

# To Determine the Frequency of Malignancy in Solitary Nodule of Thyroid in ENT, Head and Neck Surgery Department at Civil Hospital Karachi

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## ABSTRACT

**Objective:** To determine the frequency of malignancy in solitary nodule of thyroid.

**Study Design:** Observational / Descriptive study.

**Place and Duration of Study:** This study was conducted in the Department of Otolaryngology and Head and Neck Surgery at Civil Hospital Karachi from January 2007 to July 2008.

**Materials and Methods:** This study comprises of 70 cases, in one and half years. We have included all cases of solitary nodule of either sex more than 10 years and excluded those patients who were exposed to radiation or underwent any sort of neck surgery previously. All Patients with solitary thyroid nodule were investigated with routine hematological and biochemical tests, thyroid profile, thyroid Scan, ultra sound neck and FNAC in outpatient department. At admission all risks/benefits of surgical procedures were explained to patients. Post-operative histopathological report of specimen was compared with preoperative fine needle aspiration cytology.

**Results:** In our 70 cases study 59 patients were diagnosed with benign and 11 with malignant disease. Papillary carcinoma was found the most common tumor in 63.63%.

**Conclusion:** Papillary carcinoma is the most common tumor in solitary thyroid nodule in our study followed by follicular carcinoma.

**Key Words:** Solitary thyroid nodule, FNAC, Papillary carcinoma

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## INTRODUCTION

Thyroid nodules have been defined by the American Thyroid Association (ATA) as "discrete lesions within the thyroid gland, radiologically distinct from surrounding thyroid parenchyma."<sup>1</sup> Thyroid nodules are common, their prevalence being largely dependent on the identification method. The estimated prevalence by palpation alone ranges from 4% to 7%,<sup>2,3</sup> whereas ultrasound detects nodules in 20% to 76% of the adult population,<sup>3,4</sup> particularly with the current use of high-resolution ultrasound techniques.<sup>5</sup> The reported frequencies detected by ultrasound correlate with the prevalence reported at surgery and autopsy with ranges between 50% and 65%.<sup>6</sup> Majority of patients with STN are in between 30 to 35 years.<sup>7</sup> The importance of STN lies in the increase risk of malignancy in various studies from 5% to 20%.<sup>7</sup>

STN were seen in both sexes, but four to six times more commonly in females.<sup>8</sup> The gender disparity is perhaps explained by the hormonal influences of both estrogen and progesterone, as increasing nodule size and new nodule development have been demonstrated to be related to pregnancy and multiparity.<sup>9</sup> Papillary carcinoma is more common histological type of thyroid cancers followed by follicular, medullary, anaplastic, non-Hodgkin lymphoma and unclassified tumors in order of frequency<sup>10</sup>. Number of investigations include thyroid function test, thyroid ultrasound and thyroid scan are being used to distinguish between benign and malignant STN but none of them is found to be very sensitive, and specific.<sup>11</sup> Fine-Needle Aspiration biopsy is considered to be the "Key investigation" in evaluation of STN.<sup>12</sup> If this is performed with perfection can guide exact extent of surgery in various thyroid lesions<sup>13</sup>. FNAC also provide knowledge of cancer cell type which aid in the planning of surgical procedures.<sup>14</sup> FNAC can easily be performed and accepted by patients and has low cost benefit ratio. If the sample is not diagnostic can easily be repeated.<sup>15</sup> FNAC is also very safe and highly accurate in evaluation of thyroid nodule in childhood.<sup>16</sup>

The main purpose of this study is to know the frequency of malignancy in solitary thyroid nodule so the surgical procedure can be planned accordingly.

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## MATERIALS AND METHODS

This is a observational / descriptive study and conducted in the department of otolaryngology and Head and Neck Surgery at Civil Hospital Karachi from January 2007 to July 2008. In the one and half year 70 patients were admitted with STN. We have included all cases of solitary nodule of either sex, more than 10 years and excluded those patients who were exposed to radiation or any sort of neck surgery previously. Thyroid profile, thyroid Scan, ultra sound neck and FNAC was carried out in outpatient department. At admission risk/benefit were explained to the patient and informed written consent was taken regarding whole management. Post-operative histopathological report of specimen was compared with preoperative cytology.

