Diagnostic dilemma of parotid lipomas: imaging versus fine needle aspiration cytology

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ABSTRACT

Lipomas are common soft tissue neoplasms; however, they are found rarely in the parotid gland region. The purpose of this study was to analyze the diagnostic challenges of this rare condition. We performed a retrospective analysis of 11 patients with parotid lipomas, treated from November 2009 to February 2014. The mean age at diagnosis was 46.6±2.9 years, and the study population included 8 males and 3 females. Computed tomography (CT) and/or magnetic resonance imaging (MRI) were performed in radiological diagnosis. Fine needle aspiration (FNA) was performed in all cases (including two times in five patients, for a total of 16 biopsies) and results were diagnostic in four instances. Specificities of the CT, MRI, and FNA cytology tests were 100%, 100%, and 25% respectively. CT and/or MRI scans were more reliable than FNA cytologies for accurate diagnosis of parotid lipomas.

KEY WORDS: lipoma; parotid gland; diagnosis; radiology; cytology

Bosn J Basic Med Sci. 2014;14(4):250-253.

INTRODUCTION

Parotid lipomas are uncommon, slow-growing, non-metastasizing mesenchymal neoplasms composed of mature adipose tissue with a fibrous capsule [1,2]. Approximately 25% of lipomas and their variants arise in the head-and-neck region and most of these occur subcutaneously in the posterior neck. Rarely, lipomas can develop in the parotid gland, with reported incidence ranges from 0.6 to 4.4% of all parotid tumors. They appear most frequently in the fifth and sixth decades of life, with a marked male predominance [3]. Parotid lipomas can be diagnosed by ultrasonography (USG), CT or MRI [4]. FNAB (fine needle aspiration biopsy) can also be performed. Surgical excision is considered definitive treatment [5]. The goal of the present study was to analyze the diagnostic challenges of this rare condition.

MATERIALS AND METHODS

Between November 2009 and February 2014, 11 consecutive patients with parotid gland lipomas were identified. USG, CT, MRI, and FNA cytology were used for preoperative diagnosis. FNA was performed using a 22-gauge needle attached to a 10-mL syringe. Definitive diagnosis was confirmed by postoperative histopathological examination in all patients. Descriptive statistics and specificities for diagnosis by CT, MRI, and FNAB were generated.

RESULTS

The mean age at diagnosis was 46.6±2.86 years (range, 34 to 59 years), and the study population included eight male and three female patients.

Contrast-enhanced CT or MRI scans were used for radiological assessment in seven cases. Three patients (Cases 2, 6 and 8) received both CT and MRI scans. Imaging scans revealed homogenous masses with regular surfaces and densities consistent with lipomatous tissue. Sixteen FNA samples, including two samples from 5 of the 11 patients, were obtained for preoperative cytologic examination. While 4 of the 16 FNA samples revealed mature-appearing adipose tissue (Figure 1a), 12 samples were characterized as insufficient or non-diagnostic. Postoperative histopathological examination in all cases revealed mature adipose tissue with a fibrous capsule (Figure 1b). Specificities of the CT, MRI, and FNA cytology

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Submitted: 1 August 2014 / Accepted: 21 September 2014

tests were 100%, 100%, and 25% respectively. Radiological and histopathological aspects of diagnosis are summarized in Table 1.

All lesions were intraparotid and unilateral. Ten tumors originated from the superficial lobe, and one tumor involving both the superficial and deep lobes also extended to the parapharyngeal space (Figures 2a and 2b). Average tumor dimensions were 40.4 × 28.4 × 20.8 mm, ranging from 26 × 15 × 17 mm to 83 × 53 × 30 mm.

DISCUSSION

As with any mass in the parotid region, results of imaging investigations (USG, CT and MRI) and FNA cytology must be analyzed in context to arrive at the correct diagnosis [3]. The utility of these two diagnostic approaches is unclear, with some studies having found that imaging and FNA biopsies are comparable in their preoperative accuracy, and that combination the two diagnostic approaches has no added value [6].

