CASE REPORT

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PARAPHARYNGEAL LYMPH NODE METASTASIS: AN UNUSUAL PRESENTATION OF PAPILLARY THYROID CARCINOMA

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Abstract: Background. Parapharyngeal space nodal metastases are usually secondary to malignancies of the pharynx and sinonasal tract, although localization of lymphomas is also possible. Parapharyngeal metastases arising from thyroid papillary carcinoma are instead an exceedingly rare event, with only 10 cases reported up to now in the literature.

Methods. We describe two cases of parapharyngeal metastasis from thyroid papillary carcinoma in a man and a woman, aged 40 and 52 years, respectively.

Results. Both patients had a lesion that clinically appeared to be located in the parapharyngeal space; they underwent CT and MRI, which detected a cystic mass in the poststyloid compartment. In the first patient, fine-needle aspiration cytology failed in identifying the histologic nature of the lesion, which was excised through a transcervical approach. A diagnosis of metastatic thyroid papillary carcinoma was rendered and therefore the patient underwent total thyroidectomy. In the second patient, a total thyroidectomy, previously scheduled for multinodular goiter, was performed along with the removal of the parapharyngeal mass. Definitive histologic findings revealed that the two parapharyngeal masses were cystic metastases from a thyroid papillary carcinoma. Both patients received postoperative 131I treatment. Twenty-four months after surgery, the first patient is free of disease, whereas the second one has clear signs of abnormal 131I uptake in the lungs.

Conclusions. The differential diagnosis of a parapharyngeal poststyloid mass should also include metastasis from thyroid papillary carcinoma. When the lesion displays a cystic appearance on imaging, it is advisable to rule out a thyroid primary by ultrasonographic examination. The occurrence of a metastasis in such unusual site, even though rarely reported, does not seem to significantly affect the prognosis of the disease. © 2003 Wiley Periodicals, Inc. Head Neck 26: 190–196, 2004

Keywords: parapharyngeal metastasis; papillary thyroid carcinoma; follicular thyroid carcinoma

The parapharyngeal space (PS) is an inverted cone-shaped region that extends from the skull base to the hyoid bone. The lateral boundary is made up of the fascia that covers the inner surface of the pterygoid muscles, the deep lobe of the parotid gland, and the posterior belly of the digastric muscle. The space is medially limited by the buccopharyngeal fascia (that covers the pharyngo-basilar fascia and the superior pharyngeal constrictor muscle) and by the alar fascia. According to some authors,1 this is a thin and frequently
dehiscent structure that separates the PS from the retropharyngeal space and on occasion permits the internal carotid artery to reach the midline. The posterior boundary of the PS is more controversial. Because most authors agree in placing the carotid sheath within the PS, the posterior layer of this sheath corresponds to its limit. A complex structure, called the tensor-vascular-styloid fascia, divides the PS into the prestyloid and poststyloid compartments. In reality, this structure is composed of two parts: the tensor veli palatini muscle and fascia (superiorly) and the stylopharyngeal and styloglossus muscles (inferiorly). In the poststyloid compartment, in addition to neural and vascular structures, multiple lymph nodes are present. They might be involved by malignancies of the pharynx, sinonasal tract, and, in very rare instances, of the thyroid gland.

Herein we report two cases of occult thyroid papillary carcinoma presenting as a parapharyngeal mass whose metastatic nature was established only by definitive histologic studies. We also address the characteristic radiologic features of these metastatic parapharyngeal lymph nodes and the impact of this clinical manifestation on the management of well-differentiated thyroid tumors.

**CASE 1**

A 40-year-old man sought hospitalization in September 2000 for a swelling of the left tonsil that had been present for 2 months. His history was negative for recent head and neck infections. On admission, the patient was not febrile, and hematologic tests were within normal limits. On physical examination, a mild displacement of the left tonsillar fossa and nasopharyngeal wall, as with an “ab extrinseco” compression, was evident; the overlying mucosa was apparently normal. The rest of the physical examination was unremarkable. To evaluate the lesion that clinically appeared to take origin from the PS, CT and an MRI scans were performed. Both studies demonstrated a nonhomogeneous mass located in the poststyloid compartment of the left PS, anteriorly displacing the stylopharyngeal muscle and prestyloid fat pad. The CT scan revealed the mass to be hypodense and cystic, with some scattered irregular areas of enhancement (Figure 1A). The MRI revealed a hyperintense signal on both SE T2 and SE T1 in the upper part of the lesion; the caudal part of the mass was slightly hypointense on SE T1 (Figures 1B and 2).

