



## Case report

## “Heterotopic abdominal wall ossification: A case report” information

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## ABSTRACT

**Introduction and importance:** Heterotopic ossification is forming a new bone in tissues that do not normally ossify. HO was first reported in 1901 by Askanazy and Lubarsh in a case report study. The range of HO is wide from minute foci to large clinically significant ossification. The incidence of HO in abdominal scars is extremely low.

**Case presentation:** We present an 84-year-old man referred to our hospital after an unsuccessful elective colostomy reversal in a local hospital. The colostomy was made for fecal diversion after sigmoidectomy due to treatment of sigmoid volvulus about three months ago. The patient had a past medical history of hypertension for 8 years under treatment of amloride.

**Clinical discussion:** In general appearance, the patient was not ill or toxic. Vital signs were normal. Postoperatively Patient did not defecate. In his physical examination was not found abdominal tenderness or rebound tenderness. The patient underwent laparotomy which revealed significant retroperitoneal adhesion and colostomy was reversed. Accidentally was found a dense structure with bone-like consistency in the abdominal wall close to the scar was resected. The specimen Pathologic examination showed metaplastic bone deposition with mature bone trabeculae and heterotopic ossification was confirmed.

**Conclusion:** We report a rare case of HO that was identified at the abdominal wall. Heterotopic ossification can lead to serious complications. However, in symptomatic patients, surgical excision is an acceptable treatment, unlike in asymptomatic patients.

## 1. Background

Heterotopic ossification is forming a new bone in tissues that do not normally ossify [1]. According to etiology, Heterotopic ossification (HO) is classified as acquired or congenital. Neurogenic, traumatic, and myositis ossificans progressiva are the acquired form of HO. It is common in large joints due to trauma. Although the pathophysiology of this condition is not yet clear, tissue hypoxia and metabolic or genetic factors are the hypotheses that have been generally accepted [2].

The range of HO is wide from minute foci to large clinically significant ossification. The incidence of HO in abdominal scars is extremely low although many abdominal surgeries are performed around the world, [3]. HO was first reported in 1901 by Askanazy and Lubarsh in a case report study [4].

Because Heterotopic abdominal wall Ossification is a rare occurrence, we present a case presentation of an 83-year-old male patient with a Heterotopic abdominal wall Ossification discovered 3 months after Hartman surgery for sigmoid volvulus of the Colon.

## 2. Case report

The patient was an 84-year-old man referred to our hospital after an unsuccessful elective colostomy reversal in the local hospital. The colostomy was made for fecal diversion after sigmoidectomy due to treatment of sigmoid volvulus about three months ago. The patient had a past medical history of hypertension for 8 years under treatment of amloride and benign prostatic hyperplasia that had received tamsulosin.

In general appearance, the patient was not ill or toxic. Vital signs were normal. Postoperatively Patient didn't has defecation. In his physical examination was not found abdominal tenderness or rebound tenderness. The other systemic examination did not reveal abnormalities. Laboratory and radiologic examinations were requested. Laboratory findings are shown in Table 1.

Preoperatively, the abdominal x-ray showed irregular high-opacities shadows of the adipose and muscular planes near the colostomy. The patient underwent laparotomy. Intraoperatively ab-

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**Table 1**  
Laboratory findings of the patient.

Test	Result	Reference range
10 <sup>9</sup> /L × WBC (white blood cells)	13.3	4.0–11.0
HB	10.8	13–16
PLT × 10 <sup>3</sup> /μL	331	150–450
Urea	35	11–55
Cr	1.3	0.6–1.3
AST	28	UP to 37
ALT	11	UP to 41
ALP	139	100–360
Bili T	0.4	1.2–0.3
Bili D	0.1	
PT	12.9	12–14
PTT	28	25–45
INR	1.03	≤0.3
BS	122	<140 140 to 199 ≥200
		Normal Prediabetes Diabetes
Potassium	4.3	3.5–5
Sodium	142	135–145
Amylase	71	<100
Lipase	16	<60
Troponin	NEG	

domen was opened from the previous surgical line and with significant retroperitoneal adhesion between the small bowel and surrounding soft tissue. Accidentally a dense structure with bone-like consistency in the abdominal wall close to the scar was found that was compatible with the abdominal X-ray findings. Colostomy was reversed and hard tissue was carefully resected [Fig. 1]. The Specimen was sent to the pathology laboratory. The specimen was cut into multiple pieces in five blocks and 20 % of it was embedded. In histopathology, metaplastic bone deposition with mature bone trabeculae with chronic inflammation, foreign body type giant cell reaction, and fibrosis without atypia or malignancy were confirmed in specimen resection [Fig. 2]. This work has been reported in line with the SCARE criteria [5]. Tissue analysis under polarised light after Congo red stain was negative.

