

Role of USG guided FNAC in case of solitary thyroid nodule

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Abstract

Background: The most common presentation of thyroid carcinoma is solitary thyroid nodule and only 10% of clinically apparent solitary thyroid nodule is cancerous. On investigation, many apparently solitary thyroid nodules will be shown to be part of a multinodular goitre. The solitary thyroid nodule was managed primarily by resection keeping in mind the potential risk of malignancy. But as all solitary thyroid nodules are not malignant, there is always good reason to manage these patients conservatively. **Methods:** I have studied 20 patients. The patients were taken from the indoor and OPD of the Department of ENT and Head-Neck Surgery, Darbhanga Medical College and Hospital. The period of the study was between June 2017 and May 2018. **Results:** Formulate a management plan of solitary thyroid nodule on the basis of the report of USG guided FNAC as the prime investigation. This investigation as a routine basis. It was done in those cases where there was a strong suspicion of malignancy on FNAC. We did thyroid scan in total 5 cases and all these cases were found to have cold nodules. 4 cases were seen to be malignant. **Conclusion:** I have particularly given my attention to the clearly benign reports while doing USG guided FNAC. It was a very high accuracy rate and a low false negative report as well. So, USG guided FNAC when done properly by an experienced cytopathologist can reliably formulate the management plan of solitary thyroid nodule.

Key Word: solitary thyroid nodule.

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Received Date: 20/12/2018 Revised Date: 12/01/2019 Accepted Date: 01/02/2019

DOI: <https://doi.org/10.26611/1016921>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:
03 February 2019

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.”¹ They may be discovered by palpation during a general physical examination or with radiographic studies performed for medical evaluations, such as carotid duplex ultrasound (US), computed tomography (CT) scans, magnetic resonance imaging (MRI) studies, or 18FDG-PET

scanning. The latter entities are called “thyroid incidentalomas” and they generally do not correspond to palpable thyroid lesions. Conversely, clinicians may identify palpable thyroid lesions that do not correspond to distinct radiological entities, and therefore would not be defined as thyroid nodules.² Thyroid nodules are common, their prevalence being largely dependent on the identification method. The estimated prevalence by palpation alone ranges from 4% to 7%,^{3,4} whereas US detects nodules in 20% to 76% of the adult population,^{5,7} particularly with the current use of high-resolution US techniques.⁷ The reported frequencies detected by US correlate with the prevalence reported at surgery and autopsy with ranges between 50% and 65%.⁸ The estimated annual incidence of thyroid nodules in the United States is approximately 0.1% per year, conferring a 10% lifetime probability for developing a thyroid nodule.⁶ Thyroid nodules are 4 times more common in women than men and their frequency increases with age and low iodine intake.⁴ 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.^[9,10] Exposure to ionizing radiation, either during childhood, or as an occupational exposure, will cause a rate of development of thyroid nodules of 2% per year, reaching a peak incidence in 15 to 25 years.^{11,12} Thyroid nodules are clinically important for several reasons. They may cause thyroid dysfunction and, rarely, compressive symptoms, but they are primarily important because of the need to exclude thyroid cancer. The reported prevalence of malignancy in thyroid nodules evaluated by biopsy ranges from 4.0% to 6.5% and is largely independent of the nodule size.^{13,14} Despite this, papillary microcarcinomas (smaller than 1 cm) incidentally found at the time of surgery are much more common (up to 36%),^{15,1+6} but it is controversial whether or not a survival benefit exists with the diagnosis and treatment of such entities, given their generally benign course^{17,18} Importantly, the incidence of thyroid nodules discovered incidentally during 18FDG-PET imaging is small (1%–2%), but the risk of malignancy may be as high as 27%, thus such nodules require immediate evaluation.¹⁹ The predictive value of these ultrasound characteristics is highly variable across the literature. Microcalcifications and abnormal cervical lymph nodes probably have the highest predictive values for thyroid cancer (up to 94% and 100% respectively), although their sensitivity is generally low (26% and 5% respectively)^{21,22}. Microcalcifications seen as punctate echogenicities are due to calcified psammoma bodies typical of papillary thyroid cancer. They can be difficult to distinguish from colloid but the presence of comet-tail artifacts associated with colloid crystals may be helpful²⁰. The association of macrocalcifications with thyroid cancer is less consistent²². However, recent data suggest that coarse calcifications and disrupted peripheral or “eggshell” calcifications are also markers of increased cancer risk²³

