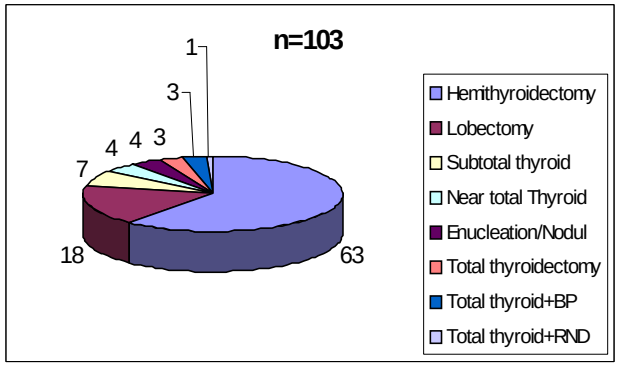

Fig. 3. Surgical procedures.
BP: berry picking, RND: radical neck dissection.

We analyzed the surgical complications of each patient and we found that hypothyroidism (11=10.7%) was the commonest complications among all followed by hypocalcaemia (9=8.7%) and haematoma that is shown in *(Fig. 4).*

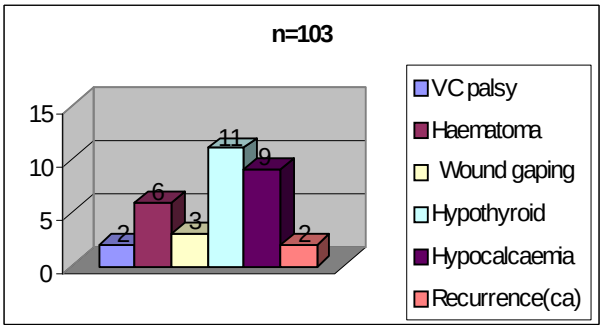

Fig. 4. Surgical complications.
VC: vocal cord.

After surgical removal, surgical specimen of every patient were sectioned, macroscopically evaluated and sent for histopathologal examination. Histopathologically nodular colloid goiter (51= 49.5%) was found to be the commonest histopathological diagnosis followed by carcinoma (22= 21.4 %) and follicular adenoma (17= 16.5 %), which is shown in *(Fig. 5).*

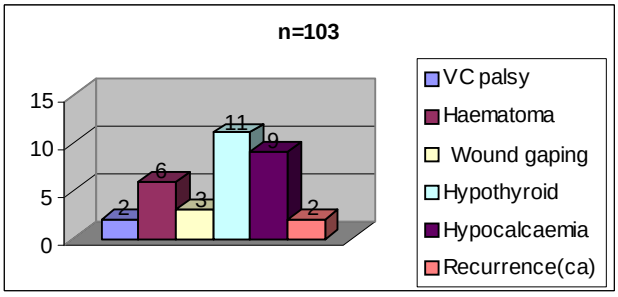

Fig. 5. histopathological diagnosis.
MNG: multinodular goitre, *SAT/LT: subacute thyroiditis/ lymphocytic thyroiditis.*

After receiving histopathological report, findings of FNACs' were compared with the findings of histopathology of each and every case of thyroid surgery which were analyzed and found following differences *(Table 1).*

Table 1. Difference of FNAC with histopathology.

No	*Types of pathology*	*FNAC*	*Histopathology*	*Difference*
1	Nodular colloid goitre	41	41	0
2	NCG+Cystic changes	11	10+ (1 ca)	1
3	Follicular Neoplasm	23	17+ *(4 MNG+2 ca)*	6
4	Carcinoma	19	19 + 1+2 = 22	3
5	SAT/LT	05	05	0
6	Cyst	04	04	0

NCG= nodular colloid goitre, SAT= subacute thyroiditis, LT= lymphocytic thyroiditis.

It is interesting to mention here that of the total 103 cases, three carcinomas was missed in FNAC (one in nodular colloid goitre with cystic changes and two in follicular neoplasm) which could correctly diagnosed in histopathology.
Likewise to analyze the diagnostic accuracy of FNAC statistically, each and every findings of FNACs' were correlated with the findings of histopathology of all cases of thyroid surgery and following observation were made *(Table 2).*

Table 2. Diagnostic accuracy of FNAC.