Although the sensitivity of USG in diagnosis of lipoid lesions is limited, an elongated echogenic mass in the subcutaneous tissues should suggest the diagnosis of lipoma [7]. We used USG in all cases as an initial diagnostic approach before FNA. We did not include USG findings in this study because USG alone does not provide sufficient information about the exact location, borders, and relationship to the facial nerve for lesions in the parotid region [9,10].

CT and MRI are the imaging modalities of choice for facilitating the diagnosis of parotid gland lipomas. Imaging is also important in evaluating tumor location and formulating a surgical approach [8,9].

Contrast-enhanced high resolution CT is a useful radiological tool in the diagnosis of parotid lipoma. Normal parotid tissue reveals a positive density; however, lipomatous tissue reveals a well-demarcated, hypodense density (–50 to –150 Hounsfield units) [8,9]. In MRI, studies, lipomas show a high T1 and low T2 signal characteristic of fatty tissue that is comparable in signal intensity to subcutaneous fat. The fat suppression sequence of lipomatous lesions demonstrated on MRI clearly distinguishes these masses from other types of tumors, provides superior soft tissue definition, and accurately reveals the location of the tumor in relation to the facial nerve [9,10].

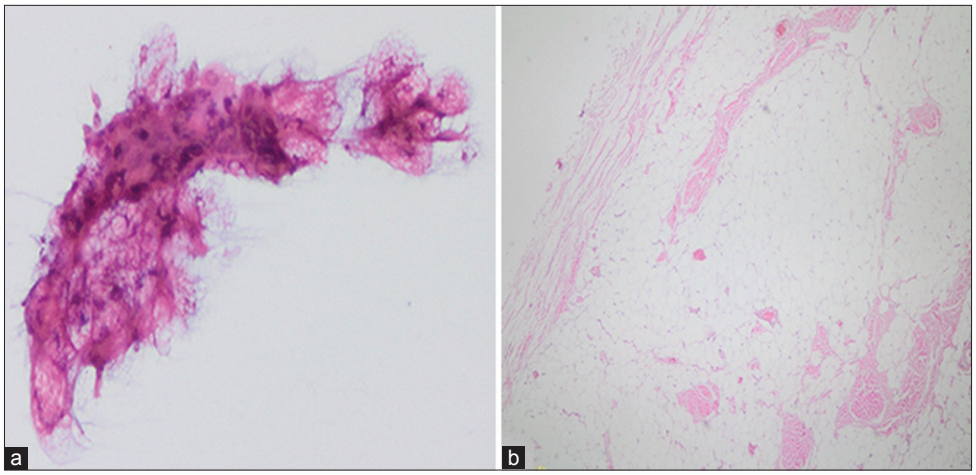

FIGURE 1. (a) Aspirate smear showing mature adipocytes with spindle-shaped nuclei and vacuolated cytoplasm (Papanicolaou stain ×200). (b): Tissue section revealing mature adipocytes and fibro-collagenous stroma with a fibrous capsule (Hematoxylin & Eosin ×40).

TABLE 1. Diagnostic features of the patients

Case	CT	MRI	FNA cytology
1	-	Homogeneous and regular surfaced mass	Lipomatous lesion
2	Adipose tissue signal density mass arising from deep and superficial lobe and spreading to parapharyngeal area (Figure 2a)	Homogeneous mass in fat-suppressed sequences from deep and superficial lobe and protruded to parapharyngeal area	Lipomatous lesion
3	Well-demarcated, adipose tissue density mass	-	Lipomatous lesion
4	Homogenous, adipose tissue density mass	-	Non-diagnostic (two times)
5	-	Homogeneous mass in fat-suppressed sequences	Lipomatous lesion
6	Well-demarcated homogenous and adipose tissue density mass spreading to deep lobe	Homogeneous and regular surfaced mass spreading to deep lobe (Figure 2b)	Non-diagnostic (two times)
7	Well-demarcated, adipose tissue density mass	-	Non-diagnostic
8	Well-demarcated, adipose tissue density mass in the parotid superficial lobe	Homogeneous and regular surfaced mass in fat-suppressed sequences	Non-diagnostic
9	Well-demarcated, homogenous, adipose tissue density mass	-	Non-diagnostic (two times)
10	-	Homogenous and well demarcated mass	Non-diagnostic (two times)
11	-	Homogeneous regular surfaced mass	Non-diagnostic (two times)

