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Research Article

Diagnostic Accuracy of Fine Needle Aspiration Cytology in Pleomorphic Adenoma of Submandibular Gland

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Abstract

Objective: The study evaluated the usefulness and accuracy of fine needle aspiration cytology (FNAC) in the diagnosis of pleomorphic adenoma of the submandibular gland (SMG).

Methods: From January 2006 to December 2012, 31 patients with SMG benign tumors were treated at Chonnam National University Hospital. Twenty nine cases involved preoperative FNAC. A retrospective chart review analyzed the results of FNAC and compared them with the corresponding histopathological diagnosis.

Results: Preoperative FNAC diagnosed pleomorphic adenoma in 25 of the 29 patients. The remaining four patients were diagnosed with chronic sialadenitis (n = 2), suspicious of malignant tumor (n = 1) or unsatisfactory specimen (n = 1). All 29 patients underwent SMG tumor removal. FNAC had a diagnostic sensitivity of 85.7%, positive-predictive value of 96.0% and accuracy of 82.8% for diagnosing pleomorphic adenoma of SMG.

Conclusion: Preoperative FNAC is a useful and accurate adjunct in the workup of pleomorphic adenoma of SMG. Preoperative FNAC should be part of the initial evaluation of submandibular masses.

Keywords: Fine needle aspiration; Preoperative procedure; Submandibular gland neoplasm; Pleomorphic adenoma

Introduction

Salivary gland neoplasms are uncommon and account for an estimated 3-4% of head and neck tumors [1,2]. The submandibular gland (SMG) contributes to only 8-12% of salivary gland tumors [1,2]. In addition, enlarged or symptomatic SMGs are often the result of non-neoplastic lesions, such as sialolithiasis or sialadenitis [1,3]. This, along with the relative rarity of neoplastic lesions of SMG, often leads to delayed diagnosis and treatment of these lesions.

Fine needle aspiration cytology (FNAC) may be a valuable and sufficient technique mainly for the assessment of SMG tumors. FNAC is essential in the basic workup of many tumors of the head and neck [4]. The technique is rapid, easy to perform, safe, well-tolerated and complications are rare [5,6]. FNAC has been used in the investigation of salivary gland lesions for many years [6]. However, the role of FNAC in the workup of salivary gland tumors has been debated [6,7].

At Chonnam National University Hwasun Hospital, FNAC of submandibular masses are usually performed on patients during their first clinical visit and is used as the initial procedure for further management of all patients. Herein, we review our experience with the diagnostic accuracy of FNAC in SMG benign tumors. The aim of this study was to evaluate the usefulness and accuracy of FNAC in the diagnosis of pleomorphic adenoma of SMG in comparison to the histopathological findings.

Materials and Methods

After obtaining approval from the Institutional Review Board of Chonnam National University Hwasun Hospital, a retrospective review was performed to evaluate patients with a preoperative diagnosis of SMG benign tumor at the hospital's Department of Otolaryngology-Head and Neck Surgery from January 2006 to December 2012. A diagnosis of SMG benign tumor was made based on symptoms, mass location and the results of imaging studies. Thirty-one patients with a preoperative diagnosis of SMG benign tumor were identified based on their medical records.

Charts were reviewed to obtain information about preoperative diagnostic workup, surgical procedures, pathologic diagnoses, and postoperative clinical outcomes. Metastatic tumors, malignant tumors and lymphomas were excluded from this study. After reviewing preoperative diagnostic workup, two patients who did not undergo preoperative FNAC were excluded.

The remaining 29 patients diagnosed as SMG benign tumor underwent removal of the tumor. The transcervical procedure for SMG excision under general anesthesia was used for all patients. All cases of SMG benign tumor were confirmed histopathologically.

Results

Twenty-nine of 31 pediatric patients underwent FNAC before surgical removal of SMG benign tumors. This group of patients included 11 (37.9%) males and 18 (62.1%) females. The age of the patients ranged between 17 and 75 years with a mean of 45.6 years. A submandibular mass was observed in all patients. Preoperative evaluation included physical examination, radiologic procedures and FNAC. All patients in our study underwent preoperative computed

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Table 1: Results of fine needle aspiration cytology and histopathologic examination.

		Histopathologic results	
		PA (n = 28)	Myoepithelioma (n=1)
FNAC results	PA (n = 25)	24	1
	Chronic sialadenitis (n = 2)	2	
	Malignant tumor (n = 1)	1	
	Unsatisfactory specimen (n = 1)	1	
Total	29	28	1

FNAC, Fine needle aspiration cytology; PA, Pleomorphic adenoma

tomography. In addition, six patients underwent preoperative ultrasound accompanied by computed tomography scans.

FNAC was performed preoperatively on all patients. Hematoma, infection, facial nerve damage, implantation of tumor cells or other complications were not observed. Twenty-five of the 29 patients were diagnosed as pleomorphic adenoma by FNAC. The remaining four patients were diagnosed with chronic sialadenitis (n = 2), suspicious of malignant tumor (n = 1) or unsatisfactory specimen (n = 1). However, final histopathological results were little different. Twenty-eight patients had pathologically confirmed pleomorphic adenoma. The remaining patient had myoepithelioma. A summary of the pathologic results is shown in Table 1.

