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Case Report

A case of pleural lipoma evaluated with multi-imaging methods ☆

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ABSTRACT

We reported a rare case of patient affected by pleural lipoma, studied with ultrasound, X-rays, CT, and MRI examination, with both conventional and functional MR imaging modality (DWI), in order to highlight the diagnostic contribution of the DWI sequence. It is necessary to make an adequate evaluation with dedicated imaging to make a correct differential diagnosis from the corresponding malignant forms which would require more radical treatment. In this case we evaluated the effectiveness of the DWI sequence in reaching the correct diagnosis. DWI highlighted the absence of restriction signal, both in the lesion and in any contextual nodules. ADC map revealed a mean ADC value= 0.38 × 10^{-3} mm^2/s. indicative for benign lesion (lipoma). In our case, The DWI/ADC sequence has contributed to orienting us towards the correct diagnosis representing an added value by showing both the absence of restriction nodules related to the lesion as well as an ADC value compatible with lipoma. Therefore, it is suggested to include the DWI sequence in the protocol for MRI evaluation of pleural masses.

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Introduction

Lipomas are solid, benign, mesenchymal neoplasms that develop from the adipose tissue, emerging from the adipocytes. Lipomas originating from the thoracic pleura are particularly rare, with only a few cases reported in the literature, 20 based on our knowledge [1], of which only 2 have also been studied with MRI and none with a Diffusion-weighted imaging (DWI) [2,3].

Pleural lipomas are more frequent in the adult, typically asymptomatic, but sometimes they can appear with compressive symptoms such as dyspnea, chest pain and nonproductive cough according to their dimensions. The radiological investigation with CT scan is considered indicative for the diagnosis, considering a density on the Hounsfield Units (HU) scale comparable to subcutaneous fat, between –50 and –150 HU [4]. However, CT alone is not able to discriminate simple lipoma from malignant forms because some lipomas have similar characteristics to their malignant counterparts. Accurate characterization is important to guide treatment. This can be done using magnetic resonance imaging with sequences for oncologic applications as (DWI [5]. The addition of contrast-enhanced sequences and DWI improve the characterization of the spectrum of lipomatous tumors [6].

Case presentation

A 54-year-old patient has been complaining, for some months, of slight discomfort on the right, in the region between the upper abdomen and the base of corresponding hemithorax, laterally. This pain did not show any changes in intensity during the respiratory acts and was not in relation to meals. He showed no signs of wheezing. Assuming it was a gallbladder or a liver disease, an ultrasound examination of the abdomen was performed. During the study of the liver, the patient showed a moderate lifting of the right hemidiaphragm, so the use of transthoracic window was required. Studying the hepatic segments immediately below the diaphragm, close to the right pulmonary base, the presence of exuberant tissue about 7 mm. thick, adherent to the pleura and heterogeneously hypoechoic (Fig. 1) was discerned. The Power-Doppler study showed no contextual vascularity. Other findings related to the ultrasound study of the abdomen appeared without pathological aspects.

Having found this new element in the chest, it was decided to proceed with a standard chest x-ray examination (Fig. 2). The chest X-ray examination highlights the presence of a hypodiaphanous area that cannot be dissociated from the pleura, close to the right base which modifies its silhouette. We also reported the absence of pleural effusion. In suspicion of a pleural lipoma, an MRI examination is needed. The study protocol adopted included, in addition to the conventional study (SE T1, TSE T2, and STIR) also the sequences: DWIBS with a 3D reconstruction, to better detect any lymphadenopathy, DWI with ADC map and T1 weighted fat-saturation sequence, before and after contrast medium administration, in order to highlight any vascularized tissue within the lesion. Conventional, coronal plane, no-contrast T1-weighted (Fig. 3A) and fluid-sensitive (TSE T2) sequence (Fig. 3B) revealed, on the right, the presence of a well-defined mass, close to the pleura, blunting the corresponding costophrenic sulcus. The mass has a high signal in T1 and T2 (isointense to the subcutaneous adipose tissue). No evidence of included septa. Conventional, axial plane, no-contrast T1-weighted (Fig. 4A) and fat-saturation T2 (STIR) sequence (Fig. 4B) confirms the absence of contextual septa as well as nodules with a high T2 signal that could orient for a high degree of malignancy of the lesion. Furthermore, the complete signal degradation in STIR is appreciated, confirming the noticeable lipomatous nature of the lesion. DWIBS sequence (Fig. 5), 3-D reconstruction (coronal plane) showed no significant lymphadenopathies in the axillary (bilaterally) and mediastinal areas. A DWI (b-value = 800) sequence, on the axial plane (Fig. 6A) showed the absence of high signal intensity both of the lesion of any contextual nodules. ADC map (Fig. 6B) revealed a mean ADC value= 0.38×10^{-3} mm^2/s. indicative for benign lesion (lipoma). No contrast fat-Suppressed T1 (SPIR) weighted sequence (Fig. 7A),

