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Heterotopic ossification beneath the upper abdominal incision after radical gastrectomy: Case report

Zhang X *et al.* HO after abdominal incision

Xiang Zhang, Ping-Tian Xia, Yan-Chao Ma, Yong Dai, Yan-Lei Wang

Abstract

BACKGROUND

Heterotopic ossification (HO) is a rare clinical phenomenon that refers to bone formation in nonossifying tissues.

CASE SUMMARY

This report presents two cases of HO beneath the upper abdominal median incision after radical gastrectomy. The first patient had postoperative pain below the incision area. There were no signs of anastomotic leakage, and the wound healed. Computed tomography (CT) findings 2 wk postoperatively were negative for HO, but the 6-wk CT showed HO beneath the incision. The patient refused reoperation, and after conservative therapy, the pain was gradually relieved after 2 wk. In the second case, postoperative recovery was uneventful, and HO was only detected on routine follow-up CT after 4 mo. An anti-adhesion membrane was applied beneath the peritoneum in both patients. Our findings suggest that HO beneath the abdominal incision might form at approximately 1 mo postoperatively. It may cause intractable pain; however, reoperation is usually not required.

CONCLUSION

In our cases, we suspect that HO may be related to the use of foreign materials beneath the peritoneum, which needs to be further investigated.

Key Words: Heterotopic ossification; Upper abdominal incision; Radical gastrectomy; Case report

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Core Tip: Heterotopic ossification (HO) beneath the upper abdominal incision is a rare clinical phenomenon that refers to bone formation in nonossifying tissues. In our cases, we suspect that HO may be related to the use of foreign materials beneath the peritoneum, which needs to be further investigated.

INTRODUCTION

Heterotopic ossification (HO) is a rare clinical phenomenon that refers to bone formation in nonossifying tissues. This is a unique phenomenon that has rarely been reported following abdominal surgery. HO of an incisional scar was first described by Askanazy in 1901 as a subset of myositis ossificans traumatica^[1,2]. Since then, more than 100 cases have been reported worldwide^[2-6]. These numbers are probably an underestimate of the actual incidence, because these ossifications are usually asymptomatic^[3]. HO has been described as a benign postoperative complication in most studies.

CASE PRESENTATION

Chief complaints

Case 1: The first patient was a 62-year-old man, he underwent radical gastrectomy (Billroth I anastomosis) with a midline abdominal incision. Postoperatively, the patient experienced pain below the incisional area.

1

Case 2: A 57-year-old man also underwent distal gastroscope (Billroth I anastomosis) due to gastric cancer with a midline abdominal incision. The patient had no other comorbidities.

History of present illness

The two patients underwent distal gastroscope (Billroth I anastomosis) because of gastric cancer.

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History of past illness

Case 1: The patient had a history of coronary stent implantation performed 3 mo ago.

Case 2: The patients had no significant past illness.

Personal and family history

The patients had no significant personal and family history.

Physical examination

Case 1: There were no signs of anastomotic leakage, and the wound healed.

Case 2: Upon palpation, the incisional area was hard and firm.

Laboratory examinations

N/A

4

Imaging examinations

Case 1: Computed tomography (CT) 2 wk postoperatively showed no obvious abnormality (Figure 1A), but the 6-wk CT showed calcification beneath the incision (Figure 1B-D).

Case 2: In the 4-mo follow-up CT scan, calcified tissue was noted under the upper abdominal incision, extending from the immediate subxiphoid region to the umbilical region (Figure 1E-G).

FINAL DIAGNOSIS

The patients were diagnosed with ossification beneath the upper abdominal incision.

TREATMENT

The patient of case 1 refused reoperation, and after conservative therapy (non-steroidal anti-inflammatory drugs), the pain was gradually relieved after 2 wk.

OUTCOME AND FOLLOW-UP

At a 1-year follow-up, the patients of case 1 had no signs of recurrence.

DISCUSSION

The following common features of ectopic ossification have been summarized in documented cases: (1) Male patients are more susceptible to ectopic ossification, and the male-to-female ratio is as high as 10:1^[7]; (2) this pathology has mostly been reported in vertical scars; (3) the ectopic bone is generally formulated within the first year postoperatively; (4) all cases in the literature occurred during primary healing, and neither wound complications nor changes in serum ion levels were noted. Both our cases fit all of these features. Moreover, the newly formed bone was detected in the first case 6 wk postoperatively, which is sooner than the earliest ectopic abdominal incision ossifications reported in the literature (2 mo)^[1]. Our findings suggest that HO beneath the abdominal incision might form at approximately 1 mo postoperatively.

