The Egyptian Journal of Hospital Medicine (July 2025) Vol. 100, Page 3190-3198

Qualitative Evaluation of Salivary Glands Lesions Using US and CT Imaging, A Comparative Study

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ABSTRACT

Background: US and CT imaging are the first line imaging modalities used to diagnose salivary glands lesions, so it is important to prioritize and dedicate more studies for better salivary lesions characterization.

Purpose of the study: This study aimed to evaluate the different salivary glands lesions using ultrasound and CT, and to compare their characteristics. **Patients and methods:** We prospectively evaluated 76 patients with 76 salivary lesions involving the parotid (57.9%), submandibular (34.2%) and sublingual (3%) salivary glands. US (using high frequency linear transducers 5—12 MHz) and CT imaging (using 64 multislice machine) were used. Using US, lesions were characterized according to echogenicity, homogeneity, shape, nature and Doppler vascularity. While using CT, lesions were characterized according to their density, homogeneity, shape, size (in cm), nature, enhancement pattern, as well as the presence of associated lymphadenopathy.

Results: According to our research, computed tomography had a 92% sensitivity, 85% specificity, 92% positive predictive value, 89% negative predictive value, and 89% accuracy rate for diagnosing salivary gland lesions in both homogeneous and heterogeneous groups. For the identification of salivary gland lesions, computed tomography also demonstrated 100%, 88%, 89%, 60%, and 100% sensitivity, specificity, accuracy, positive predictive value, and negative predictive value in the focal shape and diffuse shape groups respectively. Ultrasound had 70% sensitivity, 100% specificity, 100% positive predictive value, 47% negative predictive value, and 76% accuracy in diagnosing salivary gland lesions in the associated cervical lymph node. Additionally, it demonstrated that the main and final diagnoses of salivary gland lesions by US and CT did not differ significantly in terms of salivary gland lesion (p=0.987).

Conclusion: Ultrasonography (US) and computed tomography (CT) were reliable methods for diagnosing salivary gland lesions.

Keywords: Ultrasonography, CT, Salivary glands, Masses, Sialadenitis.

INTRODUCTION

The primary paired salivary glands in the body that influence the initial stage of digestion are the parotid, submandibular, and sublingual glands. Pain and edema are the most typical clinical signs of salivary gland imaging. Imaging is useful in identifying the masses of salivary glands and also in differentiating them from the masses/pathologies of adjacent cervical spaces, especially parapharyngeal, masticator, and submental spaces and mandibular lesions [(1)].

Salivary gland issues are rather frequent in persons of all ages. Since these lesions cannot be seen with the naked eye, a clinical examination by itself is unable to distinguish between their actual nature, location, extent, and etiology. It would definitely benefit the patient as well as the doctor if they could get an idea of the exact type of lesion affecting the salivary gland [(2)]. Numerous inflammatory, viral, neoplastic, traumatic and congenital reasons are among the many differential diagnoses for a parotid tumor. Approximately 70% of parotid lesions are malignant, according to several studies, but 75% to 80% of parotid neoplasms are benign. The wide differential diagnosis of a parotid tumor necessitates a methodical approach to the workup. A thorough history and physical examination are the first steps in the workup, which may involve several diagnostic components [(3)].

The most effective method for visualizing the salivary glands at the moment is ultrasound. The size, shape, echogenicity, and possible localized lesions of the glands are regularly assessed. Doppler techniques can provide valuable information in some cases, allowing for the assessment of parenchymal blood flow, glandular tissue vascular system and the vasculature of focal lesions [(4)]. Although ultrasound is the first-line imaging tool for salivary gland imaging, it has frequently been combined to contrast-enhanced CT for localizing a deeper lesion and detecting sialolithiasis or metastatic lymph node [(5)].

Cross-sectional imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI) provide high-resolution, multiplanar evaluation of the osseous structures and soft tissue of the oral and maxillofacial region, respectively [(6)]. Although MRI has exhibited superior soft-tissue differentiation in salivary lesion evaluation, it also has some limitations, including contraindications for patients with internal ferromagnetic devices, high monetary and time costs, and the inability to identify and define stones and calcifications [(7)].

PATIENTS AND METHODS

Patients: 76 participants participated in this observational cross-sectional analytical investigation of either gender with major salivary glands complaints attending to Radiology Department at Kasralainy, Menoufia University Hospitals, Ashmon General Hospital during the period from October 2019 to March 2021. The patients' age ranged from 19 to 66 years old,

Received: 06/03/2025
Accepted: 06/05/2025

the mean age was 38.26 ± 14.29 Years. There were 46 males (60.5 %) & 30 females (39.5 %).

Exclusion criteria included: Pregnant patients, children (less than 18 years old), allergic patients, patients with renal impairment.