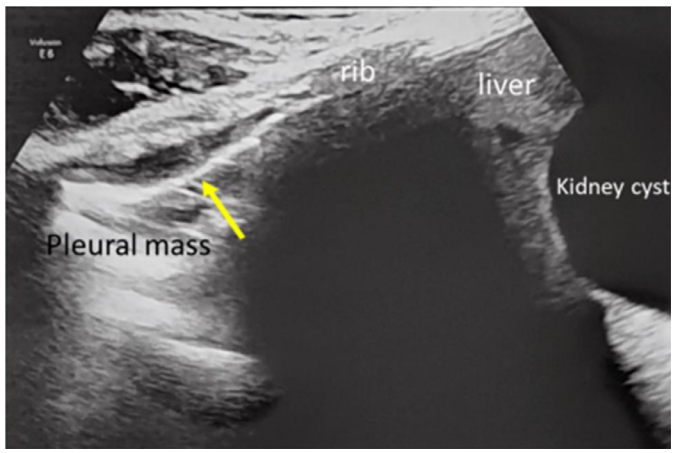

Fig. 1 – Intercostal longitudinal-oblique latero-basal US scan reveals an inhomogeneous hypoechoic mass located nearby the right costo-diaphragmatic recess.

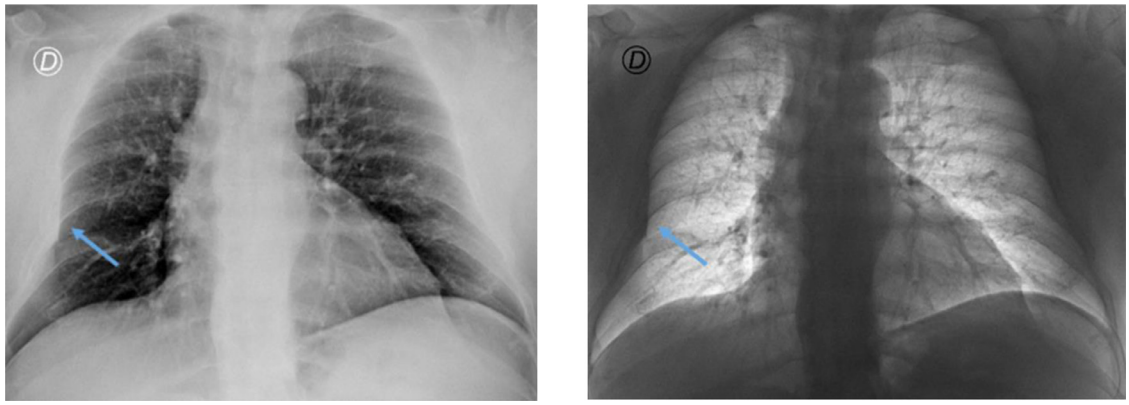

Fig. 2 – Frontal standard chest X-ray examination showed, in the right lower field, a well-defined oval mass of 1.3 cm in short axis, attached to the pleura. Absence of pleural effusion.

