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Original Article

Comparative Study of Ultrasound Guided FNAC and Conventional FNAC in the Diagnosis of Parotid Tumour

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Abstract

Objective: *To evaluate role of ultrasound guided FNAC for the diagnosis of parotid tumor.*

Methods: *This cross sectional study was conducted in 39 patients with parotid tumor admitted in the ENT department of out door of Bangabandhu Sheikh Mujib Medical University, Dhaka Medical College Hospital, and Sir Salimullah Medical College and Mitford Hospital Dhaka, during July 2013 to June 2014 were enrolled for surgical management. Conventional FNAC and ultrasound guided FNAC were done in all these patients and they were followed up from the admission upto the post operative tissue diagnosis of parotid tumor in respective pathology departments for histopathological correlation.*

Results: *The highest incidence of parotid tumor was in 4th decade and male to female ratio was almost 1:1. The main clinical feature were 27(69.2%) had firm, 6(15.4%) soft, 1(2.6%) hard and 5(12.8%) over the parotid tail. The validity of histopathology evaluation for pleomorphic in USG FNAC sensitivity 95.7%, specificity 100.0%, accuracy 97.4%, positive predictive values 100.0%, negative predictive values 94.1%. Evaluation for Meucoepidermoid sensitivity 80.0%, specificity 97.1%, accuracy 94.9%, positive predictive values 80.0%, negative predictive values 97.1% in USG FNAC. In USG FNAC for identification Warthin sensitivity 100.0%, specificity 100.0%, accuracy 100.0%, positive predictive values 100.0%, negative predictive values 100.0%. Evaluation for Adenocystic in USG FNAC sensitivity 100.0%, specificity 100.0%, accuracy 100.0%, positive predictive values 100.0%, negative predictive values 100.0%.*

Conclusion: *It can be concluded that Ultrasound guided FNAC has definite value in the diagnosis of tumours and can be regarded as a sensitive and specific imaging modality for pre-operative discrimination of the benign and malignant parotid tumours.*

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Introduction

Parotid gland masses include benign tumours, malignant tumours and chronic inflammatory diseases and the identification of these benign or malignant lesions is linked with management. Approximately 80% of salivary gland tumours occur in the parotid gland. Of these, approximately 75- 80% are benign. The majority of the benign tumours in the parotid gland are epithelial tumours.

Clinical presentation of parotid tumours, especially the malignant ones, depends on its involvement with the facial nerve, staging

it according to the House-Brackmann scale, and of other cranial nerves, as well as the involvement of other structures outside the parotid such as masseter, sternocleido-mastoid muscle, mastoid, skin, ear canal, mandible, skull base. Ultrasonography (US) is a low-cost modality with high sensitivity in detecting masses in the superficial lobe of the parotid gland. Its inability to show part of the deeper parotid lobe is overcome by computerized tomography (CT) and/or magnetic resonance imaging (MRI) which can be particularly useful, as complementary studies, for correct surgical planning. A broad spectrum of pathologies that present themselves along with parotid swelling and extraglandular masses can also mimic parotid lesions clinically. It is frequently difficult on clinical grounds alone to distinguish between neoplastic and non-neoplastic causes for a parotid mass and also to reliably differentiate between benign and malignant neoplasms. If an accurate pre-operative diagnosis can be achieved using a combination of clinical, imaging cytology or histology, then many non-neoplastic lesions will not require excision. Surgery may also be avoided for certain parotid neoplasms in the elderly or unfit, e.g. Warthin's tumour. To ensure that surgery is indicated and to allow appropriate operative planning and patient consent, an accurate preoperative diagnosis is essential. After initial demonstration and characterization of a parotid lesion with imaging, usually with ultrasound or MRI, needle biopsy is used to confirm its nature if required. Following the demise of open biopsy, due to high rates of tumour seeding fine-needle aspiration cytology has become an established technique. FNAC is fairly reliable for the diagnosis of pleomorphic adenomas, but it has difficulty identifying carcinoma ex-pleomorphic adenoma. Differentiation between pleomorphic adenomas, adenoid cystic carcinoma, monomorphic adenoma and mucoepidermoid carcinoma may be difficult. Nevertheless, none of these tools provide definitive information regarding the nature and the precise histology of a parotid mass and, furthermore open biopsy of a parotid mass is not recommended due to the risk of seeding in the case of solid malignancy. Therefore, what usually occurs in clinical practice is that most parotid masses are operated upon in order to obtain the final histological diagnosis.