FNAC had a diagnostic sensitivity of 85.7%, positive-predictive value of 96.0%, and accuracy of 82.8% for diagnosing pleomorphic adenoma of SMG (Table 2).

There were no major complications resulting from surgical intervention. On marginal mandibular nerve injury, six patients presented neurological sequelae that resolved spontaneously within 6 months. Partial anesthesia of tongue sense developed in two cases due to the contusion of the lingual nerve by compression or retraction during surgery. Resolution was complete within 4 weeks. Disease recurrence was not observed in any of the patients.

Discussion

The accuracy of FNAC is quite good, as reflected in its sensitivity, specificity, positive predictive value and negative predictive value [7,8]. In this study, the sensitivity and accuracy for diagnosing pleomorphic adenoma of SMG was 85.7% and 82.8%, respectively. These values suggest that FNAC is a reliable method in assessing pleomorphic adenoma of SMG. In our study, one false positive result occurred in the diagnosis of pleomorphic adenoma of SMG. The patient was diagnosed with a pleomorphic adenoma, which eventually proved to be a myoepithelioma. Myoepithelioma of SMG is extremely rare [9]. It can be difficult to distinguish pleomorphic adenoma and myoepithelioma by means of the presence of a prominent ductular element, a larger stromal component and chondroid and myxochondroid foci [9].

There were four false negative finding in the diagnosis of pleomorphic adenoma of SMG. One case diagnosed as suspicious of malignant tumor turned out to be pleomorphic adenoma. However, this patient underwent FNAC at a local hospital and not at our institution. FNAC can be difficult to interpret as the smears

Table 2: Results of fine needle aspiration cytology and histopathologic examination for pleomorphic adenomas of submandibular gland.

		Histopathologic results	
		PA (n = 28)	Other disease (n = 1)
FNAC results	PA (n = 25)	24	1
	Other disease (n = 4)	4	0
Total	29	28	1

FNAC, Fine needle aspiration cytology; PA, Pleomorphic adenoma

are often hypocellular or poor quality, and do not allow a confident diagnosis [10]. Therefore, it was important that FNAC was assessed by experience of clinician in training under close supervision of an expert. Another two cases diagnosed as chronic sialadenitis turned out to be a pleomorphic adenoma. Such misdiagnoses can result from unrepresentative sampling [11]. It is usually possible to reach a correct interpretation using a combination of clinical and radiologic examinations [11]. In this study, we performed surgical excision of SMG tumors after verifying SMG mass by radiologic examination. In the last case, the result of FNAC was an unsatisfactory specimen. Ultrasound-guided FNAC has the potential to increase the yield [12]. Ultrasound-guided FNAC was conducted in three patients, and its accuracy was 100%. In addition, when the clinical suspicion is high, repeating FNAC might increase accuracy [1,13]. The low specificity in this case might also have reflected the somewhat small sample size.

FNAC can be used in a step-wise manner initially to determine the salivary gland origin of a neck swelling, secondly to offer guidance as to its neoplastic or non-neoplastic nature and finally, in the case of tumors, to determine its benign or malignant character [14]. The distinction between neoplastic and non-neoplastic salivary lesions was highly reliable, supporting conservative management in many patients [6]. If the results of FNAC reveals non-neoplastic lesions, this provides rapid reassurance to both patients and clinicians, and helps to avoid unnecessary surgery in many cases [6,8,15,16]. In addition, some benign neoplasms occurring in elderly patients may be better managed by watchful waiting than by immediate surgical excision [7,8]. FNAC appears to be cost-effective in addition to supplying preoperative diagnoses helpful in counseling, operative planning and allaying patient anxiety [8].

Pleomorphic adenoma is the most common benign tumor [1,2,17]. All benign tumors except one in our study were pleomorphic adenomas. Surgical excision is a safe and effective treatment of SMG tumors [1,2,17]. Temporary marginal mandibular nerve weakness is the main postoperative complication reported after excision of SMG tumors [18]. Recurrence following pleomorphic adenoma excision is uncommon [1].

In summary, we documented the high diagnostic accuracy and sensitivity of FNAC in pleomorphic adenoma of SMG, and confirmed that FNAC is a valuable diagnostic tool in the workup of pleomorphic adenoma of SMG. However, false positive and false negative results can occur. FNAC be used in combination with clinical examination and a radiological approach [6,17]. For analyzing a FNAC an experienced pathologist is of major importance to gain good assumptions for the final histopathology. In addition, repeat FNAC or ultrasound-guided FNAC is useful in patients who have a non-diagnostic or negative finding on FNAC [1,12,13].

Conclusion

Preoperative FNAC is a useful and accurate adjunct in the workup of pleomorphic adenoma of SMG. FNAC is helpful for counseling and surgical planning and should be considered in all cases of SMG tumors before surgical excision. Preoperative FNAC should be part of the initial evaluation of submandibular masses.

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