



ORIGINAL RESEARCH PAPER

Radio-diagnosis

CLINICAL CORRELATION BETWEEN ULTRASONOGRAPHIC FINDINGS & NECK SWELLING

KEY WORDS: Neck Swelling, Thyroid Nodules Ghengha Ultrasonography.

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ABSTRACT

Present study is based upon 26 thyroid swellings and 24 cases of nonthyroid swellings (cervical lymphadenopathy with or without abscess transformations, parotid abscess, thyroglossal cyst, epidermal inclusion cyst and submental lipoma). Female dominance was observed. Main clinical presentation was swelling of various sizes at different sites. Pain was in few cases only. Ultrasonography revealed various nodules of hypoechoic texture in both varieties of thyroid pathology. Calcification was seen in three of the cases. Peripheral & intralesional vascularity was seen on color doppler study in papillary thyroid swelling. Nonthyroid group presented with a variety of features as described in detail in text. Literature supported our observations in majority of cases. FNAC and/or postoperative histopathology confirmed the diagnosis in all the cases.

INTRODUCTION:

Neck swelling is a quite common problem among the rural population. Thyroid pathology is common amongst the neck swellings and "Ghengha" a general name is given to this swelling in regional population. Many of these remain asymptomatic but with advancement of age of pathologies, they may become symptomatic i.e. pain & tenderness. The diagnosis is established on real time B-mode Ultrasonography with 5–7.5 MHz linear transducer with color doppler setting; Though CT & MRI may also be employed but Ultrasonography is relatively cheap, readily available tool even at a small medical setup. Other neck pathologies could be cervical lymphadenopathy, thyroglossal cyst, epidermal inclusion cyst, Parotid abscess, Submental lipoma etc. These also may be nicely evaluated on Ultrasonography.

MATERIAL & METHODS:

The present study was undertaken in the department of Radio-diagnosis, Heritage Institute of Medical Sciences, Varanasi between the period of July, 2017 to May, 2018. Patients with suspected neck swelling were referred from OPD & IPD of different department of the especially ENT.

All together 50 cases of neck swelling were investigated, majority with suspected thyroid lesions.

Short history was taken and USG done with 5.0 / 7.5 MHz linear probe on Wipro GE Logiq E9 machine on B scan and color Doppler technique Sonographic findings were interpreted and correlated together with clinical findings followed by confirmation on histopathology where ever possible.

Finally the data was tabulated, statistically analysed and conclusions were drawn.

OBSERVATIONS:

Present study consists of 50 cases of neck swelling divided in thyroid swelling (26 cases) and nonthyroid swelling (24 cases).

Sex and Age incidence are presented in table 1:

Thyroid Group (26 Cases)			Nonthyroid Group (24 Cases)		
Age	No. of Cases		Age	Total No. of Case	
	Male	Female		Male	Female
1 – 20 Yrs.	x	01	1 – 20 Yrs.	x	01
21 – 30 Yrs.	x	06	21 – 30 Yrs.	03	04
31 – 40 Yrs.	03	06	31 – 40 Yrs.	03	06
41 – 50 Yrs.	02	03	41 – 50 Yrs.	01	02
51 – 60 Yrs.	01	01	51 – 60 Yrs.	01	02
61 – 70 Yrs.	01	01	61 – 70 Yrs.	x	x
71 – 80 Yrs.	x	x	71 – 80 Yrs.	x	x
81 – 90 Yrs.	1	x	81 – 90 Yrs.	01	x
	08	18		09	15

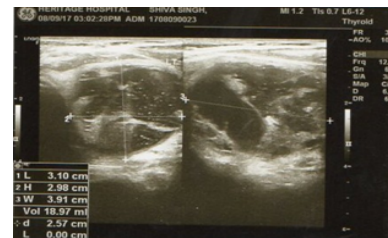
Majority of thyroid pathologies were in 3rd, 4th & 5th decade of life with female dominance as shown in Table 1. Similarly, same Table 1 again shows female dominance in 3rd decade of life amongst

nonthyroid pathologies. Majority of cases were having complaint of gradually increasing neck swelling for variable duration.

