Fine-needle Aspiration Puncture in Parotid Gland Lesions

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SUMMARY

Introduction: The fine-needle aspiration puncture is a safe and effective method in the investigation of parotid gland lesions.

Objective: Evaluate the correlation between the cytological findings of fine-needle aspiration puncture and the histological diagnosis in patients with parotid gland lesions.

Method: Retrospective study of 58 patients submitted to fine-needle aspiration puncture and posterior to surgical treatment between January 2001 and January 2005.

Results: Positive correlation with histological results occurred in 44 cases (75,86%) and negative correlation occurred in 14 cases (24,14%). Considering the ability of fine-needle aspiration puncture in diagnoses neoplasm, independently of histological type, there was a positive correlation in 49 cases (84,48%) and a negative correlation in nine cases (15,52%). The sensibility was of 82,4%, specificity of 100%, positive predictive value of 100%, negative predictive value of 43,8% and accuracy of 84,4%.

Conclusion: The fine-needle aspiration puncture in parotid gland lesions is an effective method for evaluation and therapeutic planning, proportioning better conditions for case discussion between the physician and patient.

Key words: biopsy, parotid neoplasms, cytology, histology.

INTRODUCTION

The technique of aspiratory puncture with fine needle (APFN) was initially used to investigate injuries in salivary glands around 1920 (1,2) with improvement and development between 1950 and 1960 and popularization in the seventies (3,4). It is a minimally invasive diagnostic examination and of low cost (5,6) used in the differentiation between neoplasia and non-neoplasia injuries and being able to differentiate between a benign or malign neoplasia injury (7).

The APFN presents considerable advantages in the diagnosis in relation to the radiological findings and of physic examination (8,9) as well as in relation the surgical conventional biopsies (10) being that this procedure not always can be discharged (11).

Hemorrhages, hematomas, neoplasia dissemination and injury of the face nerve are some possible complications (12,13).

Being injuries of the parotid region a diagnostic challenge and considering the APFN an excellent procedure for the diagnosis of the tumoral injuries of the parotid region, we investigate its capacity in promoting a correct diagnosis of these injuries comparing the cytological and histological findings of submitted patients with the parotidectomia with previous puncture.

METHOD

Retrospective analysis of the data of 156 patients submitted to the resection of injuries in parotid region in our hospital between January 2001 and January 2005. 58 patients with injury in topography of parotid gland were selected, who submitted to the pre-surgical APFN with positive cytological results. All the patients had been guided and had assented in terms of the accomplishment of the APFN and the surgical treatment.

The APFN was carried through by an only pathologist doctor of our hospital, with experience in the method, who also prepared the material and interpreted the findings. The puncture was carried through with needle 0.70 X 30/ 22G 1 ¼ with cytoaspirator connected to the syringe of 20 ml and guided by ultrasonography (US). A smear of the material obtained was done in 6 microscopy blades, half of which were imbibed in 96% alcohol and the remains sent to laboratory dry. The material was stained by the method of Papanicolau or eventually by the method of Giemsa.

The patients were submitted to surgical treatment that varied according to the necessity of each case being carried through since partial parotidectomies with preservation of the face nerve until total parotidectomies. Twenty and eight patients were male and thirty female with average age varying between 61.2 ± 18.5 years and 69.3 ± 15.6 years, respectively.

The findings of the cytology were divided in two groups: neoplasia and non-neoplasia injuries. The injuries of the first group had been classified in adenolymphoma, pleomorphic adenoma, mucoepidermoid carcinoma and squamous cell carcinoma. The second group injuries were classified in sialoadenitis, cyst and lymphoid hyperplasia. These findings were compared with the histological findings of the material in paraffin and the agreement among them evaluated by calculating the sensitivity, specificity, positive predictive value, negative predictive value and accuracy. These same calculations were carried through in the independent evaluation of the diagnosis of adenolymphoma and pleomorphic adenoma. Study registered in the committee of ethics of the institution (protocol 049/06).

