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ORIGINAL ARTICLE

ROLE OF HIGH RESOLUTION SONOGRAPHY IN CHARACTERIZATION OF SOLID SALIVARY GLAND TUMORS

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ABSTRACT: AIM: The goal of our study was to evaluate the role of high resolution ultrasonography in differentiation of benign and malignant tumors of salivary glands. **MATERIAL AND METHODS:** This study was carried out in 52 patients with salivary gland tumors, ultrasound and Color Doppler examination were performed in each patient followed by USG guided FNAC/core biopsy. Presumed ultrasound diagnoses were compared with histopathology. **RESULTS:** 52 tumors were detected by sonography, out of them 32 were benign and 20 were malignant. 81.2%benign tumors had sharp border, but 20% malignant tumors also had sharp borders. Non-homogenous echo pattern was seen in 85% malignant and 46.7% of benign lesions. **CONCLUSION:** Ultrasound is very useful in identification of salivary gland tumors; however, due to their non-specific imaging features, it is not reliable enough to differentiate between benign and malignant tumors.

KEYWORDS: High resolution sonography, Color Doppler, Salivary glands, Pleomorphic adenoma, Benign, Malignant.

INTRODUCTION: Salivary gland tumors are not common; they represent 2-4% of all head and neck cancers. Majority of them (80%) are located in the parotid gland, 14% in the submandibular gland and the rest of them in the sublingual glands and in the minor salivary glands.(1) The smaller the gland has the higher the proportion of malignant tumors. The rate of malignancy in the parotid gland is 20-25%; it increases to 40-45% in the submandibular gland and to 51-80% in the sublingual and minor salivary glands.(2)

High resolution ultrasonography (HRSG) is first choice of imaging modality as it is widely available, cost effective and capable to image all the three major salivary glands, i. e., parotid, submandibular and sublingual glands. However, for the deep segment of the parotid gland and minor salivary gland tumors, ultrasound may not be enough. In such cases MRI is used, as it provides very precise information on the position, extension and nature of the mass.(3) In USA, MRI is almost the only technique used in cases where a neoplastic enlargement of a salivary gland is suspected. CT is used mostly to detect salivary duct stones.(4)

There are various sonographic features which can predict malignancy like irregular margin, non-homogenous echopattern, calcification, regional enlarged lymph nodes, internal composition and absence of distal acoustic enhancement.(5) therefore, our intention of the study was to evaluate role of ultrasound to differentiate between benign and malignant tumors.

MATERIAL & METHODS: A prospective study was done in Radio diagnosis Department of Index medical college, Indore over a period of 15 months (Jan. 2014 – March 2015). This study consists of 52 patients, who presented with swelling of a salivary gland region and the clinical suspicion of salivary gland tumor. Age range of patients was from 15 to 70 years. Patients with acute or chronic inflammation of salivary gland and purely cystic masses were excluded from the study.

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All lesions detected by HRSG were included in the study and preceded for FNAC/biopsy. HRSG examination was performed on SIEMENS ACUSON 300 machine with linear transducer (7.5-10MHz). Sonographic features of each salivary gland tumor were assessed just prior to biopsy/FNA cytology, USG and histopathology findings were blinded for each other. All tumors were evaluated for the location, size, shape, margins, echo texture, calcification and regional lymphadenopathy. The B-mode sonography was followed by color Doppler examination. FNAC/biopsies were performed under USG guidance and histo-pathological findings were considered as final diagnosis.

RESULT: 52 salivary gland tumors were taken in our study; out of these 20 tumors (38.5%) were diagnosed to be malignant and 32 tumors (61.5%) were benign in HRSG and Color Doppler examination; while on histo-pathological examination 24(46.2%) were found to be malignant and 28 (53.8%) were benign. Out of 52 tumors detected by sonography 28(53.8%) were found in females and 24(46.2%) in males. No tumor was found to be bilateral in our study.

GENDER	Malignant 20(38.5%)	Benign 32(61.5%)	Total 52
Female	08(28.6%)	20(71.4%)	28(53.8%)
Male	12(50%)	12(50%)	24(46.2%)

Table 1

Our study reveals female predominance of salivary gland tumors and chances of malignancy more in males.

Borders	Malignant (20)	Benign (32)
Sharp	04(20%)	26(81.2%)
Blurred	16(80%)	06(18.8%)

Table 2

Above table reveals that blurred border of lesion have more chance of malignancy.

Echopattern	Malignant	Benign
Homogenous	3(15%)	17(53.2%)
Non-homogenous	17(85%)	15(46.8%)
Calcification	08(40%)	01(3.1%)

Table 3

Above table shows that lesions with non-homogenous echo patterns and calcification have more chance of malignancy.

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	Malignant (20)	Benign (32)	Total (52)
Absent	01(5%)	3(9.3%)	04
Poor-vascularized	15(75%)	27(84.4%)	42
Well- vascularized	04(20%)	02(6.2%)	06

Table 4

Majority of total salivary gland tumors were showing poor vascularization in both groups.

DISCUSSION: Our aim of study was to know how reliable ultrasound features like border, echo pattern, internal composition and vascularity for characterization of salivary gland tumors. In our study, most benign tumors (81.2%) had sharp borders, but about 20% malignant tumors also presented with sharp borders. However, if this feature alone is considered, then about 20% malignant tumors would be misdiagnosed as benign. Therefore, this feature of tumor border is not a strong indicator for benign nature. Most malignant tumor (81.2%) presented with blurred borders, while 18.8% benign tumors also had blurred border, therefore, again this feature alone could not be considered as a predictor for malignancy. Similarly other studies revealed that low grade mucoepidermoid carcinoma is the most commonly misinterpreted as benign, particularly because of its distinct borders and regular shape.[2]

Although in our study, most malignant tumors (85%) were non-homogenous, while 46.8% benign tumors were also non-homogenous. Therefore, according to results whether a tumor is homogenous or not, it does not give any idea of its nature.

