Heterotopic bone formation in an abdominal wall scar

A 63-year-old man complained of long-standing abdominal pain and stiffness at the location of a midline abdominal scar. He had undergone gastric surgery ten years before. Clinical examination revealed a palpable hard elongated structure along the abdominal wall incision.

Imaging Findings:

Ultrasound revealed a highly echogenic linear structure, with acoustic shadowing, 0.5 cm wide and extending longitudinally along the midline, from the sternal xiphoid appendix to the umbilical region, along the location of the previous laparotomy scar.

A lateral plain film of the abdomen, slightly extended to the inferior chest, revealed a bone-like structure in a superficial location extending from the lower limit of the sternum to the middle abdomen. Superiorly there was no clear delimitation from the sternal xiphoid appendix.

The patient was submitted to CT to better delineate the location of this structure and its relationship with the sternum in order to plan surgical excision. CT confirmed complete ossification with typical bone-like structure, with cortical and medullary bone. There was no clear cleavage plane with the sternum.

Discussion:

Heterotopic bone formation in an abdominal wall incision scar is considered a subtype of traumatic myositis ossificans [1]. By definition it consists of mature bone formation in an abdominal wall scar, with osseous, cartilaginous and occasionally myelogenous elements.

It is a well recognized but relatively rare surgical complication, with only a few case reports and small case series described in the literature. Usually bone formation occurs in the first few months after surgery. It rarely occurs after the first year [2]. It has a significant male predominance, with a reported male-to-female ratio of 10:1 [2, 3]. Ossification is typically found in vertical abdominal wall incisions. In cases in which there were horizontal and vertical abdominal incisions heterotopic bone formation was only found in the vertical component [2, 3].

It is still unknown how heterotopic bone formation occurs in abdominal wall scars and several theories have been suggested, such as osteoblastic metaplasia of multipotential mesenchymal cells after trauma or implantation of small particles of bone or periosteum into the soft tissues during surgery [1, 3].

Patients usually complain of regional pain and discomfort, sometimes with limitation of movements.

The radiological appearance on conventional X-rays and CT usually allows a confident diagnosis, with the
visualization of the typical findings of a bone-like structure with cortical and medullary components with a vertical orientation along the abdominal wall scar. Ossified scar usually forms between the anterior abdominal fascia and the peritoneal surface [1]. Size of ossification is highly variable, with the largest ones reported measuring 15 x 4.5 cm [2, 4].

In an early phase, when calcifications are not yet visualized or are still very discrete, it may be mistaken for a post-surgical scar infection or dystrophic calcifications. In cases in which there is extensive internal calcification it may be confused with a retained foreign body [1].

Heterotopic bone formation in abdominal wall scars should be treated with complete surgical resection. There are only a few cases reported in the literature of recurrence after surgical resection [2].

Differential Diagnosis List: Heterotopic bone formation on a previous abdominal wall scar, Dystrophic calcification, Retained foreign body, Bone tumour arising from the xiphoid process

Final Diagnosis: Heterotopic bone formation on a previous abdominal wall scar

References:
Figure 1

Description: Ultrasound transverse (a) and longitudinal (b) shows a hyperechogenic linear structure in a superficial location along the abdominal wall scar. Origin: Clínica Quadrantes, Lisbon, Portugal.
**Description:** Ultrasound transverse (a) and longitudinal (b) shows a hyperechogenic linear structure in a superficial location along the abdominal wall. **Origin:** Clínica Quadrantes, Lisbon, Portugal
Description: The lateral abdominal X-ray demonstrates a vertically oriented bone-like structure, with no clear cut cleavage plane with the sternum superiorly. Origin: Clínica Quadrantes - Lisbon, Portugal
Description: CT, axial plane (a,b), coronal (c) and sagittal (d) reconstruction, confirms the presence of an ossification along the abdominal wall scar, with visualization of cortical and medullary components

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