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

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
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 x200). (b): Tissue section revealing mature adipocytes and fibro-collagenous stroma with a fibrous capsule (Hematoxylin & Eosin x40).](image)

**TABLE 1.** Diagnostic features of the patients

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