Because an ultrasonography-guided fine needle aspiration cytology (FNAC) did not permit diagnosis, the patient underwent excision of the parapharyngeal mass through a transcervical approach. At definitive histologic study, the diagnosis was metastatic papillary thyroid carcinoma. Ultrasonography of the thyroid detected a 2-cm hypodense nodule in the deep portion of the left thyroid lobe, and a total thyroidectomy without neck dissection was performed 3 weeks after the first operation. The definitive histologic findings were consistent with the previous diagnosis, and the tumor was staged as pT2a N1a M0.

The postoperative course was uneventful, and the patient was discharged from the hospital 5 days after surgery. In March 2001, a dose of 92 mCi of

**FIGURE 1.** Axial plane, postcontrast CT (A), plain MR SE T1 (B) (case 1). Both the techniques demonstrate a mass lesion in the poststyloid compartment of the parapharyngeal space displacing stylopharyngeal muscle (black arrows), the internal carotid artery (arrowhead), and prestyloid fat tissue (white arrowheads). Scattered areas of contrast enhancement are detected at CT, MRI shows a spontaneously hyperintense signal.
A 52-year-old woman was admitted in November 2000 with a diagnosis of a left parapharyngeal mass and a multinodular goiter that had been present since 1997. $^{131}$I scintigraphy findings were consistent with the diagnosis of multinodular goiter. An anesthesiologist had noted an asymptomatic parapharyngeal lesion during a preoperative evaluation for a gynecologic procedure. On the physical examination, a soft mass was detectable between the angle of the mandible and the anterior border of the sternocleidomastoid muscle. At endoscopy, displacement of the left pharyngeal wall, extending from the nasopharynx to the pyriform sinus, was evident. Both CT and MRI scans confirmed the presence of a mass located in the poststyloid compartment of the PS; the stylopharyngeal muscle was anteriorly displaced, whereas the internal carotid artery (ICA) was displaced posterolaterally. The lesion had a cystic appearance on both examinations; plain MRI showed a slightly hyperintense signal. Thick and irregular septa, highly enhancing after contrast administration, were detected within the lesion; a nodule in the upper part of the mass was also demonstrated by MRI (Figure 3). In November 2000, the patient underwent a transcervical excision of both the parapharyngeal mass and the thyroid gland. The left PS was filled by a 6-cm soft mass, which did not seem to infiltrate the surrounding structures. Because of the presence of a 1.5-cm hard nodule of the left thyroid lobe $^{131}$I was administrated. In September 2002, at the last follow up visit, the patient was disease free.

**CASE 2**

A 52-year-old woman was admitted in November 2000 with a diagnosis of a left parapharyngeal mass and a multinodular goiter that had been present since 1997. $^{131}$I scintigraphy findings were consistent with the diagnosis of multinodular goiter. An anesthesiologist had noted an asymptomatic parapharyngeal lesion during a preoperative evaluation for a gynecologic procedure. On the physical examination, a soft mass was detectable between the angle of the mandible and the anterior border of the sternocleidomastoid muscle. At endoscopy, displacement of the left pharyngeal wall, extending from the nasopharynx to the pyriform sinus, was evident. Both CT and MRI scans confirmed the presence of a mass located in the poststyloid compartment of the PS; the stylopharyngeal muscle was anteriorly displaced, whereas the internal carotid artery (ICA) was displaced posterolaterally. The lesion had a cystic appearance on both examinations; plain MRI showed a slightly hyperintense signal. Thick and irregular septa, highly enhancing after contrast administration, were detected within the lesion; a nodule in the upper part of the mass was also demonstrated by MRI (Figure 3). In November 2000, the patient underwent a transcervical excision of both the parapharyngeal mass and the thyroid gland. The left PS was filled by a 6-cm soft mass, which did not seem to infiltrate the surrounding structures. Because of the presence of a 1.5-cm hard nodule of the left thyroid lobe $^{131}$I was administrated. In September 2002, at the last follow up visit, the patient was disease free.