RESULTS

The cytological findings of the APFN were divided in neoplasia and non-neoplasia injuries (Table 1). It had positive correlation between the cytological and histological results in 44 cases (75.86%) and negative correlation in 14 cases (24.14%) (Table 2).

Considering the capacity of the APFN in diagnosing neoplasia, independent of the histological type, it had a

Table 1. APFN cytology.

Non-Neoplasia	N	Neoplasia	N	
Sialoadenitis	9	Adenolymphoma (Warthin tumor)	11	
Cyst	5	Pleomorphic adenoma	28	
Lymphoid Hyperplasia	2	Mucoepidermoid Carcinoma	1	
		Squamous Cell Carcinoma	2	
TOTAL	16		42	58

positive correlation in 49 cases (84,48%) and a negative correlation in 9 cases (15,52%) (Table 3). Sensitivity (s) was of 82.4%, specificity (e) of 100%, positive predictive value (PPV) of 100%, negative predictive value (NPV) of 43.8% and accuracy of 84.4% (Table 4).

The relation of the divergent diagnostic between cytology and histology is shown in Table 5. In relation to these divergent diagnostic in 9 punctures classified as non-neoplasia the histological result showed to be neoplasia and benign injuries. In the 5 punctures with diagnosis of neoplasia, being 2 malignant and 3 benign, the histology showed that the 2 benign neoplasias in the cytology were malignant in the histology and the 3 malignant neoplasias of the cytology were benign in the histology. The classifications of all the injuries with their respective cytological and histological diagnostics are shown in Table 6.

All the punctures with cytology of pleomorfic adenoma (28) had confirmation in the histology although in others 8 cases with varied punctures (goal CEC, sialoadenitis, lymphoid hyperplasia, mucoepidermoid carcinoma) the histology revealed to be pleomorfic adenoma. The calculations for this diagnosis showed a sensitivity of 77.7%, specificity of 100%, PPV of 100%, NPV of 61.1% and accuracy of 86.2% (Table 7).

In relation to the diagnosis adenolymphoma, in 2 cases the histology did not confirm the diagnosis that were compatible with malignant neoplasia being 1 cystic adenoid and 1 mucoepidermoid. In 1 case with puncture of cyst the histology showed to be about one adenolymphoma. We have thus a sensitivity of 86.2%, specificity of 95.8%, PPV of 81.8%, NVP of 97.8% and accuracy of 94.8% (Table 8).

Hematomas, infection, implantation of neoplasia cells, damages to the face nerve or other complications in the accomplishment of the APFN were not observed.

Discussion

Our study showed that in 44 cases (75.86%) there was a positive correlation between the cytological findings and the histological results found after the surgery of patients with injuries in parotid gland. When we consider the capacity of the APFN in diagnosing neoplasia injuries we observe a little bigger positive correlation, occurring in 49 cases (84.48%) and with a accuracy of 84.4%, concordant with literature (7,14).

Among the 9 cases (15.51%) in which there wasn't a positive correlation between the cytology and the histology we observe that the histological diagnosis was of

Table 2. Correlation between APFN diagnosis and AP.

Positive	44	-75,86%
Negative	14	-24,14%
TOTAL	58	

Table 3. Correlation of APFN diagnosis and AP in relation to neoplasia diagnosis.

Positive	49	84,48%
Negative	9	9,68%
TOTAL	58	

Table 4. Data concerning neoplasia and non-neoplasia.

Sensitiveness	82,40%
Specificity	100%
Predictive Positive Value	100%
Predictive Negative Value	43,80%
Accuracy	84,40%

Table 5. Summary of disagreeing diagnosis.

APFN	AP
Sialoadenitis (5)	Pleomorphic adenoma (4) Adenocarcinoma (1)
Cyst (3)	Adenolymphoma (Warthin tumor) (2) Cystoadenoma (1)
Lymphoid Hyperplasia (1)	Pleomorphic adenoma (1)
Adenolymphoma (Warthin tumor) (2)	Mucoepidermoid Carcinoma (1) Cystic Adenoid Carcinoma (1)
Mucoepidermoid Carcinoma (1)	Pleomorphic adenoma (1)
Squamous Cell Carcinoma (2)	Pleomorphic adenoma (2)

Table 7. Data concerning pleomorphic adenoma.