In FNAC, Haemorrhage from the major neck vessels can occur and there is a very small but definite risk of tumour implantation along the needle track.[1] The occurrence of inadequate aspirates is yet another problem. The problems of interpretation due to meager amount of cellular material demand great experience on part of the histopathologist[2,3] The technique is less invasive, safe and no sophisticated equipment is required to perform it. Diagnosis is made quickly and it is virtually free of serious complications. It has therefore become the initial investigation for evaluating parotid gland masses. However, reliance solely upon FNAC findings at the expense of clinical, radiographic, or other findings is unsafe.[4] In the absence of ultrasound-guidance or an on-site cytologist, the diagnostic accuracy of FNAC often falls off dramatically.

There are important potential complications of needle biopsy including haemorrhage, facial nerve injury and also tumour seeding in the needle tract. The identification of the intraparotid vessels on ultrasound should allow the main parotid vessels and thereby the adjacent facial nerve to be avoided during biopsy.

The interpretation was based on individual ultrasound features of parotid gland masses with reference to reports[5-7] and was combined with the investigators experience, including

dimensions, shape, margins (circumscribed, spiculated or ill-defined), echogenicity (anechoic, hypoechoic, isoechoic or hyperechoic), echotexture (homogeneous or heterogeneous) and vascularization. Vascularization was assessed in four grades: Grade 1 indicates no vessels visible in the mass in colour Doppler flow imaging (CDFI) low-flow mode; Grade 2 indicates a few vessel segments of no more than three blood vessels visible in the whole mass; Grade 3 indicates up to five vessels visible in the mass; and Grade 4 indicates more than five vessels visible in the mass.

The sonographic characteristics suggesting probably malignant or malignant masses were irregular shape, spiculated or ill-defined margin, heterogeneous echotexture, punctate calcification and vascularization. The sonographic characteristics suggesting probably benign or benign mass were round or ovoid shape, circumscribed margin, homogeneous echotexture and vascularization. Ultrasound is able to demonstrate benign and malignant features of focal lesions and can be used to guide fine-needle aspiration biopsy or core biopsy to confirm their nature. Small, well-differentiated primary parotid gland malignancies may appear benign on ultrasound and all such lesions should be considered for biopsy to exclude malignancy. If ultrasound is able to compartmentalize a mass to the superficial lobe and biopsy confirms benign pathology respectively, then no further imaging is required. Ultrasound is able to guide the need for further imaging (CT or MRI) in those lesions with sonographically malignant features or large masses whose extent is difficult to assess with ultrasound, particularly if deep lobe involvement is suspected.

In the present report, data will be described emerging from this cross sectional and comparative study in the current setting, evaluating the pathological, prognostic and surgical parameters (including complications) of a consecutive series of patients who will undergo parotidectomy in our Institutes and found to be affected by a benign or by a malignant neoplasm. Improvement in the accuracy of the preoperative diagnosis of a parotid gland mass is essential. Ultrasound can locate a small lesion with in the gland, which would give confidence to the clinician about his clinical findings. USG FNAC can avoid injury to facial nerve or major vessels and avoid unnecessary delay in the diagnosis preoperatively which would bring a more specific approach in the management of parotid mass. Therefore this study was carried out to evaluate ultrasound guided FNAC for the diagnosis of parotid tumor.

