

## Assessment of Salivary Gland Pathology by Ultrasound and Doppler Modalities

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### Abstract

**Background:** Various studies were reported that diseases of salivary glands are diverse in etiology ranging from the inflammatory etiology to a diverse category of benign and malignant neoplasms. Many of these salivary gland pathologies are rare and the diagnostic methods available are also not optimal and less sensitive. **Material & Methods:** The present prospective study was conducted at department of radiodiagnosis of our tertiary care hospital. The study duration was of one year from January 2019 to January 2020. A sample size of 50 was calculated at 95% confidence interval at 10% acceptable margin of error. Patients with swelling or lesions of salivary glands were included in the present study irrespective of age, sex duration of history and etiology. **Results:** In the present study, on the basis of colour doppler findings of the pathological lesion, the benign lesions like pleomorphic adenoma reported peripheral vascularity and the inflammatory lesions had diffuse and marked vascularity in the salivary gland. The malignant lesions showed central vascularity on color Doppler. Out of the 50 study participants the benign lesions showed well-defined margins and the malignant lesions reported irregular margins on ultrasonography findings. The most common pathological lesion was benign type which was found in 90% of the cases which was followed by malignant lesion which was reported in 10% patients. **Conclusion:** We concluded from the present study that ultrasonographic findings can differentiate various salivary gland pathology. Along with colour Doppler findings, the diagnostic accuracy of ultrasonography is increased.

**Key words:** Ultrasonography, Colour Doppler, Salivary gland pathology.

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### Introduction

Salivary glands are type of exocrine glands which produce saliva [1]. There are three major salivary glands, parotid gland, submandibular gland and sublingual glands and several minor glands which are present throughout the oral cavity, nasopharynx region and tracheobronchial tree [2]. Various studies were reported that diseases of salivary glands are diverse in

etiology ranging from the inflammatory etiology to a diverse category of benign and malignant neoplasms [3]. Many of these salivary gland pathologies are rare and the diagnostic methods available are also not optimal and less sensitive. The Inflammatory salivary gland lesions are commonly of bacterial or viral in etiology [4]. However, inflammatory salivary gland

lesions can also be found in sialolithiasis, sialadenosis and autoimmune disorders like Sjogren's syndrome. The presence of calcifications and presence of vascularity are also commonly reported implications [5].

Pathological changes in salivary glands nowadays commonly studied with ultrasonography. It is less expensive, easy to use, less time consuming, suitable for peripheral location of the salivary gland and non-ionizing [6]. The results of ultrasonography are broadly described as hypoechoic, hyper echoic and isoechoic. The sonographic findings also help to locate the borders, distribution of internal echoes, shape, acoustic enhancements, vascularity of the salivary glands and presence of calcification [7]. The grey-scale examination will be succeeded by the color Doppler sonography examination. It will help to detect the vascularity of pathology. Hence, the present study was conducted to assess and evaluate the salivary gland pathology by Ultrasound and Doppler modalities at our tertiary care hospital.

### Materials & Methods

The present prospective study was conducted at department of radiodiagnosis of our tertiary care hospital. The study duration was of one year from January 2019 to January 2020. A sample size of 50 was calculated at 95% confidence interval at 10% acceptable margin of error. Patients with swelling or lesions of salivary glands were included in the present study

irrespective of age, sex duration of history and etiology. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant.

Patients having coagulation disorders, post-operative patients and patients who had only clinical suspicion of salivary gland pathology were excluded from the present study. The data were collected by predesigned performa along with general physical and clinical examination. Data analysis was carried out using SPSS v22. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05.

