

Pseudoaneurysm of the Deep Circumflex Iliac Artery: A Rare Complication at an Anterior Iliac Bone Graft Donor Site Treated by Coil Embolization

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Pseudoaneurysm formation of the deep circumflex iliac artery (DCIA) after harvesting an anterior iliac bone graft for spinal fusion is reported herein. A 76-year-old man with cervical myelopathy underwent anterior cervical decompression and fusion with a left anterior iliac bone graft. A painful left inguinal mass was noted 1 month later. He was admitted to our emergency ward. Angiography of the left external iliac artery was performed which showed a pseudoaneurysm of the DCIA. Selective transarterial coil embolization of the artery was performed, and bleeding was arrested. In a review of the previous literature, only 1 pseudoaneurysm of the DCIA was reported to be associated with anterior iliac bone graft. In conclusion, vascular injury after anterior iliac bone harvesting is rare but can occur. Selective transarterial coil embolization is a prompt and effective solution. (*Chang Gung Med J* 2002;25:480-4)

Key words: deep circumflex iliac artery, pseudoaneurysm, anterior iliac bone graft, transarterial coil embolization.

The iliac bone is a common site to harvest bone for orthopedic and spinal surgery. Respective major and minor complication rates calculated from the data presented by Younger and Chapman were 5.3% and 25% at the anterior iliac donor site and 1.35% and 18.4% at the posterior iliac donor site.⁽¹⁾ A 21% morbidity rate with iliac bone grafts was reported by Laurie et al.⁽²⁾ Major complications include chronic severe pain, deep infection, large hematomas, prolonged wound drainage, sensory loss, severe pain, and unsightly scars.⁽¹⁾ Other complications include hernia through defects in the ileum,⁽³⁾ fractures,⁽⁴⁾ and pelvic instability.⁽⁵⁾ Vascular injury as a complication of harvesting anterior iliac bone is rare; only a case of deep circumflex iliac

artery (DCIA) injury has been reported.⁽⁶⁾ The remaining vascular complications resulted from harvesting posterior iliac bone with superior gluteal vessel injury.⁽⁷⁻¹⁰⁾ Only one of these was treated by transarterial coil embolization.⁽⁹⁾ This is a report of a rare complication, a pseudoaneurysm in a DCIA, encountered after harvesting an anterior iliac bone graft for spinal fusion. The pseudoaneurysm caused massive bleeding that was successfully managed by selective transarterial coil embolization.

CASE REPORT

A 76-year-old man complained of numbness in all 4 extremities for 2 weeks.

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Neurological examination revealed hyperreflexia in the upper limbs, impaired sensation in the distal part of all limbs, and weakness of all limbs. Magnetic resonance imaging of the cervical spine showed C3-4 spondylosis and cervical spondylosis with cord compression. Anterior cervical decompression and fusion from C3-4 to C4-5 was therefore performed. A bone strut was harvested from the left anterior iliac crest, and a metallic plate was fixed to the cervical spine.

Although the patient's neurological symptoms improved after the operation, he still felt discomfort at the left iliac bone donor site. He often massaged the left anterior iliac region to relieve the feeling. A painful and swollen mass suddenly appeared in the left inguinal region 1 month later. He came to our emergency ward for help. Laboratory data showed decreased hemoglobin, red blood cell count, and hematocrit level. Angiography was immediately performed. A study of the left common iliac artery demonstrated arteriosclerosis of the external iliac artery without vascular abnormality. Under the suspicion of donor site trauma, a selective angiogram was performed by placing a 4-Fr RC-1 angiocatheter (Terumo, Tokyo, Japan) into the DCIA which showed a pseudoaneurysm (Fig. 1). The DCIA was selectively embolized by two 2-mm; 3-cm and two 3-mm; 5-cm stainless coils (Cook, Bloomington, IL, USA) (Fig. 2), after which repeat angiography of

the DCIA showed no residual pseudoaneurysm (Fig. 3). Post-embolization computed tomography showed massive hematoma at the donor site with contrast medium pooling at the sac of the pseudoaneurysm and good coil packing within the pseudoaneurysm itself (Fig. 4). On the same day, the hematoma was removed from the donor site. The

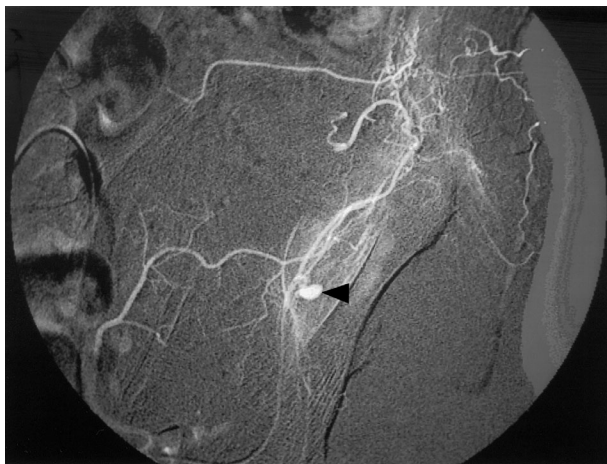


Fig. 1 Selective angiogram of the deep circumflex iliac artery showing a pseudoaneurysm (black arrowhead).



Fig. 2 Selective placing of stainless coils (black arrow) to trap the pseudoaneurysm neck by placing a 4-Fr RC-1 catheter proximal to the pseudoaneurysm (black arrowhead).