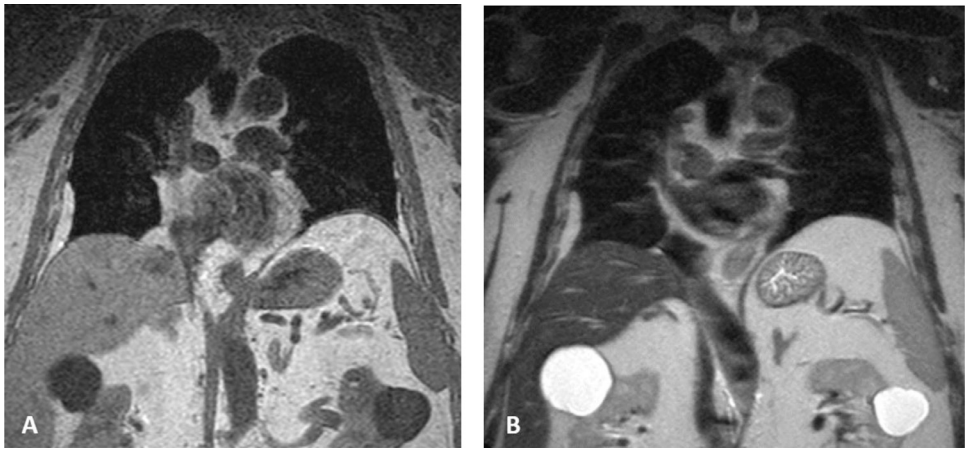

Fig. 3 – (A, B) Conventional, coronal plane, no contrast T1-weighted (A) and fluid-sensitive (TSE T2) sequence (B) revealed, on the right, the presence of a mass with well-defined margins, adhered to the plaura, ubliterating the corresponding costo-phrenic sinus. The mass has a high signal in T1 and T2 (isointense to the subcutaneous adipose tissue). No evidence of included septa.

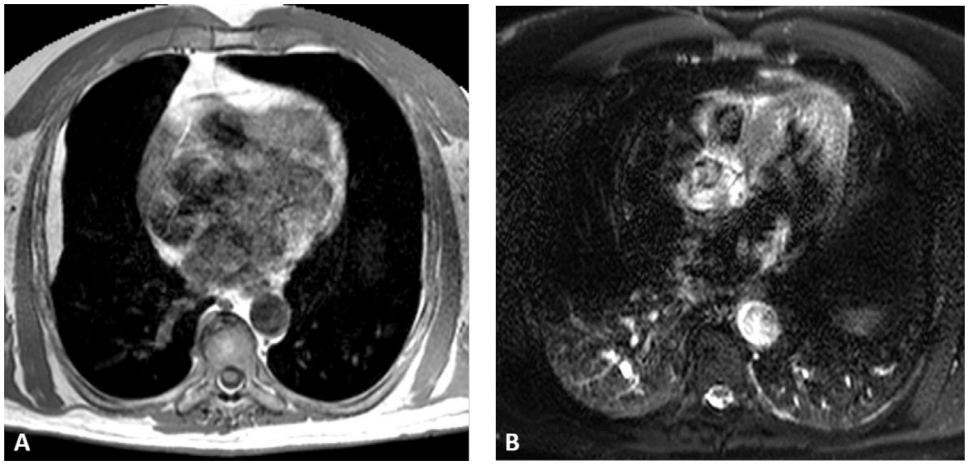

Fig. 4 – (A, B) Conventional, axial plane, no contrast T1-weighted (A) and fat-saturation T2 (STIR) sequence (B) confirms the absence of contextual septa as well as nodules with a high T2 signal that could orient for a high degree of malignancy of the lesion. Furthermore, the complete decay of the lesion signal in STIR is appreciated, confirming the frankly lipomatous nature of the lesion.

Fig. 5 – DWIBS sequence, 3-D reconstruction (coronal plane): there are no significant lymphadenopaties in the axillary (bilaterally) and mediastinal areas.

on the axial plane and a static, postcontrast enhancement (SPIR) sequence (Fig. 7B), with subtraction imaging, highlights the absence of enhancing nodules and septations in the context of the lesion.

Although the RM study, both conventional and, particularly, with Functional MR Imaging modality (DWI), strengthened the diagnostic hypothesis of pleural lipoma, so a biopsy was carried out, which confirmed the diagnosis by the presence of mature adipocytes, surrounded by thin fibrous septa (Fig. 8). No atypical stromal cells or lipoblasts were found. The tumor was diagnosed as a lipoma. Considering the small size of the lesion, the few symptoms and according to what reported in the literature [1], we decided to periodically follow the lesion without resorting to surgery. Video-assisted thoracic surgery (VATS) will be considered only in case of lesion enlargement or worsening of symptoms [7].