Table 2: Reveal no. of various types of neck swelling with possible diagnosis on ultrasound. Majority were confirmed on biopsy and / or post surgery and they are described in Table 2 with respective illustrations.

Swelling	No. of cases:
Thyroid Swelling:	
Thyroid colloid goitre	20
Malignant thyroid nodule	06
Nonthyroid Swelling:	
Thyroglossal cyst	03
Epidermal inclusion cyst	02
Cervical lymphadenopathy	16
Parotid mass	02
Submental lipoma	01
Total	50

Twenty cases of colloid goitre forms a major group. On Ultrasonography both lobes were involved (9 cases), right lobe enlargement (4 cases) and left lobe enlargement (7 cases). Multinodular lesion of hypoechoic echotexture seen in all the cases with focal area of solid echo. Increased peripheral color flow picture is seen in 18 cases. Tiny calcification are noticed in 3 cases. All the cases were proved to have colloid goitre on FNAC examination.

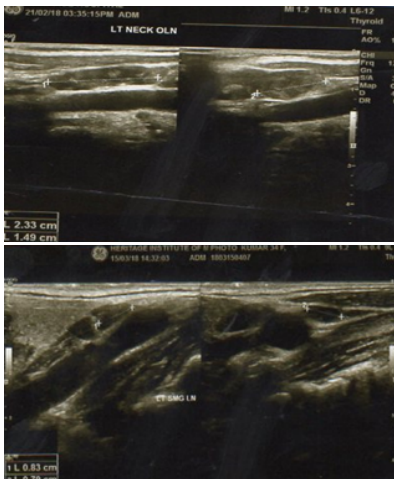


Six cases of papillary carcinoma thyroid recorded in this study. They revealed heterogeneous echotexture in enlarged left lobe in 4 cases while right lobe was involved in 2 cases. Peripheral as well as intralesional vascularity was seen in all the cases. None had evidence of calcification. Papillary carcinoma was diagnosed, later on confirmed on FNAC examination.

Three cases of thyroglossal cyst were encountered. They presented with cystic lesion in midline. Also there were internal debris of coarse echotexture. Vascularity was absent. Diagnosis was finally established on surgery.



Sixteen cases of lymphnodal enlargement in cervical region were seen, majority having hypoechoic echotexture while 5 cases showed anechoic lesion suggestive of abscess. They had suppurative bacterial infection on content microscopic evaluation.



Two cases of parotid mass seen involving left side gland presenting as circumscribed hypoechoic rounded masses with a lobulated distinct border with posterior acoustic enhancement with minimal vascularity.



One case of Submental lipoma revealed a soft painless swelling in submental region with poor density on plain X-ray. On ultrasound, heterogeneous echogenicity without abnormal vascularity or calcification was seen.



DISCUSSION:

Thyroid pathologies:

One of the thyroid swelling is colloid nodule which is non-neoplastic benign nodule within thyroid gland and forms vast majority of nodular thyroid disease (Bell et al....). On ultrasound,

these lesions have iso to hypoechoic echotexture.

There may be internal cystic or heterogeneous change or calcification. There might be present of multiple echogenic foci (of inspissated colloid) with comet tail artifact (Brant et al 2012).

Multinodular goitre:

Multinodular goitre are an enlarged thyroid gland due to multiple nodules which may have normal, decreased or increased (toxic nodule) function.

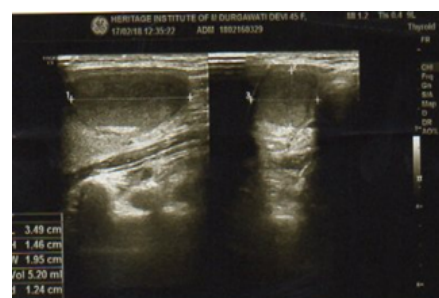
It is more common in females in the age group of 35 – 50 years of age range. There may be nodular enlargement in midline of neck and they may be euthyroid. On ultrasound various described and observed features are iso or hyperechoic lesion with surrounding hypoechoic halo – sometimes sponge like or honeycomb pattern is also seen in our study. Hyperfunctioning nodule on color doppler examination revealed peripheral vascularity and/or intra-nodular vascularity suggested the probability of malignant lesion. To differentiate benign and malignant lesion ultrasound plays an important role. Benign lesions show large cystic component with hyperechoic solid areas, peripheral halo and comet-tail artifact, while malignant lesions show large hypoechoic solid (more than one cm need fine needle aspiration) areas, intranodular blood flow and microcalcification.