● **US examination:** The Toshiba Applio 500 US, Logiq P9, and Logiq E9 machines with the highest frequency transducer were used for the exams. Wide-band linear transducers with a median frequency of 7-7.5 MHz or higher are typically employed at frequencies between 5 and 12 MHz. 5 to 10 MHz transducers may be helpful in evaluating big tumors and lesions found in deep gland regions. During the US examination, every lesion and every salivary gland was assessed in at least two perpendicular planes. In order to evaluate lymph nodes and look for concurrent or linked diseases, the entire neck was also scanned.

● **CT examination:** The examinations were performed using two CT machines; Philips brilliance 64 section multi– 64-section multidetector CT scanner (Toshiba Medical Systems, Aquillion); and detector row CT scanner (Brilliance 64, Philips Healthcare, Cleveland, OH, USA). All patients underwent pre- & post-contrast CT scanning for the neck.

Contrast injection was done using automatic pump with approximately 70-100 ml of a nonionic contrast material was injected through a 16/18-gauge cannula placed in a superficial vein with scan delay of 30-40 seconds (slice thickness 0.5 mm & slice interval of 0.5 mm). Sagittal and coronal reconstruction were done, with soft tissue and bone windows.

● **Image analysis:** Salivary gland lesions were studied carefully according to their different characteristics. Many hyper-echoic lesions had non-specific imaging features, which creates diagnostic uncertainty based just on imaging, even if some lesions had extremely distinctive ultrasound appearances. CT images were also carefully evaluated, to characterize the lesions, examine the structures next to the salivary glands and look for neoplasia, cysts, mucoceles, acute inflammatory processes, and abscesses.

● **Standard of references:** US & CT findings were compared with the results of the histopathological examinations after the excision of lesions or with follow up examinations after proper treatment for inflammatory cases.

Ethical approval: Menoufia Hospital Ethical Committee gave its approval to the project. All patients gave their informed permissions. The study adhered to the Helsinki Declaration throughout its execution.

Statistical analysis

The SPSS version 25 software for Microsoft Windows 10 and Microsoft Excel 2017 were used to tabulate and statistically analyze the results.

Descriptive statistics: quantitative data were presented as mean ($\bar{x}$), standard deviation (SD), and range (minimum-maximum), whilst qualitative data were presented as number (N) and percentage (%).

Analytic statistics: The Chi-square test ($\chi 2$) and Mann Whitney's test were employed. Two-tailed probabilities were used to quote significant test results. The results' significance was assessed at the 5% level ($P \leq 0.05$).

RESULTS

Lesion characteristics: We prospectively evaluated 46 (60.50%) males and 30 (39.50%) females. The mean age of the patients was 38.26 ± 14.29 years, with a range of 19 to 66 years. The patients who were included had a BMI of 28.32 ± 3.31 kg/m^2. The majority of the studied patients suffered from swelling (71.1%) and pain (78.9%). Also, 18.4% of the studied patients suffer from fever and malaise. Parotid gland was the affected gland in 57.9% of the studied patients, followed by submandibular gland in 34.2% and sublingual gland in 7.9% of the included patients. 52.6% of lesions were proved histopathologically as neoplasms, while (13.2%) were proved as simple cysts. The rest of the lesions were followed up, and proved as sialadenitis (15.8%), sialolithiasis (13.2%), ductal causes (2.6%), and abscess (2.6%).

US characteristics: The mean size of the focal lesions in ultrasound was 3.09 ± 1.53 cm. Concerning the echogenicity, 63.2% of the included lesions were hypoechoic, 21.1% were hyperechoic and 13.2% were iso-echoic. 50 lesions (65.8%) were of heterogenous texture, while 26 lesions (34.2%) were homogenous. About 76.3% of the lesions were focal while 18 lesions (23.7%) were diffuse. The majority of lesions (55.3%) were associated with cervical lymphadenopathy. Concerning the nature of lesion, 60.5% had mixed nature and 47.4% had normal vascularity.

CT characteristics: The mean size of the lesions was 3.17±1.59 cm. Most (44.7%) of the lesions were hypodense, while 42.1% were hyperdense and 13.2% were isodense. About 65.8% of the lesions had heterogeneous texture. 84.2% of the lesions were reported as focal in shape, while 15.6% were diffuse/ill-defined. The majority of the lesions (78.9%) were associated with enlarged cervical lymph node. Concerning the nature of lesion, 52.6% had mixed solid and cystic components. Contrast uptake was reported in 42.1% of the lesions.

US & CT diagnosis: There was non-significant difference between computed tomography and ultrasound diagnosis in terms of shape, size of focal lesions and nature of salivary gland lesions ($p > 0.05$). However, the presence of cervical lymphadenopathy was significantly highly in computed tomography than ultrasound ($p=0.028$) (Table 1).