Methods

This cross sectional study was carried out in the in the departments of ENT of Bangabandhu Sheikh Mujib Medical University, Dhaka Medical College Hospital, Sir Salimullah Medical College and Mitford Hospital, Dhaka during the study period July 2013 to June 2014 on 39 patients with parotid tumor. This study recruited patients with parotid tumor who underwent surgery and patients with other tumors or inflammatory disease was excluded. Prior to the commencement of this study, the research protocol will be approved by the thesis committee (Local Ethical Committee). For every patient, personal data was recorded, including habits (in particular smoking and alcohol consumption), family history, with particular regard to tumours (salivary gland) clinical presentation of the parotid neoplasm.

US was performed with a real-time scanner-Acuson 128XP (Acuson, Mountain View, CA, USA) or Sonoline Elegra (Siemens, Issaquah, WA, USA) -using a 7 or 7.5 MHz linear

transducer. The benign neoplasms and a case of lymphoid hyperplasia were classified in one group because these lesions are more likely to be homogeneous and have well-defined margins. All benign neoplasms, lymphoid hyperplasia and lymphomas had well-defined margins, while all carcinomas inflammatory lesions and sialadenitis had an indistinct outline.

All the aspirations were performed by qualified histopathologists. The results obtained on FNAC & Ultrasonography guided FNAC was categorized into three categories; Benign, Malignant and Suspicious.

Ultrasonography was used for localization of target tissues in selected cases. A case was considered as ''suspicious'' when the cytology showed atypical cells without having overt features of malignancy. For the purpose of analysis the "suspicious" cases on cytology were regarded as malignant and was grouped under the heading ''Malignant Neoplasms''. Final diagnosis was made on the basis of histopathological examination of biopsy specimens. A comparison of these results was made to determine the diagnostic value of US guided FNAC. Blood Complete picture, screening for hepatitis B and C, Blood Sugar and Urea Levels, Serum Creatinine and Electrolytes Estimation and LFTs, Urine R/E, ECG, Echoardiography, X-Ray Chest, CT and MR Imaging were performed.

Categorical variables were presented in the form of frequency and percentage and quantitative data was presented in the form of mean and standard deviation. For the validity of study outcome, sensitivity, specificity, accuracy, positive predictive value and negative predictive value of US guided FNAC and simple FNAC in the evaluation of parotid tumor was calculated and compared.

Results

The mean age of the patient's parotid tumour was 37.65±11.29 years varied from 20 – 60 years. Male and female patients were found 19(48.7%) and 20(51.3%) respectively.

Ultrasound diagnosis was found in 2 cases among them 2 cases were warthin histopathology and which was significantly ($p<0.05$) associated with histopathology. But other USG findings were not significantly ($p>0.05$) associated with histopathology.

Table I

Comparison between histopathology and USG findings (n=39)

USG findings	Histopathology												
	Ch. Sialo-adenitis		Pleom-orphic		Meucoepidermoid		Warthin		Adeno cystic		Cyst		p-value
	n		n		n		n		n				
Hypoechoic (n=29)	1	3.4	20	69.0	3	10.3	1	3.4	3	10.3	1	3.4	0.129^{ns}
Cystic (n=7)	0	0.0	2	28.6	2	28.6	1	14.3	1	14.3	1	14.3	0.431^{ns}
Ultrasound diagnosis (n=2)	0	0.0	0	0.0	0	0.0	2	100	0	0.0	0	0.0	0.002^{s}
Ill defined small area (n=1)	0	0.0	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0.982^{ns}
Total	1		23		5		4		4		2		

s=significant; ns= not significant

P value reached from chi square test

Table II

Comparison between histopathology and conventional FNAC (n=39)

