ORIGINAL ARTICLE

Role of Ultrasonography in Papillary Thyroid Carcinoma Diagnosis

BAKHT TAJ[1], ZAFAR AYAZ[2], SHUMAILA SHAKOOR[3], MAHEEN SAAD[4], MYRA TAHIR[5],TALHA LAIQUE[6*],
[1]*Department of ENT, DHQ Hospital, Daggar Buner-Pakistan*
[2]*Department of ENT, DHQ Teaching Hospital, Timergara-Pakistan*
[3]*Department of Anatomy, Lahore Medical and Dental College, Lahore-Pakistan*
[4]*Department of Biochemistery, Fazaia Medical College, Islamabad-Pakistan*
[5]*Department of Radiology, CMH, Sialkot-Pakistan*
[6]*Department of Pharmacology, Lahore Medical and Dental College, Lahore-Pakistan*
Correspondence to Dr. Talha Laique, Assistant Professor of Pharmacology Email: talhalaique51@gmail.com Tel:+92-331-0346682

ABSTRACT

Papillary thyroid carcinoma (PTC) accounts roughly 75% cases of total thyroid malignant tumors. **Purpose:** To access the diagnostic accuracy of ultrasound in nodular papillary thyroid carcinoma. **Study Design:** Cross-sectional study. **Methodology:** Patients (n=153) having thyroid nodules were enrolled to conduct the present study at Department of Otorhinolarynogology Khyber Teaching Hospital, Peshawar-Pakistan for 6 months keeping confidence interval 95%,and 9% margin of error. Enrolled patients were informed and consent was taken. **Statistical analysis:** Mean ± SD for age whereas frequency and percentage were given for gender and type of nodules was given by SPSS version 20. Significant p-value was of ≤0.05. **Results:** The mean age of patients was 49 ± 2.13 years. Majority patients (74%) had multinodules while 26% patients had solitary nodules. Sensitivity of ultrasound as a diagnostic tool in our study was 75% whereas specificity was 92%. **Conclusion:** Thyroid ultrasound is a relatively an accurate modality for diagnosing Papillary thyroid carcinoma. **Keywords**: Ultrasonography, Papillary Thyroid Carcinoma and Imaging Modality.

INTRODUCTION

Thyroid cancer is the most common malignancy of endocrine glands. It affects approximately one in every fifty Pakistani. Any thyroid nodule raises the suspicion of malignancy among subjects of any age[1]. Papillary thyroid carcinoma (PTC) is the most common thyroid malignancy accounting roughly 75% cases of total thyroid malignant tumors. Majority of thyroid nodules are benign but new nodules are always screened to rule out malignancy[2]. Effective screening with the help of different imaging modalities like ultrasound, computer tomography, magnetic resonance imaging etc can help in early correct diagnosis as well as its therapeutic management thereby declining its mortality and morbidity rate[3].

In early developmental phase of goiter, thyroid gland is highly vascular and diffused. With time, it not only grows but also forms small nodules. Thyroid gland may be single or multi-nodular. These nodules occur in 4-7% of the adult population globally.[4] With high resolution ultrasonography technique, they are detected in almost half of subjects over 40 year of age as reported by literature review.

The risk factors for the development of these nodules include increasing age, iodine deficiency, previous radiation exposure and taking diet containing carcinogenic material.[5] Literature review revealed the fact that radiation exposure to a child at any age results in thyroid dysfunction while increasing the chances for the development of either benign or malignant thyroid nodules[1].

If nodule is malignant than imaging studies define its extent as well as find non-palpable masses if present. Their findings alter the therapeutic approach. Thyroid ultransonography is used as a first line diagnostic investigation for detecting and characterizing nodular thyroid disease globally.[6] Micro calcification is the most important indicator of papillary thyroid carcinoma on ultrasonography. Otherwise aggressive biopsy is done to detect cancer in thyroid tissue. It is an invasive procedure.

Due to the high incidence of thyroid cancer among our Pakistani population but limited data available regarding its diagnosis due to limited resources, we planned the current study to assess the the diagnostic accuracy of ultrasound in nodular papillary thyroid carcinoma.

The objective of the study was to assess thyroid ultrasound in nodular papillary thyroid carcinoma as a diagnostic tool.

METHODOLOGY

Patients (n=153) having thyroid nodules were enrolled to conduct the present study at Department of Otorhinolarynogology, Khyber Teaching Hospital, Peshawar-Pakistan keeping confidence interval 95%,and 9% margin of error after Hospital's Ethical Committee approval for 6 months. Consent was taken from patients. The ultrasound was done while characteristics of thyroid tissue including solid echo structure, hypoechogenicity, fine or micro clarification, and ill-defined margin, were recorded as papillary carcinoma. After surgical excision of the thyroid nodule, the specimen was sent for histopathological examination. Patients with both genders having thyroid nodule were included in present study. Patients who failed to give informed consent, have thyroid abscess and pregnant females were excluded.[7]

Statistical analysis: Mean±SD for age whereas frequency and percentage were given for gender and type of nodules was given by SPSS version 20.

RESULTS

Among 153 enrolled patients, age and gender distribution was summarized in Table-1.

Among 153 enrolled patients, thyroid nodule distribution was presented as frequency and percentage (%) in Table-2.

Diagnosis of Papillary thyroid cancer by ultrasound and histopathology was presented as frequency and percentage (%) in Table-3.

