BRIEF COMMUNICATION

Cysts in the Posterior Triangle of the Neck in Adults⁎

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Abstract Cystic lesions of the posterior triangle are a pathologic entity whose diagnosis is made in the first two years of life. Its presentation in adulthood is an incidental finding and the differential diagnosis includes cystic lymphangioma, lymphatic metastasis of thyroid cancer and branchial cyst. Often with the finding of a cervical lump, FNA is made before diagnostic imaging is performed, however, this procedure is not always advisable. We reviewed the cases of patients who came last year to our department with a cystic mass in this location and correlating the imaging findings with pathologic specimen.

We show characteristic findings of these lesions in order to make an early diagnosis and thus to get the approach and treatment appropriate of adult patients with a cystic lesion in the posterior cervical triangle.

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KEYWORDS
Lymphatic malformations; Thyroid cancer; Branchioma; Doppler ultrasound; Magnetic resonance imaging findings

PALABRAS CLAVE
Linfangioma; Cáncer de tiroides; Quiste branquial; Ecografía; Resonancia magnética

Quistes en el triángulo cervical posterior en adultos

Resumen Las lesiones quísticas del triángulo posterior forman una entidad patológica cuyo diagnóstico se realiza en los 2 primeros años de vida. Su presentación en la edad adulta es un hallazgo ocasional y su diagnóstico diferencial incluye el linfangioma quístico, las metástasis linfáticas del cáncer de tiroides y el quiste branquial. Con frecuencia, ante el hallazgo de una tumoralización cervical se realiza PAAF previa a la imagen diagnóstica, sin embargo, este procedimiento no siempre es el aconsejable. Hemos revisado los casos de pacientes que acudieron en este último año a nuestro servicio con lesiones en esta localización correlacionando los hallazgos de imagen con los resultados anatomopatológicos.

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Introduction

The presence of a completely cystic lesion in the posterior triangle of the neck in adults is an uncommon finding. In overall evaluation of cystic lesions of the neck, the most common lesions are cysts of the thyroglossal duct, followed by branchial cleft cysts and lymphangiomas.\(^1\) In a study of lesions of the posterior triangle of the neck the most common are associated with the accessory spinal chain. Therefore, inflammatory or metastatic adenopathies and lymphomas represent the most common lesions, and usually appear as solid lesions or, to a lesser extent, with central necrosis. Congenital lesions are the next most common, such as branchial cleft cysts, lymphangiomas and hemangiomas, and tumours such as lipomas and neurofibromas.\(^2,3\)

Uniting these 2 elements, the most frequent cystic lesions in the posterior triangle of the neck would be lymphangiomas and branchial cleft cysts of the third arch. Despite the fact that adenopathies are the commonest group of lesions, they would not be included amongst cystic lesions as this form of presentation is rare.

Furthermore, branchial cleft cysts and lymphangiomas are congenital lesions. Third arch cysts appear in childhood and young adulthood, whereas lymphangiomas present in 80%-90% of cases in the under twos.

Therefore it is extremely rare to find the appearance of a complete cystic lesion in the posterior triangle of the neck in an adult. Nonetheless, we have found 4 adult patients with lesions of these characteristics in the past year, which lead us to undertake a study with a view to establishing a differential diagnosis in this clinical situation.

Methods

This is a retrospective study of 4 patients who presented at our department because they had “discovered a lump in the lower region of the neck”. None of the patients had a clinical history. They all underwent a CT scan and an ultrasound study which included a Doppler test and 2 underwent complementary MR imaging.

The lesions were classified according to their structure into uni vs multilocular, whether septated or not, thin (less than 2 mm)/thick walled and the presence or not of enhancement. According to their content in simple (anechogenic) or complex (with fine echoes) cysts. The septa were defined as vascular or avascular according to the Doppler ultrasound test findings.

The radiological findings were correlated with the anatomopathological findings after surgical removal in the 4 cases.

Results

All the patients were young adults (23–37 years of age) who presented with symptoms of a painless mass in the neck of recent onset and with no signs of swelling in the lower region of the neck. None of the patients had a clinical history of interest. They all underwent CT and ultrasound scan which showed cystic lesions in the posterior triangle of the neck. However the structural pattern (in the 3 techniques), and the Doppler ultrasound test were different (Table 1).

Case 1 was a 34 year-old male. CT scan with IVC showed a right-sided multilocular lesion, well-defined with slightly thickened walls which presented moderate enhancement after contrast. The ultrasound confirmed the cystic nature of the lesion and absence of flow was confirmed in the Doppler test. The patient was operated and the anatomopathological study concluded a cystic lymphangioma.

Case 2 (Fig. 1) was another male aged 25. CT scanning showed a septated cystic lesion. On the ultrasound the mass had thick walls with intense vascularity on the Doppler test. The patient underwent surgery and anatomopathological analysis established a diagnosis of papillary thyroid carcinoma metastases.

Case 3 (Fig. 2) was another male aged 37. A cystic, anechogenic and polylobulated lesion was found on the ultrasound study. The walls of the cyst did not present a flow on the Doppler test. The CT and the MR scans confirmed the existence of a cystic lesion in the supraclavicular region. Pathological study gave a diagnosis of cystic lymphangioma.

Case 4 (Fig. 3) was a women aged 23. The CT and MR scans showed a unilocular cystic lesion, thin-walled with no enhancement, at the level of the 4th cervical level on the right. The ultrasound study confirmed that it was a cystic lesion with dispersed fine echoes. There were no vascularised septa. Surgical removal and examination of the tissue sample showed a cystic formation coated with stratified squamous epithelium and lymphoid tissue with abundant keratinic material filling the cyst, these findings were compatible with a branchial arch cyst.

