Research Article
AMERICAN JOURNAL OF PHARMACY AND HEALTH RESEARCH
www.ajphr.com
2016, Volume 4, Issue 2
ISSN: 2321–3647(online)

Ultrasonography an effective screening tool for Major salivary gland pathology: A pilot study

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ABSTRACT

There are three pairs of major salivary glands, namely Parotid, Submandibular and Sublingual. Parotid gland is located in the retro-mandibular fossa, Submandibular under the body of the mandible, & the Sublingual in the sublingual space lying lateral to the genioglossus muscle. Apart from obstructive and inflammatory diseases they are also prone for neoplastic changes. After clinical evaluation of gland ultrasonography is an important screening tool for salivary gland pathology. The aim of this study was to establish the usefulness of ultrasonography in screening of major salivary gland for various pathological conditions. 40 patients visited to Department of Oral Pathology/Oral Medicine and Radiology with chief complains associated with major salivary glands were included in our study. Patient was first subjected to plain radiography followed by ultrasonography. Ultrasound was not only found superior to plain radiography in screening of obstructive disease, it also provided valuable information about other pathological condition associated with major salivary gland. As ultrasonography is simple non ionizing, non invasive diagnostic procedure it should be used as first-line of imaging modality in assessment of salivary gland diseases.

Keywords: Ultrasonography, sialolith ,sialadenitis, tumor, Sjogren syndrome

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Received 18 January 2016, Accepted 21 February 2016

Please cite this article as: Gupta J *et al*., Ultrasonography an effective screening tool for Major salivary gland pathology: A pilot study American Journal of Pharmacy & Health Research 2016.

INTRODUCTION

Salivary glands are exocrine gland producing enzyme, lubricant, mixing agent and immune factors. They are broadly grouped as Major Salivary Glands and Minor Salivary Glands. Salivary gland diseases are diverse ranging from the minor inflammatory conditions to a diverse group of benign and malignant neoplasms. Many of these salivary gland diseases are rare and the investigative methods available are also minimal and less productive[1]. Bacterial or viral infections are most common cause of inflammatory diseases associated with salivary gland and it is the most common pathological condition associated with salivary gland. Salivary gland calculi are the second most common pathology associated with salivary gland specially with submandibular gland. Salivary gland tumour is the least common pathology associated with salivary gland.

Although diverse, most of the salivary gland disorders manifest themselves as the enlargement of the gland that is usually associated with pain[2]. Most of salivary gland diseases have an overlapping clinical manifestation. The choice of imaging modality for the salivary glands depends on the clinical presentation and symptoms associated with the disease. Correct diagnosis of disease is mandatory to make a treatment choice.

Ultrasonography is a technique based on sound waves that acquire image on real time without the use of ionizing radiation. Being superficial structures, the parotid and submandibular glands are suitable for high resolution ultrasound examination. This non invasive, painless and relatively inexpensive examination provides rapid visualization of the salivary glands and is a useful adjunct to computed tomography and MRI examination, particularly in tumor pathology. Being a non ionising diagnostic procedure even for obstructive pathology like sialolith it should be the first line of screening modality rather than plain radiography.

With this background a study has been conducted in Z. A. Dental College, AMU Aligarh to evaluate usefulness of ultrasonography in screening of salivary gland pathology.

MATERIALS AND METHOD

40 Patient (25 male and 15 females) with clinical presentation of salivary gland disease like pain and swelling in major salivary gland (parotid, submandibular and sublingual salivary gland) were included in our study. Out of 40 patients in 21 patient parotid gland was affected and in 19 patient submandibular gland was affected. Detail history associated with chief complains that is dryness of mouth, duration of swelling, associated symptoms, aggravating factors etc. were recorded. Patient with extreme mouth dryness were also questioned about associated systemic

symptoms like dryness of eye and joint pain to confirm or rule out Sjogren syndrome. Clinical examination of affected gland was done to determine salivary flow or tenderness associated with it.

