SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Radiology

Fracture of the Costal Cartilage A Misdiagnosed Pathology: about A Case and Literature Review

Christ Labretesche Gracia Gakosso[1, 2*], Ildiko Agoston[3], Mehadi Meradi[3], Stéphane Arblade[3], Safia Bergheuil[3]

[1]Radiology Resident, Department of Radiology, François Quesnay Hospital, Mantes la Jolie, France
[2]Department of Radiology, Mohammed VI Hospital, Cadi Ayyad University, Marrakech, Morocco
[3]Senior Radiologist, Department of Radiology, François Quesnay Hospital, Mantes la Jolie, France

DOI: 10.36347/sasjs.2023.v09i01.002 | **Received:** 29.11.2022 | **Accepted:** 03.01.2023 | **Published:** 07.01.2023

***Corresponding author:** Christ Labretesche Gracia Gakosso
Radiology Resident, Department of Radiology, François Quesnay Hospital, Mantes la Jolie, France

Abstract | **Case Report**

Costal cartilage fracture is a rare traumatic injury but the frequency is probably underestimated. This lesion, not visible on X-rays, is nevertheless simple diagnosis in ultrasound, computed tomography and MRI. We report here a case of low anterior anterior post-traumatic chest pain following a brawl in a young patient in general condition.

Keywords: Costal cartilage fracture, computed tomography, chest pain.

INTRODUCTION

Costal cartilage fracture is a rare traumatic injury but the frequency is probably underestimated. This lesion, not visible on X-rays, is nevertheless simple diagnosis in ultrasound, computed tomography and MRI. We report here a case of anterior post-traumatic parietal pain by brawl occurred in a driver.

OBSERVATION

This 51-year-old patient, a bus driver, presented fourteen (14) days prior to admission with anterior chest wall pain, lateralized at the left base, following a brawl followed by a fall with a direct impact on the chest on the left side. The patient would have started self-medication with the usual analgesics with a clear improvement in pain. The evolution was marked by the resurgence of left basithoracic pain justifying a consultation with his doctor. The clinical examination found a left chest basal pain, triggered on palpation and during respiratory movements, initially suggesting a simple muscle contusion. The chest X-ray in front view showed no rib fracture or other abnormality (Figure 1). As the pain persisted and was aggravated by breathing, the patient consulted his doctor, who suspected a pulmonary embolism. A complementary injected thoracic scan in search of a pulmonary embolism was indicated by his doctor (Figure 2). It showed a displaced overlapping rib cartilage fracture of the seventh left rib with no soft tissue abnormalities and no pulmonary embolism or pneumothorax detected. The CT scan was therefore used to correct the diagnosis in view of the patient's history. The patient was rested and treated with painkillers already started.

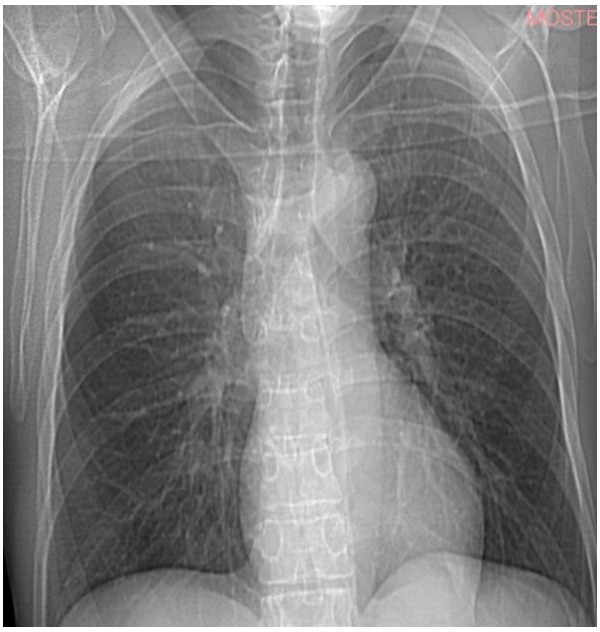

Figure 1: Chest X-ray in front incidence, absence of rib fracture line or parenchymal lesion

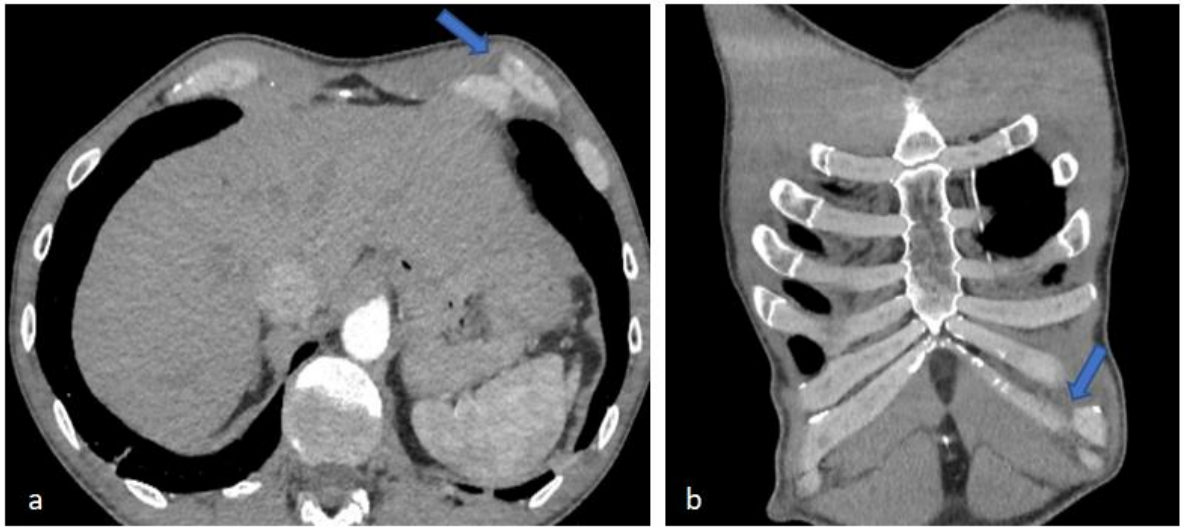

Figure 2: Chest CT scan injected in axial (a) and coronal (b) section, performed at three weeks after the trauma, showing a complete fracture with overlap of the two fragments of the costal cartilage of the seventh left rib (Arrow), without pulmonary abnormality or adjacent soft parts

