Research Article

Sonological, cytological, and histopathological correlation in parotid lesions: a 5-year experience

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Abstract

Background: Parotid is a superficial, readily accessible major salivary gland. Differentiation between non-neoplastic salivary disease and salivary gland tumor is not difficult. Accurate subtyping and grading of salivary neoplasms are only possible with combined efforts of a sonologist and a pathologist. With increasing use, it is evident that ultrasonography (USG) has becomes more reliable as a predictor of the exact nature of parotid lesions.

Objective: The aim of this study was: (1) to establish a correlation between the various findings reported by sonography and cytology, histopathology, and cytology plus histopathology; (2) to evaluate and compare the results of USG, fine-needle aspiration cytology (FNAC), and postoperative histopathology examination; and (3) to detect any emerging trend in relation with USG and histopathology and cytology.

Materials and Methods: A retrospective and prospective randomized study was performed on more than 210 patients during a period of 5 years. The data were obtained from the Department of Radio diagnosis and Department of Pathology, M.G.M. Medical College, Indore.

Results: In the present study, it was found that USG has emerged as a potent diagnostic modality in detecting parotid lesion. Results indicate that significant increment was found in the use of USG and FNAC for parotid lesion study.

Conclusion: An accurate correlation between USG finding and FNAC finding was found in non-neoplastic lesion (inflammatory and cystic). Histopathology also remains a gold standard for the same.

KEY WORDS: Parotid lesions, ultrasonography, FNAC, histopathology

Introduction

Parotid is a superficial, readily accessible major salivary gland. Preoperative assessment of parotid swelling by sonography and cytology is especially important in our country where tuberculosis and metastatic squamous cell carcinoma invading perisalivary lymph nodes mimic parotid swelling. Differentiation between non-neoplastic salivary disease and salivary gland tumor is not difficult. Accurate subtyping and grading of salivary neoplasms are only possible with combine efforts of a sonologist and a pathologist. Parotid lesions are increasing detected by sonography. At the same time, fine-needle aspiration cytology (FNAC) is also gaining ground as a diagnostic modality.

Pathology remains the final tool for diagnosis. Till date, ultrasonography (USG) is acting as a bridge between surgery and pathology. However, with increasing use, it is evident that USG is becoming more reliable as a predictor of the exact nature of parotid lesions.

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Materials and Methods

A retrospective and prospective randomized study was performed on more than 210 patients during a period of 5 years (i.e., from 2008 to 2012). The data were obtained

Table 1: Protocol for USG and FNAC

Title	USG	FNAC/Cytology
Preparation	No special preparation	No special preparation, but written consent must
Equipment	HR 7–14 MHz linear transducer and curved linear for deep portion	23 G, 1″ needle with three parts, 20 ml disposable syringe
	Color Doppler/ power for vessels and vascularity assessment	
Techniques	Assess the glands echogenicity. It is similar to muscles echogenicity. Owing to the fat content, the parotid will be more attenuative than the submandibular gland.	Blind procedure: hold the gland firmly, take FNAC from 2 different sides and direction and prepare 3 slides from each side.
	Compare both sides—God give us pair organs.	Air dried-MGG
	Size, location, vascularity, surrounding anatomy including lymph node, duct dilatation, confirm with a color Doppler.	Alcohol fix-Pap stain and 1 slide kept reserve for future study
Hard Copy	Parotid gland long and transverse, accessory parotid gland, right and left side of the neck. Document the normal anatomy. Any pathology found in 2 planes including measurements and vascularity.	Preserve all slides for 3 years

Table 2: Sonographic findings during the year 2008–2012

Year	Benign	Malignant	Cystic	Others	Total
2008	10	02	02	04	18
2009	22	05	03	02	32
2010	24	07	06	05	42
2011	26	10	08	08	52
2012	35	11	10	10	66
Total	117	35	29	29	210

from the Department of Radio Diagnosis and Department of Pathology of M.G.M. Medical College, Indore.

Experimental Work

A total of 210 cases were included in the study. In all cases, USG results were compared with cytology (FNAC), histopathology, and with cytology plus histopathology. In this study, some exclusion criteria were the following: FNAC was not USG-guided because of the heavy work-load in both departments. The age and sex were not used as determinants. Color Doppler and power angio study were considered in few cases.