**FIGURE 3.** Postcontrast CT (A), MR SE T2 (B), SE T1 before (C) and after (D) contrast enhancement (case 2). Similar to the previous case, a mass lesion is visible in the poststyloid compartment of the parapharyngeal space displacing the stylopharyngeal muscle (black arrows) and the internal carotid artery (black arrowhead). The lesion appears cystic, and an enhancing solid nodule is evident in its superomedial part (white arrowheads).
apparently infiltrating the sternothyroid muscle, a hemithyroidectomy with frozen sections was performed. Since histologic findings were consistent with papillary carcinoma and the intraoperative findings suggested an extracapsular spread of the tumor and bilateral nodal involvement, completion thyroydectomy and bilateral selective (levels II–IV, VI) neck dissection were accomplished. During the postoperative course, there were no complications, and the patient was discharged on the fifth postsurgical day. Definitive histologic examination revealed two nodules of papillary carcinoma in the left thyroid lobe with invasion of the strap muscles. Three positive nodes in the left level VI and a micrometastasis in the right level III were also identified. The parapharyngeal mass turned out to be a cystic metastasis from papillary thyroid carcinoma. The disease was therefore staged as pT4b N1a M0. In view of the extent of the disease and of the presence of a pathologic pulmonary uptake, the therapeutic plan was completed by an administration of three doses of 131I. In November 2002, an 131I scintigraphy still showed an uptake in the lungs.

DISCUSSION

The PS can be involved by four different types of neoplastic lesions: primary tumors (benign or malignant), metastatic lymph nodes, lymph node involvement by lymphoproliferative diseases, and tumors arising from adjacent sites that secondarily extend into the PS. In general, neoplasms of the PS might be considered rare and represent up to 0.5% of all head and neck tumors.3,5,14 In the prestyloid compartment, neoplasms usually originate from salivary tissue (deep lobe of the parotid gland or minor salivary glands), whereas the poststyloid compartment is mainly affected by lesions arising from vascular or neural structures. Lymph nodes in the poststyloid compartment of the PS are more frequently involved by pharyngeal or sinonasal squamous cell carcinoma and lymphomas. The occurrence of a metastasis from a well-differentiated thyroid carcinoma in the PS is an exceedingly rare event, with only 10 cases from papillary carcinoma6–15 and 2 cases from follicular carcinoma3,4 reported to date. Interestingly, the case described by Sirotnak et al8 was subsequently published by Carter et al15 with an updated follow-up.

Rouviere16 demonstrated that in one fifth of his dissections a lymphatic pathway directly connecting the posterior part of the thyroid lobe to the parapharyngeal and retropharyngeal space was present. This observation provides a satisfactory explanation for metastases to both the parapharyngeal and retropharyngeal space.17–19

At present, preoperative diagnosis of parapharyngeal masses is made mainly on the basis of imaging techniques (CT and/or MRI) that help in defining the extent of the lesion and its relationship with surrounding structures, its compartment of origin (prestyloid vs poststyloid), and might even suggest its histologic nature. Retropharyngeal nodes are located within the poststyloid compartment; therefore, radiologic differential diagnosis includes lesions displacing lateral or anterior to the ICA, as well as the stylopharyngeal and styloglossus muscles.

Lymph node metastases from papillary thyroid carcinoma might show characteristic imaging features such as a cystic appearance and calcifications. The first finding, which is present in up to 70% of cases,20 is even more frequent in young patients and might be related to a more aggressive pattern of tumor growth.21,22 In both CT and MRI, cavitation results in a fluid density/signal intensity (low density, hypointensity on SE T2, hypointensity on SE T1). As a general rule, thyroid carcinomas have a tendency to produce large amounts of macromolecular colloid material (including thyroglobulin) moreover, their high vascularization accounts for the onset of spontaneous intralesional hemorrhages. Both the macromolecular protein content and the hemoglobin catabolites shorten the T1 relaxation time, resulting in a spontaneously SE T1 hyperintense signal of the node.21,23,24

Punctate calcifications (corresponding to psammomatoid bodies) might be detected both at ultrasonography or at plain CT, whereas their demonstration is very difficult at MRI. Their frequency is controversial: according to some authors,21,23,24 they might be encountered in up to 25% to 40% of specimens. However, in a recent report,22 no calcifications were found in 97 metastatic cervical nodes.

In the PS metastases from thyroid papillary carcinoma (Table 1), cystic appearance and calcifications were disclosed (by imaging examination or intraoperative evaluation) in seven (58.3%) patients6,7,10,12,13 and one patient (8.3%),8 respectively. On cross-sectional imaging, the differential diagnosis of cystic lesions arising in the poststyloid compartment of the PS should include cystic schwannoma, neurofibroma, inflammatory adenopathies, necrotic nodal metastases or lymphomas,
cystic hygroma, and pseudoaneurysms of the ICA. Branchial cleft cysts\textsuperscript{1,4,14,25,26} arise instead in the prestyloid compartment.