Data analysis was done using SP10.0 version. No inferential test was applied as it is a descriptive study. Histopathology is taken as a gold standard investigation to distinguish between benign and malignant lesions among the solitary nodule included in study. Frequency of malignancy in solitary thyroid nodule also calculated on histopathological basis.

## RESULTS

Seventy cases of this study included 12 male and 58 female (table: 1). Female to male ratio was 4.8:1. Age range for our patients was observed between 12 to 70 years. Mean patient age was 36.6 years. Thyroid profile (table: 2) reported 67 patients with euthyroid and three hyperthyroid where these hyperthyroid after making them euthyroid, were operated. Thyroid scan (table: 3) revealed malignancy observed in all patients of cold nodule. Ultrasound (table: 4) was also performed in all patients where 8 patient were of solid, 2 of complex and 1 of cystic nodule found with malignancy. Fine needle aspiration cytology was also performed in all the cases where 61 patients (87.14%) were reported with benign disease, 8 patients (11.4%) with malignant and 1 patient with suspicious cytology.

Histopathological results revealed that 59 patients (84.28%) were having benign nodular disease and only 11 patients (15.71%) with malignant disease. Frequency of malignancy (table: 5) was calculated which revealed papillary carcinoma in 7 patients, anaplastic in 2 patients, hurthle cell in 1 patient and medullary carcinoma in 1 patient.

In this study malignancy was noticed in 2 male patients and 9 female patients. Out of the 2 males, 1 patient was having medullary carcinoma and other reported with papillary carcinoma. Among 9 female patients, 6 patients presented with papillary, 2 had follicular and 1 patient had hurthle cell carcinoma. None of patients presented with anaplastic carcinoma in this series.

**Table No. 1: Sex distribution of 70 cases**

| S. No | Sex    | No of patients | Percentage |
|-------|--------|----------------|------------|
| 1     | Male   | 12             | 17.14%     |
| 2     | Female | 58             | 82.85%     |

**Table No. 2: Thyroid Function Test**

| Sr. No | Thyroid Function Test | No of Patients | Percentage |
|--------|-----------------------|----------------|------------|
| 1      | Hyperthyroid          | 3              | 4.28       |
| 2      | Hypothyroid           | 0              | 0          |
| 3      | Euthyroid             | 67             | 95.71      |

**Table No. 3: Thyroid Scan (Tc99) finding**

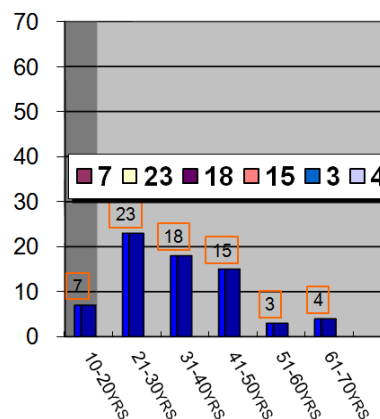
| S. No | Type of nodule | No of Patients | Malignant Benign |            | %age of total no of patients |
|-------|----------------|----------------|------------------|------------|------------------------------|
| 1     | Cold           | 66             | 11 (16.6%)       | 55 (83.3%) | 94.3%                        |
| 2     | Hot            | 4              | 00               | 4          | 5.7%                         |
| 3     | Warm           | 00             | 00               | 00         | 00%                          |

**Table No.4: Thyroid Ultra Sound Finding**

| S. No | Nature of nodule | No of Patients | Malignant  | Benign     | %age of total No of Patients |
|-------|------------------|----------------|------------|------------|------------------------------|
| 1     | Solid            | 43             | 08 (18.6%) | 35 (81.3%) | 61.4%                        |
| 2     | Cystic           | 19             | 01 (5.26%) | 18 (94.7%) | 27.14%                       |
| 3     | Complex          | 8              | 02 (25%)   | 06 (75%)   | 11.4%                        |

