









Heterotopic ossification of the anterior abdominal wall

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ABSTRACT

Heterotopic ossification is the formation of bone tissues in areas other than the skeletal system. It is more often seen as a complication of orthopedic surgery; however, it is a pathological condition that might be observed during the healing of abdominal incisions in the midline. The aim of this study is to present a case of a 63-year-old male patient with complaints of induration and pain on the region of his previous incision through which he had been operated for achalasia. Heterotopic ossification has also been discussed in the light of the current literature.

Keywords: Abdominal incision, bone formation, heterotopic ossification

INTRODUCTION

Heterotopic ossification (HO) is the formation of new bone tissue in soft tissues, which normally lack ossification. Based on the etiology, HO is classified as neurogenic HO, traumatic HO, and myositis ossificans progressiva. It is more common in large joints after orthopedic surgery. Although the pathophysiology of the condition has not been clearly understood yet, the hypothesis of stimulation of mesenchymal cells through tissue hypoxia and metabolic or genetic factors to form a bone tissue by metaplastic transformation has been generally accepted.

Development of HO in an abdominal midline incision is rare. However, Kim et al. (1) reported the incidence of development of HO in a midline incision as 25%. Increased incidence has been particularly observed in cases of supraumbilical midline incisions. The aim of this study is to present an extraordinary case of an HO developed in a supraumbilical incision line in a patient who had been operated for achalasia two years ago.

CASE PRESENTATION

A 63-year-old male who had undergone esophago-cardiomyotomy at another center 2 years ago for achalasia presented to our clinic with complaints of induration and pain in the incision area. His past medical history was otherwise nonspecific. Upon physical examination, a palpable mass was observed on the upper half of the midline incision. Abdominal ultrasonography (US) revealed an area of increased density measuring 1 cm wide and 5 cm in long, which was considered a collection. No opacity could be seen on chest X-ray at the region of the lesion. A hard mass on linea alba in the subcutaneous fatty tissue, measuring 8 cm in length, was found to be fixated to the surrounding tissue at laparotomy. The mass was seen to be close to the xiphoid process with no direct contact with it. The mass was excised, and the wound was primarily closed. The specimen was sent for pathological examination. Macroscopic examination revealed a bone tissue measuring 8.5×1×0.5 cm (Figure 1). Microscopic examination revealed organized cortical and medullary lamellar bone and fatty bone marrow in fat and connective tissue (Figure 2). The mass was diagnosed as HO ossification when its localization was also considered.

The patient was discharged on postoperative day four because he belonged to another city. There were no postoperative complications. The lesion was seen to be completely resolved during follow-up visits. The patient was informed about the case presentation, and approval was obtained.

DISCUSSION

Heterotopic ossification is the formation of bone tissue in areas other than the skeletal system, for example, skin, subcutaneous fat, scars, or mesenteric tissue (2, 3). The etiology and pathogenesis of HO, which demonstrated to have real osteoblastic activity and bone formation at histological examination, have not been completely explained yet. The hypothesis of the stimulation of mesenchymal cells through tissue hypoxia and metabolic or genetic factors to form a bone tissue by metaplastic transformation is generally accepted for the pathogenesis of the condition. The condition is generally evaluated in the following three groups: a) Neurogenic HO, the spasticity, long-term comatose condition, and exposure

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Figure 1. Macroscopic view of the heterotopic ossification

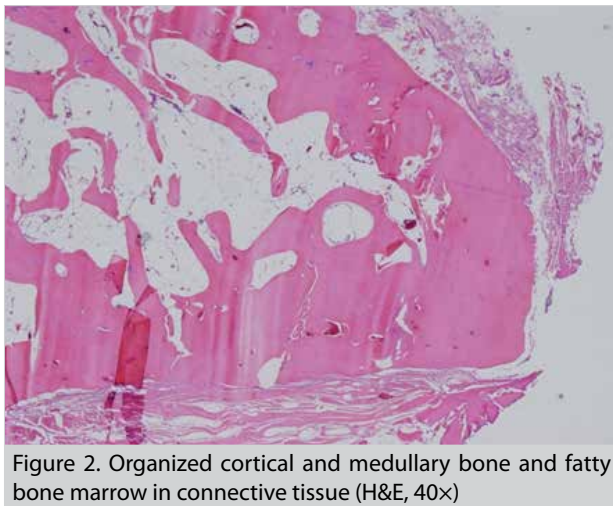


Figure 2. Organized cortical and medullary bone and fatty bone marrow in connective tissue (H&E, 40x)

to immobilization in patients with head trauma play a role in the etiology in this group (4, 5); b) Traumatic HO, it develops following fractures of the hip, elbow, and knee and after orthopedic surgery (5); c) On the other hand, myositis ossificans progressiva is an autosomal dominant congenital disease (5).

Heterotopic ossification might be observed following abdominal and vascular surgery, although it has been known to be a complication of orthopedic surgery. Kim et al. (1) reported the incidence of HO to be 25% by postoperative computed tomography evaluation of 152 cases having abdominal incisions. It is more common in men than in women (89%) (6). Some authors proposed that increased abdominal pressure causes an increased suture line tension in men owing to heavy work load (7, 8).

Another assumption is the inoculation of pieces of periosteum or perichondrium separated from the xiphoid process or the symphysis pubis during surgery (2). In this case, no connection was observed between the xiphoid process and ectopic bone during the exploration.

Patients may suffer from limited mobility, pain, and induration in the area of the incision. Upon physical examination, a palpable mass can be found at the incision line. Direct X-rays, US, CT, and magnetic resonance imaging can be used for diagnosis in case of suspicion of HO. Differential diagnosis includes post-

operative complications, such as foreign materials, wound infection, and neoplasms. This formation was reported as fluid collection in the US, performed at our radiology department. We believe that the presented pathology is infrequent and that radiologists are not familiar with this image.

Literature contains insufficient evidence on the use of non-steroidal anti-inflammatory drugs, such as indomethacin and bisphosphonates, in the prevention or treatment of HO in the early period (9, 10). Although there is no standard method for treating the condition, the most frequently used surgical treatment option is excision and primary closure. Some authors, considering the differentiation effect of mechanical stress on pluripotent stem cells, prefer reconstruction techniques, such as tension-free repair or component separation in surgical treatment (11, 12).

The application of radiation therapy following abdominal surgery is debatable owing to side effects; however, radiation therapy is recommended after orthopedic surgery to prevent the development of HO.

Complications associated with HO are rarely encountered. A histologically proven HO tissue capable of producing triple hematopoiesis with normal function was reported in two case reports during our literature search (13, 14). Although HO is a benign lesion, osteosarcoma transformation and fracture of mature lesions following direct trauma are among the complications reported in the literature (15).

CONCLUSION

Heterotopic ossification, which is generally known to develop following orthopedic surgery, can also rarely be observed in abdominal incisions. Radiological examination is important in differential diagnosis. Excision and primary closure is an appropriate and safe method for treatment.

Informed Consent: Written informed consent was obtained from patient who participated in this study.

Peer-review: Externally peer-reviewed.

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