The group of patients with a parapharyngeal metastasis from papillary thyroid carcinoma reported in Table 1 includes five women and seven men, ranging in age from 13 to 72 years (mean, 50.4 years). It is worth mentioning that correct histologic diagnosis of the parapharyngeal mass was preoperatively established in only four patients.\textsuperscript{7,8,11,13} In one patient, it was reached intraoperatively.\textsuperscript{10} In three patients,\textsuperscript{7,10,13} the excision of the parapharyngeal metastasis and thyroidectomy was concomitant, whereas in other four, thyroidectomy was performed secondarily after the definitive histologic findings on the

**Table 1. Parapharyngeal metastasis from papillary thyroid carcinoma: review of the literature.**

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Age/gender</th>
<th>Peculiar radiologic features</th>
<th>Surgical approach to the parapharyngeal mass</th>
<th>Treatment on the primary</th>
<th>Treatment on the neck (dissected levels)</th>
<th>Postoperative staging</th>
<th>Postoperative treatment with \textsuperscript{131}I</th>
<th>Follow-up (interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robbins et al.</td>
<td>62/F</td>
<td>Moderate enhancement (CT)</td>
<td>Transcervical</td>
<td>ST\textsuperscript{*}</td>
<td>T2 N1a M0</td>
<td>No</td>
<td>NED (24 mo)</td>
<td></td>
</tr>
<tr>
<td>Ferrario et al.</td>
<td>47/M</td>
<td>Cystic appearance (MRI)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>T2a N1a M0</td>
<td>Yes</td>
<td>NED (not available)</td>
<td></td>
</tr>
<tr>
<td>Sirotnak et al.</td>
<td>53/F</td>
<td>Calcific lesion (CT)</td>
<td>Transoral</td>
<td>T T\textsuperscript{T}</td>
<td>T1 N1a M0</td>
<td>Yes</td>
<td>NED (24 mo)\textsuperscript{15}</td>
<td></td>
</tr>
<tr>
<td>Imai et al.</td>
<td>72/M</td>
<td>Hyperintensity (MRI)</td>
<td>Transmandibular and transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>rT0 N1a M0</td>
<td>No</td>
<td>NED (36 mo)</td>
<td></td>
</tr>
<tr>
<td>Saydam et al.</td>
<td>54/F</td>
<td>Moderate enhancement (CT)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>?</td>
<td>No</td>
<td>NED (24 mo)</td>
<td></td>
</tr>
<tr>
<td>Ducci et al.</td>
<td>68/M</td>
<td>Moderate enhancement (MRI)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>Tx N1a M0</td>
<td>Yes</td>
<td>NED (36 mo)</td>
<td></td>
</tr>
<tr>
<td>Saydam et al.</td>
<td>53/M</td>
<td>Moderate enhancement (MRI)</td>
<td>Transmandibular</td>
<td>T T\textsuperscript{T}</td>
<td>rT0 N1a M0</td>
<td>Yes</td>
<td>NED (24 mo)</td>
<td></td>
</tr>
<tr>
<td>Aygenc et al.</td>
<td>47/M</td>
<td>Cystic appearance (MRI)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>?</td>
<td>No</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>13/F</td>
<td></td>
<td>Slight hyperintensity (MRI)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>?</td>
<td>No</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Thomas et al.</td>
<td>46/M</td>
<td>Cystic appearance (CT)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>T1a N1a M0</td>
<td>Yes</td>
<td>NED (12 mo)</td>
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<tr>
<td>Lombardi et al.</td>
<td>40/M</td>
<td>Cystic appearance (CT, MRI)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>T2a N1a M0</td>
<td>Yes</td>
<td>NED (24 mo)</td>
<td></td>
</tr>
<tr>
<td>52/F</td>
<td></td>
<td>Cystic appearance (CT)</td>
<td>Transcervical</td>
<td>T T\textsuperscript{T}</td>
<td>T4b N1a M0</td>
<td>Yes</td>
<td>AWD (24 mo)</td>
<td></td>
</tr>
</tbody>
</table>

*Metachronous.

\textsuperscript{1}Synchronous.

