EVALUATION OF PAROTID GLAND LESIONS BY HRUSG IN ADULTS AND CORRELATION WITH FNAC FINDINGS

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ABSTRACT

BACKGROUND
With the advent of high-resolution ultrasound, evaluation of superficial soft tissue structures has become very easy. Parotid gland being a superficial structure is easily amenable for high resolution ultrasound evaluation. And in the same sitting, a guided FNAC can be done for pathological characterization of suspected mass. Because of ease of availability, non-ionizing property, repeatability, real time scanning, being less expensive and easy follow up, USG can be used as a first line diagnostic procedure for suspected parotid lesions.

METHODS
This is a prospective study of 45 patients in the adult age group of 18 years and above, referred to the Department of Radiodiagnosis, NSCB Medical College, Jabalpur, with suspected parotid gland pathology. All these patients underwent USG and then FNAC after proper consent for histopathological examination. After detailed history, correlative laboratory findings, sonography was done with high resolution probe with patient in supine position and head turned to opposite side. Scanning was done by coupling techniques with the use of gel in axial, sagittal & coronal planes. Diagnosis was confirmed on FNAC and clinical correlation.

RESULTS
Out of a total number of 45 patients who were diagnosed and evaluated for parotid gland lesions by ultrasonography, the most common condition was pleomorphic adenoma followed by infective and inflammatory pathology.

CONCLUSIONS
HR Ultrasound is a useful 1st line modality to evaluate superficially located lesions in the parotid glands; in the same sitting an USG guided FNAC can be done which helps in diagnosing & characterizing lesions in the superficial lobe. The deep parotid lobe is mostly inaccessible for USG evaluation and can be supplemented by more advanced cross-sectional imaging like CT & MRI.

KEYWORDS
Parotid Gland, Parotid Pathologies, Ultrasound


BACKGROUND
Of the 3 major salivary glands, parotid gland is the largest. Various imaging methods such as USG, CT, MRI are currently used for evaluation of parotid gland.¹−⁷ USG being easily available, non-ionizing and with higher resolution transducer technology is ideally suited to provide faster and reliable information in a superficially situated Parotid gland.

Pathologies of Parotid gland are uncommon and show varied histological & biological characteristics. And making them a major challenge for Radiologist Clinician. The large range of differential diagnosis influences not only the prognosis but also the treatment. USG guided FNAC is very useful investigation with regard to lesions in the superficial lobe of Parotid. The Aim of this work is to look at the various imaging spectrum of Parotid pathologies in daily clinical practice and to provide some fundamental clues as to the nature of Parotid lesions on ultrasound.

There are a number of different imaging modalities for evaluation of parotid gland lesions like Ultrasonography, Colour Doppler, CT scan, MRI. Ultrasonography plays a very significant role in the diagnosis and management of parotid gland lesions. It has several significant advantages which make it an ideal modality in the evaluation of parotid gland lesions. HR USG can differentiate glandular from extra glandular location of the lesions. It can characterize solid from cystic masses. Further characterization of solid mass can be made on the basis of morphology of the lesion and...
associated adenopathy. Moreover, HR USG can be used to guide biopsy of the suspected lesions. Easy accessibility and lack of radiation makes it an easily reproducible & repeatable imaging modality alternative to CT & MRI. The deep component of the lobe however is difficult to evaluate by ultrasound and should be evaluated by CT & MRI.

METHODS

Study Area
The present study was carried out in the Department of Radiodiagnosis, NSCB Medical College Jabalpur.

Type of Study
A prospective observational study.

Sample Size
45 patients.

Inclusion Criteria
Patients referred to Radiodiagnosis department with parotid gland lesions were included in the study.

Study Protocol
45 Patients were evaluated, which comprised 18 Male and 27 female patients (Table 1); where the patients had presented with swelling in the pre auricular region along with some associated symptoms like odynophagia, restricted mouth opening, fever, facial muscle weakness and lastly skin numbness. Proper diagnosis of parotid gland tumour was evaluated by Ultrasonography.

RESULTS
Among the 45 patients who were examined with USG, positive findings on imaging and guided FNAC include 28 Pleomorphic adenoma, 6 Sialadenitis, 6 epidermoid cysts, 3 Sjogren’s syndrome, 2 Warthin’s tumours (Table 2). Among the patients with positive findings 15 had inflammatory pathologies and rest of the 30 patients had neoplastic lesions. In this study Parotid gland tumour is more common in females (60%) than in males (40%) – Table 1. Among the patients with Parotitis 3 had bilateral inflammation.

