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FREQUENCY OF MALIGNANCY IN COLD NODULE THYROID"

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ABSTRACT

Objective:Thyroid nodules is common clinical problems. The purpose of study is to evaluate the frequency of malignancy in both sexes, in different age groups and comparison of different types of carcinoma, which occur in cold nodule. This study will help in highlighting the significance of such a finding and help towards establishing a treatment protocol applicable to our setting.

Study Design: Descriptive Study.

Place and Duration of StudY:Surgical Ward II, Jinnah Post-graduate Medical Center (JPMC) Karachi (from Sept 2006 to August 2008).

Patients and Methods:It is a descriptive study including 65 patients with cold nodule thyroid, during a period of two years from September, 2006 to August, 2008, conducted in the Department of General Surgery, Ward-2, Jinnah Postgraduate Medical Centre, Karachi. The patients presented in surgical outpatient department with solitary thyroid nodules were advised thyroid scan. The patients in which thyroid scan shows cold nodule were further evaluated.

Results:Out of 65 patients with cold nodule, 47 (72.3%) patients had simple colloid goitre, 7 (10.76%) patients had follicular adenoma, 1 (1.5%) patient had thyroiditis, 5 (7.69%) patients had papillary carcinoma, 2 (3.07%) patients had follicular carcinoma and 1 (1.5%) patient had medullary carcinoma. The frequency of malignancy in cold nodule thyroid was 12.3%.All the patients with thyroid carcinoma were ultimately treated by total thyroidectomy and postoperative thyroxine and radioactive iodine therapy was advised.

Conclusion:The frequency of malignancy in cold nodule thyroid was 12.3% in this study. Different types of thyroid carcinomas found in this study are; papillary carcinoma 62.5%, follicular carcinoma 25% and medullary carcinoma 12.5%. In this study, thyroid carcinomas are found commonly in middle aged group and more frequently in females. No recurrence or metastasis found in the follow-up period. Hence this study recommended the total thyroidectomy as a procedure of choice for thyroid carcinoma.

Keywords: Cold nodule, Thyroid carcinoma, Total thyroidectomy.

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INTRODUCTION

Thyroid nodules is common clinical problem, found in 5% of adult population in UK and USA[1,2,4]. These occur 3-4 times more frequently in women than men[1,2,4]. The female to male ratio is 4:1. Nodules occur most commonly in 30 to 50 years old patients. Infact, many clinically solitary nodules may be found on scanning or at thyroid exploration to be part of a multinodular goitre[3]. A solitary nodule has a higher risk of being malignant than the multiple palpable nodules of a multinodular gland[2]. The incidence of malignancy in solitary thyroid nodule is about 15%[1,2,4]. Solitary thyroid nodule in a male is much more likely to be malignant than in a female. The risk of malignancy is increased at either end of the age range. In a teenager of either sex, it must be provisionally diagnosed as carcinoma[4]. The risk increases as age advances beyond 50 years. So about 10% of solitary thyroid nodules in middle aged are malignant, but this figure exceeds 50% in the young and the old. On thyroid scanning, clinically solitary nodules are classified as hot (hyperactive), warm (normally active) or cold (inactive). The prevalence of a cold nodule is 2.5 times greater in areas of iodine deficiency than in iodine sufficient areas[8]. About 80% of solitary thyroid nodules are cold, out of these 15% prove to be malignant[4]. Hot nodules are less likely to be neoplastic than cold[3]. According to one study (in a large review of more than 5000 pateints), carcinomas were found in 16% of cold nodules, 9% of warm nodules and 4% of hot nodules[2].

We hope to find out the frequency of malignancy in a cold nodule thyroid, which is a common condition and tends to present in a younger age group.

PATIENTS AND METHOD

This is a descriptive study of 65 patients with cold nodule thyroid admitted in the Surgical Ward-2, Jinnah Postgraduate Medical Centre, Karachi during a period of two years from September, 2006 to August, 2008. The present study is conducted to evaluate frequency of malignancy in cold nodule thyroid on the basis of clinical presentation, laboratory investigations, FNAC, thyroid scanning and histopathology (after lobectomy).

The patients presented in surgical outpatient department with solitary thyroid nodules were advised thyroid scan. The patient in which thyroid scan shows cold nodule were further evaluated. After selection from the OPD, the patients were admitted in the ward where initial evaluation included a detailed history, physical examination, routine investigations, FNAC, operative findings, histopathology report were done in all patients. The results were then analysed and conclusions were made. The results of this study were compared with the other studies of National and International literatures.