S No	*Statistical elements*	*Results in %*
1	Sensitivity	86.36%
2	Specificity	100%
3	Diagnostic accuracy	97.09%
4	Diagnostic inaccuracy	2.91%
5	Positive predictive value	100%
6	Negative predictive value	96.42%

Discussion

In our study, age of the patients who underwent thyroid surgery for different thyroid disorders, ranged from 16 to 69 years and maximum no of cases were belonged to ages 21-30 years. D'Andrea et al [6] carried out a similar study in Rome and they also found almost similar age distribution as compare to us which ranged from 27 to 68 years. But thyroid malignancies are common in elderly population. According to OH Shaheen,[3] papillary thyroid carcinoma is found more in adults where as other variant of thyroid carcinomas are more common in elderly population.
Regarding sex, we observed all surgical thyroid diseases were extremely female predominant i.e. male: female ratio was 1:10.4, which contradicts most of the studies done till date. Watkinson et al [2] in their study mentioned that although the disease is female predominant, male: female ratio was only 1:3. Likewise, OH Shaheen [3] in his observation of similar type of study also found similar results i.e. male: female ratio was1:2.5.
In our study, among the thyroid swellings, out of 103 cases we found maximum no of solitary thyroid nodules (51), followed by malignancy (19) and follicular neoplasm (18) respectively, diagnosis of which were based on FNAC. Similar study was carried out by Dorairajan et al [7] where they also found almost similar results. Among 100 thyroid swellings they found 67 solitary thyroid nodule, 20 carcinomas, and four subacute & lymphocytic thyroiditis. Similarly Lin et al [4] in their study observed that out of 378 thyroid swellings, 269 were benign lesions and 111 were malignant (28.8%) which is a little bit higher than our study. Swelling can occur at any part of the thyroid gland. In our study, out of 103 cases, 50 patients had right sided swelling, 36 had left sided, five had in the isthmus and rest 12 had in both lobes of the thyroid gland. We have not found this type of distribution of thyroid swelling in the literature.
In this study, of the 103 patients, 41 were colloid goitre, 11 had colloid goitre with cystic changes, 23 were follicular neoplasm, 19 were carcinoma, five were sub acute & lymphocytic thyroiditis and four were cystic lesions,

diagnosis of which was based on FNAC. But after surgical removal of all these lesions specimens were sent for histopathological examination (HPE). In histopathology, out of 52 colloid goitres with or without cystic changes, 51 were diagnosed as colloid goitre and in one specimen of colloid goitre with cystic changes carcinoma was found. Likewise of the 23 follicular neoplasms, only 17 were diagnosed as the same where as four were diagnosed as multinodular goitre and two were carcinoma respectively. There were no difference in the diagnosis of subacute & lymphocytic thyroiditis and cystic lesions, both in FNAC and histopathology. Three carcinoma cases were missed in FNAC and these were diagnosed by histopathology, i.e. the diagnostic accuracy of FNAC, in our study was 97%.

Almost similar study was carried out by Gupta et al [8] where they correctly made diagnosis of papillary carcinoma by FNAC in 112 of 139 cases (80.5%), which accuracy is a little bit lower than that of our study. Likewise Dorairajan et al [7] studied 100 cases of solitary thyroid nodule and compared the findings of FNAC (pre op) with histopathology (post op) and concluded that FNAC tailed in 95% of cases which is almost similar to us. Similarly Agrawal S [9] compared findings of FNAC with histopathology in 100 cases of thyroid nodules and demonstrated an accuracy of 90.9% which is a little bit lower than that of our observation.

De Vos tot Nederveen Carpel et al [10] carried out a comparative study of USG guided FNAC from thyroid swellings with subsequent histopathology of the same and observed that FNAC was correct in 105 of 108 benign cases (97%). They also revealed a cytological-histological discrepancy (2%) in only four out of 231 cases, which is almost similar observed by us.

In this study, we correlated findings of FNAC with that of histopathology and found that sensitivity was 86.4%, specificity was 100%, positive predictive value was 100%, negative predictive value was 96.4%, diagnostic accuracy was 97% and diagnostic inaccuracy was 3%, which was more or less similar to findings observed by Bernier et al [11] where the sensitivity of FNAC was 94%, specificity was 100%, positive predictive value was 100% and negative predictive value was 87%.

Surgeries performed for different thyroid swellings were variable from simple enucleation to total thyroidectomy with radical neck dissection as per pathology identified and we encountered different complications like recurrent laryngeal nerve palsy(2), hypocalcaemia(9), wound gaping(3), hypothyroidism(11) and recurrence of the disease(2).