While no certain theory has yet been confirmed regarding etiology, several mechanisms have been studied to help explain this pathological process. Injury or, more specifically, surgical incision is considered a necessary trigger^[4]. Three requisite components are involved in the pathogenesis^[7]: (1) Inductive signaling pathways are

activated by a stimulation factor released from the site of injury. These factors, including bone morphogenic proteins, have been implicated as potential signaling vehicles^[8]; (2) then, inducible mesenchymal stem cells, which are located at the injury site, differentiate into osteoblasts or chondroblasts after receiving these signals. This process has been described as osteogenic induction^[1,4]; (3) a heterotopic environment conducive to osteogenesis must exist. HO of the abdominal wall is a subtype of myositis ossificans traumatica. Pieces of the periosteum or perichondrium of the xiphisternum or symphysis pubis may “plant” into the incision wound during the operation and then grow into bone in the scar^[1,4]. During laparotomy, we extended the incision to the xiphisternum in both cases, which can be regarded as proof of this theory to some extent.

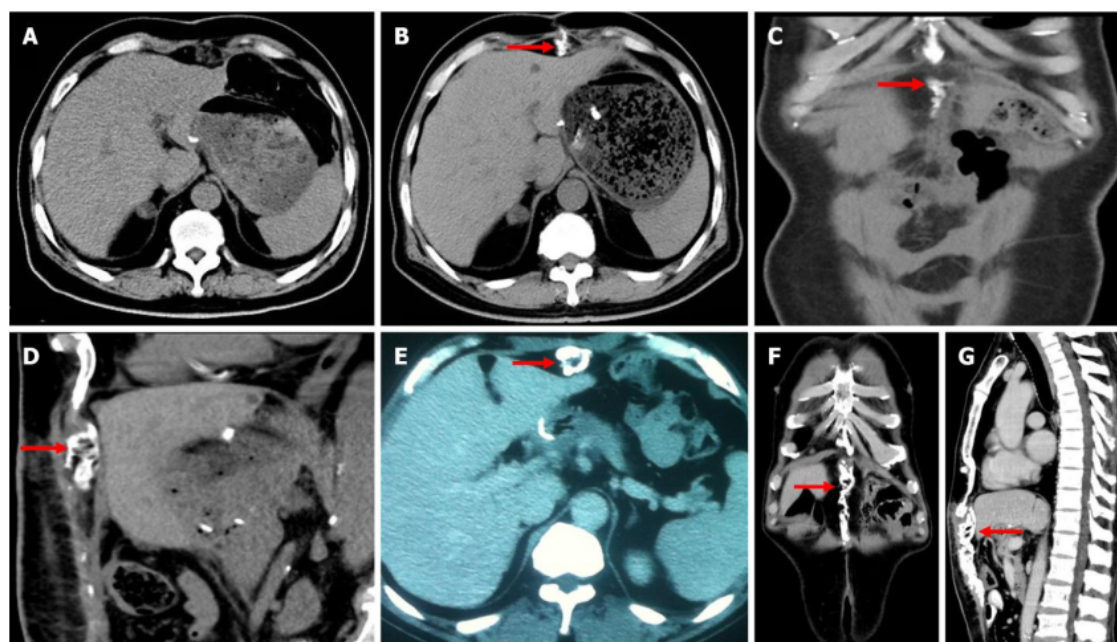
Tam *et al*^[9] recently reported a case of HO in a patient after hernia repair. In the ectopically formed bone, they found an acellular dermal matrix that had been placed in the primary incision. In our case, we placed a sodium hyaluronate-based bioresorbable membrane (Seprafilm) under the peritoneum of each patient to prevent adhesion. It has been postulated that this type of anti-adhesion agent can cause inflammatory reactions as a severe postoperative complication^[10-12]. Whether Seprafilm was the culprit in our case needs to be further investigated.

The main symptoms of HO include local pain and swelling^[7]. In suspicious cases, CT or magnetic resonance imaging should be performed for diagnosis^[2]. It is also important to exclude other postoperative complications, such as anastomotic leakage and tumor recurrence. In patients with intractable abdominal pain, conservative therapy, such as analgesic administration, parenteral transfusion, and physical therapy, should be initially performed. If conservative therapy fails, then complete excision of the lesion should be considered. Asymptomatic patients need no treatment apart from observation. The first patient in our experience had sustained abdominal pain postoperatively and was readmitted to the hospital twice. After 1 mo of conservative therapy, pain was immediately relieved before surgery was considered.

CONCLUSION

Non-steroidal anti-inflammatory drug therapy, radiotherapy, and diphosphate (ethindronate disodium) administration have been proposed to decrease heterotopic bone formation^[1]. However, the routine application of these methods is controversial and unnecessary.

Figure Legends



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Figure 1 Imaging examinations. A: Computed tomography (CT) scan 2 wk postoperatively in case 1 shows no obvious abnormality beneath the incision; B: CT scan 6 wk postoperatively in case 1 shows calcified tissue beneath the incision (arrow); C and D: Coronal and sagittal images of calcified tissue in case 1 between the incision and liver (arrow); E: CT scan 4 mo postoperatively in case 2 shows calcified tissue beneath the midline incision (arrow); F and G: Coronal and sagittal images in case 2 show extension of calcification (arrow).

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