### 3. Discussion

Heterotopic ossification is forming a new bone in tissues that do not normally ossify [1]. HO is a benign lesion but some complications such

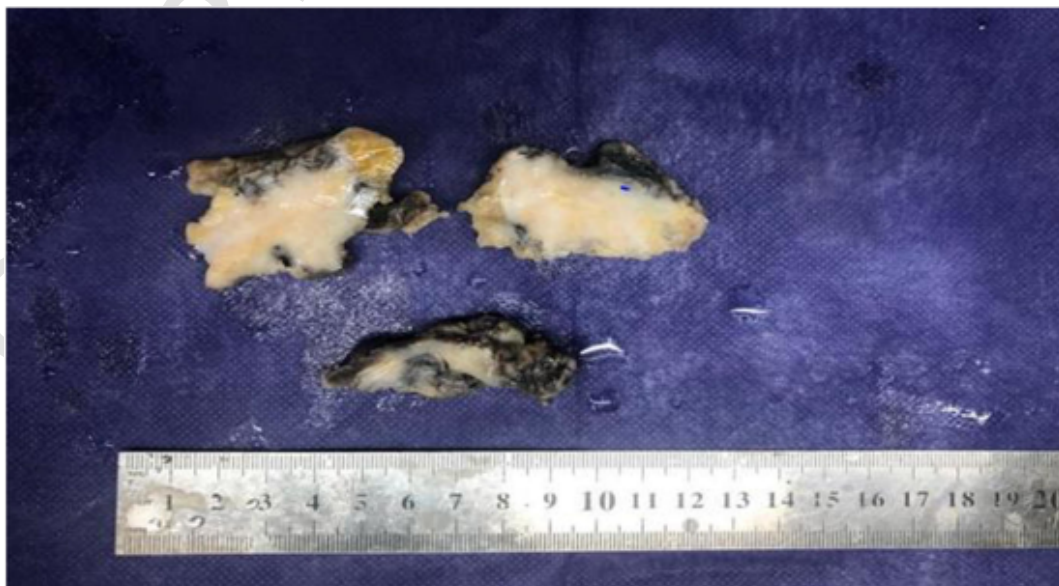
as osteosarcoma transformation and fracture of mature lesions due to trauma are reported [6]. HO was first reported in 1901 by Askanazy and Lubarsh in a case report study [4]. The incidence of HO in abdominal scars is extremely low, although many abdominal surgeries are performed around the world [3]. We intend to describe a rare case presentation of HO involving the abdominal wall site.

Although the pathophysiology of this condition is not yet clear, tissue hypoxia and metabolic or genetic factors are the hypotheses that have been generally accepted [2].

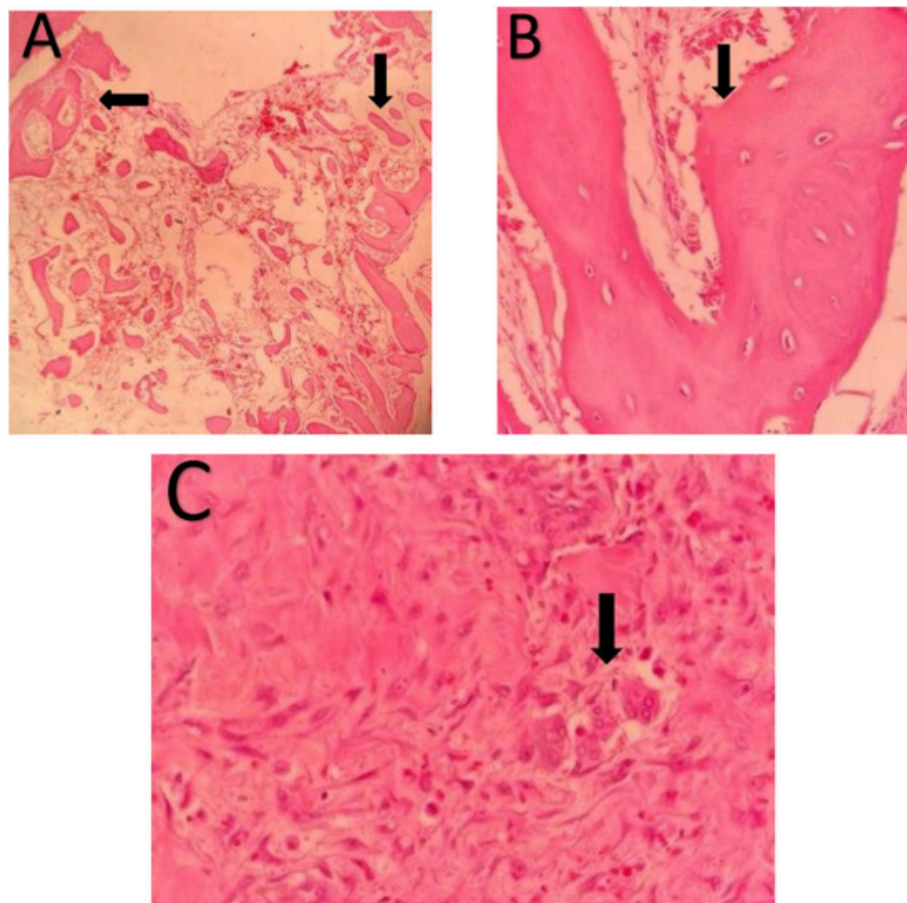
According to the etiology, Heterotopic ossification (HO) is classified as acquired or congenital. Neurogenic, traumatic, and myositis ossificans progressiva are the acquired form of HO. Neurogenic HO is a frequent complication in spinal cord injury that is characterized by the formation of new extraosseous bone in soft tissue [7–9]. Traumatic HO is related to heterotopic ossification following a trauma. Moreover, traumatic HO suggested increasing the levels of both local and systemic inflammatory markers and there is a positive correlation [10]. Myositis ossificans Progressiva is a connective tissue disorder with autosomal dominant inheritance due to mutation in the ACVR1/ALK2 gene, which encodes a bone morphogenetic protein type I receptor [10]. The onset of this disease in childhood [12]. Due to extensive HO, this disease progresses to immobilization [11].