RESULTS AND DISCUSSION

Pathological Condition	Number of cases
Salivary gland tumors	4
Salivary gland abscess	6
Acute bacterial sialedenitis	10
Chronic bacterial sialedenitis	8
Sjogren's syndrome	5
Calculi /sialolith	6
Diffuse calcification	1

The most common clinical presentation of salivary gland disease is swelling. In case of inflammation secondary to bacterial or viral infection it may be associated with pain so it is impossible to differentiate between various pathological conditions associated with salivary gland based on history and clinical examination alone. Autoimmune diseases like Sjogren syndrome also affect salivary gland. There is always a need of reliable, less sophisticated and non invasive diagnostic procedure to diagnose the salivary gland pathology.

Plain radiography like occlusal view or OPG or modified PA View of skull are usually used as first screening modality to rule out salivary gland calculi before proceeding with any further investigation. But due to anatomical location of salivary gland and presence of so many adjacent anatomical structures many at times it is difficult to diagnose even salivary gland calculi on plain radiography. Moreover they are not useful in diagnosing poorly calcified calculi. Though sialography is more accurate method of diagnosing salivary gland pathology it is not only a invasive procedure but also contraindicated in acute inflammatory condition.

Ultrasonography can be used to examine or screen all of the submandibular and sublingual salivary glands and the entire parotid gland, except for the portion obscured by the acoustic shadow of the mandible. As ultrasound can provide information regarding various changes seen in parenchymal tissue associated with different pathological conditions it can be used to screen major salivary gland.

In Europe and Asia, ultrasonography is widely accepted as the first imaging method for assessment of lymph nodes and soft-tissue diseases in the head and neck, including major salivary glands. Results of the ultrasonography examination alone may suggest the final diagnosis or supply important differential diagnostic data[3].

In our study we examined the major salivary gland using ultrasonography to see various changes seen in parenchymal tissue associated with salivary gland pathology.

Normally, the echostructure of the salivary gland is homogeneous. The echogenicity is higher than the surrounding muscles or other tissue plain.

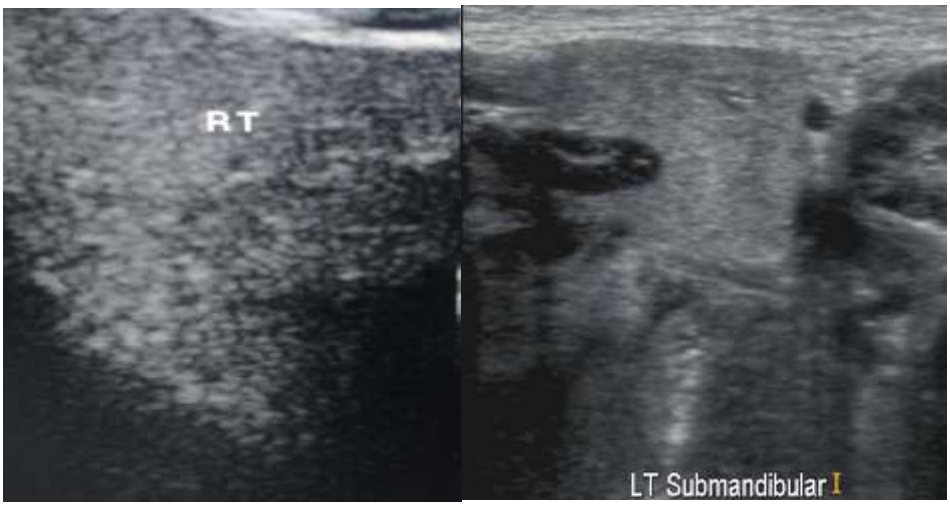

Figure 1 & 2: Normal homogenous echo pattern of parotid gland and submandibular gland

Sialoloth:

80% of Submandibular and 60% of parotid sialolith are opaque and can be visualized on plain radiograph. Parotid sialolith are difficult to visualize on plain radiograph. In one of the case the parotid gland sialolith was missed by plain radiography that was visible on ultrasonography. So our results indicate that ultrasonography is superior to plain film in the detection of salivary gland calculi because of its ability to detect non opaque stones and the exact localization of calculi (that is intraductal vs intraglandular). The finding of our study is similar to Gritzmann et al[4].