Table (1): Comparison between US and CT in diagnosis of salivary gland lesion (n= 76)

salivary gland lesion		US		CT		Test of sig. (X^2)	P-value
		No	%	No	%		
Features of lesion	**Shape:**						
	Diffuse	18	23.7	12	15.8	1.27	0.26
	Focal	58	76.3	64	84.2		
	Homogeneity:						
	Heterogenous	50	65.8	50	65.8	-	-
	Homogenous	26	34.2	26	34.2		
	Size of focal lesions (cm)						
	Mean ± SD	3.09±1.53		3.17±1.59		**U**= 0.22	0.824
	Range	0.3-6.5		0.5-6.5			
	Associated cervical lymph node:						
	Yes	42	55.3	60	78.9	4.83	**0.028***
	No	34	44.7	16	21.1		
Nature of lesion	**Nature:**						
	Cystic	10	13.2	10	13.2		
	Solid	20	26.3	26	34.2	0.6	0.741
	Mixed	46	60.5	40	52.6		

X^2: Chi square test, **U:** Mann-Whitney test, ***Significant (P-value ≤ 0.05).**

Neoplastic lesions by CT (Figure 1)

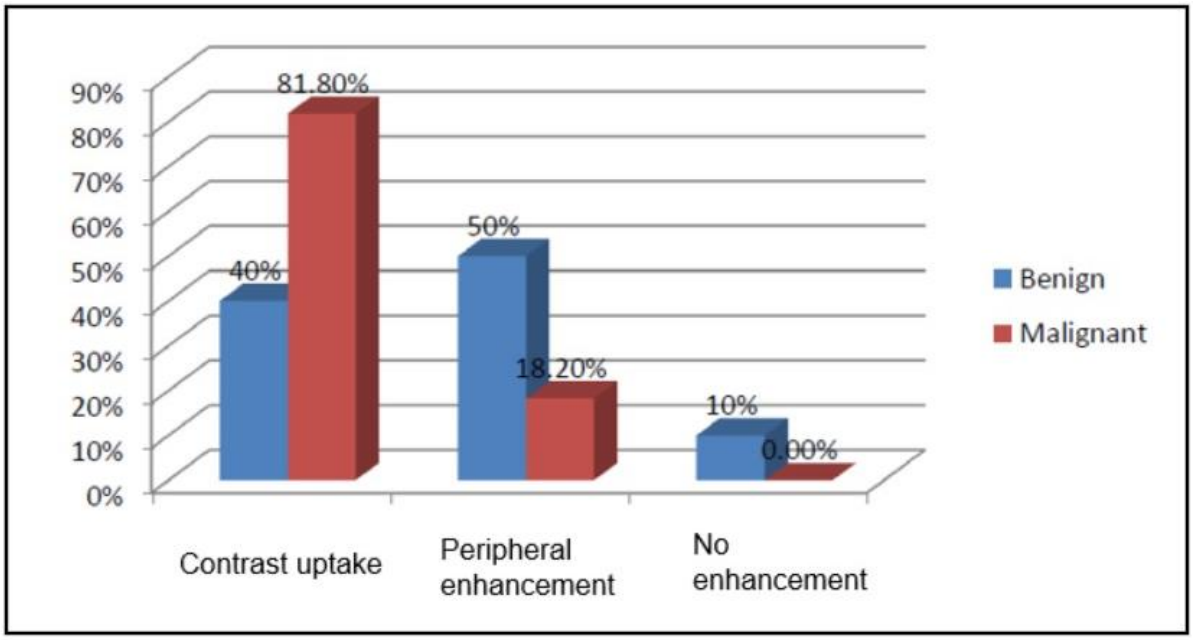

Figure (1): Comparison between benign and malignant tumors regarding the CT contrast uptake.

Forty-two (52.6%) of the lesions were histopathologically identified as neoplasms. The primary characteristics of the benign and malignant tumors were mixed. 18.2% of malignant tumors displayed peripheral enhancement, whilst 81.8% were heterogeneously enhanced. 10% of benign lesions were non-enhancing, 40% displayed homogenous/heterogenous contrast uptake and 50% displayed peripheral enhancement. The texture of all benign lesions was diverse.

Pathology of neoplastic lesions: There was 22 (52.3%) neoplastic lesions that proved malignant and 20 lesions (47.6%) were benign. The most common benign tumor was pleomorphic adenoma (80%), while second most common type was Warthin's tumor. Most common malignant neoplasms were mucoepidermoid carcinoma (54%) followed by adenoid cystic carcinoma (36.3%).

Final diagnosis: 28.9 % of patients had malignant neoplasms, while 26.3% had benign neoplasms, 18.4% had sialadenitis, 13.2% had sialolithiasis, 7.9% had cystic lesions, 2.6% had abscesses & 2.6% had ductal causes. There was non-significant difference between radiological diagnosis (by US and CT) and final diagnosis (histopathogical for neoplasms and clinical follow up, treatment, typical feature for other lesions) p=0.987 (> 0.05) (Table 2).