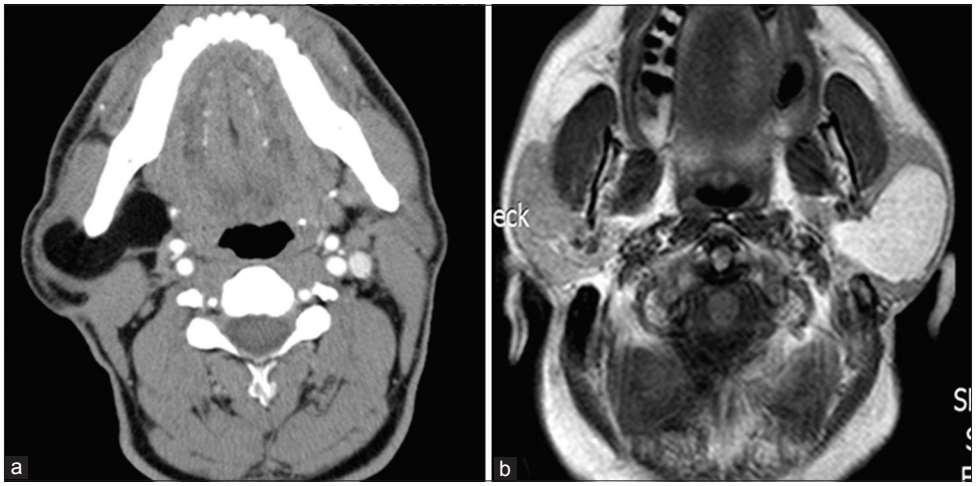

FIGURE 2. (a) Axial CT image demonstrating a well-demarcated, homogenous mass with an adipose tissue signal density arising from the deep and superficial lobe and extending to the parapharyngeal area. (b) Axial MR image demonstrating a homogeneous, regularly surfaced mass in fat-suppressed sequences spreading to the deep lobe.

The main objective of cytological examination of parotid masses is differentiation of benign lesions and malignant tumors [5]. Although accurate tumor typing is less important and may be deferred to definitive histological examination in a benign parotid mass, preoperative diagnosis enables the surgeon to select an appropriate operative procedure, and allows the patient to be informed of the nature of the disease and the treatment options prior to surgery [11]. The rarity of lipomatous lesions and the yield of a mixture of mature adipose tissue and normal salivary gland elements may result in false-negative reports of "no pathologic changes" or insufficient material for diagnosis. FNAB has been described as inaccurate for diagnosis of parotid lipomas because fat cells from lipomas are histologically indistinguishable from normal subcutaneous fat, resulting in false-negative reports [12,13]. In the present study, the most characteristic feature of parotid lipomas in both CT and MRI scans was a well-defined homogenous mass. In CT scans, lipomatous lesions were generally defined as well-demarcated, homogenous, lobulated, and hypodense. In MRI scans, fat-suppressed sequences were helpful in distinguishing lipomas from other tumoral and lipoid tissues, showing a homogeneous and hyperintense mass. Accurate diagnoses were made in all patients based on imaging investigations, and specificities of CT and MRI scans were both 100%. Both techniques provided sufficient information about tumor size, location and lesion characteristics to facilitate treatment planning and avoidance of postoperative complications.

FNA cytology of parotid gland masses was performed to exclude malignancy and confirm the diagnosis. All patients in this study underwent preoperative FNAB, and all biopsies were taken under USG guidance. Results were consistent with lipoma for four patients, and non-diagnostic for seven patients.