Dana Dumitriu et al,[6] also found equal proportion of homogenous and non-homogenous tumors in both groups in their study.

Calcification was found to be a feature of malignant tumors, present in 40% malignancy, while only 3% in benign lesions. Other studies have found that calcifications appear most frequently in pleomorphic adenomas.[7,8]

In our study, Color Doppler examination is not a reliable factor in differentiating benign and malignant tumors. Schick et al,[9] and Martinoli et al,[10] also state that Color Doppler is not enough, but the measurement of peak flow velocity and, preferably the resistive index (RI) and pulsatility index (PI) could be more useful. Warthin's tumors found in our study were very vascular (Figure 5 & 6), while most of the pleomorphic adenomas exhibited poor peripheral vascularity. Other studies have also found classical peripheral pattern "basket like" in pleomorphic adenoma.[11] Malignant tumors did not display a specific pattern of vascularization.

CONCLUSION: Although HRSG and Color Doppler examination of a salivary gland are very useful in description of location, size, shape, borders, internal structure and vascularity of a mass lesion, but due to diversity of salivary gland tumors and their non-specific imaging features, it is not reliable enough to exclude malignancy with certainty. To make a definite diagnosis USG guided FNAC/ biopsy is advocated.

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Fig. 1: Histological proven pleomorphic adenoma showing lobulated shape with sharp borders.

Fig. 1

Fig. 2: Malignant non-homogenous lesion with blurred margins.

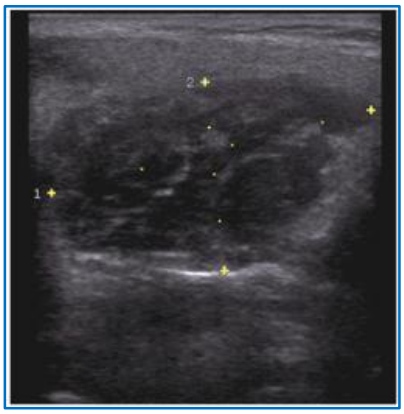

Fig. 2

Fig. 3: Histological proven case of mucoepidermoid carcinoma showing calcification with well circumscribed hypo echoic lesion having few cystic areas.

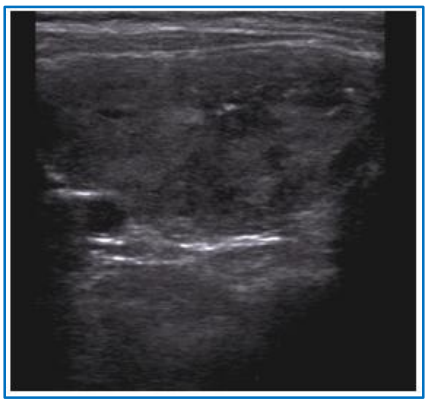

Fig. 3

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Fig. 4: Hypo vascularize of pleomorphic adenoma.

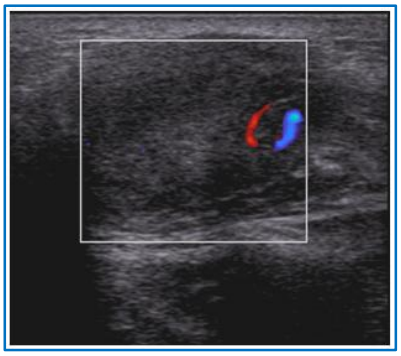

Fig. 4

Fig. 5 A & B: B-mode & Color Doppler Histological proven case of Warthin's tumor showing well defined oval shape mild hyper echoic lesion having small cystic areas, which is highly vascular on Color Doppler.

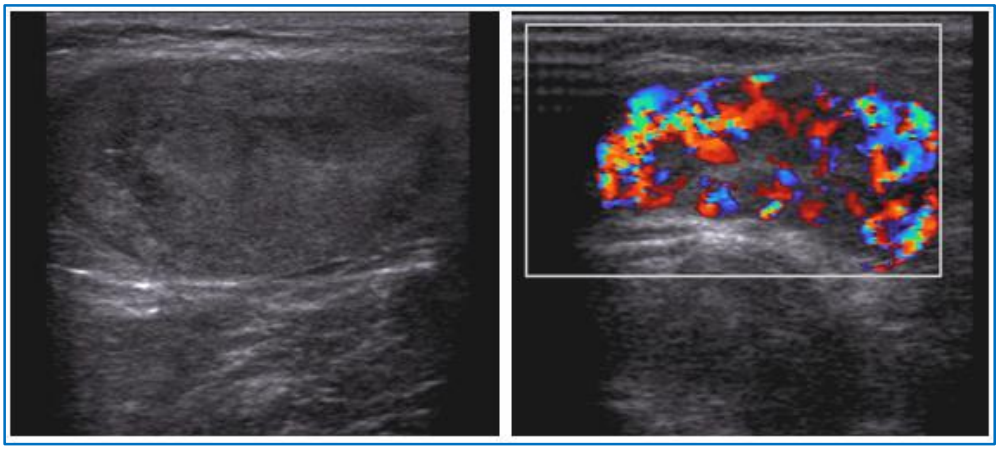

Fig. 5A & B

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