

# ULTRASONOGRAPHIC EVALUATION; NECK MASSES

ORIGINAL  
PROF-2033

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**ABSTRACT... Objectives:** To assess common presenting complaints and the role of ultrasound in evaluating neck masses in pediatric and adult population. **Design:** Cross sectional. **Setting:** Khyber X-Ray, 7 Khyber Medical Centre, Dabgari Gardens, Peshawar. **Period:** July 2011 to December 2011. **Material and Methods:** Data from patients presenting for evaluation of a neck mass was analyzed for presenting complaints and ultrasound findings according to objectives of the study. **Results:** In total 105 cases were included in the study. The mean age of patients was 36.8 years with a male to female ratio of 1:2.1. The age wise categorization included pediatric population (10.5%) adult population (89.5%). Both painful and painless neck swellings were common presenting complaints in pediatric population with cervical lymphadenopathy being the most common ultrasound finding. Among Adult males painless neck swelling was the most common presenting complaint with cervical lymphadenopathy followed by Multinodular goiter being most common ultrasound findings. Most common presenting complaint in Adult females was painless neck swelling with Multinodular goiter being most common ultrasound finding. **Conclusions:** Neck Masses are commonly encountered in all age groups especially pediatric population and adult females, Ultrasound is a useful and safe modality in evaluation of neck masses.

**Key words:** Neck, imaging, ultrasound, Doppler, salivary glands, Thyroid

## INTRODUCTION

Imaging for neck masses is frequently performed in a routine radiology practice. It is a significant need of some specialties and subspecialties e.g. Pediatrics, Pediatric Surgery, Head & Neck surgery and Endocrinology. Ultrasound is a useful imaging modality for imaging of neck masses. It is able to provide ample details about the mass including location, size, consistency, adjacent structural involvement, associated cervical lymphadenopathy if any<sup>1</sup>.

Majority of patients presenting for neck imaging have thyroid disorders however other causes of neck masses are also frequently encountered in clinical practice. They can be broadly classified into infectious, inflammatory, neoplastic, lympho-vascular, immunologic and congenital on basis of their etiology<sup>2</sup>.

Despite of recent advances in imaging of neck masses including CT scan, Magnetic Resonance Imaging and Elastography, ultrasound retains its significance as a quick & cheap modality without involvement of ionizing

radiation<sup>3-5</sup>. Hence it is often the first step in evaluation of a neck mass. Its use is significant in different types of neck masses including thyroid, salivary glands, deep neck space infections, lymphomas etc. Use of High resolution transducers and Doppler Ultrasound further helps in differentiating cause of a neck mass<sup>1</sup>.

The aim of this study was to assess the common presenting complaints in patients with Neck mass and common ultrasound findings upon evaluation of these patients.

## MATERIALS AND METHODS

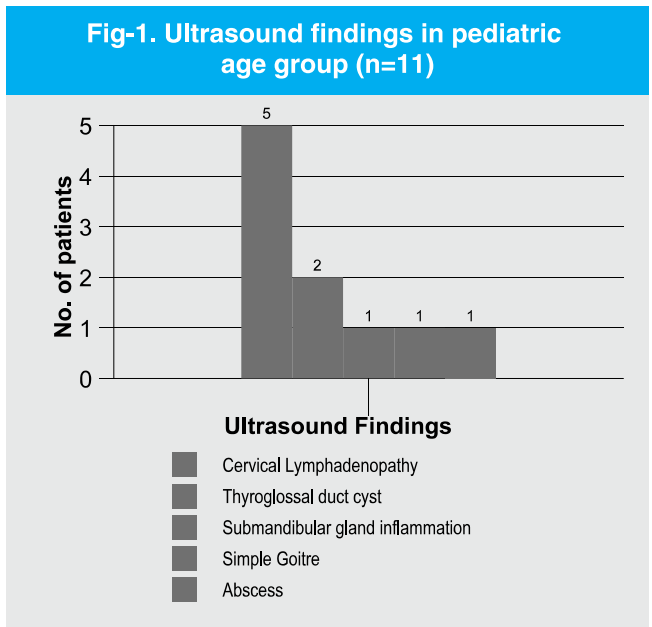
This study is a record based cross sectional study carried out from August 2011 to December 2011. The site for this study was Khyber X Rays, Khyber Medical Centre, Peshawar. Most of the patients were referred by services of General Surgery, Otolaryngology and Head & Neck Surgery, Pediatric Surgery and Pediatrics. A detailed history of presenting complaints was obtained prior to conducting ultrasound examination. All patients were evaluated by Toshiba Nemio 20 ® Doppler ultrasound