**Table No. 5: Frequency of malignancy in solitary nodule of thyroid**

| S. No | Types of malignancy | No of patients | Percentage |
|-------|---------------------|----------------|------------|
| 1     | Papillary           | 07             | 63.63      |
| 2     | Follicular          | 02             | 18.18      |
| 3     | Hurthle cell        | 01             | 9.09       |
| 4     | Medullary           | 01             | 9.09       |
| 5     | Anaplastic          | 00             | 00         |



**Graphic presentation of solitary nodule in various age groups.**

## DISCUSSION

Solitary thyroid nodule (STN) is a common thyroid disorder. Clinically recognized thyroid carcinoma constitutes less than 1% of human malignant tumors. The risk of malignancy in solitary thyroid nodule is

greater than other thyroid swelling. The risk of malignancy in generalized thyroid swelling is about 3% and in solitary thyroid nodule it is about 15% to 25% in literature<sup>17</sup>. Many studies are available in the literature for effectiveness of different investigations for accurate diagnosis of solitary thyroid nodule. Unfortunately, none of the investigation is found to provide accurate diagnosis in every case except FNAC (which is also having false positive as well as false negative results).

In our study female to male ratio is 4.8:1. Mean patient age is 36.6 years and most common site of solitary thyroid nodule is right lobe of thyroid which is similar to that of Iqbal A et al.<sup>18</sup> while Lumachi F et al, observed female to male ratio 4.1:1 and mean age was 44 years.<sup>19</sup>

We noticed swelling in front of neck as the most common presentation followed by pressure symptoms, similar types finding were noticed by Waseer MA et al study<sup>20</sup>. In comparison Zuberi LM et al study, observed that solitary thyroid nodule presented in 58.7% as a "neck swelling"<sup>21</sup>.

Thyroid scan have 100% sensitivity in our study because all malignant lesion detected on histopathology were cold nodules. However 56 patients (80%) detected with cold nodules had benign disease. In comparison Greisens O studies where scintigraphy was carried out in almost all the patients where 75% had a cold nodule<sup>22</sup>. Similarly, in another study the sensitivity of scan in the detection of thyroid cancer was 95.8% was observed.<sup>23</sup>

In contrast radionuclide perfusion study was done by Sharma R et al who considered it useful to differentiate benign from malignant cold thyroid solitary nodules with high degree of sensitivity (95%) and specificity (87.9%).<sup>24</sup> Our opinion regarding thyroid scan is that it provides little information regarding types of lesion. Kussam TA also stressed the limited role of thyroid scans in the initial workup of a solitary thyroid nodule<sup>25</sup>.

The ultrasonic assessment of solitary nodule of thyroid in this study showed that malignancy was observed in 72.72 % in solid, 9.09% in cystic and 18.18% in complex nodules. In contrast to our results Ahmed I et al reported malignancy in 27.4% of solid nodules, 8.3% in the cystic nodules and 16.67% in mixed nodules<sup>26</sup>. However ultrasound is not helpful in clearly differentiating between benign and malignant lesion. Some others studies also identified the limited role of ultrasound in evaluation of STN.

Fine needle aspiration cytology is widely accepted as the most accurate, sensitive, specific and cost-effective diagnostic procedure in the assessment of thyroid nodule and help to select the patients preoperatively for surgery. In this study, sensitivity for cytological diagnosis of FNAC is 72.72%, specificity 99.08% positive predictive value 88.1%, negative predictive value 95% and diagnostic accuracy 94.2%. By Comparison to a local study Bukhari MH et al, reported sensitivity of FNAC as 90%, specificity 87.5%, and accuracy 87%, while positive predictive value (PPV)

was 93% and negative predictive value (NPV) was 79.5%.<sup>27</sup>

On histopathology we found 69 patients (84.28%) were having benign nodular disease and only 11 patients (15.71%) had malignant disease. Our results are according to international results which are between 4.7-18.3%<sup>28</sup>. In contrast to a local study, Ahmed M et al malignancy was seen in only 5 cases (4.4%) out of 113 patients. It was seen both in cold (4.6%) as well as in warm (4.4%) nodules.<sup>29</sup>