Discussion

Most of pleural lipomas are clinically asymptomatic and are discovered incidentally following a chest X-ray performed for other reasons. In our case the first casual finding, suspicious for thoracic lipoma, was detected by ultrasound examination; this was possible due to the favorable localization of the lesion. However, if lipoma grow enough, can cause thoracic compression symptoms such as no productive cough, chest pain, shortness of breath end feeling of heaviness in the chest [1]. The chest X-ray was the next diagnostic imaging test we performed, confirmed the presence of the lesion and allowed us to have, in addition to the ultrasound, an objective data allowing us to exactly define its dimensions.

CT scan can detect thoracic lipomatous masses in detail showing an attenuation coefficient of about -50 to -150 HU. If the lipoma had a fibrous stroma, the density may not be uniform. Therefore, because the CT scan cannot exclude the possibility of well-differentiated liposarcoma, after the ultrasound examination and the chest X-ray examination, we decided to perform MRI examination instead of the CT. In fact, although CT is considered by some the method of choice [1,4,8], MRI allows us to highlight any contextual malignant heteroplastic components (liposarcoma) by means of a diffusion study (ADC map) and sequences post contrast media [5,6]. Furthermore, MRI allows us to clearly discriminate the mass from any pleural effusion associated with it [2]. Regarding MRI, the use of the DWI sequence could represent an added value in differentiating benign lipomas (simple lipomas and numerous variants) or intermediate-grade, known as atypical lipomatous tumors (ALTs) from well-differentiated liposarcomas (WDLs) by detecting, with high sensitivity, the presence of any nodules related to the main lesion. In the case we reported,

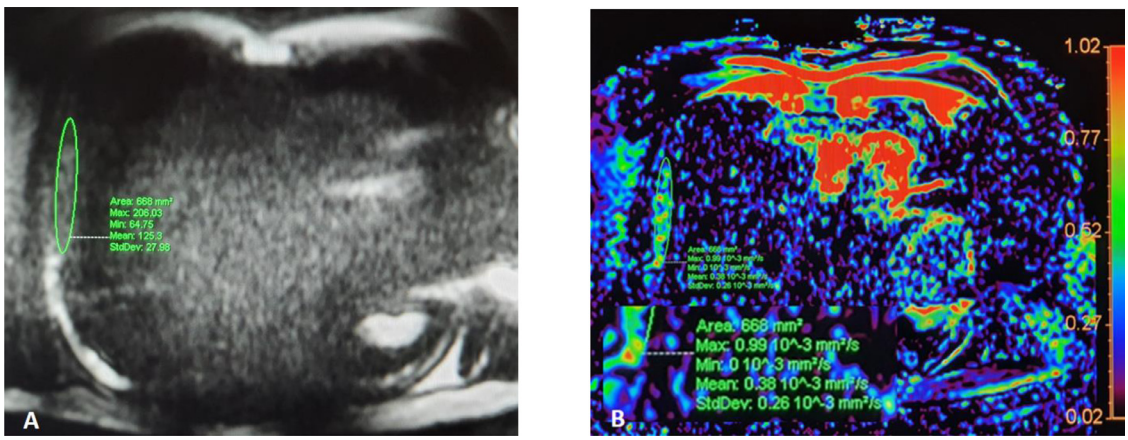

Fig. 6 – (A and B). DWI (b-value= 800), sequence, axial plane (A) showed the absence of high signal intensity both of the lesion and of any contextual nodules. ADC map (B) revealed a mean ADC value = 0.38×10^{-3} mm^2/s indicative for benign lesion (lipoma).