Conventional FNAC	Histopathology												p-value
	Ch. Sialo-adenitis		Pleom-orphic		Meucoe pidermoid		Warthin		Adeno cystic		Cyst		
	n	%	n	%	n	%	n	%	n	%	n	%	
Ch. Sialoadenitis (n=6)	1	16.7	2	33.3	1	16.7	0	0.0	2	33.3	0	0.0	0.048[s]
Pleomorphic (n=18)	0	0.0	16	88.9	1	5.6	1	5.6	0	0.0	0	0.0	0.021[s]
Meucoepidermoid (n=4)	0	0.0	1	25.0	3	75.0	0	0.0	0	0.0	0	0.0	0.008[s]
Warthin (n=3)	0	0.0	0	0.0	0	0.0	3	100	0	0.0	0	0.0	0.001[s]
Cyst (n=4)	0	0.0	3	75.0	0	0.0	0	0.0	1	25.0	0	0.0	0.774[ns]
Adenocystic (n=4)	0	0.0	1	0.0	0	0.0	0	0.0	1	25.0	2	50.0	0.001[s]
Total	1		23		5		4		4		2		

s=significant; ns= not significant

P value reached from chi square test

Table III

Comparison between histopathology and USG FNAC (n=39)

USG FNAC	Histopathology												p-value
	Ch. Sialo-adenitis		Pleom-orphic		Meucoe pidermoid		Warthin		Adeno cystic		Cyst		
	n	%	n	%	n	%	n	%	n	%	n	%	
Ch. Sialoadenitis (n=1)	1	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.001
Pleomorphic (n=22)	0	0.0	22	100	0		0	0.0	0	0.0	0	0.0	0.001
Meucoepidermoid (n=5)	0	0.0	1	20.0	4	80.0	0	0.0	0	0.0	0	0.0	0.001
Warthin (n=4)	0	0.0	0	0.0	0	0.0	4	100	0	0.0	0	0.0	0.001
Cyst (n=3)	0	0.0	0	0.0	1	33.3	0	0.0	0	0.0	2	66.7	0.001
Adenocystic (n=4)	0	0.0	0	0.0	0	0.0	0	0.0	4	100	0	0.0	0.001[s]
Total	1		23		5		4		4		2		

s=significant; ns= not significant

P value reached from chi square test

USG FNAC pleomorphic was found in 22 patients among them all patients had pleomorphic histopathology. The difference was statistically significant ($p<0.05$) between USG FNAC and histopathology.

Table IV
Comparison between histopathology with conventional FNAC and USG FNAC evaluation of pleomorphic (n=39)

Pleomorphic	Histopathology	
	Positive (n=23)	Negative (n=16)
Conventional FNAC		
Positive (n=18)	16 (TP)	2 (FP)
Negative (n=21)	7 (FN)	14 (TN)
USG FNAC		
Positive (n=22)	22(TP)	0 (FP)
Negative (n=17)	1 (FN)	16 (TN)

TP=true positive, FP=false positive, FN= false negative, TN=true negative

Table V
Comparison between histopathology with conventional FNAC and USG FNAC evaluation of meucoepidermoid (n=39)

Meucoepidermoid	Histopathology	
	Positive (n=5)	Negative (n=34)
Conventional FNAC		
Positive (n=4)	3(TP)	1(FP)
Negative (n=35)	2 (FN)	33(TN)
USG FNAC		
Positive (n=5)	4(TP)	1(FP)
Negative (n=34)	1(FN)	33(TN)

Table VI
Comparison between histopathology with conventional FNAC and USG FNAC evaluation of warthin (n=39)

Warthin	Histopathology	
	Positive (n=4)	Negative (n=35)
Conventional FNAC		
Positive (n=3)	3(TP)	0 (FP)
Negative (n=36)	1 (FN)	35 (TN)
USG FNAC		
Positive (n=4)	4 (TP)	0 (FP)
Negative (n=35)	0 (FN)	35 (TN)

Table VII
Comparison between histopathology with conventional FNAC and USG FNAC evaluation of adenocystic (n=39)

Adenocystic	Histopathology	
	Positive (n=4)	Negative (n=35)
Conventional FNAC		
Positive (n=4)	1 (TP)	3 (FP)
Negative (n=35)	3 (FN)	32 (TN)
USG FNAC		
Positive (n=4)	4 (TP)	0 (FP)
Negative (n=35)	0 (FN)	35 (TN)

Discussion

This study was carried to find out the clinical features and ultrasonography features of the patients having parotid mass. The study was also conducted to compare the findings of conventional FNAC and ultrasound guided FNAC with that of histopathology of parotid mass, and as well to compare ultrasound guided FNAC and simple FNAC of parotid mass.