METHODS

I have studied 20 patients. The patients were taken from the indoor and OPD of the Department of ENT and Head-Neck Surgery, Darbhanga Medical College and Hospital. The period of the study was between June 2017 and May 2018. The patients with solitary thyroid nodule of both sexes and all age groups. The nodules which were small, difficult to palpate and deeply seated were particularly chosen. The Geographical distribution of the patients was kept in mind specially the Iodine deficient areas. The cases of multinodular goiters were excluded from our study. Detailed history of the patient's illness, any history of radiation exposure, the familial background particularly in respect of thyroid carcinoma was taken which was followed by thorough clinical examination

with special reference to the age and sex, any pressure signs, whether there was any change of voice or not, eye signs etc. Local examination of the thyroid in reference to the position, size and shape of the nodule, transmitted pulsation, movement with swallowing, fixity to the skin or deeper structures, etc. was done. We assessed the functional status of the thyroid clinically. Routine blood test, chest X-Ray, urine and stool examination, ECG was done in order to assess the general condition of the patient.

RESULTS

I had USG guided FNAC in all the cases. First detect the nature of the solitary thyroid nodule whether it is solid or cystic. Out of 20 cases of thyroid nodule 12 nodules were cystic where as 8 thyroid nodules were solid in consistency. One case of papillary carcinoma shows cystic change in solid thyroid nodule.

Table 1: Age and Sex Distribution

Age group (in years)	No. of cases	Female	Male
0 – 15	1	1	0
16 – 25	3	2	1
26 – 35	5	6	1
36 – 45	7	5	2
46 – 55	1	1	0
56 – 65	2	1	1
66 – 75	1	0	1
Total	20 (100%)	16 (80%)	4 (20%)

The most of the patients in our study were middle aged females. So, in this study 80 % patients were females where as 20% patients were males.

Table 2: Signs and Symptoms

Associated signs and symptoms	No. of Patients
Hoarseness of voice	4 (20%)
Lymph node involvement	2 (10%)

The associated symptoms were hoarseness of voice (4 patients), lymph node involvement (2 cases) All these 2 symptoms are in favour of malignancy. There was no pain or obstructive symptoms like dysphagia. Here to mention that the selected patients with small solitary thyroid nodules.

Table 3: USG guided FNAC

Result	No. of Patients
1. Malignant	
a) Papillary Ca	3
b) Anaplastic Ca	1
2. Benign	
a) Colloid nodule	10
3. Follicular neoplasms	6
Total	20

On USG guided FNAC, 4 cases were diagnosed as clear malignant lesion, out of this 3 were papillary Ca and 1 was anaplastic Ca. FNAC can not differentiate between

follicular adenoma and follicular Ca. 16 cases out of 20 were diagnosed as colloid nodule. 6 cases were detected in FNAC as follicular neoplasms that include both follicular adenoma and follicular Ca. Histopathological examination is needed to find out capsular and vascular invasion, the hallmark of follicular Ca.

Table 4: Histopathological report

Repoft of HPE	No. of cases
1. Malignant	
a) Papillary Ca	2
b) Anaplastic Ca	2
2. Benign	
a) Colloid nodule	9
b) Follicular adenoma	7
Total	20

I have managed 9 cases with a conservative approach on the basis of the USG guided FNAC report (all were colloid nodule). I have also considered the size of the nodule. The nodules were small in all these cases. So, we are slowly changing the trend of the surgery of the solitary thyroid nodules towards a conservative approach with a meticulous follow up. This was one of the aims of our study. In this study 4 out of 20 cases were found to be malignant. Among 16 female patients 3 cases were found to be malignant (18.7%) where as 1 out of 4 male patients were seen to have a malignancy (25%). The overall malignancy rate is 20.0%.

DISCUSSION

The most of the patients in our study were middle aged females. So, in this study 80 % patients were females where as 20% patients were males. Chart review identified a total of 85 patients with 101 thyroid nodules meeting the inclusion criteria. Seventy-two patients (84.7%) were female. The mean age was 55 (95% confidence interval [CI], 52.3 to 57.6). Patient ages ranged from 23 to 76, with a median age of 55. Fifty-four patients underwent total thyroidectomy, 27 underwent hemithyroidectomy, and four underwent completion thyroidectomy. Fifteen patients (17.6%) had thyroid cancer on final pathology (including incidental microcarcinomas)²⁴. Forty-nine nodules (48.5%) were located in the left lobe, 51 (50.5%) in the right lobe, and one in the isthmus. The mean nodule size was 53.6 mm (95% CI, 51.6 to 55.6). The median nodule size was 52 mm (range, 40 to 90). Information on nodule consistency was available for 94 nodules. Of these, 40 nodules (42.6%) were solid, 53 (56.4%) were complex, and one was cystic. FNAC was performed on 90 patients (89.1%). The distribution of the FNAC was 7.8% nondiagnostic, 68.9% benign, 10% AUS/FLUS, 10% suspicious for follicular neoplasm/follicular neoplasm, 2.2% suspicious for malignant disease (category 5), and 1.1% malignant²⁴. In this study, the associated symptoms were hoarseness of