The abdominal wall and parietal peritoneum sites of HO are seen in recent cases [13–19]. The lesions in most cases occurred after surgery, but some patients with HO didn't have a history of any previous surgeries [20]. Our patient had Hartman surgery for sigmoid volvulus of the Colon 3 months ago.

Heterotopic ossification must be distinguished from other similar pathologies. Dystrophic calcification and malignant tumors of bone and contrast leakage and foreign body are in differential diagnosis HO [13,14]. Dystrophic calcification is a common pathology with the deposition of insoluble calcium salts in previously damaged tissue without the activity of osteoblastic [13]. Malignant tumors of the bone have different radiological and histological growth patterns. The malignant bone tumors on imaging almost have indistinct borders, and in histology have central ossification without peripheral ossification [14]. However, due to the rare occurrence and nonspecific radiological appearance of HO, diagnosing before surgery is difficult. Imaging modalities may not be able to accurately distinguish between differential diagnoses. Early stages of heterotopic ossification in radiology are difficult because only soft tissue density mildly increases [21]. The abdominal



**Fig. 1.** Show resected specimen with firm consistency from the abdominal wall measuring 5 \* 3 \* 2 cm.



**Fig. 2.** A and B show metaplastic bone deposition with mature bone trabeculae (see black arrows). C shows chronic inflammation, foreign body type giant cell reaction, and fibrosis. Hematoxylin and eosin (H&E) stain (see black arrows).

X-ray in our case showed calcifications with linear morphology in the adipose and muscular tissue near the colostomy. The markers are non-diagnostic, but some HO reports have described elevation in alkaline phosphatase due to increases in osteoblastic activity [22]. In our patient, alkaline phosphatase is in the normal range of laboratory reference range. The best way to reach a definitive diagnosis is through excision and histopathological analysis. Our pathological finding is metaplastic bone deposition with mature bone trabeculae with chronic inflammation, foreign body type giant cell reaction, and fibrosis that HO was confirmed.

The method for treating benign and asymptomatic lesions of HO is conservative management, but in symptomatic cases (i.e., bowel obstruction), surgical excision and primary closure may be indicated [13]. It is better to avoid unnecessary surgeries or incisions because, in a patient with a history of HO, the surgery itself is a risk factor that increases the Possibility of recurrence or further progression [13,15]. In surgical treatment, some authors prefer reconstruction techniques, such as tension-free repair or component separation [23]. In our case, the patient was referred to our hospital after an unsuccessful elective colostomy reversal in the local hospital. Elective colostomy reversal is unsuccessful because of fibrous band adhesion that is created by Hartman surgery. In the operation accidentally was found a dense structure with a bone-like consistency in the abdominal wall at the top of the scar.

Prophylactic use of nonsteroidal anti-inflammatory drugs, bisphosphonates, or radiation therapy in high-risk patients may reduce the incidence of HO [24–26].

the presentation of this case is important because it makes doctors more aware of HO pathology and better define the cause and treatment.

#### 4. Conclusion

We report a rare case of HO that was identified at the abdominal wall. Heterotopic ossification benign lesion but some complications such as osteosarcoma transformation and fracture of mature lesions due to trauma are reported. However, in symptomatic patients, surgical excision is an acceptable treatment unlike in asymptomatic patients. Further investigation of the etiology, diagnosis, prevention, and treatment of HO for appropriate prophylactic and therapeutic options of HO is advised.

#### Abbreviations

HO	heterotopic ossification
H&E	hematoxylin and eosin

#### Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

#### Ethical approval

Hormozgan University of Medical Sciences Ethical Committee approved the study under the ethical code IR.HUMS.REC.1401.102 and the study conforms with the Helsinki Declaration's statements.

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The study did not receive any funding.

## Author contribution

M. Karimi and S. Mousavi participated in the conception and design of the study. M. Karimi wrote the manuscript and evaluated the patients. S. Mousavi and M. Karimi did the microscopic examination of the endometrial specimens and wrote the pathology reports.

All authors reviewed the manuscript and approved the final manuscript.

## Guarantor

Mohadeseh Karimi.

## Research registration number

researchregistry9814.

## Conflict of interest statement

The authors declare no conflict of interest.

## Data availability

The data sets used during the current study are available from the corresponding author upon reasonable request.

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