Table No. I.
FREQUENCY OF VARIOUS CARCINOMAS IN 8 PATIENTS OF COLD NODULE THYROID

DIAGNOSIS	NO. OF PATIENTS	PERCENTAGE
Papillary carcinoma	5	62.5%
Follicular carcinoma	2	25%
Medullary carcinoma	1	12.5%

Table No. II.
SEX DISTRIBUTION IN 8 PATIENTS OF THYROID CARCINOMA

SEX	NO. OF PATIENTS	PERCENTAGE
Male	1	12.5%
Female	7	87.5%
Total	8	100%

Table No. III.
AGE DISTRIBUTION IN 8 PATIENTS OF THYROID CARCINOMA

AGE (YEARS)	NO. OF PATIENTS	PERCENTAGE
10-20	3	37.5%
21-30	1	12.5%
31-40	3	37.5%
41-50	1	12.5%
51-60	-	-

N = 8
X = 27.75 years
X ± S.D
27.75 ± 11.26 years

RESULT

The age of patients ranged from 16 – 60 years. The peak incidence of disease in this study was in the 2nd decade of life. Out of 65 patients, 11 were male and 54 were female. The male to female ratio was 1 : 4.9. Out of 8 patients of thyroid carcinoma, 7 were female and 1 male. All the patients presented with swelling infront of neck. Swelling was present in the right lobe in 35 patients (53.8%) in the left lobe in 23 patients (35.38%) and in the isthmus in 7 patients (10.76%), 60 patients (92.3%) had firm swelling, 4 patients (6.15%) had hard swelling, while in 1 patient (1.5%) it was fixed with adjacent structures. Results of FNAC were benign cystic lesion in 12 patients (18.46%); out of which 1 was haemorrhagic colloid cyst. In 41 cases (63.07%) the report was benign, in 8 cases (12.3%) the report was suspicious and in 3 cases (4.6%) it showed malignant cells. Only in 1 case the report was necrotizing thyroiditis.Depending upon the results of all investigations, patients were classified into three groups:

Group-I**:** Benign cystic lesions	(18.46%)
Group-II:Benign solid lesions	(64.61%)
Group-III**:**Malignant andsuspicious lesions	(16.9%)

Group-I:

Out of 12 patients in this group, 2 patients (3.07%) had complete decompression of the cyst after aspiration. In 1 patient (1.5%), who had blood-stained aspirate, lobectomy was done. Lobectomy was also done in the remaining patients due to large size of goitre, cosmesis or wishes of the patients. Postoperative histopathology report showed benign cystic lesions. All the patients in this group were females. No postoperative complication occurred in this group.

Group-II:

This group included 42 patients. All the patients were operated due to large size of goitre, anxiety, or cosmetic purpose, lobectomy + isthmusectomy was the procedure performed in these patients.

The histopathology report was thyroiditis in one patient while all others had simple colloid goitre

Three patients developed hoarseness of voice after surgery, which recovered completely later on. Two patients developed postoperative wound infection, which was treated with antiseptic dressings and antibiotics. Recurrence is not observed in any case up to date.

Group-III:

This group included 11 patients. All the 3 patients who showed malignant cells on FNAC and clinically and per-operatively were also in favour of malignancy (thyroid nodule was hard and fixed and in 2 cases cervical lymphadenopathy was present), were subjected to total thyoidectomy. All the 8 patients confirmed malignancy and was papillary carcinoma in 2 patients, follicular carcinoma in 2 patients and medullary carcinoma in 1 patient. Then completion total thyroidectomy was performed in these patients.

After total thyroidectomy, the malignant cases were advised thyroxine in divided doses of 0.2 – 0.3mg/day and also referred to atomic energy centre, JPMC, Karachi for radio-iodine therapy .Following protocol was made for the follow-up of the patients.

All the 8 patients with malignancy were advised radioactive iodine (^{131}I) scan after 6 weeks of surgery.

Ablation of remnant functioning thyroid tissue with radioactive iodine.

Rescan after six months to one year. Thyroxine was omitted six weeks before scanning.Rescan after one year, then after two years.

Two patients with malignancy did not come for follow up while the others had no evidence of recurrence and metastasis during the follow-up period of two years.

Two patients had transient signs of hypocalcemia after total thyroidectomy and were treated appropriately. One patient developed unilateral paralysis of vocal cord postoperatively.