### Results

In the present study a total of 50 patients with swelling or lesions of salivary glands were included in the present study irrespective of age, sex duration of history and etiology. In our study the patients were aged from 8 to 64 years, the mean age of the enrolled patients was  $34 \pm 4.89$  years. Out of total, majority of study participants were male 58% and 42% of study participants were female. In the present study on the basis of laterality of swelling, among 88% patients swelling was unilateral and among 12% patients unilateral swelling was recorded. out of the total study participants 56% of study participants had firm consistency of swelling and 28% of study participants had soft consistency of swelling. (Table 1)

**Table 1: Distribution of study participants according to study parameters.**

Parameters	No. of cases	
Mean age (years)	34±4.89 years	
Gender	Male	58%
	Female	42%
Swelling	Unilateral	88%
	Bilateral	12%
Consistency	Firm	56%
	Soft	28%

In the present study, on the basis of echotexture of the pathological lesion on ultrasonography, the most common echotexture of the pathological lesion was mixed echotexture which was found in 36% of the cases which was followed by

hyperechoic echotexture was reported in 32% patients which was followed by hypoechoic echotexture reported in 22% study participants which was followed by anechoic echotexture reported in 10% study participants (Table 2)

**Table 2: Distribution of study participants based upon ultrasonographic findings.**

Echotexture of the pathological lesion	No. of cases
Hyperechoic	32%
Hypoechoic	22%
Anechoic	10%
Mixed	36%

In the present study, on the basis of colour doppler findings of the pathological lesion, the benign lesions like pleomorphic adenoma reported peripheral vascularity and the inflammatory lesions had diffuse and marked vascularity in the salivary gland. The malignant lesions showed central vascularity on color Doppler. Out of the 50 study participants the benign

lesions showed well-defined margins and the malignant lesions reported irregular margins on ultrasonography findings. The most common pathological lesion was benign type which was found in 90% of the cases which was followed by malignant lesion which was reported in 10% patients

**Table 3: Distribution of study participants based color Doppler findings.**

pathological lesion	No. of cases
Benign	90%
Malignant	10%

## Discussion

In the present study a total of 50 patients with swelling or lesions of salivary glands were included in the present study irrespective of age, sex duration of history and etiology. In our study the patients were aged from 8 to 64 years, the mean age of the enrolled patients was  $34 \pm 4.89$  years. Out of total, majority of study participants were male 58% and 42% of study participants were female. In the present study on the basis of laterality of swelling, among 88% patients swelling was unilateral and among 12% patients unilateral swelling was recorded. out of the total study participants 56% of study participants had firm consistency of swelling and 28% of study participants had soft consistency of swelling. Similar results were obtained in a study conducted by Urszula Zaleska-Dorobisz et al among

135 patients of salivary gland pathology and reported similar findings to present study among majority of patients of salivary gland pathology [8]. Similar results were obtained in a study conducted by Patange NA et al among 30 patients of salivary gland pathology and reported similar findings to present study among majority of patients of salivary gland pathology [9].

In the present study, on the basis of echotexture of the pathological lesion on ultrasonography, the most common echotexture of the pathological lesion was mixed echotexture which was found in 36% of the cases which was followed by hyperechoic echotexture was reported in 32% patients which was followed by hypoechoic echotexture reported in 22% study participants which was followed by anechoic echotexture reported in 10%

study participants. Similar results were obtained in a study conducted by C M Eneroth et al among patients of salivary gland pathology and reported similar findings to present study among majority of patients of salivary gland pathology [10]. Similar results were obtained in a study conducted by H Schurawitzki et al among 308 patients of salivary gland pathology and reported similar findings to present study among majority of patients of salivary gland pathology [11].

In the present study, on the basis of colour doppler findings of the pathological lesion, the benign lesions like pleomorphic adenoma reported peripheral vascularity and the inflammatory lesions had diffuse and marked vascularity in the salivary gland. The malignant lesions showed central vascularity on color Doppler. Out of the 50 study participants the benign lesions showed well-defined margins and the malignant lesions reported irregular margins on ultrasonography findings. The most common pathological lesion was benign type which was found in 90% of the cases which was followed by malignant lesion which was reported in 10% patients. Similar results were obtained in a study conducted by M J Bradley et al among 56 patients of salivary gland pathology and reported similar findings to present study among majority of patients of salivary gland pathology [12]. Similar results were obtained in a study conducted by Burke C J et al among patients of salivary gland pathology and reported similar findings to present study among majority of patients of salivary gland pathology [13].

### Conclusion

We concluded from the present study that ultrasonographic findings can differentiate various salivary gland pathology. Along with colour Doppler findings, the diagnostic accuracy of ultrasonography is increased. High resolution ultrasonography with colour Doppler sonography should be the first line of imaging choice in

suspected cases of salivary gland pathology.

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