Hoshimoto's Thyroiditis (chronic lymphocytic thyroiditis) is an autoimmune disease leading to destruction of gland and hypothyroidism. 20 cases of colloid goitre in our study predominantly occurred in females over 40 years of age.



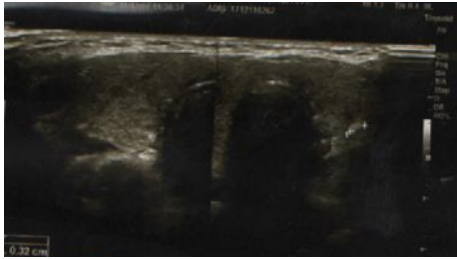
In Children, hypothyroidism results in growth failure and results in delayed puberty. Clinically, there is painless enlarged gland. Ultrasound exhibits focal or diffuse glandular enlargement with coarse heterogeneous and hypoechoic echopattern. Slight to marked increased vascularity is noticed.

Small atrophic gland represents end stage disease. Benign and malignant changes may co-exist. Perithyroidal satellite lymphnode (Delphian node) just cephaled to isthmus is seen in form of associated feature.



Grave's Disease:

Grave's disease is an autoimmune disease having evidence of thyrotoxicosis. Women of 20 – 50 years of age show on ultrasonogram a diffusely enlarged thyroid (2-3 times of its normal size), hypoechoic & heterogeneous in nature. Extensive intra thyroid blood flow, spectacular "Thyroid inferno" is a characteristic on Doppler study.



Thyroid Malignancies:

Thyroid malignancies are classified into papillary, follicular, medullary, poorly differentiated, anaplastic type. Thyroid lymphoma, squamous cell thyroid carcinoma and sarcoma of thyroid are other types reported in the medical Journal also.

The papillary and follicular types together are classified as differentiated thyroid carcinoma and have favourable prognosis than medullary and undifferentiated type. Papillary thyroid cancer is most common type of thyroid cancer (75 – 85% of all thyroid cancer cases). Mostly seen in 30 – 50 years of age with female: male ratio 3:1. These are well circumscribed, isolated and less than 2.5 cm in young people. Neck lymphnodes may be affected. Presence of lymphnodes in some of these cases are important and they are enlarged lymphnodes with altered architecture, small calcification within lymphnode, disorganized or irregular blood flow and asymmetric lymphnodes compared with other side. These may be asymptomatic or having pain. On USG solid, irregular or cystic mass seen originating from normal thyroid tissue.

NONTHYROID SWELLING GROUP:

Thyroglossal Cyst:

Thyroglossal cyst is a fibrous cyst that forms from a persistent thyroglossal duct. These cysts can be defined as an irregular neck mass or a lump which develops from cells and tissues left over after the formation of thyroid gland during development stage. It is seen as midline neck mass located caudal (below) to hyoid bone. However can occur along the path of thyroglossal duct from base of tongue to the suprasternal notch (Goel et al...). Other common causes of midline neck masses include lymphadenopathy, dermoid cyst & various odontogenic anomalies (Goacchini 2015). Lump usually moves during swallowing or sticking the tongue out. The lump may not be apparent until few years of birth, later on they become infected and swollen. Other features may be hoarseness of voice, troubled breathing or swallowing. Mucus may drain out near cyst on opening the mouth, tender near the area of cyst or redness of skin around the area of cyst. Normally thyroid gland develops at bottom of tongue & travels through the thyroglossal duct to take its place in neck, just below the larynx. When duct does not go away completely, the cells from left over duct tissue can leave an opening that becomes filled with pus fluid or gas & takes a shape of cyst.