Table (2). Difference between primary and final diagnosis of salivary gland lesion by US and CT in (n= 76)

	Primary diagnosis		**Final diagnosis**		**Test of sig. (X^2)**	**P-value**
	No	**%**	**No**	**%**		
Salivary gland lesion:						
Abscess	2	2.6	2	2.6		
Sialadentitis	12	15.8	14	18.4		
Sialolithiasis	10	13.2	10	13.2	0.63	0.987
Cystic lesion	10	13.2	6	7.9		
Ductal Causes (lesion) benign	2	2.6	2	2.6		
tumor	18	23.7	20	26.3		
Malignant tumor	22	28.9	22	28.9		

Accuracy of US & CT against pathology in the diagnosis of neoplastic lesions: Ultrasound had 100% sensitivity, 82% specificity, 90% accuracy, 83% positive predictive value and 100% negative predictive value for diagnosing salivary gland neoplasms. For the diagnosis of salivary gland neoplasms, CT had 80% sensitivity, 91% specificity, 86% accuracy, 89% positive predictive value, and 83% negative predictive value **(Table 3).**

Table 3. Accuracy of US against CT for diagnosis of salivary gland lesions (n= 76)

US	**CT homogeneity**				**Sensitivity**	**Specificity**	**Accuracy**	**PPV**	**NPV**
	Heterogenous		**Homogenous**						
	No	**%**	**No**	**%**					
Heterogenous	46	92	4	15.4	92%	85%	89%	92%	85%
Homogenous	4	8	22	84.6					
Shape									
US	**Diffuse**		**focal**		**Sensitivity**	**Specificity**	**Accuracy**	**PPV**	**NPV**
	No	**%**	**No**	**%**					
Diffuse	12	100	8	12.5					
Focal	0	0	56	87.5	100%	88%	89%	60%	100%
Associated cervical lymph node									
US	**Yes**		**No**		**Sensitivity**	**Specificity**	**Accuracy**	**PPV**	**NPV**
	No	**%**	**No**	**%**					
Yes	42	70	0	0	70%	100%	76%	100%	47%
No	18	30	16	100					

- **(A)** Ultrasound images revealed few left parotid well defined hypo-echoic mass lesion with mixed cystic and solid components that showed hypervascularity **(B & C).** Contrast enhanced axial & coronal CT images showed enlarged left parotid gland that showed few fairly defined enhancing lesions, the largest measuring 3 cm with bilateral reactive cervical lymph nodes.
- The radiological findings are suggestive of benign neoplastic mass lesion.
- Histopathological diagnosis by excisional biopsy: Warthin's tumor (Figure 2).

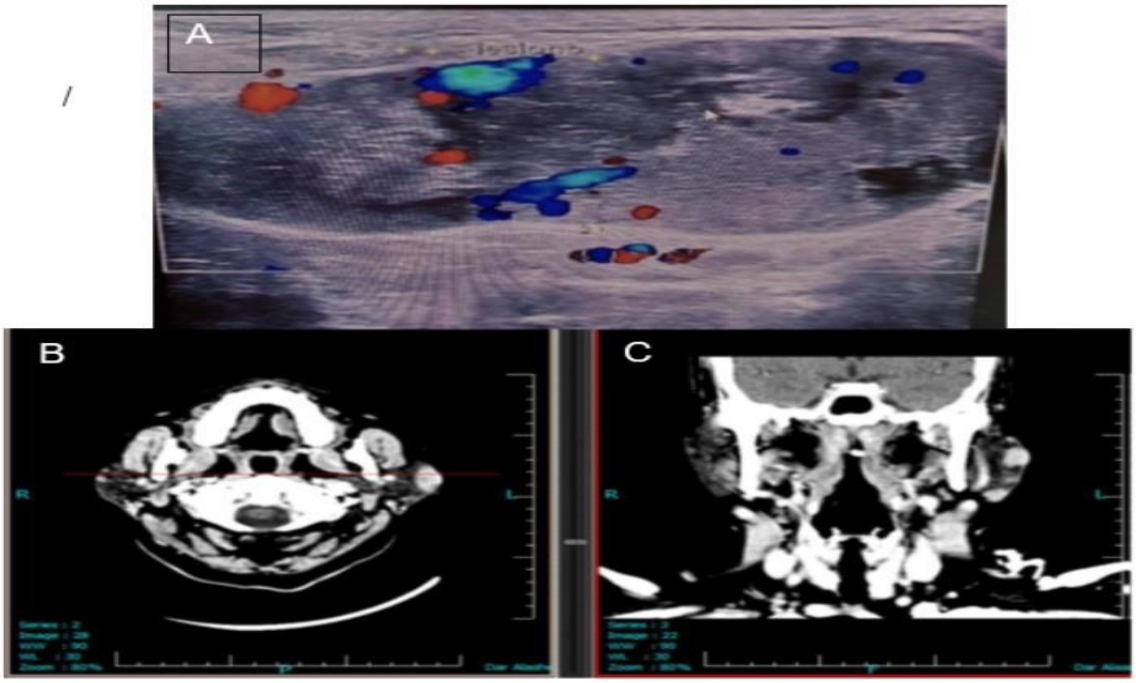

Figure (2): A 59 year-old female patient presented by chronic left Parotid swelling