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<th></th>
<th>Female</th>
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<tr>
<td>Total</td>
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<td>18</td>
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<td>Table 1. Sex Distribution</td>
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<table>
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<th>Disease Distribution</th>
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<tr>
<td>Pleomorphic adenoma</td>
<td>28</td>
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<tr>
<td>Sialadenitis</td>
<td>6</td>
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<tr>
<td>Epidermoid cysts</td>
<td>6</td>
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<tr>
<td>Sjogren’s syndrome</td>
<td>3</td>
</tr>
<tr>
<td>Warthin’s tumour</td>
<td>2</td>
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<tr>
<td>Table 2. Disease Distribution</td>
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DISCUSSION
Of the 3 major salivary glands Parotid is the largest. Being superficial it is also easily accessible for USG evaluation. It is situated in the Parotid space which is bordered posteriorly by sternocleidomastoid muscle and is divided into superficial and deep lobe by a plane formed by facial nerve. As the facial nerve is not visualized by USG, retro mandibular vein above the facial nerve used as the landmark. Major excretory duct of the parotid gland, the Stenson’s duct passes on the surface of Masseter and then pierces the Buccinator muscle and opens at the level of upper 2nd molar tooth. In contrast to other salivary glands the Parotid gland becomes encapsulated after the development of lymphatic system therefore intra parotid lymph nodes and lymphatic channels are present. Normal Parotid gland on USG appears homogenously hyper echoic as compared to adjacent muscles. With ultrasound it is possible to identify all superficial lobe parotid pathologies with 100% accuracy, even those that are smaller than centimeter in size.1 Only a part of deep lobe can be seen because of overlying mandible.8 USG is able to characterize the lesion solid or cystic and USG guided FNAC allows correct lesion characterization in almost all cases.9 The incidence of salivary gland tumour annually is approx. 0.5 - 2.0/ lac population.10 In our study there was a female predominance as in some of the other studies but sex differences are not significant.11 Fiorella et., al showed high incidence of benign over malignant lesions in parotid gland.12 Our results were similar to previous study. FNAC reports in our study showed Pleomorphic adenoma as the most common lesion which is in accordance with other studies.13

Pleomorphic Adenoma
On USG imaging Pleomorphic adenoma shows well defined lobulated outline and is a hypo echoic solid mass with posterior acoustic enhancement.14,15

![Figure 1a and 1b](image1.png)

Figure 1a and 1b shows pleomorphic adenoma of right parotid superficial lobe. HRUSG scan a demonstrates a well-defined lobulated outline and is a hypo echoic solid mass with posterior acoustic enhancement. scan b demonstrates vascularity.

Sialadenitis
High resolution ultrasound showed enlargement of parotids with reduced echogenicity with increased blood flow.16,17

![Figure 2a, 2b and 2c](image2.png)
Figures 2a, 2b and 2c show sialadenitis of bilateral parotid superficial lobes. HRUSG scan a) demonstrates hypo echoic parotid parenchyma. scan b & c demonstrates increased vascularity of right and left parotid parenchyma.

**Warthin’s Tumour**

Warthin’s tumour is most commonly seen in tail of parotid gland, can be unilateral or bilateral, most often seen in elderly men. On USG they are seen as well-defined heterogeneous lesions with multiple anechoic foci representing cystic spaces. Tail of the parotid is the most common location.\(^{18,19}\)

**Sjogren’s Disease**

Sjogren’s is an autoimmune disease of middle age women causing lymphocytic and plasma cell infiltration. USG shows enlarged parotid glands with multiple tiny hypo echoic areas secondary to lymphocytic infiltration and dilated ducts.\(^{20,21}\)

**Epidermoid**

The epidermal cyst is a benign cyst and develops out of ectodermal tissue. Only 1.6% occur in the oral cavity and are rare.\(^{22}\) Primary epidermal cysts of salivary glands appear to be very rare and literature search for the past 25 years revealed only very few cases in parotid gland.\(^{23}\) Epidermal cysts usually occur secondary to obstruction. On USG they are seen as well defined hypo echoic cystic lesion with no vascularity in the lesion and no evidence of calculi in the duct or glands.\(^{24}\)

**CONCLUSIONS**

High Resolution USG with colour Doppler is very effective in evaluating superficial parotid pathologies. The use of guided FNAC almost always helps in arriving at a diagnosis which can replace higher cross-sectional and more expensive modalities like CT scan & MRI in a poor patient population of our country. These should be used only when USG is inconclusive, and lesion involves deep lobe of the parotid gland.

**REFERENCES**