DISCUSSION

Costal cartilage fractures are very little described in the literature. They are one of the causes of post-traumatic pain of the anterior chest wall. They can be found in trauma through brawls and contact sports [1]. They are rare but their frequency is probably underestimated, because the clinical presentation is that of a rib fracture, and it is usually concluded to a simple muscle contusion in front of the normality of standard images [2]. Two types of mechanisms are implicated in costal cartilage fractures. The first mechanism is "rotational" and seems to predominate on the chondrosternal and chondrocostal junctions of the second ribs. These regions, which are not very mobile, would give way more easily as a result of the torsion phenomenon. This type of injury is more frequently encountered during combat sports. The second mechanism is direct trauma to cartilage and would affect the lower ribs more frequently [1, 2]. In the illustrated case, it was a mechanism by direct shock during a brawl with computed tomography a fracture of the cartilage of the septian left rib, which corroborates with the causes expressed in the literature.

Costal cartilage is not visible on X-rays, apart from foci of ossification that appear during adulthood. Thus, only a fracture of a highly ossified costal cartilage can be visualized on an X-ray [3]. On the other hand, other imaging techniques, ultrasound, CT and MRI [3, 4] make it possible to analyze the costal cartilage and adjacent structures very well. On computed tomography, cartilage is easily differentiated from neighboring structures by the contrast gradient existing with muscle and adjacent fat: cartilage, whose density is between 70 and 120 UH is denser than muscle and fat, but less dense than ribs. Multiplanar reconstructions make it easy to visualize the fracture line of the costal cartilage [4]. In the reported case, the standard X-ray was normal and the complementary chest CT scan performed in the context of a suspicion of pulmonary embolism in the face of persistent chest pain, made it possible to correct the diagnosis objectifying a displaced fracture of the costal cartilage of the seventh left rib, not visualized on the standard radiograph.

In addition, it is important to remember that another inexpensive and accessible imaging technique such as ultrasound can contribute to the diagnosis of a costal cartilage fracture [5]. In an ultrasound study of patients with suspected costal fractures, Griffith *et al*., found 11% of fractures localized on the costal cartilage or at the costal junction [1]. The fracture line in ultrasound is visualized as a discontinuity of the anterior echogenous boundary of the cartilage. It can also be "highlighted" by the presence of air, which then causes a flickering artifact within the cartilage [1, 6].

MRI has the inherent drawbacks of its cost and availability. It certainly has a better sensitivity for this type of fracture thanks to perilesional edema, responsible for a hypersignal on T2-weighted sequences [5, 6]. It thus allows the immediate localization of the traumatic zone and the fracture line.

Treatment of costal cartilage fractures is symptomatic: analgesics, nonsteroidal anti-inflammatory drugs, ice application, compression belt. One case of pseudarthrosis of a cartilage fracture of the first rib has been reported [7]. This patient, whose fracture had not been initially diagnosed, had chronic pain seven years before the trauma. In our series, the patient had persistent pain wrongly related to a pulmonary embolism, the CT scan fortunately made it possible to correct the diagnosis in front of the data of the interrogation and the clinical examination but did not objectify pseudarthrosis despite the delay diagnosis. In addition, it was recommended a rest with

continuation of analgesics. The evolution was favourable under treatment.

CONCLUSION

Costal cartilage fractures are a little-known and rare cause of post-traumatic pain of the anterior chest wall. However, they are easily diagnosed in imaging (ultrasound, CT, MRI), thus allowing appropriate care. It is therefore important for any radiologist to thoroughly investigate any previous chest pain so as not to misunderstand the diagnosis.

REFERENCES

1. Griffith, J. F., Rainer, T. H., Ching, A. S., Law, K. L., Cocks, R. A., & Metreweli, C. (1999). Sonography compared with radiography in revealing acute rib fracture. *AJR. American journal of roentgenology*, *173*(6), 1603-1609.
2. Miles, J. W., & Barrett, G. R. (1991). Rib fractures in athletes. *Sports Medicine*, *12*(1), 66-69.
3. Obaid, H., Nealon, A., & Connell, D. (2008). Sonographic appearance of side strain injury. *American Journal of Roentgenology*, *191*(6), W264-W267.
4. Subhas, N., Kline, M. J., Moskal, M. J., White, L. M., & Recht, M. P. (2008). MRI evaluation of costal cartilage injuries. *American journal of roentgenology (1976)*, *191*(1), 129-132.
5. Ontell, F. K., Moore, E. H., Shepard, J. A., & Shelton, D. K. (1997). The costal cartilages in health and disease. *Radiographics*, *17*(3), 571-577.
6. Malghem, J., Vande Berg, B. C., Lecouvet, F. E., & Maldague, B. E. (2001). Costal cartilage fractures as revealed on CT and sonography. *American Journal of Roentgenology*, *176*(2), 429-432.
7. Brower, A. C., & Woodlief, R. M. (1980). Pseudarthrosis at the first sternocostal synchondrosis. *AJR Am J Roentgenol*, 135, 1276-1277.