- **(A)** Ultrasound images revealed heterogeneous well defined hypoechoic right submandibular mass lesion measuring 2x2.9cm with no vascularity. **(B and C)** Pre- & post-contrast CT images showed right submandibular marginally enhancing soft tissue mass lesion, with bilateral reactive cervical lymph nodes.
- The radiological findings are suggestive of an inflammatory lesion (abscess).
- Histopathological diagnosis confirmed by excisional biopsy as intraglandular inflammatory caseating granulomatous lymphadenitis (Figure 3).

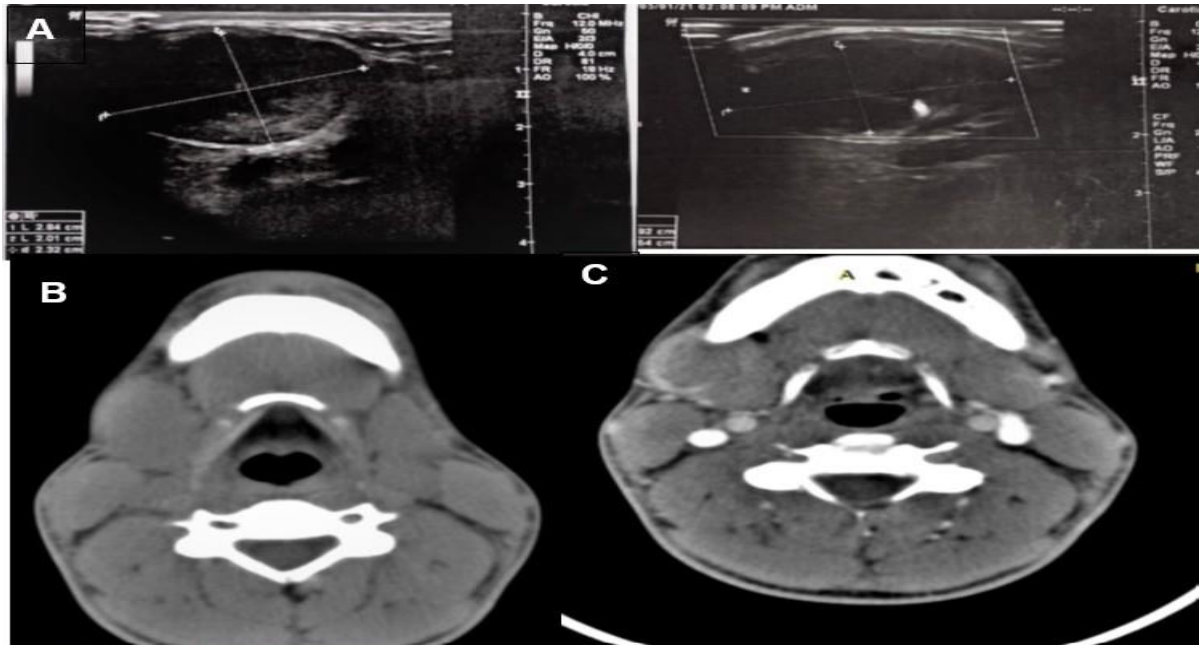

Figure (3): A 19 year-old male patient presented by chronic RT submandibular swelling.

- **(A)** Ultrasound images revealed ill-defined mixed complex hypo-echoic heterogenous mass lesion measuring about 6 x 5.2 cm with peripheral vascularity. **(B)** Contrast enhanced axial CT images showed right submandibular heterogeneously enhancing lesion with lytic changes of the underlying mandibular body and associated suspicious right cervical lymph nodes.
- The radiological findings are suggestive of malignant neoplastic mass lesion.

Excisional biopsy histopathological diagnosis verified the lesion's malignant character (invasive moderately differentiated keratinizing squamous cell carcinoma) (Figure 4).