\textsuperscript{2}Previous.

Abbreviations: AWD, alive with disease; NED, no evidence of disease; ST, subtotal thyroidectomy; TT, total thyroidectomy.
parapharyngeal mass were obtained.\textsuperscript{5,8,11,12} In three other patients,\textsuperscript{9,11,12} the parapharyngeal metastasis appeared 10, 13, and 2 years after the excision of the primary tumor. Definitive histologic findings did not identify the thyroid primary tumor in only one case.\textsuperscript{11}

A subtotal thyroidectomy was performed in only one patient,\textsuperscript{6} whereas the other nine\textsuperscript{7–13} underwent a total thyroidectomy. The same operation was used in both our patients: the first was a metachronous procedure, whereas the second was synchronous. In the latter, thyroidectomy had been previously scheduled because of the diagnosis of multinodular goiter; a positive frozen section on a nodule suspected to be malignant led to total thyroidectomy.

The surgical approach for PS neoplasms depends on the site and location of the mass, its relationship to major vessels, and especially its nature (benign vs malignant).\textsuperscript{3} Because of the limited exposure of major vessels, a transoral approach should be used only for small lesions that do not transgress the styloid process\textsuperscript{3} and after a careful examination of the relationship between the lesion and the adjacent vascular structures by imaging techniques. The transcervical or transcervicousbmaxillary approaches, in relation to the good exposure of the prestyloid and poststyloid compartment, including major vessels, should be considered the optimal choice.\textsuperscript{3,14,25}

In eight patients the parapharyngeal lesion was removed either by a transoral\textsuperscript{8} or a transcervical approach.\textsuperscript{6,7,10–13} Because of the extension and dimension of the lesion, the remaining two cases, were treated by a transcervical\textsuperscript{11} and a mandibulotomy-transcervical combined approach.\textsuperscript{9} In the two patients reported herein, the parapharyngeal lesion was removed by a transcervical approach.

Detection of a parapharyngeal lesion, especially if located in the poststyloid compartment, with imaging findings suspicious for metastasis from thyroid carcinoma, can modify the preoperative workup and consequently the surgical strategy. Careful physical examination and ultrasonography of the thyroid and neck can help to identify thyroid gland nodules and/or metastatic nodes requiring FNAC. If a parapharyngeal metastasis from a papillary thyroid carcinoma is preoperatively diagnosed, the operation should also include a total thyroidectomy with or without neck dissection. Because of the presence of a direct pathway of drainage from the thyroid gland to parapharyngeal nodes, their metastatic involvement is not necessarily associated with an increased risk of level II–VI metastases. Therefore, when there is no clinical and/or ultrasonographic evidence of cervical nodal metastasis, neck dissection might be avoided. This approach is supported by the low rate of nodal recurrence (5\%) in patients with differentiated thyroid carcinoma staged as N0 at diagnosis.\textsuperscript{27} If one or more cervical node metastases are detected, however, the surgical strategy would not differ from that usually adopted in N+ patients with differentiated carcinomas. Depending on the number, site, size, and extension of metastatic nodes, a proper neck dissection should be planned.\textsuperscript{28}

After a follow up ranging between 12 and 36 months (mean, 22.8 months) \textsuperscript{6–11,13} reviewed in Table 1 were all free of disease. Unfortunately, clinical details on either the extent of follow-up or on the status of the patients were not provided by Aygenc et al.\textsuperscript{12} In the case reported by Ferrario et al,\textsuperscript{7} the length of follow-up was not mentioned, although the clinical information suggests that the patient was free of disease. Because of the presence of \textsuperscript{131}I uptake in the lungs at scintigraphy, one of our patients (case 2) is considered still affected by disease. Overall, these data give a clear confirmation that papillary thyroid carcinoma, despite nodal involvement, is characterized by good disease-free and overall survival.

**CONCLUSIONS**

Whenever the head and neck surgeon is faced with a parapharyngeal mass in the poststyloid compartment, especially with a cystic appearance, he or she should be aware of the possibility of a nodal metastasis from papillary thyroid carcinoma. If a lesion with these imaging findings is detected, an FNAC of the mass together with clinical and ultrasonographic examination of the thyroid gland could help to achieve a preoperative diagnosis. Even though the number of patients with metastatic involvement of parapharyngeal lymph nodes from papillary thyroid carcinoma is limited, this event does not seem to markedly influence the course of the disease.

**REFERENCES**