Report Format for USG

The report format used for USG is as follows:

1. Enlargement: Parotid or periparotid
2. Nodular : Solid/cystic/mixed
3. Echogenicity : Iso/Hyper/Hypo or mixed
4. Intraparotid duct: Lymph node, calcification, calculi, facial nerve—absent/present
5. Lobular architect, margins: Regular/irregular
6. Vascularity
7. Lymph node in the vicinity

Results

In this study, it was found that USG has emerged as a potent diagnostic modality in parotid lesion. Results indicate an approximately 240% increase in the use of USG. At the same time, an approximately 230% increase in use of FNAC was also found. An accurate correlation (90%) between USG finding and FNAC finding was found in non-neoplastic lesion (inflammatory and cystic). Histopathology also remains a gold standard. The results

Table 3: Diagnosis based on FNAC

Cytological opinion	Description	2008	2009	2010	2011	2012
Benign	Pleomorphic adenoma	06	12	12	15	17
	Warthin's tumor	04	10	12	11	18
Malignant	Mucoepidermoid Carcinoma	1	1	2	2	2
	Adenoid cystic carcinoma	–	1	1	2	3
	Aciner cell carcinoma	1	1	1	2	2
	Metastatic carcinoma	–	1	1	2	2
	Adenoid carcinoma	–	1	2	2	2
Cystic	–	2	3	6	8	10
Others	–	4	2	5	8	10

Table 4. Histopathology data of parotid tumors

Histopathological diagnosis	2008	2009	2010	2011	2012
Pleomorphic adenoma	06	12	12	15	17
Warthin's tumor	04	10	12	11	18
Mucoepidermoid carcinoma	1	1	2	2	2
Adenoid cystic carcinoma	–	1	1	2	3
Aciner cell carcinoma	1	1	1	2	2
Metastatic carcinoma	–	1	1	2	2
Adenoid carcinoma	–	1	2	2	2

Table 5. Comparison of USG and FNAC

Year	Modality	Benign	Malignant	Cystic	Other	Total
2008	USG	10	02	02	04	18
	FNAC	10	22	24	26	35
2009	USG	22	05	03	02	32
	FNAC	02	05	07	10	11
2010	USG	24	07	06	05	42
	FNAC	2	3	6	8	10
2011	USG	26	10	08	08	52
	FNAC	26	10	08	08	52
2012	USG	35	11	10	10	66
	FNAC	4	2	5	8	10

Suspicious malignant lesions on USG are kept in malignant category.

Table 6: Comparison of the value of FNAC in diagnosis of salivary gland tumors

Studies	Malignant tumors		Benign tumors	
	Cytologically concordant, *n* (%)	Cytologically discordant, *n* (%)	Cytologically concordant, *n* (%)	Cytologically discordant, *n* (%)
Colella et al.[2]	387 (79.95)	97 (20.04)	1,219 (95.608)	56 (4.39)
Christensen et al.[3]	32 (71)	3 (5.45)	258 (98.47)	3 (1.145)
Jain et al.[4]	13 (92.85)	1 (7.14)	62 (93.93)	4 (6.06)
Mihashi et al.[5]	15 (88.23)	2 (11.76)	87 (100)	0 (0.0)

of the sonographic findings during 2008–2012 are depicted in Table 2. The diagnosis based on FNAC is given in Table 3. The histopathological results are depicted in Table 4. The results of comparative study of the USG and FNAC are described in Table 5 and those of various studied previously conducted are depicted in Table 6.

Discussion

According to Kovacević et al.,[1] fine-needle aspiration biopsy revealed 18 (22%) malignant tumors, 30 (38%) benign tumors, and 32 (40%) non-neoplastic lesions. Among 33 solitary tumors, 9 were malignant tumors and 24 were benign tumors. The majority of the parotid lesions were hypoechoic. The USG feature that was most often associated with a benign lesion was distal acoustic enhancement. The USG features that suggested malignancy were a heterogeneous echo texture, indistinct margins, and regional lymph node enlargement. The results of the present study, which was carried out during 2008–2012, prove that USG has emerged as a potent diagnostic modality in parotid lesion. It was found that 117 cases of parotid lesions were diagnosed as benign by USG from 2008 to 2012 whereas 44 lesions were detected by FNAC. Similarly, 35 cases were diagnosed malignant by USG whereas 42 were diagnosed as malignant by FNAC. In different studies, FNAC was found to be very accurate in making diagnosis of salivary gland tumors.

Conclusion

From the result of the present work, it can be concluded that an accurate correlation (90%) between USG finding and FNAC finding was found for non-neoplastic lesion (inflammatory and cystic). In neoplastic lesions FNAC is

still a better predictor. However, USG also appears as a modality of conclusion. Histopathology also remains a gold standard. Reporting of cystic lesion is nonconclusive and often misleading. A more in-depth study of this aspect may prove fruitful. Many times, hemorrhagic/acellular smear reported on FNAC are hindrance to a quick diagnosis. This is an extremely encouraging and heartening sign of progress because accuracy in sonography is beneficial for patient as well as for the doctors.

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