Anwar et al.[8] showed the ages varied from 20 to 78 years with the mean age 41.28+13.06 years and Parotid gland tumours were the commonest in 4th decade comprising 59.6% of all the tumours in their study, which is closely resembled with the current study. On the other hand, Jing-Jia et al.[9] has observed higher mean age of patient women parotid tumour, which was 43.6 years. In another study Yerli et al.[10] found mean age 61 years varied from 31 to 90 years. The findings are higher with the current study, which maybe due to extended life expectancy, geographical and racial influences may have significant impacts on parotid tumour. Anwar et al.[8] mentioned that males and females were equally affected by parotid malignancies, where they found male to female ratio was 1.28:1. On the other hand, Jing-Jia et al.[9] and Yerli et al.[10] showed male to female ratio were

almost 2:1 in their respective studies. In another study, Ramachandra et al.[11] found that 10.1% and 89.9% were male and female respectively.

The clinical features that may be present in a malignant tumour of the parotid gland are well known.[12-13] This knowledge is acquired through generations of experience but there have been scanty reports in the literature directed specifically to the study of these features.[14-15] Apart from their possible correlation with malignancy, the full implications of these features, therefore, have not been evaluated in detail. Wong[16] showed 19.9% cases were firm in clinical feature.

Jing-Jia et al.[9] found Pleomorphic adenoma was the most common benign tumor, it accounted for 56.6% of the benign tumors. The second commonest benign tumor was Warthin's tumor 23.3%, cyst 6.9% and cystadenoma 1.3% and were uncommon benign parotid tumors. In another study Anwar et al.[8] found pleomorphic adenoma 66.7%, Warthin tumour 5.3%, Mucoepidermoid carcinoma 5.3% and Adenoid cystic carcinoma 10.5%. Bussu et al.[17] found among the benign lesions, the most frequent, by fair, were pleomorphic adenomas (almost 50%) and Warthin's tumours. The above findings are comparable with the current study observed in conventional FNAC. Jing-Jia et al.[9] observed 26 malignancies, out of which mucoepidermoid carcinoma 30.8%, was the most common histological type, followed by carcinoma ex pleomorphic adenoma 15.4%, squamous cell carcinoma 11.5%, and adenoid cystic carcinoma 7.7%. Adenocarcinoma 3.8% and basal cell carcinoma 3.8% were rare. The histopathological findings as determined on examination of biopsy specimens observed by Anwar et al[8].and showed Pleomorphic adenoma 63.2%, Adenoid Cystic carcinoma 14.0%, Warthin tumour 5.3% and Mucoepidermoid carcinoma 5.3%, Bussu et al.[17] obtained adenoid cystic carcinoma 10.0% and mucoepidermoid carcinoma 6, 9%. In the 10 operated lymphomas, cytology had not led to the suspicion of the final histological diagnosis.

In this series it was observed that ultrasound diagnosis was found in 2 cases among them 2 cases were Warthin histopathology and which was significantly ($p<0.05$) associated with histopathology. But hypoechoic and ill defined small area were not significantly ($p>0.05$) associated with histopathology.

In conventional FNAC it was observed that pleomorphic was found in 18 patients among them 88.9% patients had pleomorphic histopathology, 5.6% ad meucoepidermoid and 5.6%. Conventional FNAC ch. sialoadenitis, pleomorphic, meucoepidermoid, warthin and adenocystic were significant ($p<0.05$) with compared to histopathology. On the other hand in USG FNAC pleomorphic was found in 22 patients among them all patients had pleomorphic histopathology. The difference was significant ($p<0.05$) between USG FNAC with histopathology.