scanner with 4.2MHz frequency transducer later proceeding to 11 MHz frequency. Color Doppler was frequently used in evaluating thyroid pathologies. Results were recorded in a standardized Microsoft Excel spreadsheet. SPSS (version 17) statistical software was used for data analysis. Statistical analysis was mainly done using prevalence ratios.

**RESULTS**

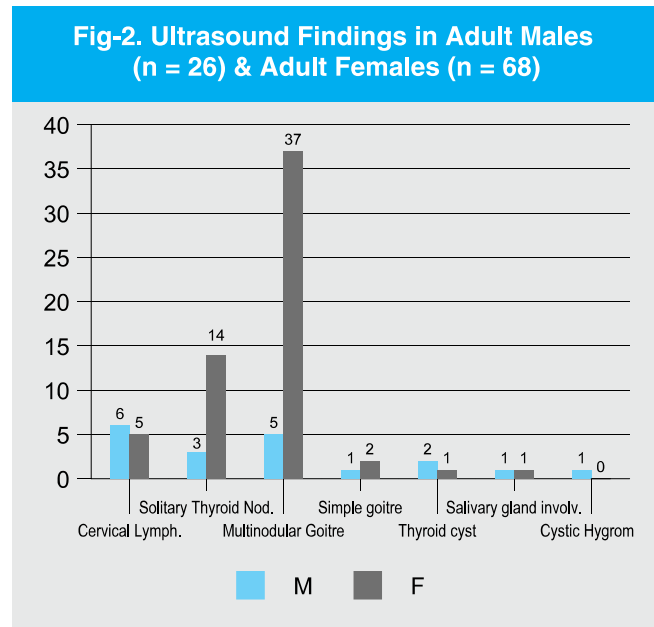
A total of 105 cases were included in the study. The total number of male patients was 34 and number of female patients was 71 giving a male to female ratio of 1: 2.1. The average age of cases came out to be 36.8 years.

Among the pediatric age group (age 16 or less), total number of patients was 11 (10.5% of total). Painful and painless swelling in neck was common presenting complaint each with 5 cases. One patient presented with discharging sinus from neck. Upon evaluation ultrasound findings included cervical lymphadenopathy with 5 cases, thyroglossal duct cyst with 2 patients, submandibular gland inflammation, goiter and deep neck space abscess with 1 case each. (Figure: 1).



Adult male patients (age greater than 16 years) group comprised of 26 patients (24.8% of total). Painless neck swelling was the most common presenting complaint with 19 cases followed by painful neck swelling in 5 patients. Upon evaluation cervical lymphadenopathy

was the most common ultrasound finding with 6 cases followed by Multinodular goiter with 5 cases. 3 patients had solitary thyroid nodule, thyroid cysts and submandibular gland inflammation were present in 2 patients followed by cystic hygroma (mentally challenged patient) and solid mass (lymphoma) with one case each. (Figure: 2).