DISCUSSION

Thyroid nodule is a common surgical problem and the prevalence rate is about 5% of the population.[1,2,3,7] Solitary thyroid nodule is very common and mostly benign.[1] The incidence of malignancy in solitary thyroid nodule is 11–20%[6] while according to some authors, it is 15-20% and even up to 50%.[2] About 80% of the solitary thyroid nodules are cold, but only 15% prove to be malignant.[5] As the thyroid surgery carries significant risk, one should not operate on every patient of goitre. Therefore, there should be some selective approach for the management of the patient with cold thyroid nodules and surgery in benign conditions should be avoided.

Thyroid nodules occur 3–4 times more frequently in women than men.[1,8] In this study the male to female ratio is 1:4.9. Thyroid nodules occur early in the endemic area.[5] The prevalence of a cold nodule is 2.5 times greater in areas of iodine deficiency than in iodine-sufficient areas.[8] Thyroid nodules are most commonly found in 20 to 40 years of age group.[5] In this study the peak incidence was between 21–30 years of age. Right lobe of the thyroid gland is involved more often by the solitary thyroid nodule.[9] In present study, 35 patients (53.8%) had nodule present in the right lobe. The incidence of malignancy in cold thyroid nodule is 15%.[1,5] In this study out of 65 patients with cold thyroid nodules, 8 had carcinoma. The incidence of malignancy in cold thyroid nodule is 12.3%. The main purpose of FNAC is to differentiate benign from malignant nodules that will require surgical removal. In this study, it served this purpose. In 11 patients out of 65, it showed the report of malignant or suspicious cytology. After operation 8 cases proved to be of thyroid carcinoma. Therefore, FNAC has a very high diagnostic accuracy rate of more than 90%. It is the most cost effective, safe and reliable for the evaluation of a thyroid nodule.[10,11] But it is unable to differentiate follicular adenoma from follicular

carcinoma. Papillary carcinoma is the most common form of thyroid cancer, accounting for 50 to 80% of all thyroid malignancies. The reported incidence of Papillary thyroid carcinoma has more than doubled in many countries during the past half century. In Tasmania, an Island State of the commonwealth of Australia, the incidence has increased by 24.7% per annum during the last two decades.[12] While follicular carcinoma accounts for 10–20%, anaplastic for 13% and medullary carcinoma for 5–10%.[1,5] A study done in the surgery department of Mauriziano Hospital of Torino, Italy shows that amongst the thyroid neoplasms, papillary carcinoma is the commonest one (54.3%), medullary carcinoma (4.6%) and others (2.4%).[13] The results obtained in this study of 8 patients of thyroid cancer were, papillary carcinoma in 5 patients (62.5%), follicular carcinoma in 2 patients (25%) and medullary carcinoma in one patient (12.5%).

Solitary nodules causing airway compression or those at high risk for Carcinoma should prompt evaluation for surgical treatment.[14] There is considerable controversy regarding the most appropriate surgical treatment of patients with differentiated thyroid carcinoma. This controversy concerns the extent of thyroid resection. Most surgeons prefer total thyroidectomy on patients with differentiated thyroid carcinoma. Recurrence rate increase if less than total thyroidectomy is performed.[15] For differentiated thyroid neoplasms, near-total thyroidectomy with preservation of a portion of the posterior thyroid capsule on the contralateral side should be done to reduce the risk of parathyroid insufficiency.

There is virtual consensus that lobectomy is the least that should be done for a thyroid nodule that is suspicious for malignancy.[1,5,8] Many have reported minimal morbidity following total thyroidectomy and recommended its use for all thyroid cancers, while others recommended lobectomy, which is associated with less complications because only one recurrent laryngeal nerve is at risk and it is impossible to remove or injure all the parathyroids. Whether the long-term survival is the same with lobectomy as with total thyroidectomy is still unclear. On the basis of some retrospective studies, the authors concluded that the complications like recurrent laryngeal nerve injuries and hypoparathyroidism, are more frequent with total thyroidectomy than with a procedure less than total thyroidectomy.[14]

Brooks et al proposed that total thyroidectomy has increase complication rate and did not decrease the incidence of local or nodal recurrences and disease related deaths. There was also no difference in survival. Thus, these authors concluded that lobectomy is as effective as total thyroidectomy for differentiated thyroid carcinoma. Authors, in favour of lobectomy, also recommend that if a contralateral focus of cancer becomes clinically significant in case of papillary carcinoma, completion thyroidectomy can be performed easily at a later date.[8]