Frequency of malignancy is calculated in our study where we noticed papillary carcinoma in 7 patients (63.6%), follicular carcinoma in 2 patients (18.8%), medullary carcinoma in 1 patient (9%) and huthle cell carcinoma in 1 patient (9%). Similar results were reported by Virk MA et al, where papillary carcinoma was seen in 62.5% cases.<sup>30</sup> In contrast, in Ahmed I et al study incidence of cancer in solitary nodule of thyroid was reported 23.7%.<sup>31</sup> Papillary carcinoma constituted 57.9% of the malignancy, follicular carcinoma was, 21%, anaplastic carcinoma was 15.78% and lymphoma 5%.<sup>31</sup> Another study which depicts frequency of malignancy in solitary nodule are papillary, follicular and anaplastic carcinomas. Papillary carcinomas had the highest frequency of 73.7%, followed by follicular and anaplastic carcinomas with the frequency of 20% and 6.7% respectively.<sup>32</sup> one more study similar to our results where, out of 19 malignant cases, 12(63.16%) were papillary carcinoma, 5(26.31%) were follicular carcinoma and 2(10.53%) cases were medullary carcinoma.<sup>32</sup>

## CONCLUSION

We concluded that solitary thyroid nodule is dangerous for reasonable risk of malignancy. It should be properly investigated. FNAC is having marvelous role in pre-operative patients. In various studies although incidence of malignancy in solitary nodule varies but regarding to frequency of thyroid gland tumors, papillary carcinoma remained most common tumor in literature, as we have also reported in this study.

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

## REFERENCES

1. Cooper DS. Revised American Thyroid Association management guidelines for patients with thyroid nodules and differentiated thyroid cancer. *Thyroid* 2009;19 (11):1167–214.
2. Singer PA, Cooper DS, Daniels GH, et al. Treatment guidelines for patients with thyroid nodules and well-differentiated thyroid cancer. American Thyroid Association. *Arch Intern Med* 1996; 156 (19):2165–72.
3. Mazzaferri EL. Management of a solitary thyroid nodule. *N Engl J Med* 1993; 328 (8):553–9.
4. Tan GH, Gharib H. Thyroid incidentalomas: management approaches to non-palpable nodules