Sensitiveness	77,70%
Specificity	100%
Predictive Positive Value	100%
Predictive Negative Value	61,10%
Accuracy	86,20%

Table 8. Data concerning adenolymphoma.

Sensitiveness	86,20%
Specificity	95,80%
Predictive Positive Value	81,80%
Predictive Negative Value	97,80%
Accuracy	94,80%

Table 6.

Case	Gender	APFN Diagnosis	APFN Hystological	AP Diagnosis	AP Hystological
1	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
2	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
3	M	Malign	Malign Carcinoma	Benign	Pleomorphic Adenoma
4	F	Non-neoplasia	Rici	Non-neoplasia	Rici
5	M	Non-neoplasia	Rici	Benigno	Pleomorphic Adenoma
6	F	Non-neoplasia	Lymphoeptelial Benign Lesion	Benign	Pleomorphic Adenoma
7	M	Non-neoplasia	Cyst	Benign	Adenolymphoma
8	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
9	F	Non-neoplasia	Rici	Non-neoplasia	Rici
10	M	Benign	Adenolymphoma	Benign	Adenolymphoma
11	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
12	F	Non-neoplasia	Cyst	Benign	Adenolymphoma
13	M	Benign	Adenolymphoma	Benign	Adenolymphoma
14	F	Malign	Malign Metastase	Benign	Pleomorphic Adenoma
15	F	Benign	Adenolymphoma	Benign	Adenolymphoma
16	F	Non-neoplasia	Cisto	Benign	Cyistoadenoma
17	M	Benign	Adenolymphoma	Benign	Adenolymphoma
18	F	Benign	Adenolymphoma	Benign	Adenolymphoma
19	M	Non-neoplasia	Rici	Benign	Pleomorphic Adenoma
20	M	Non-neoplasia	Cyst	Non-neoplasia	Cyst
21	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
22	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
23	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
24	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
25	M	Non-neoplasia	Rici	Benign	Pleomorphic Adenoma
26	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
27	F	Non-neoplasia	Lymphoid Hyperplasia	Non-neoplasia	Lymphoeptelial Benign Lesion
28	M	Non-neoplasia	Rici	Non-neoplasia	Rici
29	M	Non-neoplasia	Cyst	Non-neoplasia	Cyst
30	M	Benign	Adenolymphoma	Benign	Adenolymphoma
31	F	Malign	Mucoepidermoid Ca	Benign	Pleomorphic Adenoma
32	F	Benign	Adenolymphoma	Malign	Mucoepidermoid Ca
33	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
34	F	Benign	Adenolymphoma	Malign	Adenocystic Ca
35	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
36	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
37	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
38	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
39	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
40	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
41	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
42	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
43	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
44	F	Non-neoplasia	Rici	Malign	Adenocarcinoma
45	M	Benign	Adenolymphoma	Benign	Adenolymphoma
46	F	Non-neoplasia	Rici	Benign	Pleomorphic Adenoma
47	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
48	M	Benign	Adenolymphoma	Benign	Adenolymphoma
49	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
50	F	Non-neoplasia	Rici	Non-neoplasia	Rici
51	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
52	M	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
53	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
54	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
55	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
56	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma
57	M	Benign	Adenolymphoma	Benign	Adenolymphoma
58	F	Benign	Pleomorphic Adenoma	Benign	Pleomorphic Adenoma

malignant neoplasia in all the cases. We know that there is a great difficulty in the diagnosis of malignant neoplasias with a trend to underestimating the findings thus classifying the finding as benign neoplasia (15,16) being what occurred in relation to our disagreeing diagnostic where the cytology showed a diagnosis of adenolymphoma and the histology confirmed a diagnosis of mucoepidermoid carcinoma in a case and a carcinoma cystic adenoid in another one.