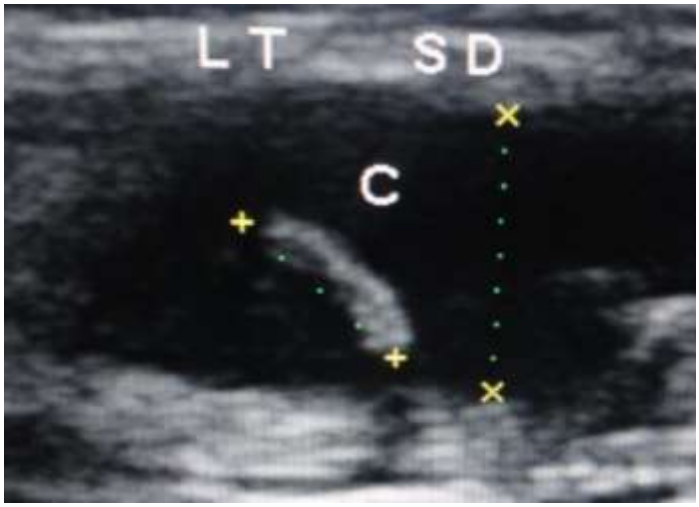

Figure 3:Calculi in Stenson's duct with typical posterior acoustic shadow

In one of the case patient was complaining of pain and swelling in right parotid gland with no detectable calculi on plain radiograph. Ultrasonography image of gland showed diffuse calcification with enlargement of gland.

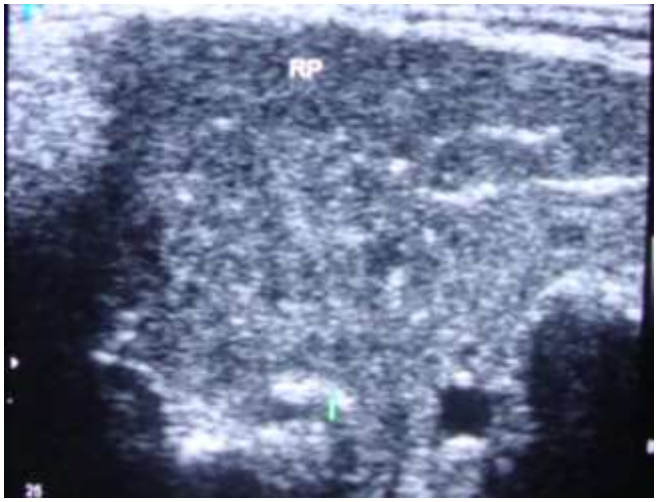

Figure 4: Diffuse calcification of parotid gland

In our study screening of parenchymal changes of salivary gland associated with various pathological conditions such as acute or chronic inflammation or autoimmune disease such as Sjogren's syndrome was done using ultrasonography.

Sialadenitis:

Sialadenitis is an inflammatory condition. It is possible to see different echo pattern of parenchymal tissue on ultrasonographic image depending upon the pathological conditions. In acute inflammation gland appeared enlarged with homogenous pattern. Whereas in chronic inflammation appeared more inhomogeneous.

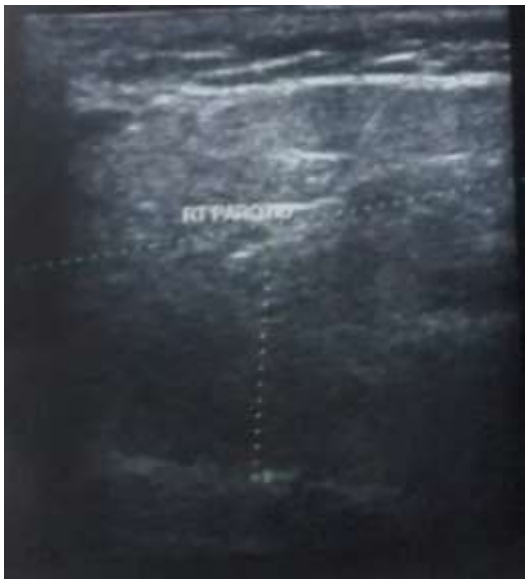

Figure 5:Heterogeneous echo pattern associated with chronic sialadenitis

Abscess: Chronic bacterial infection of salivary gland infection may lead to pus formation. Abscess produces an inhomogeneous echo pattern with fluid movement on ultrasound.