Total thyroidectomy is recommended in high risk patients, bilateral disease, larger tumours with extra-thyroidal extension, multicentricity and vascular invasion.[1,5,8,16,17] Total thyroidectomy is effective in eliminating local disease such as multicentric bilateral tumour foci and avoids recurrence of cancer in the contralateral lobe. It also prevents the remote possibility of anaplastic transformation of a remaining focus of cancer in the opposite lobe. Most importantly total thyroidectomy facilitates the detection and ablation of metastatic disease with postoperative radioactive iodine therapy, which has been shown to decrease recurrence and prolong survival.[8] A significant trend towards total thyroidectomy for low-risk differentiated thyroid carcinoma is present in the United States after a paradigm shift from treatment of macroscopic disease to the treatment of macroscopic and microscopic disease increasingly sensitive tests. Compelling arguments for thyroid Lobectomy and total throidactomy for low-risk thyroid cancer remain.[18]In present study lobectomy was done in 8 patients, isthmusectomy in 2 patients, lobectomy with isthmusectomy in 42 patients, near total thyroidectomy in 3 patients and total thyroidectomy in 8 patients. Correlating clinical picture with FNAC and logical use of thyroid malignancy short of surgery and at the same time preventing patients from being addressed to a potentially avoidable operation.[19]

The second criterion was adopted in this study for treating the thyroid malignancy based upon FNAC diagnosis and operative findings. Three patients with malignant cytology and 8 patients with suspicious cytology were treated by lobectomy + isthmusectomy initially. Histopatholoy report in 5 patients out of 8 confirmed malignancy and they were then subjected to completion total thyroidectomy. Completion thyroidectomy for thyroid malignancy should be performed either within 10 days of the primary operation or after 3 months to reduce the incidence of complications. In one study it was concluded that there is not definite impact of the timing of surgery on the rate of complications after completion thyroidectomy.[20] In our study, all the 3 patients who showed malignant cells on FNAC and clinically and peroperatively were also in favour of malignancy were treated by total thyroidectomy. No international consensus exists about what precisely constitutes a low-risk or high –risk tumor. Established indications for less than total thyriodectomy include small (< 1 cm), unifocal and non-metastatic papillary thyroid carcinoma and minimally invasive follicular thyroid carcinomas.[24] Formal neck dissection was avoided in this study, because of clinical absence of lymph node metastasis. For node-positive thyroid cancers, compartment oriented microdissection is the gold standard, whereas the concept of prophylactic lymph node dissection continues to arouse controversy. Most experts agree that routine lymph node dissection is un necessary for low-risk well-differentiated thyroid cancer.[21] Cervical lymoh node metastasis conferred independent risk in all patients with follicular carcinoma, and

in those patients with papillary carcinoma aged >45 years, but did not affect survival in patients with papillary carcinoma <45 years.[22]No patient had recurrence in the follow up period of about two years. Whether the survival rate in patients having lobectomy + isthmusectomy is the same as in total thyroidectomy is unclear due to less number of patients in this study and short period of follow up. All the patients were on thyroxine suppression and radioiodine therapy, and showed high success rates as are observed with this type of adjuvant therapy.Surgical complications were infrequent. Wound infection is an unusual complication after thyroid surgery. It was found in 2 patients (3.17%) in this study. Hypocalcemia needing calcium supplements occurs in 2 – 11% of patients in different studies.[23,24] Two patients (3.17%) developed hypocalcemia which was transient and recovered by calcium supplements in this study. Inspiratory stridor due to involvement of intrinsic laryngeal muscles may precede tetany in post-operative patients.[25] In this study 1 patient (1.58%) developed tetany postoperatively. Sorethroat, hoarsness of voice, laryngeal edema and stridor are the complications of extubation.[25] In this study, 3 patients (4.76%) developed hoarseness of voice postoperatively. The incidence of recurrent laryngeal nerve injury ranges from 1.5 – 5%.[25] The rate of recurrent laryngeal nerve palsy is much lower in solitary nodules whether solid or cystic.[26] In this study 1 patient (1.58%) developed unilateral paralysis of vocal cords after thyroid surgery.

CONCLUSION

Solitary thyroid nodule is a common surgical problem. The frequency of malignancy in cold nodule thyroid was 12.3% in this study. Different types of thyroid carcinomas found in this study are; papillary carcinoma 62.5%, follicular carcinoma 25% and medullary carcinoma 12.5%. In this study, thyroid carcinomas are found commonly in middle aged group and more frequently in females. No recurrence or metastasis found in the follow-up period. Hence this study recommended the total thyroidectomy as a procedure of choice for thyroid carcinoma. Lymph node dissection should be performed only if they are clinically involved. Surgical excision for malignancy should be followed by thyroxine and radioactive iodine therapy, because, some of the differentiated thyroid carcinomas are dependent on TSH.

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