Discussion

The posterior triangle of the neck is the space between the paraspinal muscles and the sternocleidomastoid muscles. A variety of lesions are found in this space including congenital pathologies, such as lymphangiomas, hemangiomas and branchial cleft cysts, tumours, such as lipomas and neurofibromas, and adenopathies (inflammatory, metastatic and lymphoma), which represent the majority of lesions.\(^2,3\)
### Table 1 Lesion Characteristics.

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<th>Case 1</th>
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<th>Case 3</th>
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<tr>
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<td>Doppler: vascular/avascular</td>
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Cystic lymphangioma is a vascular malformation secondary to abnormal congenital growth of the lymphatic vessels. It is one of the 3 most common congenital cystic masses of childhood, constituting 5.6% of the benign lesions of this stage. 80%–90% are detected at 2 years of age, which is the age of maximum lymphatic growth. They are very rare in adults. Naidu and McCalla perform a review of all cases published in English literature of lymphangiomas in adult patients, they refer to 91 cases in 19 different publications from 1928 to 2000. They present as a soft asymptomatic mass, of variable size and although they are usually slow-growing, they can suddenly increase in size due to haemorrhage, trauma or viral infection. They tend to surround and occasionally invade anatomical structures.

On imaging they manifest as a cystic, multiloculated mass, with thin, even indistinguishable walls. On Doppler ultrasound there is flow or little flow in the cyst walls. On CT and MR scans they appear as poorly-defined and multiloculated lesions which are thin-walled, anechoic and with no enhancement. They can on occasion present greater

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**Figure 1** Case 2: lymph node metastasis of papillary carcinoma of the thyroid. (A) Doppler ultrasound study showing a cystic lesion with intense vascularisation in the septa (long white arrows). (B) CT scan with intravenous contrast: a polyclobulated, thin-walled lesion can be seen (black arrows) with septa in the right supraclavicular region (white arrow tips). (C) Microscopic photo with H&E stain confirming lesional nature.
Figure 2  Case 3: cystic lymphangioma. (A) Doppler ultrasound study where a lobulated cystic mass can be observed with absence of parietal vascularisation (white arrow). (B) MR: Coronal T1 weighted section after gadolinium administration, showing a lobulated lesion on the lower right cervical region with thin walls and no uptake. (C) Histological section confirming the nature of the lesion.

Figure 3  Case 4: third branchial arch cyst. (A) CT scan axial section after administration of intravenous contrast. (B) CT coronal reconstruction: a thin-walled, unilocular and hypocaptant lesion can be seen. (C) Ultrasound study confirms the existence of an anechogenic cystic lesion with fine echoes in its interior.

attenuation on CT and different intensity to water on MR, or echogenic content, fluid-fluid levels and thick walls when associated with bleeding or infection.4

Papillary carcinoma of the thyroid is a well-differentiated tumour of low grade malignancy which most commonly occurs in adolescent females and young adults. It represents up to 80% of carcinomas of the thyroid. It is the malignant tumour which has the greatest incidence of lymph node metastases, which are seen in up to 50% of patients. 20% of these can even be the sole or the initial manifestation of the disease. Most of these adenopathies are solid masses located in the ipsilateral lymph node chain, in the main paratracheal, and in the middle and lower internal jugular chain. They can be vascularised, calcified and with areas of haemorrhage, or they can contain colloid material. Approximately 40% of all of them have a tendency to completely cavitate due to cystic degeneration. In this case they present as uni or multiloculated, thin or thick walled lesions with the presence of hypervascular walls or septa on Doppler ultrasound.8,9
Hudgins and Gillison address the confusion which exists between the diagnosis of a second branchial arch cyst and squamous cell carcinomas of the head and neck (SCCHN). They make special reference to SCCHN associated with HPV 16 because these appear characteristically in younger individuals, who are non-smokers and can present necrotic or even completely cystic lymph nodes, flagging up an alert regarding the widespread tendency to consider completely cystic lesions located in the 2nd cervical area to be second branchial arch cysts.

The third branchial arch cyst is a remnant of one of the 6 arches of the branchial apparatus which appear during the fourth week of gestation. Like each arch, it is associated with an internal pouch and external cleft. The 2nd to 4th clefts combine to form the cervical sinus of His which will subsequently be obliterated. 95% of branchial cysts originate from the second arch. Third arch cysts are very rare, but it is the second most common congenital lesion of the posterior triangle of the neck after lymphangioma. They usually present as a liquid unilocular lesion, thin-walled and with no septa. As in the case of lymphangioma, they can become infected or bleed leading to a denser content on CT (with fine echoes on ultrasound) and can even present thick walls.

In the presence of a laterocervical mass of unknown origin the use of FNA puncture is common in order to establish early diagnosis. This technique in the case of cystic lesions renders a high percentage of false negatives due to poor cellularity of the aspirate. Furthermore, on the assumption that this cystic lesion is a lymphangioma, there are authors who rule out its use due to its associated risk of infection.

Therefore, if a cystic cervical lesion is found in the posterior infrahyoid triangle of the neck of an adult, we should consider 3 fundamental differential diagnoses: lymphangioma, cystic metastasis of a papillary carcinoma of the thyroid and cyst of the third branchial arch. Lymphangioma and metastasis can appear as polycystic or multilocular cysts, whereas cysts of the third arch are unilocular lesions. The wall thickness and content can help to differentiate them, but the 3 lesions frequently present overlapping findings, as they can become complicated. Doppler ultrasound study can help diagnosis as metastases of papillary carcinoma of the thyroid are associated with the presence of vascularised septa. Thus a diagnosis can be established and FNA punctures can be avoided which are often not very conclusive or recommended in certain clinical situations.

Conflict of Interest

The authors have no conflicts of interest to declare.

References