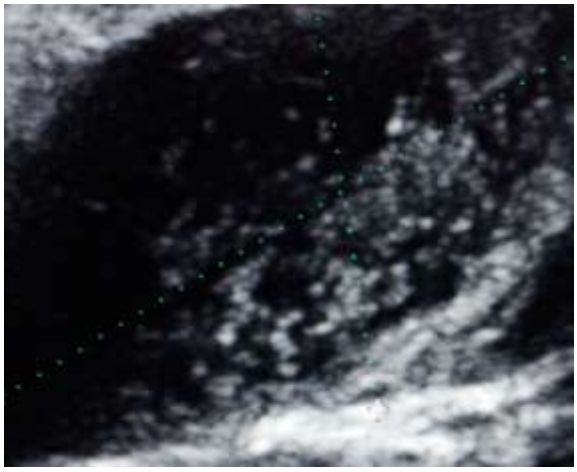

Figure 6: Shows abscess with inhomogenous echo pattern

Autoimmune Disease:

In patients suffering with Sjogren's syndrome ultrasound showed multiple oval hypo echoic patterns with inhomogenecity. This finding of our study is similar R. K. Niemela et al[5].

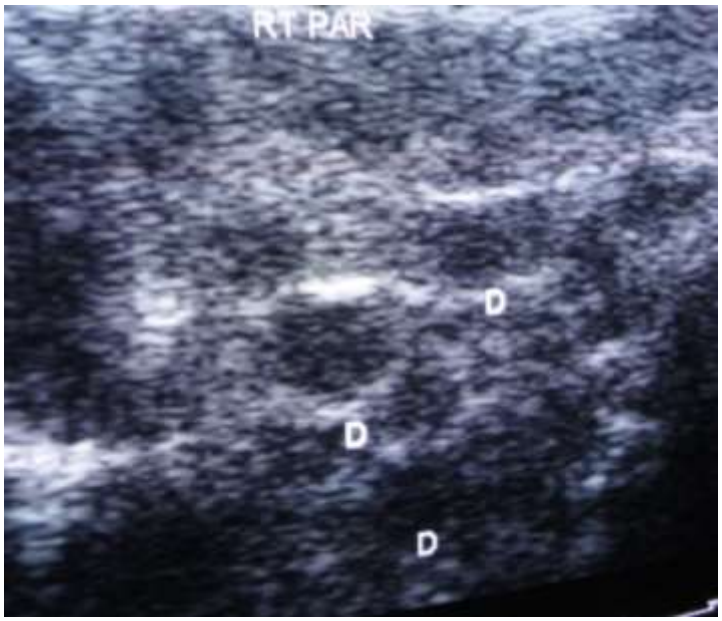

Figure 7:Ultrasound image shows multiple round hypoecohic pattern of Sjogren's Syndrome

Neoplasm:

Pleomorphic adenoma is the most common benign tumor associated with parotid gland. Ultrasonographic image of painless swelling in one patient showed well defined hypoechoic pattern. Internal Structure was Homogenous with almost no calcification suggestive of benign

tumour. FNAC of lesion was suggestive of pleomorphic adenoma. Finding of our study was in agreement with Vijai Pratap et al[7]

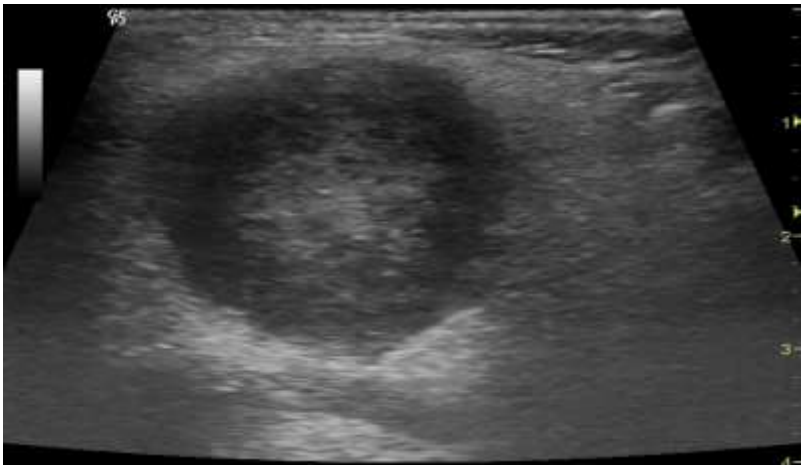

Figure 7: Pleomorphic Adenoma of Parotid gland

Malignant Neoplasm:

In one of the case swelling in parotid gland showed ill-defined margin with inhomogenous internal pattern suggestive of malignancy. Finding of our study was in agreement with Vijai Pratap et al[7] .FNAC of lesion was suggestive of mucoepidermoid carcinoma.

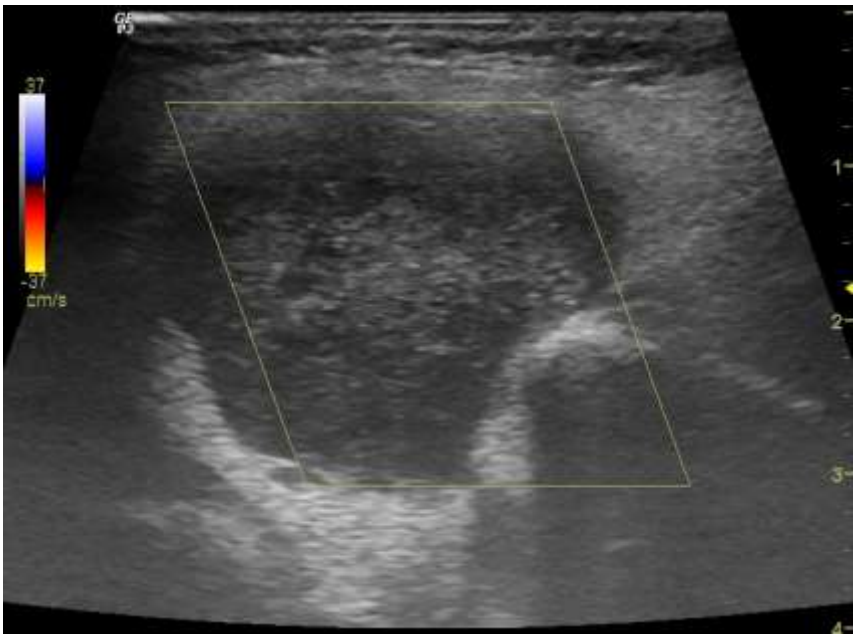

Figure 8: Mucoepidermoid Carcinoma of Parotid gland

CONCLUSION

As ultrasonography is simple non ionizing, noninvasive diagnostic procedure it should be used as first-line of imaging modality in assessment of salivary gland diseases.

REFERENCES

1. Miomir Cvetinovic et al: Evaluation of ultrasound in the diagnosis of pathological process in the parotid gland. Journal of oral and maxillofacial surgery.1991;49: 147-50.
2. T Sridhar et al: Ultrasonographic Evaluation of Salivary Gland Enlargements: A Pilot Study. International Journal of Dental Science and Research, 2013;1(2):28-35
3. Ewa J. Bialek et al: US of the Major Salivary Glands: Anatomy and Spatial Relationships, Pathologic Conditions, and Pitfalls; RG. 2006; 26 (3).
4. N. Gritzman et al: Sonography of the salivary glands; American Journal of Roentgenology: July 1989, Volume 153, Number
5. R. K. Niemelä et al: Ultrasonography of salivary glands in primary Sjögren's syndrome. A comparison with magnetic resonance imaging and magnetic resonance sialography of parotid glands. Rheumatology (2004) 43 (7): 875-879.
6. Salaffi F et al: Usefulness of ultrasonography and color Doppler sonography in the diagnosis of major salivary gland diseases. Reumatismo.2006 Apr-Jun; 58 (2):138-56.
7. Vijai Pratap et al : Sonographic Evaluation of Salivary Gland Tumors – A Hospital Based Study. International Journal of Scientific Study. January 2014;1(4).