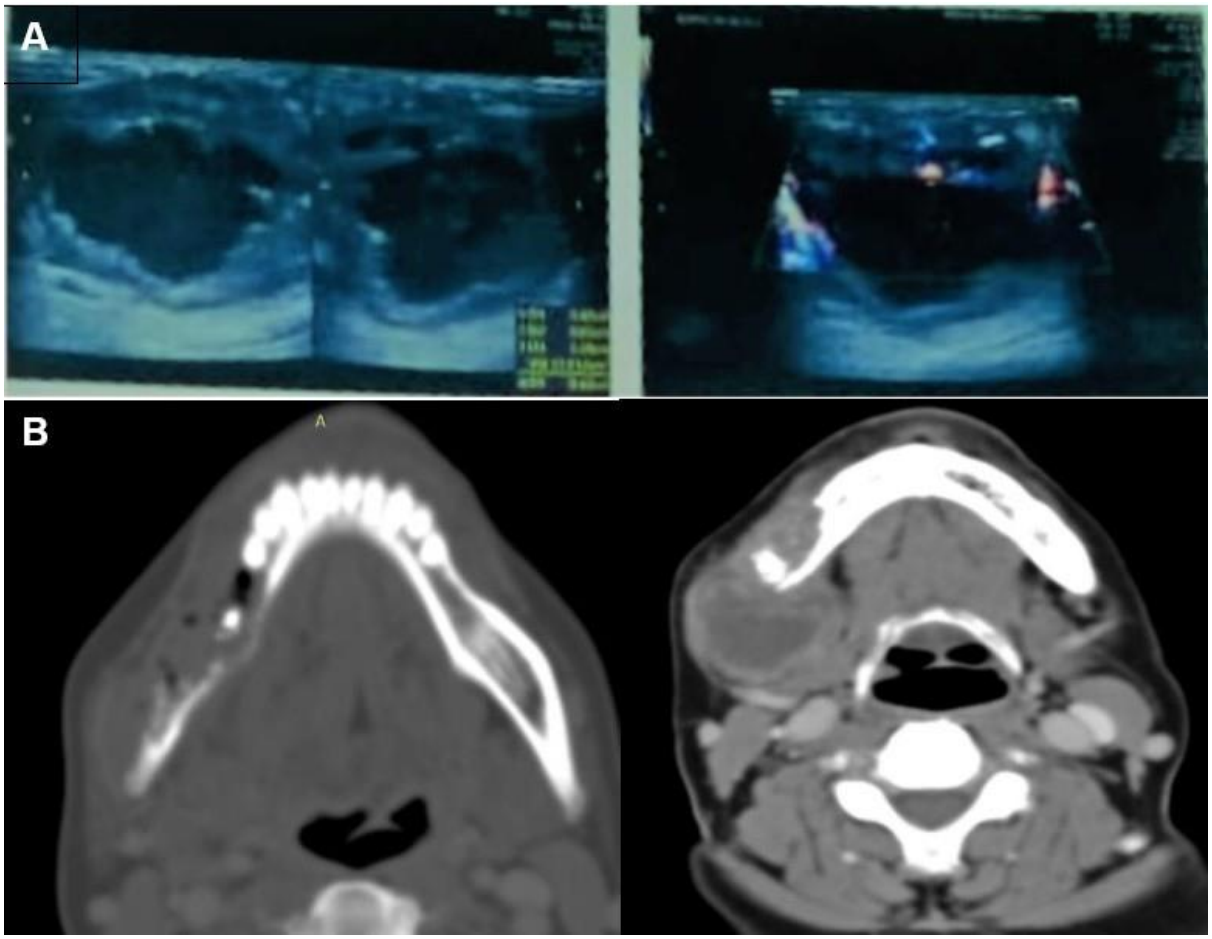

Figure (4): A 49 year-old female patient presented with chronic painful right submandibular swelling.

DISCUSSION

The primary paired salivary glands in the body that influence the initial stage of digestion are the parotid, submandibular, and sublingual glands. Pain and edema are the most typical clinical signs of salivary gland imaging [(1)]. Salivary gland issues are rather frequent in persons of all ages. Since these lesions cannot be seen with the naked eye, a clinical examination by itself is unable to distinguish between their actual nature, location, extent, and etiology. Knowing the precise kind of lesion affecting the salivary gland would be beneficial to both the patient and the physician [(2)]. Therefore, this study aimed to correlate between US and CT in the evaluation of salivary glands lesions, to enhance the ability to characterize neoplastic salivary lesions.

Our study included 76 lesions in 76 patients (unilateral in 100%). The mean age of the included patients was 38.26 ± 14.29, the majority of studied patients were males. Our results agree with the study done by **Patange *et al.*** [(8)]. They discovered that unilateral gland swelling was present in 86.6% of individuals. Lesions undergoing degeneration, or 13% of cases with malignant lesions, had calcifications and cystic alterations. Benign tumors did not exhibit lymph node involvement, but intra-carotid was the most often involved site. 16 out of 30 instances had a pathological diagnosis. The most frequent pathological diagnosis, accounting for 33.33% of cases, was chronic non-specific sialadenitis. Pleomorphic adenoma was discovered to be present in 23.3% of cases, followed by 16.6% of instances of malignancy, the most common of which was muco-epidermoid carcinoma.