Chao et al [12] carried out a retrospective study of 135 cases of thyroid surgery for different thyroid disorders and found three cases of recurrent laryngeal nerve palsy and one case of hypocalcaemia. Similarly Lee et al [13] in their retrospective study of 91 cases of thyroid surgery for thyroid nodules observed 44% transient hypocalcaemia and 10.3% & 1% transient and permanent recurrent laryngeal nerve palsy respectively, which is a little bit higher than the observation made by us. In our context complications like haematoma and wound gapping were found to be relatively higher than the complications encountered by surgeons of developed countries. The basic reasons behind these complications are environmental, financial and technical which could be minimized after elimination of these basic factors.

Conclusion

The results of this study so far indicates that although FNAC is a good diagnostic tool for thyroid lesions, USG guided FNAC would have better option for further accuracy of the diagnosis. Likewise cytologically reported, as solitary thyroid nodule with cystic changes and follicular neoplasm should be taken into consideration as malignancy might be missed particularly in these lesions. Therefore it is better to do hemithyroidectomy in solitary thyroid nodule irrespective of FNAC report.

Acknowledgement

We are grateful to the Director of Tribhuvan University Teaching Hospital Prof. Mahesh Prasad Khakurel who has consented kind enough to publish this article from the hospital side. We would like to express our sincere thanks to all faculty members of the Department of ENT-Head and Neck Surgery of TU Teaching Hospital for their creative suggestions. Likewise our hearty thanks go to all our post-graduate residents for helping us during the surgical procedures and subsequent care of the patients during their hospital stay.

References

1. Mahmood Moosa, Ernest L. Mazzaferri. Disorders of the thyroid gland. In: Charles W. Cummings eds. Otolaryngology Head & Neck Surgery. *(Laryngology Head and Neck surgery)* vol.3, St. Louis; Mosby; 1998:2450.
2. John C Watkinson eds. Stell & Maran's Head & Neck Surgery. Oxford; Butter worth Heinemann. 2000:459.
3. OH Shaheen. The thyroid gland. In: Alan G Kerr eds. Scott Browns Otolaryngology. *(Laryngology and Head and Neck Surgery)* vol. 5. London; Butterworth's; 1997: 5/18/14.
4. Lin JD, Huang BY, Weng HF, Jeng LB, Hsueh C. Thyroid ultrasonography with fine-needle aspiration cytology

for the diagnosis of thyroid cancer. *Journal of Clinical Ultrasound.*19997; **25**: 111-8.

5. Afroze N, Kayani N, Hassan SH. Role of fine-needle aspiration cytology in the diagnosis of palpable thyroid lesions. *Indian J Pathol Microbiol*. 2002;**45**:241-6.
6. D'Andrea V, Redler A, Calo P, Donati L. Thyroid nodules: comparison of preoperative and intraoperative needle aspirate and definite histological study. *Chir. Ital.* 2000;**52** : 147-53.
7. Dorairajan N, Jayashree N. Solitary nodule of the thyroid and the role of fine needle aspiration cytology in diagnosis. *Journal of Indian Med. Assoc*. 1996; **94**: 50-2, 61.
8. Gupta S, Sodhani P, Jain S, Kumar N. Morphological spectrum of papillary carcinoma of the thyroid: role of cytology in identifying the variants. *Acta Cytol.* 2004; **48**: 795-800.
9. Agrawal S. Diagnostic accuracy and role of fine needle aspiration cytology in management of thyroid nodules. *Journal of Surg Oncol.* 1995;**58**: 168-72.
10. de Vos tot Nederveen Cappel RJ, Bouvy ND, Bonjer HJ, van Muiswinkel JM, Chadha S. Fine needle aspiration cytology of thyroid nodules: How accurate is it and what are the causes of discrepant cases? *Cytopathology.* 2001;**12**: 399-405.
11. Bernier MO, Moisan C, Mansour G, Aurengo A, Menegaux f, leenhardt L. Usefulness of fine needle aspiration cytology in the diagnosis of loco regional recurrence of differentiated thyroid carcinoma. *Eur J Surg Oncol.* 2005;**31**: 288-93.
12. Chao TC, Lin JD, Chen MF. Surgical treatment of Hurthle cell tumors of the thyroid. *World J Surg.* 2005; **29**: 164-8.
13. Lee JC, Siow JK. Thyroid surgery-the Tan Tock Seng Hospital otolaryngology experience. *Ann Acad Med Singapore.* 2000;**31**:158-64.