- discovered incidentally on thyroid imaging. *Ann Intern Med* 1997; 126 (3):226–31.
5. Guth S, Theune U, Aberle J, et al. Very high prevalence of thyroid nodules detected by high frequency (13 MHz) ultrasound examination. *Eur J Clin Invest* 2009; 39 (8):699–706.
  6. Mortensen JD, Woolner LB, Bennett WA. Gross and microscopic findings in clinically normal thyroid glands. *J Clin Endocrinol Metab* 1955;15 (10):1270–80.
  7. Mazaffer EL. Management of solitary thyroid nodule. *N Eng J Med* 1993; 328:553-9.
  8. Daniels GH. Thyroid nodules and nodular thyroid: a clinical overview. *Compr Therapy* 1996;22: 239-50.
  9. Shah SH, Muzaffar S, Soomro IN, Hasan SH. Morphological pattern and frequency of thyroid tumors. *J Pak Med Assoc* 1999; 49: 131-3.
  10. Kung AW, Chau MT, Lao TT, et al. The effect of pregnancy on thyroid nodule formation. *J Clin Endocrinol Metab* 2002;87(3):1010–4.
  11. Bandhauer F. Incidental ultrasound detection of thyroid nodule, what next? *Schweiz Med Wochenscher* 2000;116 Suppl: 66-9.
  12. Polyzos SA, Kita M, Averamidis A. Thyroid nodules-stepwise diagnosis and management. *Hormones Athens* 2007; 6(2):101-19.
  13. Mazzani SJ, Rosen G, Luboshitzky R, Sharam M. Management of benign nodules based on the finding of fine needle aspiration. *J Otolaryngol* 2000;29:95-7.
  14. Chadwick DR, Harrison BJ. The role of fine needle aspiration cytology and frozen section histology in the management of differentiated thyroid cancer. The UK experience. *Langenbecks Arch surg* 1998; 383:164-6.
  15. Pisani T, Bonani M, Nagar C, Angelini M, Bezzili M, Vichione A. Fine needle and core needle biopsy techniques in the diagnosis of nodular thyroid Pathologies. *Anticancer Res* 2000;3893-7.
  16. Alshaikh, Npgan B, Daneman A, Daneman D. Fine needle aspiration biopsy in the management of thyroid nodules in children and adolescents. *J Pediatr* 2001;138:140-2.
  17. Khan SA, Gafur MA, Khan MK, Karim MR, Mohiuddin M, Islam MS. Pattern of malignancy in clinically solitary thyroid nodule. *Mymensingh Med J* 2012 Jan; 21(1):1-7.
  18. Iqbal A, Ismail M, Israr M, Ali N, Zaman J. Management of solitary thyroid nodule. *J PMI* 2005; 19(1):30-35.
  19. Lumachi F, Borsato S, Tregnaghi A, Marino F, Poletti A, et al. Accuracy of fine needle aspiration cytology and frozen section examination in patients with thyroid cancer. *Biomed Pharmacother* 2004; 58 (1):56-60.
  20. Waseer MA, Hussain R, Malik MA. Role of FNAC. Solitary nodule of thyroid; *PROF* 2001;8 (2):251-256.
  21. Zuberi LM, Yawar A, Islam N, Jabbar A. Clinical presentation of thyroid cancer patients in Pakistan AKUH experience. *J Pak Med Assoc* 2004; 54(10):526-8.
  22. Greisen O. A nodule in the thyroid gland. Preoperative examinations and treatment analysis of 990 cases. *Ugesker Laeger* 2003 3;165 (10):1031-4.
  23. Lumachi F, Varotto L, Borato S, Tregnaghi A, Zucchetta P, Marzola MC, et al. Usefulness of 99mTc-pertechnetate scintigraphy and fine-needle aspiration cytology in patients with solitary thyroid nodules and thyroid cancer. *Anticancer Res* 2004;24(4):2531-4.
  24. Sharma R, Mondal A, Sahoo M, Kakar A, Shankar LR, et al. Role of radionuclide perfusion study in cold solitary thyroid nodule for diagnosis of malignancy: a complimentary diagnostic modality to fine needle aspiration cytology. *J Assoc Physicians Ind.* 1999;47(5):488-91.
  25. Kassum TA, Goldstein DP, Rafferty MA, Rotstein LE, Irish JC. Thyroid scintigraphy in the assessment of the solitary thyroid nodule: differences in practice patterns between family physicians and specialists. *J Otolaryngol* 2007;36 (1):49-53.
  26. Ahmed I, Malik LM, Ashraf M. Pattern of Malignancy in Solitary Thyroid Nodule. *Biomedica* 1999;15:39-42.
  27. Bukhari MH, Niazi S, Hanif G, Qureshi SS, Munir M, et al. An updated audit of fine needle aspiration cytology procedure of solitary thyroid nodule: *Diagn Cytolopathol* 2008;36(2):104-12.
  28. Stojanovic D, Radovenovic D, Caparevic Z, Jakoljevic-Stojanovic M, et al. Occurrence of carcinoma in solitary thyroid nodules. *Acta Chir Iugosl* 2003;50(3):47-50.
  29. Ahmad M, Ahmad M, Malik Z, Janjua SA. Surgical audit of solitary thyroid. *J Pak med Assoc* 2000;2(3): 107-11.
  30. Virk MN, Azeem M, Abbar M, Cheema LM. The Pattern of Thyroid Disease in Non-Toxic Solitary Thyroid Nodule *Ann King Edward Med Coll* 2001; 7 (3):245-6.
  31. Sabel Ms, Staren ED, Gianakakis LM. Effectiveness of thyroid scans in the evaluation of solitary thyroid nodule. *Am J Surg* 1997; 63:660-3.
  32. Sushel C, Khanzada TW, Zulfikar I, Samad A. Histopathological pattern of Diagnosis in patients undergoing thyroid operations. *RMJ* 2009;34 (1):14–16.
  33. Khan SA, Ghafur MA, Khan MK, Karim MR, Mohiuddin M, Islam MS. Pattern of malignancy in clinically solitary thyroid nodule. *Mymensingh Med J* 2012 Jan; (1):1-7.