voice (4 patients), lymph node involvement (2 cases) All these 2 symptoms are in favour of malignancy. There was no pain or obstructive symptoms like dysphagia. Here to mention that the selected patients with small solitary thyroid nodules. On USG guided FNAC, 4 cases were diagnosed as clear malignant lesion, out of this 3 were papillary Ca and 1 was anaplastic Ca. FNAC can not differentiate between follicular adenoma and follicular Ca. 16 cases out of 20 were diagnosed as colloid nodule. 6 cases were detected in FNAC as follicular neoplasms that include both follicular adenoma and follicular Ca. Histopathological examination is needed to find out capsular and vascular invasion, the hallmark of follicular Ca. I have managed 9 cases with a conservative approach on the basis of the USG guided FNAC report (all were colloid nodule). I have also considered the size of the nodule. The nodules were small in all these cases. So, we are slowly changing the trend of the surgery of the solitary thyroid nodules towards a conservative approach with a meticulous follow up. This was one of the aims of our study. In this study 4 out of 20 cases were found to be malignant. Among 16 female patients 3 cases were found to be malignant (18.7%) where as 1 out of 4 male patients were seen to have a malignancy (25%). The overall malignancy rate is 20.0%. In other study, recent meta-analysis fourteen studies with 5439 thyroid lesions (727 malignant) were included and diagnostic value of ultrasound markers of malignancy was evaluated²⁵. Strongest predictors for malignancy were taller than wide shape, irregular margins and microcalcification (OR, 13.7, 7.2 and 7.1, respectively), while hypoechogenicity and intranodular flow were moderate predictors of malignancy (OR, 3.2 and 4.3, respectively). Reported pooled sensitivity and specificity for hypoechogenicity were 68.7% (95% CI, 58.8%-82.6%) and 60.3% (95% CI, 53.4%-68.2%), and for microcalcifications 44.1% (95% CI, 37.9%-51.3%) and 75.9% (95% CI, 70.3%-82%), respectively. When compared to our results, similar sensitivity and specificity were obtained for the former (70.2% and 67.7%, respectively), while for the latter sensitivity was lower and specificity higher (25.5% and 90.3%, respectively). We could assume that presence of microcalcification might had not always been correctly assigned and had led to different diagnostic performance of this feature. Large meta-analysis with fifty-two observational studies and 12786 nodules was conducted to evaluate the diagnostic performance of ultrasonographic features for thyroid malignancy²⁶. While sensitivity of ultrasonographic features associated with malignancy was rather low as in our study (26.7% to 63%, in our study 25.5% to 70.2%, respectively), four features showed relatively high specificity-microcalcifications, central vascularisation, irregular

margins, and a taller than wide shape (87.8%, 78%, 83.1%, and 96.6%). Our results regarding specificity are in quite agreement with these figures, and we found highest specificity for microcalcifications and central vascularisation (90.3% for both). Diagnostic performance of fine needle aspiration cytology (FNAC) in the present study was in concordance with previous reports²⁷. Its sensitivity remains a problem even when experienced operator and cytopathologist are involved in the procedure. In the present study 8 patients with benign cytology had malignant histology. The role of ultrasonographic findings is therefore important in selection of nodules for biopsy and special caution is recommended in cases where ultrasound suspicious nodules yield benign cytology results. Lesions of undeterminate significance/follicular neoplasia (AUS/FLUS, Bethesda Category III) are problematic from diagnostic and therapeutic aspect. From 8 nodules with this cytologic characterization two had malignancy (25%), and the remaining six were benign. Lately Ho *et al.* reported malignancy rates of 26.6%-37.8% for AUS/FLUS nodules²⁸, which are higher than the predicted risk in the previous studies that ranged from 5-15%^{28,29}.

CONCLUSION

The comparison of pre-operative USG guided FNAC report with that of the post-operative histopathology report have re-evaluated the scope of FNAC in the clinical setting of solitary thyroid nodule and tried to formulate a management plan. Awareness of the suspicious ultrasound features is mandatory in order to optimize diagnostic and therapeutic approach to vast number of patients with thyroid nodules. When compared with post-operative histopathology report, it can be concluded that USG guided FNAC can guide the course of management of "Solitary Thyroid Nodule".

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Source of Support: None Declared
Conflict of Interest: None Declared