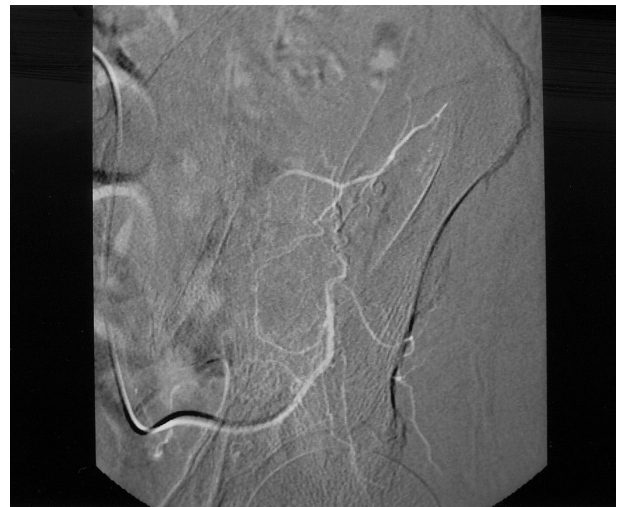


Fig. 3 Subtraction angiogram of the deep circumflex iliac artery after coil embolization showing no residual pseudoaneurysm.



Fig. 4 Computed tomographic scan after transarterial coil embolization showing massive hematoma (white arrows) at the donor site with contrast medium pooling at the sac of the pseudoaneurysm (white arrowhead) and good coil packing (black arrowhead).

patient remained well and was discharged 3 days after the operation. He was symptom-free for 2 months after discharge from the hospital.

DISCUSSION

Vascular injury to the DCIA is a rare complication due to either trauma or various procedures.^(6,11-13) Only a few reports of superior gluteal artery laceration and arteriovenous fistula during or after posterior or iliac bone harvesting have been reported.^(8,9)

In the literature, vascular injury during or after anterior iliac bone harvesting has been reported once.⁽⁶⁾ This is the first instance of vascular injury during or after anterior iliac bone harvesting which was treated by transarterial coil embolization.

The DCIA originates from the external iliac or femoral artery in the region of the inguinal canal. It then courses laterally and upwards toward the anterior superior iliac spine (ASIS) for approximately 5 to 7 cm. A large ascending branch emerges as it approaches the ASIS, which pierces the transverse abdominal muscle and lies between it and the internal oblique muscle.

The artery then leaves the inguinal floor, pierces the transversalis fascia, and enters a fibro-osseous tunnel formed by the line of attachment of the trans-

versalis fascia and the iliaca fascia.⁽¹⁴⁾ By reviewing its anatomy, it is evident that laceration of the DCIA may occur during anterior iliac bone harvesting, even if no arterial bleeding occurs during graft harvesting as in this patient. One possibility for vascular injury to the DCIA is partial tearing during surgery with spasm of the involved artery. Another may be due to a spiky end of the donor site with chronic erosion of the arterial wall due to motion or massage, as in this patient. Since angiography of the external iliac artery indicated arteriosclerosis in the current patient, perhaps the DCIA was arteriosclerotic and vulnerable to trauma. It also may have finally ruptured due to violent motion or local massage.

Most pseudoaneurysms result from some type of penetrating trauma. The penetrating wound will damage all layers of the artery with extra-arterial hematoma formation. The hematoma may become organized which will produce a fibrous layer in the pseudoaneurysmal wall.⁽⁸⁾

Vascular complications related to iliac bone graft have been reported.⁽⁶⁻¹⁰⁾ The treatment options include observation,⁽⁷⁾ Fogarty catheterization,⁽⁸⁾ transarterial coil embolization,⁽⁹⁾ and percutaneous balloon occlusion.⁽¹⁰⁾ Transarterial embolization of vascular injury associated with iliac bone graft harvesting is often effective. Due to the advantage of embolization avoiding the problem of locating and controlling bleeding, it is suggested as a preferable choice to surgical intervention.⁽⁹⁾ In the current patient, angiography clearly demonstrated the pseudoaneurysm, and selective coil embolization arrested the bleeding. In retrospect, removal of the hematoma might not have been necessary in this patient, because it was accompanied by a risk of removing or causing dislodgment of the coil.

In conclusion, the DCIA can be injured during or after anterior iliac bone graft harvesting in patients with fragile arterial walls. Immediate angiography and transarterial coil embolization may be the best treatment option when massive bleeding occurs at the harvest site.

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深旋腸骨動脈之假性動脈瘤：前腸骨移植之罕見併發症 成功用金屬線圈栓塞治療

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深旋腸骨動脈之假性動脈瘤是前腸骨移植之罕見併發症。一位76歲男性病患患有頸脊髓神經病變，接受前頸減壓及融合術使用前腸骨移植。術後一個月病患發現一疼痛之左鼠蹊腫塊。血管攝影發現左深旋腸骨動脈之假性動脈瘤，此出血處被選擇性經動脈金屬線圈成功栓塞。經回顧醫學文獻，只有一位類似病患被報告過。雖然深旋腸骨動脈之假性動脈瘤是一罕見的前腸骨移植併發症，但它可成功的被經動脈金屬線圈栓塞所治療。(長庚醫誌 2002;25:480-4)

關鍵字：深旋腸骨動脈，假性動脈瘤，前腸骨移植，經動脈金屬線圈栓塞治療。