The present study showed that the majority of the studied patients presented with swelling (71.1%) and pain (78.9%). Also, 18.4% of the studied patients suffered from fever and malaise. Parotid gland was affected in 57.9% of the studied patients, followed by submandibular gland in 34.2% while sublingual gland affection was reported in 7.9% of the included patients.

The mean duration of patient complaints was 1.85 ± 1.47 months.

The study by **Thakkar *et al.*** [9] revealed that, most common presenting complaint is swelling (100%) and odynophagia (43.3%) followed by lymphadenopathy (26.6%) followed by restricted mouth opening (20%), fever (16.6%), facial muscle weakness (13.3%) and lastly skin numbness (6.6%). With no cases affecting the sublingual gland, the most frequent location for salivary gland tumors was the parotid gland (80%), followed by the submandibular gland (16.6%) and minor salivary glands (3%). Just 11.2% of the pleomorphic adenomas were found in the submandibular gland, whereas 88.8% were found in the parotid gland.

Another study was conducted by **Gritzmann *et al.*** [10] showed that due to their superficial position, the parotid, the submandibular, and the sublingual glands can be imaged with high resolution transducers. Sonography can distinguish between obstructive and non-obstructive sialadenitis in acute inflammatory disorders. It is possible to identify abscess forms and regulate the colliquation's maturation.

According to histopathological data and follow up, our study had malignant neoplastic lesions in 28.9%, followed by benign tumors in 26.3%. We also had sialadenitis in 18.4% of the lesions, sialolithiasis in 13.2 %. 7.9% had cystic lesion and abscess in 2.6%, also the same percentage for ductal causes “ductectasia”.

While radiologically, this study had 23.7% benign neoplastic lesions, followed by sialadenitis in 15.8% of the lesions and 13.2% cystic lesions and sialolithiasis. These results agree with the study by **Purcell *et al.*** [11], which showed that sialolithiasis is the most common benign disorder of the salivary glands. Because of the more viscous, alkaline saliva and the upward draining of the duct that promotes stasis, 80–90% of calculi are detected in the submandibular system. Just 5% to 10% of instances are caused by parotid calculi, and 0% to 5% are caused by sublingual calculi.

Pleomorphic adenoma accounted for 80% of the benign neoplasms in our study, with Warthin's tumor coming in second (20%). Mucoepidermoid carcinoma accounted for 54% of the malignant neoplasms, followed by adenoid cystic carcinoma (36.3%) and squamous cell carcinoma (9%). The study by **Beale *et al.*** [12] discovered that the salivary glands are impacted by a variety of malignancies. About 70% of tumors at the parotid gland are pleomorphic adenomas, the most prevalent benign tumor and neoplastic lesion of the gland. Mucoepidermoid carcinoma is the most prevalent malignant tumor, making up around 10% of salivary tumors and 30% of all malignancies, of which about half are parotid.

Using US, the current study showed that 63.2% of lesions were hypo-echoic while 21.1% were hyperechoic. Our study also showed that 65.8% of the lesions had heterogenous texture, and 60.5% had mixed nature (cystic and solid). 76.3% of lesions were focal in shape, and 47.4% of lesions had normal vascularity while 28.9% were hyper-vascular. The majority of the lesions (55.3%) had associated cervical lymphadenopathy. By US 72.7% of malignant lesions had mixed (cystic & solid component) nature while 72.7% were hyper-vascular. Benign neoplasms showed mixed nature in 50 % of the lesions and 70% showed normal vascularity. All the neoplastic lesions (100%) were heterogenous.

Our results agree with the study of **Bialek *et al.*** [13] who stated that in chronic inflammation, salivary glands are normal sized or smaller, hypoechoic, and in homogeneous, sialolithiasis manifests as distal acoustic shadowing and noticeably hyperechoic lines or spots. Enlarged, hyperechoic glands devoid of focal lesions or elevated blood flow are the hallmark of sialosis. In homogeneous salivary glands with sporadic tiny, oval, hypoechoic or anechoic regions that are typically well defined, as well as increased parenchymal blood flow, are the US characteristics of advanced Sjogren syndrome. Warthin tumors are typically oval, hypoechoic, well-defined lesions that frequently contain anechoic zones and are frequently hypervascularized. Pleomorphic adenomas are typically hypoechoic, well-defined, lobulated lesions with posterior acoustic enhancement that may contain calcifications. Salivary gland malignant neoplasms might appear benign or may be hypoechoic in homogeneous structure and have fuzzy margins, uneven forms, and irregular borders. Salivary gland cysts lack internal blood flow, have well-defined edges, anechoic contents and posterior acoustic amplification.