Total number of adult female patients was 68. Most common presenting feature in this age group was painless neck swelling with 28 followed by painful neck swelling in 27, known history of hypothyroidism in 4, dysphagia in 2, hoarseness in 2 and difficulty breathing in one case respectively. Ultrasound examination revealed Multinodular goiter to be most common cause of neck mass with 37 cases followed in order by solitary thyroid nodule (14 cases), cervical lymphadenopathy (5 cases), thyroid cyst (one case) and submandibular gland inflammation (one case). (Figure: 2)

**DISCUSSION**

The average age of patients in our study was 36.8 years with a male to female ratio of 1:2.1. This ratio corresponded well with figure quoted by Iqbal et al. (1:2.8)<sup>6</sup>.

10.5% of cases belonged to pediatric population. Among them 45.5% were found to have cervical

lymphadenopathy upon ultrasound examination. Cervical lymphadenopathy is a relatively common finding in this age group as is usually caused by transient infections and sometimes malignancy especially lymphomas<sup>7</sup>. 2 patients (among 11 in this age group) were found to have thyroglossal duct cyst. Ultrasound is useful in detection of cyst as well as commenting on position of thyroid gland before undertaking definitive surgery i.e. Sistrunk's procedure<sup>2,8</sup>. One case in this age group had neck abscess. Common reported causative organisms of neck abscesses are pyogenic bacteria, mycobacterium tuberculosis and atypical mycobacteria<sup>9</sup>. Rossler et al. found ultrasound to be helpful in diagnosis of laryngeal disorders in children e.g. subglottic Hemangioma<sup>10</sup>. Ultrasound is also reported as first line investigation in diagnosis of parotitis which is a frequently encountered problem in pediatrics. Sodhi et al. from India reported infectious, inflammatory congenital and neoplastic causes as etiology of neck mass in children. Similar picture was observed in our study as well<sup>1</sup>.

Among adult patients, thyroid disorders were the most common cause of a neck mass. Ultrasound is usually the first imaging modality in evaluation of solitary thyroid nodule as well as Multinodular goiter<sup>11</sup>. Ultrasound guided fine needle aspiration cytology (FNAC) is reported to be safe procedure with complication rate of less than 0.7% which can largely be attributed to direct visualization with image guidance<sup>12,13</sup>. Thyroid nodules are reported to be benign 90% of time however ultrasound facilitates in differentiating benign versus malignant thyroid nodules<sup>6</sup>. As described by Anil et al. ultrasonographic features suggesting malignancy in a thyroid nodule include presence of calcification, irregular margins, hypoechogenicity in a solid nodule and chaotic vascularity. Spongiform cystic and well defined nodules are usually of benign nature<sup>14-18</sup>. The Thyroid Imaging Reporting and Data System (TIRADS) is a quality assurance tool for validating ultrasound of thyroid gland and was found to have a sensitivity of 95% and specificity of 65%<sup>19</sup>.

Doppler ultrasound is also reported to be useful tool in evaluation of benign versus malignant salivary gland mass. As mentioned by El Khateeb et al. Doppler

ultrasound indices of Resistivity index > 0.7, Pulsatility index > 1.2 and Peak systolic velocity > 44.3 should raise concern of malignancy in a salivary gland mass<sup>20</sup>. However in our study all salivary gland masses were of inflammatory or infectious nature.

## CONCLUSIONS

Thyroid disease constituted the bulk of patients with neck masses. Ultrasound is a quick, useful and cost effective modality in evaluation of neck masses in all age groups.

## ACKNOWLEDGMENTS

The authors would like to acknowledge efforts of Mr. Abdul Khaliq Umair in process of manuscript preparation.

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Article received on: 28/06/2012

Accepted for Publication: 12/10/2012

Received after proof reading: 05/11/2012

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**Article Citation:**

Siddiqui EH, Siddiqui S, Rasool G, Shah N. Ultrasonographic evaluation; neck masses. Professional Med J Dec 2012;19(6):890-893.

## PREVIOUS RELATED STUDIES

- **Ejaz Hussain Siddiqui, Saad Siddiqui, Abdul Munim, Noreen Shah.** Urolithiasis; presentation and ultrasonographic evaluation (Original) Prof Med Jour 18(3) 380-385 Jul, Aug, Sep 2011.