CASE REPORT

Iliac crest bone graft donor site hernia: not so uncommon

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SUMMARY

A 73-year-old man, who had undergone fracture fixation of humerus with LCP plating and bone grafting, presented again with a peri-implant fracture after 1 year. A repeat surgery was contemplated and replating was performed with tricortical bone graft harvested from the iliac crest. In the postoperative period the patient developed a tender swelling at the graft site with nausea and abdominal discomfort. It was managed conservatively thinking it to be a haematoma at the graft site. In the following 2 days his symptoms worsened. A CT abdomen showed the herniation of caecum from the bone graft donor site with obstruction. The patient was taken up for emergency surgical repair, the caecum was reduced and polypropylene mesh hernioplasty was performed. The patient recovered well without recurrence in the follow-up period. Iliac crest bone graft site hernia is not so uncommon and care has to be taken while harvesting.

BACKGROUND

Bone grafting for the treatment of fractures is an essential tool of orthopaedic surgery. Iliac crest is a rich source of both cortical and cancellous bone. With the increasing incidence of trauma and fractures in the modern age, it is very essential for the treating surgeon to know about the complication of bowel herniation through the bone graft donor site. If proper care is taken while harvesting without damaging the inner cortex a great deal of morbidity can be averted.

CASE PRESENTATION

A 73-year-old man (weight 56 kg, height 171 cm) was operated for fracture of the mid-shaft humerus in 2011. This fracture was fixed with a locking plate (4.5 Limited Contact Plate (LCP)) and iliac bone graft. The patient again presented to hospital a year later with pain and deformity of right arm and x-ray showed peri-implant fracture. A repeat surgery was contemplated for removal of previous plates and replating with tricortical bone graft harvested from the right iliac crest. The immediate postoperative period was uneventful. On 10th day of operation the patient noticed a swelling at the graft site, which was associated with nausea and mild abdominal discomfort. The swelling was tender and had no obvious impulse on cough. With a diagnosis of haematoma it was treated with conservative measures. Two days later the patient developed vomiting, abdominal distension and constipation. CT abdomen showed herniation of the bowel from the anterior portion of the iliac crest

(figure 1). A diagnosis of intestinal obstruction secondary to iliac crest bone graft donor site hernia was made and taken up for emergency surgery.

INVESTIGATIONS

CT abdomen showed herniation of caecum and ascending colon with associated mesentery through a 6×4 cm fibro-osseous defect in the lateral aspect of the abdominal wall at the graft incision site. A separate and well-defined bony piece in the inter-muscular plane and lateral to the iliac blade was also seen.

DIFFERENTIAL DIAGNOSIS

Haematoma at the graft site.

TREATMENT

Emergency surgical exploration was performed with incision over the previous scar. The hernial sac was found to lie in the subcutaneous space, which contained the caecum and ascending colon. A free bony piece with its sharp point was impinging on the dilated caecum producing a potential danger of perforation. All contents were repositioned, free bony piece removed and sharp border of the ilium was smoothed. Defect was closed with a polypropylene mesh which was anchored to the periosteum. The drain was removed on the fourth postoperative day.

OUTCOME AND FOLLOW-UP

The patient's postoperative recovery was uncomplicated and was discharged on the 10th postoperative day. On follow-up the wound had healed well and there was no recurrence of the hernia.

Figure 1 CT abdomen sagittal view showing herniation through the iliac crest graft site.

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Figure 2 Reconstructed CT image showing the full thickness defect in the anterior portion of the iliac crest.

DISCUSSION

Autogenous bone graft from the iliac crest is frequently harvested and is still the gold standard in the treatment of many bone defects. Numerous complications are associated with bone grafting like damage to arteries (superior gluteal, fourth lumbar, iliolumbar and deep circumflex iliac), damage to nerves (lateral femoral, ilioinguinal), ureteral injury, gastrointestinal hernia, ileus, haematoma, pelvic instability and fractures.¹ Gastrointestinal herniation through the wing of the ilium after grafting is an extremely rare complication. Fewer than 40 cases have been reported since Oldfield reported a 'land slide' hernia of caecum as the first case in 1945.^{2,3} This complication is more prevalent in women. As previous reports suggest, overall incidence varies between 5% and 9%,⁴ incarceration occurs in about 25% and strangulation in 10% of the cases (figure 2).

The onset of symptoms of herniation has been reported to have occurred from as early as 24 days to as late as 15 years following the iliac bone grafting surgery.⁵ Our patient developed symptoms within 11 days which is the shortest presentation time to the best of our knowledge.

The full-thickness iliac crest fibro-osseous defect as a rigid ring is prerequisite through which abdominal content can herniate after muscular/fascial diastasis. The content can vary from retroperitoneal fat, kidneys, spleen, liver, small and large bowel. In our case it was the herniation of caecum (figure 3).

Figure 3 Intraoperative picture of herniation of caecum.

The usual presentation of this hernia is chronic pain with or without a soft mass. Pain varies from discomfort and dragging sensation to intestinal colic and may be accompanied by digestive problems such as nausea, vomiting and abdominal discomfort. Mass in the defect area is usually soft with fluctuating volume, shows impulse on coughing and bowel sound on auscultation. A haematoma or an abscess is closest possible differential diagnosis.⁶ Other possibilities include intra-abdominal tumours, muscle hernia, renal tumour and pannicular lumbosacral iliac hernia, lipoma, fibroma or other soft tissue tumours. Clinical diagnosis of the condition is relatively simple. Plain radiographs can show the bony defect and dilated bowel loops outside the wing of ilium. However, CT abdomen should be performed, as it delineates muscular and fascial layers, outlines the bone and confirms the content of the hernial sac.

Hernia is treated with the same basic principles of any other hernia surgery, namely reduction of the hernia and obliteration of the defect with tension-free mesh repair. It can be performed through a laparoscopic,⁷ retroperitoneal or transabdominal approach as per the surgeon's choice and the patient's clinical condition.

Three main treatment possibilities have been described:

- ▶ Advancement of various soft tissues such as the abdominal fascia, abdominal muscle, iliac muscle and tensor fascia lata and imbrication to bridge the fibro-osseous gap.⁸
- ▶ The Bosworth technique, to change the profile of the involved iliac crest and remove the notch. To achieve this, resection of the bone, transposition of the anterior superior iliac spine to a more distal and posterior position is performed so that muscular, ligamentous and fascial structures can be held tightly across the defect.⁹
- ▶ Closure of the defect with prosthetic mesh or bone allografts especially if the defect is greater than 4 cm².¹⁰

Predisposing factors of this condition are age more than 65 years, obese patients with poor musculature, increased abdominal pressure, hypertension and harvesting of a full-thickness graft especially from the middle portion of the iliac crest. Thus to avoid this complication, bicortical bone grafts should be preferred. Inner table and middle portion of the iliac crest should be preserved. Other techniques such as bone substitutes and cell therapy can also be considered for bony reconstruction.

Learning points

- ▶ Iliac crest graft site gastrointestinal hernia is extremely rare, so a high degree of suspicion is required to diagnose this condition.
- ▶ Verification of intact peritoneum and avoidance of the anterior portion of the iliac crest while harvesting full thickness graft.
- ▶ Composite bioceramic osteoconductive grafts, which provide a framework for human osteogenesis and cell therapy, can be used as a true graft

Contributors RP was involved in concept and design of the case report. He is also the guarantor. NK was involved in manuscript preparation and editing. RS was involved in definition of intellectual content and literature search.

Competing interests None.

Patient consent Obtained.

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