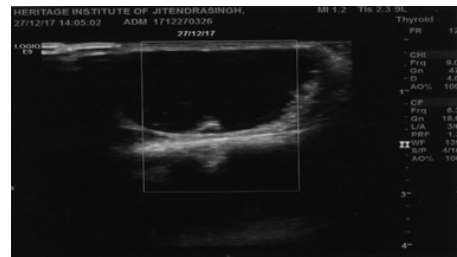


Epidermoid Inclusion Cyst:

Also known as Epidermoid cyst and epidermal inclusion cyst. They represent proliferation of squamous epithelium within a confined space in dermis or subdermis. Usually they are found incidentally

but they may present as a firm nontender lump. When they rupture, their necrotic debris mimics infection. Besides face, neck it may also appear over scalp, trunk & back.

Malignant change occur as squamous cell carcinoma. Ultrasound reveals ovoid to spherical lesion in 70%, lobulated in 20% and tubular shape in 8% of cases. Small lesion shows anechoic cyst but bigger lesion may be heterogeneous. Usually these lesions are vascular in nature (Sharued et al.....).



Cervical lymphadenopathies:

Size:

Inflammatory and malignant lymphnodes are larger in size than metastasis which involve small nodes. Therefore size of lymphnode does not contribute to any definitive diagnosis.

Shape:

Malignant and tubercular lymphnodes are usually round in shape with a short axis to long axis ratio is ≥ 0.5 while reactive and normal nodes are long or oval shaped. Eccentric cortical hypertrophy (focal intra nodal tumor infiltration is useful to identify malignant nodes).

Nodular border:

Malignant and lymphomatous nodes have a sharp border. Reactive and normal nodes show unsharp border (shozushima et al 1990). Sharp borders are due to tumor infiltration & reduced fatty deposits within lymphnodes which increase the acoustic impedance difference between lymphnode & surrounding tissue. Tubercular lymphnodes have unsharp borders due to edema & inflammation of surrounding soft tissue (peradenitis).

Echogenic Hilus:

Echogenic hilus is a normal sonographic feature of normal cervical lymphnodes (86%), seen in large nodes. Metastatic, lymphomatous & tubercular nodes have absent hilus. However presence or absence of echogenic hilus is not sole criteria in diagnosis.

Echogenicity:

Normal, reactive, lymphomatous & tubercular nodes are hypoechoic in comparison to adjacent muscles. Metastatic nodes are usually hypoechoic except for matastasis from papillary carcinoma of thyroid which is hyperechoic.

Calcification:

Intranodal calcification is a rare finding in cervical lymphnodes. 50-69% of metastasis from papillary carcinoma of thyroid shows calcification which is punctuate, peripherally located & may show acoustic shadowing. This is also present in lymphomatous & tuberculous nodes after treatment. These calcifications are usually dense and produce acoustic shadowing.

Intranodal necrosis:

Intranodal necrosis is a pathognomonic feature and of two types: Coagulation necrosis and cystic necrosis (more common). Coagulation necrosis is seen as intranodal echogenic focus whilst cystic necrosis appears as an echolucent area. Cystic necrosis is commonly found in tuberculous nodes, metastatic nodes from squamous cell carcinoma & papillary carcinoma of thyroid.

Additional findings:

Soft tissue oedema appears as a diffuse hypoechoic area with loss of fascial planes. Matting is another finding seen as clumps of multiple abnormal lymphnodes with abnormal intervening soft

tissues. These observations are common in tubercular pathologies and are due to periadenitis of nodes.

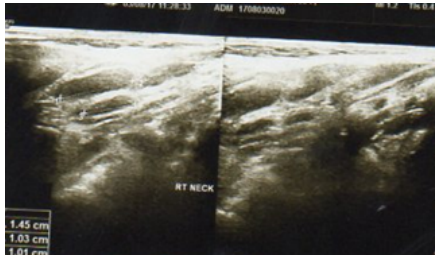
Vascular Pattern:

Vascularity are present as hilar vascularity or a vascularity in normal and reactive lymphnode while metastatic nodes show peripheral or mixed vascularity (lymphomatous nodes). Peripheral vascularity is highly suspicious of malignancy.

Vascular pattern in tuberculous pathology simulates both benign & malignant condition. Intranodal vascularity & peripheral vascularity are common in tubercular nodes.

Vascular Resistance:

Metastatic nodes have higher RI & PI than reactive nodes.