In relation to the disagreeing diagnostics with puncture of malignant neoplasia it was about a mucoepidermoid carcinoma with histology of pleomorphic adenoma and two metastases of squamous cell carcinoma with histology of pleomorphic adenoma demonstrating habitual diagnostic confusion in relation to the pleomorphic adenoma and the malign injuries (8,17,18,19).

We do not observe false positives in the correlation of the cytological findings and histological as for the neoplasia diagnosis thus justifying the high value of the specificity and agreeing to the literature that presents a variation between 0% and 6% (8,15,20,21,22).

In relation to the false negatives we observe that in 5 injuries classified as sialoadenitis they were in fact about 4 benign neoplasia injuries (pleomorphic adenoma) and a malignant neoplasia injury (adenocarcinoma). We know that for the diagnosis of a neoplasia injury the identification of distinct cellular types is necessary and that the malignity diagnosis is based on the finding of signals as invasion and destruction of fabric to salivar normal, anaplasia, pleomorphism and atypical mitosis (14). In these cases, we believe that the material has been collected in inadequate place or specifically in the malignity case the material has been insufficient for a correct diagnosis. In relation to the cytology of lymphoid hyperplasia with histology of pleomorphic adenoma we believe that even with the orientation of the ultrasonography the punctured place did not correspond to the place of the injury. The cystic injuries present a great percentage of false diagnostics (3,6,19), being that in 3 of our cases the histológico examination revealed to be about benign neoplasia injuries: 2 adenolymphomas and 1 cystoadenoma.

All the cytological diagnostisis of pleomorphic adenoma were confirmed in the histology leading to a specificity of 100% and sensitivity of 77.7% while sensitivity for the diagnosis of adenolymphoma was of 86.2% what goes against the findings of Atula and col that shows a bigger sensitivity in relation to the diagnosis of pleomorphic adenoma between the benign neoplasia injuries. Perhaps this difference can be justified by our reduced sample.

Even with an accuracy above 80% in the differentiation between the neoplasia and non-neoplasia injuries, we come across with the false negative results that can consequently lead to an incorrect diagnosis and to an improper treatment (14,20). We thus realize the importance of the medical follow-up for the patients whose puncture result presented non-neoplasia injury and that were not submitted to the surgery. We point out that the decision of surgical approach in the cases of puncture with non-neoplasic diagnosisis related to the clinical suspicion of the surgeon in being a neoplasia injury, based on clinical history, physical examination and radiological examinations which also increases the sensitivity of the APFN (23,24). The surgical treatment exactly with the negative APFN is considered many times the best therapeutic option (11).

We know that our casuistry is small, mainly in relation to the diagnostic of malignant neoplasias, but we consider the study opportune for the classification and better understanding of the data in our environment.

The APFN is a safe diagnostic procedure and of easy accomplishment that causes little discomfort to the patient with improvement of its accuracy when guided by US (25,26). The main objective of the cytological diagnosis is the differentiation between neoplasia and non-neoplasia injuries and if possible the differentiation of the neoplasia injuries in benign or malignant, being that the histological definition of the tumor will be carried through, in the majority of the times, in definitive in the histological study. However, the main point to be considered is the capacity of the examination in supplying to a cytological trustworthy pre-operatory diagnosis that is of great value for the therapeutical planning mainly in patients with important comorbities in which the surgical risk is high. Therefore, the APFN is a widely used examination for the diagnosis and surgical planning of the neoplasias of salivary glands allowing to one better interaction between the doctor and the patient, providing a discussion on the therapeutical options and promoting a more conscientious decision on the considered treatment. However, all professionals that use the APFN in practical clinic must be aware of the limitations of the method.

Conclusion

The aspiratory puncture with fine needle of injuries in parotid gland reveals to be an adequate method of evaluation and therapeutical planning providing to better conditions for the discussion of the case between the doctor and his/her patient.

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