Using contrast enhanced CT, our study showed that 44.7 % of the lesions were hypodense, 65.8% heterogenous and 84.2% had well defined margins. The majority of lesions (52.6%) had mixed nature (cystic and solid component) while 42.1% showed post contrast enhancement, and 31.6% showed peripheral enhancement. The mean size of lesions was 3.17 ± 1.59 cm. 71.4% of the diffuse lesions proved as sialadenitis while 67.7% of the focal lesions proved as neoplastic lesions.

By CECT, 72.7% of malignant lesions had mixed nature, 90.9% were heterogenous and 81.8% showed post contrast enhancement. 50% of the benign lesions had mixed nature, 50% showed peripheral enhancement while 40% were enhanced. All benign lesions were heterogenous.

Determining whether a salivary gland tumor was benign or malignant was the most important step in the diagnosing process. Clinical diagnosis of salivary gland tumors was rare and mostly relied on imaging results. As a result, preoperative imaging is crucial to surgical planning [14]. In a study conducted by **Zuo *et al.*** [7], The histology and the CT features, particularly the increased features, were closely correlated. Salivary

tumor contrast enhancement patterns are correlated with vascular architecture and histopathologic characteristics. More than two-phase CT scans might be useful in showing the tumor's characteristics, but they take a lot of time and interfere with patients' everyday lives. Both patients and radiologists benefit from a prompt and precise diagnosis. The pathology still determines the final diagnosis.

In the present study, there was statistically significant difference between CT and US in the detection of lymph nodes with CT being more accurate (p value 0.028), there was no significance difference (P value >0.05) in detection of shape, size, and nature of lesions 0.026, 0.82, 0.74 respectively. Similarly, according to the study by **Rudack *et al.*** [(15)] for the diagnosis of tumor-like lesions, CT and US yielded nearly the same results in respect of the correct diagnosis. In contrast, MRI outperformed the US. There was no discernible difference between CT and US or MRI and US according to the Chi-square test. When the accurate diagnosis of benign and malignant tumors was separated out, it was discovered that US/MRI and CT were frequently used to make the right diagnosis for benign tumors. Despite the statistical analysis showed no discernible difference, the ultrasound examination appeared to be marginally better than the MRI and CT. Only a small percentage of malignant tumors, on the other hand, could be accurately diagnosed. In this case, MRI appeared to be marginally better than ultrasonography, while CT showed the worst outcomes. Additionally, there were no discernible differences between US, CT, and MRI in the analysis of malignant tumors.

Between US and CT, US had 90% accuracy, 100% sensitivity, 82% specificity, 83% positive predictive value, and 100% negative predictive value in terms of diagnosing benign and malignant salivary gland tumors. On the other hand, CT had 89% PPV, 83% NPV, 80% sensitivity, 91% specificity, and 86% accuracy. The final diagnosis of salivary gland lesions and the radiological diagnosis did not differ significantly in our investigation. p=0.987 (>0.05= insignificant). These findings are consistent with **Rudack *et al.*** [(15)] who found that, ultrasound achieved a sensitivity of 88%, a specificity of 54% and an accuracy of 79%. For the main salivary glands, it is the best first-line investigative imaging technique. Examining the diseases that affect the salivary glands both internally and externally is beneficial. It is a suitable chairside approach to identify the existence of salivary glandular disease because it does not involve the use of ionizing radiation. Additionally, it demonstrated that the sensitivity, specificity, and accuracy of CT and MRI were similar when it came to identifying benign and malignant entities (CT showed 91% sensitivity, 57% specificity & 78% accuracy, while MRI showed 90% sensitivity, 52% specificity & 84% accuracy). CT is more accessible and less expensive than MRI. Unenhanced CT is the preferred method for detecting bone erosion brought on by cancerous tumors and is helpful in detecting tiny calculi inside the salivary gland or duct. When malignant illness affects the chest and salivary glands, enhanced CT is employed for staging [(16)].

Salivary gland tumors can be diagnosed with both ultrasound and CT scans. For the initial imaging of salivary gland tumors, ultrasound is still a very attractive choice, albeit having a slightly lower specificity rate than CT scans. An intra-glandular component of the mass, particularly in the deep lobe of the parotid, mass extending to the parapharyngeal region that cannot be reached by ultrasound, and osseous affection in malignant masses can all be evaluated using a CT scan.

LIMITATIONS: Our study had few limitations. First, small number of patients with wide variety of lesions, limiting their detailed study, second, pathology was not obtained in all lesions eg inflammatory. Also, fewer prior studies included different salivary gland lesions as well as detailed CT analysis of such lesions. Also US had its limitations such as short neck and painful lesions.

CONCLUSION

Our research indicated that computed tomography (CT) and ultrasound (US) were both effective imaging modalities for staging salivary gland masses and dependable techniques for diagnosing salivary gland diseases. They might assist in distinguishing between benign and malignant tumors and reducing the differential diagnosis.

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