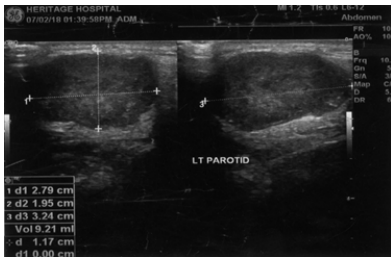


Parotid Mass:

Two cases in present study. FNAC proved pleomorphic adenomas. Pleomorphic adenomas are usually hypoechoic, well defined lobulated lesions that may contain calcifications.

Warthin's tumors are oval, hypoechoic lesions, often contain anechoic areas and hypervascularised.

Malignant neoplasms have irregular borders, blurred margins and inhomogeneous structure (Ewa J. Bialek, Wleslaw Jakubowski et al).



Submental Lipoma:

Submental lipoma is a benign tumor composed of mature adipocysts usually seen in adults. They are subcutaneous in location, soft, painless, usually encapsulated and of fat content. 5 – 15% of patients may have multiple lesions. Associated pathology could be Cowden syndrome, proteus syndrome, Familial multiple lipomatosis and Bannayan – Zonana syndrome etc.

Summary and Conclusion:

This study is based upon 50 cases of neck swelling out of which 26 cases were of thyroid gland pathology and 24 cases were of nonthyroid group of pathology. In thyroid group twenty cases of nonmalignant like colloid goitre, hashimoto's thyroiditis and six cases of papillary carcinoma of thyroid noted.

24 cases of nonthyroid swelling included cervical lymphnodal pathology (16 cases), thyroglossal cyst (3 cases), Parotid abscess (2 cases), Epidermal inclusion cyst (2 case), submental lipoma (1 case), Ultrasonography made presumptive diagnosis in all the cases which were proved on biopsy or post surgery. Enlargement of gland with iso, hypo, hyperechoic texture, with or without calcification, intralesional vascularity or peripheral vascularity were found on ultrasound examination. Therefore it is concluded that high resolution ultrasound with color Doppler imaging technique is very good for assessment of these pathologies. However precise histopathological diagnosis is established on or after FNAC / Post surgical histopathology.

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Reference:

1. Gioacchini, FM: Clinical presentation and treatment outcomes of thyroglossal duct cyst: a systemic review. *Intenational J. of oral & Maxillofacial surgery* 44 (1) 119 – 126, 2015.
2. Suzanne falck 2017. <http://www.healthline.com/health/thyroglossal-duct-cyst>.
3. Shozushima M, Suzuki M, Nakasima T, Yanagisawa Y, Sakamaki K, Takeda Y. Ultrasound diagnosis of lymph node metastasis in head and neck cancer. *Dentomaxillofac Radiol* 1990;19:165-70.
4. Ahuja A, Ying M. An overview of neck node sonography. *Invest Radiol* 2002;37:333-342.
5. Chang DB, Yuan A, Yu CJ, Luh KT, Kuo SH, Yang PC. Differentiation of benign and malignant cervical lymph node with color Doppler sonography. *Am J Roentgenol* 1994;162:965-8.
6. Solbiati L, Charboneau JW, Osti V, James EM, Hay ID. The thyroid gland. In: Rumack CM, Wilson SR, Charboneau JW, editors. *Diagnostic Ultrasound*. 3rd ed. Vol. 1. St. Louis, Missouri: Elsevier Mosby; 2005. Pp. 735 – 70.
7. Hoang JK, Lee WK, Lee M, Johnson D, Farrell S. US Features of thyroid malignancy: Pearls and pitfalls. *Radiographics*. 2007; 27:847-60. [PubMed].
8. JunP, Chow LC, Jeffrey RB. The sonographic features of papillary thyroid carcinomas: pictorial essay. *Ultrasound Q* 2005;21 (1): 39-45 [Medline](#).
9. SWu, GLiu, YGuan: Role of ultrasound in the assesment of benignninty and malignancy of parotid masses, *Dentomaxillofac Radio* 2012 Feb; 41 (2), 131-135.
10. Bell D.J.; Weerekkody Y: Colloid nodule (Thyroid). *Radiopedia.org*.
11. Goel A, Gaillard F: Thyroglossal duct cyst. *Radiopedia.org*.