In conventional FNAC for evaluation of pleomorphic in this study it was observed true positive 16 cases, false positive 2 cases, false negative 7 cases and true negative 14 cases in identification by histopathology. In USG FNAC true positive 22 cases, no false positive, false negative 1 case and true negative 16 cases identified by histopathology. Bajaj et al.[18] noted 11 true positive, 54 true negative, two false negative and two false positive in ultrasound guided FNAC. In England a study done by Brennan et al.[19] obtained true positive 16, false positive 5, false negative 7 and true negative 75. Deneuve et al.[20] done a study in France and found that true positive 7, false positive 4, false negative 0, true negative 67. Gobic et al.[21] observed true positive 13, false positive 13, false negative 3, true negative 147. In another study Carrillo et al.[22] observed true

positive 60, false positive 1, false negative 5, true negative 69. The above findings are comparable with the current study.

Que and Perry[23] in a study of 169 patients on parotid found that fine-needle aspiration cytology had the sensitivity and specificity for pleomorphic adenoma 78.0% and 95.0% respectively, which is similar with the present study. In conventional FNAC for evaluation of eucoepidermoid, true positive 3 cases, false positive 1 case, false negative 2 cases and true negative 33 cases in identification by histopathology observed in this study. In USG FNAC, true positive 4 cases, false positive 1 case, false negative 1 case and true negative 33 cases in identification by histopathology.

In a study, Que and Perry[23] showed the fine-needle aspiration cytology had the sensitivity and specificity for identification of mucoepidermoid carcinoma 14.0% and 99.0% respectively. In this current series it was observed in Conventional FNAC for evaluation of Warthin, true positive 3 cases, no false positive, false negative 1 case and true negative 35 cases in identification by histopathology. In USG FNAC, true positive 4 cases, no false positive, no false negative and true negative 35 cases in identification by histopathology. Veder et al.[24] found 95.5% diagnostic accuracy of ultrasound guided FNAC for identification of Warthin tumour, which is consistent with the current study. In this current study it was observed that in conventional FNAC evaluation of adenocystic, true positive 1 case, false positive was 3 case, false negative 3 case and true negative 32 cases in identification by histopathology. In USG FNAC, true positive 4 cases, no false positive, false negative 1 case and true negative 35 cases in identification by histopathology.

Baharudin et al.[25] showed the sensitivity in distinguishing malignant from benign disease was 57.0% with a specificity of 76.0%. The overall FNAC accuracy in the diagnosis of parotid tumour was 74.0% by conventional FNAC. Razmpa et al.[26] obtained FNAC sensitivity was 82.5% and specificity was 93.3%. The accuracy of the test was 87.5%. Positive predictive value was 93.3% and negative predictive value was 82.35%. Chwee et al.[27] and Eisele & William[28] obtained that the accuracy varied from 84% to 97%, the sensitivity from 54% to 95%, and the specificity from 86% to 100%. Contucci et al.[29] showed conventional Fine-needle aspiration cytology (FNAC) identified malignancy in more than 50%. Ellis and Auclair[30] mentioned the accuracy of FNAC at the low end of the 60% to 75%.