Summary of findings on ultrasonography as well as histopathology were summarized in table 4 below. 74 patients appeared true positive whereas 69 patients were true negative on both MRS and histopathology**.**

Table-1: age and gender distribution among enrolled patients

Age distribution (years)	**Frequency**	**% age**
21-30 years	**9**	**6**
31-40 years	**31**	**20**
41-60 years	**100**	**65**
Above 60 years	**13**	**9**
Mean±SD	49 ± 2.13 Years	
Gender distribution		
Male	26	17
Female	127	83
Total	**153**	**100**

Table-2: Thyroid nodules distribution among enrolled patients

Type of thyroid nodules	**Frequency**	**% age**
Solitary nodule	**40**	**26**
Multinodules	**113**	**74**
Total	**153**	**100**

Table-3: Diagnosis of papillary thyroid cancer by Ultrasound and histopathology

PTC by ultrasonography	**Frequency**	**% age**
Yes	55	36
No	98	64
PTC by histopathology		
Yes	130	85
No	23	15
Total	**153**	**100**

Table 4: Summary of finding on ultrasonugraphy as well as histopathology

USG	**Histopathology^{++}**	**Histopathology--**	**Total**
Positive	48	7	55
USG Negative	82	16	98

Sensitivity of ultrasound as a diagnostic tool in our study was 75% whereas specificity was 92%.

DISCUSSION

In our study the incidence of multinodule was more 74% as compare to solitary nodules 26%. Moreover ultrasonic had detected 36% cases of papillary carcinoma while according to Histopathological reports a total of 85% cases were recorded in which papillary carcinoma was diagnoses. Similar results were observed in study done by Chan BK et al[8] in which the incidence of multinodule was 76% and solitary nodules were 24%. Forty percent cases of papillary carcinoma were deleted by ultrasound while sixty precent cases were recorded by histopathological reports.

In our study the correlation of ultrasonic findings versus histopathological findings was analyzed and had been concluded that although the ultrasound findings in diagnosis of papillary carcinoma are not accurate as compare to histopathological results but it can help to predict the papillary carcinoma in some extant. In this study 55 diagnosed cases of ultrasound, histpathological report has shown 48 cases in which papillary carcinoma was present and in 7 cases the papillary carcinoma not found. Similarly in 98 undiagnosed cases of ultrasound, histopathological report has shown 82 cases in which papillary carcinoma was present and in 16 cases the papillary carcinoma not found. Similar observation were recorded in other studies done by Chan BK et al, Wienke JR et al[8,9].

Our study shows that sensitivity and specificity of papillary carcinoma was analyzed as sensitivity was 75%, specificity was 92%. Similar results were found in study done by Wienke JR et al[9] in which sensitivity of papillary carcinoma was 76%, specificity was 91%, Positive predictive value was 85% and Negative predicative value was 84%. Simillary results were also observed in another study conducted by Frates MC et al[10] in which sensitivity of papillary carcinoma was recorded as 74%, specificity was recorded as 93%, Positive predictive value was 82% and Negative predicative value was 81%.

CONCLUSION

Thyroid ultrasound is a relatively an accurate modality for diagnosing Papillary thyroid carcinoma and has dramatically improved our skills of its correct diagnosis.

Acknowledgements: I am thankful to Allah and all my colleagues for their help.

Limitations: Our study had several limitations like financial constraints and fewer resources.

Conflict of interest: None

Funding: None

REFERENCES

1. Bron LP, O' Brien CJ. Total thyroidectomy for clinical benign disease of thyroid gland. Br J Surg 2004;91(5):569-74.
2. Muller PE, Kabus S, Robens E, Spelsberg F. indications risks and acceptance of total thyroidectomy for mulitnodular benign goiter. Surg 2001;31:958-62.
3. Colak T, AKCA T. Total versus subtotal thyroidectomy for the management of benign multinodular goiter in an endemic region. ANZ J. Surg. 2004;74:974-78.
4. Shah SSH, Khan A. Assessment of the complications of total thyroidectomy. J. Surg. Pak Int 2005;10(3):23-89.
5. Misiolek M, Waler J, Namyslowski M, Podwinski A, Czecior E. Recurrent laryngeal nerve palsy after thyroid cancer surgery a larngological and surgical problem. Eur Arch Otohinolaryngol 2001;258:460-62.
6. Hisham AN, Azlina AF, Aina EN, Sarojan A. Total thyroidectomy: the procedure of choice for mulitnoduar goiter. Eur J Surg 2001;167(6):403-5.
7. Palazzo FF, Sywak MS, Sidhu SB, Baraclough BH, Delbridge LW. Parathyroid autotransplantation during total thyroidectomy. Does the number of glands transplanted affect outcome. World J. Surg. 2005;29:629-31.
8. Chan BK, Desser TS, McDougall IR,Weigel RJ, Jeffrey RB. Common and uncommon sonographic features of papillary thyroid carcinoma. J Ultrasound Med 2003;22(10):1083–90.
9. Wienke JR, Chong WK, Fielding JR, Zou KH, Mittelstaedt CA. Sonographic features of benign thyroid nodules: interobserver reliability and overlap with malignancy. J Ultrasound Med 2003;22 (10):1027–31.
10. Frates MC, Benson CB, Doubilet PM, Cibas ES, Marqusee E. Can color Doppler sonography aid in the prediction of thyroid nodules? J Ultrasound Med 2003;22(2):127–31.