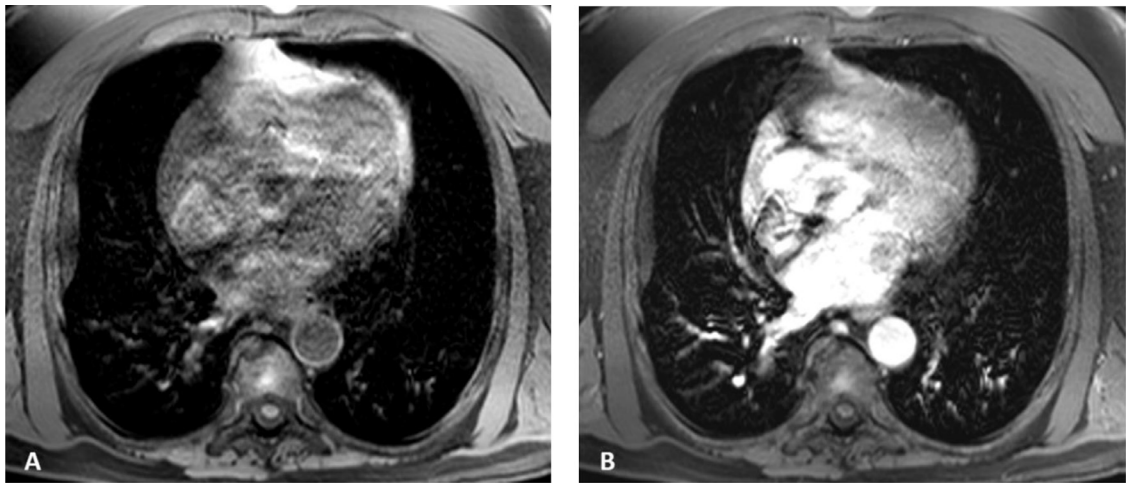

Fig. 7 – (A and B). Axial plane, no contrast fat-Suppressed T1 (SPIR) weighted sequence (A) and static, postcontrast enhancement (SPIR) sequence (B) including subtraction imaging, highlights the absence of enhancing nodules and septations in the context of the lesion.

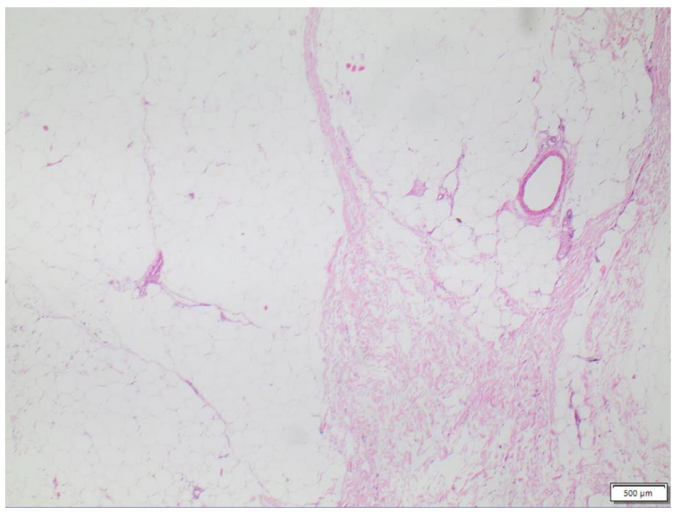

Fig. 8 – Hematoxylin and eosin staining (H&E, x 200). Histopathological examination revealed the presence of mature adipocytes intercalated in a thin fibrous septa. There were no atypical stromal cells or lipoblasts. The tumor was diagnosed as a lipoma.

no nodules associated to the lesion were found, which was an indicative sign of benignity. Using DWI/ADC mapping, the presence of high signal on the image with b-value= 800 and consequent low mean values in ADC-map of the tumor are significantly different between lipomas and other aggressive tumor types. Regarding to lipomas, Brett et al. [5] proved that in lipoma, the whole tumor ADC values showed a mean values between 0.1 and 0.4 $\times$ 10^{-3} mm^2/s. In the case we presented, the ADC value of the lesion was 0.38 $\times$ 10^{-3} mm^2/s, in accordance with the study of Brett et al.

However, since it was not possible to exclude, on the only basis of imaging, an atypical lipomatous tumor (ALT) or well-differentiated liposarcoma (WDL), the lesion was evaluated by biopsy [7,9].

Conclusions

The consideration that we want to emphasize, which emerges from the presentation of our case, is the added value of the DWI study in the characterization of pleural lipoma, in particular in cases in which the morphological aspect of the lesion, as well as the post-contrast MRI study, has a nonunique meaning. The DWI study allows, in addition to providing a typical ADC value of lipoma, to exclude the presence of any peri- and intralesional restriction nodules, without a significant increase in the duration of the exam. Therefore, the clinical implications of our findings are essentially those of encouraging the use of MRI with DWI sequence, compared to the use of CT.

Patient consent

Written informed consent was obtained from the patient.

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