CONCLUSION

Despite the rarity of parotid lipomas in clinical situations, they should be considered in the differential diagnosis of parotid masses. CT and/or MRI scans are more reliable than FNA cytology in accurate diagnosis of parotid lipomas. The results of this study indicate that radiological examination via CT and/or MRI is perfectly adequate in the diagnosis of parotid lipomas. FNA cytology should be considered if there is any suspicion of malignancy.

DECLARATION OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Wu CW, Chi HP, Hsu YC, Chan LP, Kuo WR. Giant lipoma arising from deep lobe of the parotid gland. World J Surg Oncol. 2006; 4: 28. http://dx.doi.org/10.1186/1477-7819-4-28.

[2] Ryu JW, Lee MC, Myong NH, Chung M, Park DK, Kim JT, et al. Lipoma of the parotid gland. J Korean Med Sci. 1996 December; 11(6): 522–525. http://dx.doi.org/10.3346/jkms.1996.11.6.522.

[3] Ethunandan M, Vura G, Umar T, Anand R, Pratt CA, Macpherson DW, et al. Lipomatous Lesions of the Parotid Gland. J Oral Maxillofac Surg2006;64:1583-1586. http://dx.doi.org/10.1016/j.joms.2005.10.059.

[4] Dispenza F, De Stefano A, Romano G, Mazzoni A. Post-traumatic lipoma of the parotid gland: case report. ACTA otorhinolaryngologica italica 2008;28:87-88.

[5] ZbarenP,ScharC,HotzMA,LoosliH.ValueofFine-NeedleAspiration Cytology of Parotid Gland Masses. Laryngoscope, 111:1989–1992, 2001. http://dx.doi.org/10.1097/00005537-200111000-00023.

[6] Tryggvason G, Gailey MP, Hulstein SL, Karnell LH, Hoffman HT, Funk GF, et al. Accuracy of Fine-Needle Aspiration and Imaging in the Preoperative Workup of Salivary Gland Mass Lesions Treated Surgically. Laryngoscope, 123:158–163, 2013. http://dx.doi.org/10.1002/lary.23613.

[7] Kuwano Y, Ishizaki K, Watanabe R, Nanko H. Efficacy of diagnostic ultrasonography of lipomas, epidermal cysts, and ganglions. Arch Dermatol 2009;145:761–764. http://dx.doi.org/10.1001/archdermatol.2009.61.

[8] Starkman SJ, Olsen SM, Lewis JE, Olsen KD, Sabri A. Lipomatous Lesions of the Parotid Gland: Analysis of 70 Cases. Laryngoscope, 123:651–656, 2013. http://dx.doi.org/10.1002/lary.23723.

[9] Chikui T, Yonetsu K, Yoshiura K, Miwa K, Kanda S, Ozeki S, et al. Imaging findings of lipomas in the orofacial region with CT, US, and MRI. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1997, 84(1):88-95. http://dx.doi.org/10.1016/S1079-2104(97)90302-4.

[10] Kransdorf MJ, Bancroft LW, Peterson JJ, Murphey MD, Foster WC, Temple HT. Imaging of fatty tumor: distinction of lipoma and well-differentiated liposarcoma. Radiology 2002;224:99-104. http://dx.doi.org/10.1148/radiol.2241011113.

[11] Cho HW, Kim J, Choi J, Choi HS, Kim ES, Kim SH, et al. Sonographically Guided Fine-Needle Aspiration Biopsy of Major Salivary Gland Masses: A Review of 245 Cases. AJR 2011; 196:1160–1163. http://dx.doi.org/10.2214/AJR.10.4256

[12] Layfield LJ, Glasgow BJ, Goldstein N, Lufkin R. Lipomatous lesions of the parotid gland. Potential pitfalls in fine needle aspiration biopsy diagnosis. Acta Cytol. 1991;35(5):553-6.

[13] Ulku CH, Uyar Y, Unaldi D. Management of lipomas arising from deep lobe of the parotid gland. Auris Nasus Larynx 2005;32:49–53. http://dx.doi.org/10.1016/j.anl.2004.09.004