In ultrasound guided fine-needle aspiration cytology (FNAC) Piccioni et al.[31] found sensitivity and specificity were 81% and 99%, respectively. Accuracy for malignancy was 97%, accuracy for benignity was 83%; positive and negative predictive values were 93% and 98%, respectively. Contucci et al.[29] showed the accuracy, sensitivity and specificity of cytologic findings were, respectively, 94%, 57.2% and 100%. Sonography enables the diagnosis of cysts or ranulae and the accuracy of sonography in assessment of sialolithiasis is about 90.0% obtained by Gritzmann[32]. Jain et al.[33] study showed FNAC sensitivity of 92.8%, specificity of 93.9%, a positive predictive value of 81.2% and negative predictive value of 98.4% for malignant salivary gland tumors. There was one false-negative diagnosis and four false-positive cases diagnosed on FNAC. Salgarelli et al.[4] study had confirmed a wide range of accuracy rates for FNAC evaluation of parotid masses, varying from 79% to 97%. Wan et al.[34] mentioned that ultrasound guided FNAC had a sensitivity of 83% (95% CI: 40.4%, 99.6%), a specificity of 100%, and an accuracy of 97% (95% CI: 80.3%, 99.9%) in

providing specific tissue diagnoses and in differentiating benign masses from malignant masses. US guided FNAC had a PPV of 100% and a NPV of 96% (95% CI: 77.2%, 99.9%) in diagnosing malignancy.

Bajaj et al.[18] showed ultrasound guided FNAC the overall sensitivity of FNAC was 84.6% and specificity was 96.4%. Pre-operative recognition of malignant tumours may help prepare both the surgeon and patient for an appropriate surgical procedure. Its enhancement of the pre-operative recognition of malignant parotid tumours may alert more stringent attention to the operative margin and hence better tumour clearance. Hartimath et al.[35] in India found that sensitivity of needle aspiration for malignancy was 90.9% while the specificity was 96.6%. There was 1 false negative case and 1 false positive case. The diagnostic accuracy of test was 95.1%. The diagnostic efficiency in their series was 96.4%, with an overall predictive value of 98.3% for malignancy reported by Frable and Frable[36]. Another similar study conducted by Awan and Ahmad[37] that the diagnostic accuracy of FNAC in the study was 92% with sensitivity, specificity, positive predictive and negative predictive values of 70%, 97%, 87% and 92% respectively. Anwar et al.[8] study showed the diagnostic value of USG guided FNAC sensitivity 86.67%, Specificity 97.62%, Positive Predictive Value 92.86%, Negative Predictive Value 95.35% and Diagnostic Accuracy 94.74%.

Obaid and Yusuf[38] found FNAC as a useful adjunct in the management of epithelial parotid tumours and recommend the pre operative use of FNAC on such cases. Ashraf et al.[39] found sensitivity, specificity, positive predictive value, and negative predictive value of FNAC for benign neoplastic lesions at 98.52%, 87.05%, 94.36% and 96.55%, respectively, whereas for malignant neoplastic lesions these values were 77.77%, 98.78%, 93.33% and 95.29%, respectively. The overall accuracy of FNAC in diagnosis of parotid neoplasms has been reported by Orell et al.[40] and Hartimath et al.[35] to be 87% to 100% with sensitivity of 87% to 100% and a specificity of 90% to 100% in distinguishing benign from malignant lesions. The diagnostic accuracy of FNAC in Anwar et al.[8] study was 94.74% with sensitivity of 86.67% and specificity 97.62%. In Pakistan a retrospective review showed the diagnostic accuracy of FNAC in salivary glands was found to be; positive predictive value 100%, negative predictive value 91.4% and diagnostic efficacy 91.8%. The study reported by Aan, Tanwani[41] positive correlation for neoplastic lesions to be 93.9%. Ultrasound guided FNAC was found to be highly specific for malignancy and its sensitivity for malignancy was good.

Conclusion

This study shows that parotid tumor was more frequent in 4th decade and alike in male and female. More common clinical feature were firm and soft. As the histopathological diagnosis of the present study significantly more associated well with ultrasonod guided FNAC findings with compared to conventional FNAC, where the validity tests are higher in evaluation of pleomorphic, Meucoepidermoid, Warthin and Adenocystic. It can be concluded that the ultrasonod guided FNAC is useful diagnostic modality in pre-operative discrimination of benign and malignant parotid masses and it should be worthy to note here that ultrasonod guided FNAC can help the ENT physician in the rational approach of patient management.

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