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Left External Iliac and Common Femoral Artery Occlusion Following Blunt Abdominal Trauma without Associated Bone Injury

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Blunt abdominal trauma may cause peripheral vascular injuries. However, blunt abdominal trauma rarely results in injuries to the external iliac and common femoral arteries, which often stem from regional bone fractures. Here, we present the case of a patient who had experienced trauma in the lower abdominal and groin area three months before presenting to the hospital, but these injuries did not involve bone fractures and had been managed conservatively. The patient came to the hospital because of left lower leg claudication that gradually became severe. Computed tomography angiography confirmed total occlusion of the external iliac and common femoral arteries. The patient underwent femorofemoral bypass grafting and was discharged uneventfully.

Key words: 1. Internal iliac artery
2. Femoral artery
3. Blunt trauma

CASE REPORT

A 45-year-old male was admitted to Wonju Severance Christian Hospital, suffering from left leg claudication that had persisted for three months. He had fallen from a 1.5-meter height and had experienced a direct blow from a long steel bar to the left lower abdomen and groin. Although he visited a private clinic rather than seeking more specialized care, he suffered from a subcutaneous hemorrhage on the left lower abdominal wall without pelvic bone fracture. At his initial examination at the private clinic, his vital signs were stable and further tests were not administered. Subsequently, he experienced a gradual onset of pain and weakness in the left leg. At our hospital, a physical examination and Doppler imaging revealed a weak left femoral pulse. A computed tomography angiogram demonstrated an area of total obstruction extending from the left external iliac artery to the femoral artery (Fig. 1). The distal part of the femoral artery and the popliteal artery showed no signs of stenosis or occlusion. The left femoral artery was exposed under general anesthesia. The common femoral artery showed total obstruction and atrophic change, containing an atheromatous embolus (Fig. 2). A Fogarty catheter did not advance from the common femoral artery to the external iliac artery. A femorofemoral bypass graft was performed uneventfully, using an 8-mm polytetrafluoroethylene graft. Postoperative values of the ankle-brachial index and a postoperative computed tomography angiogram showed good patency.

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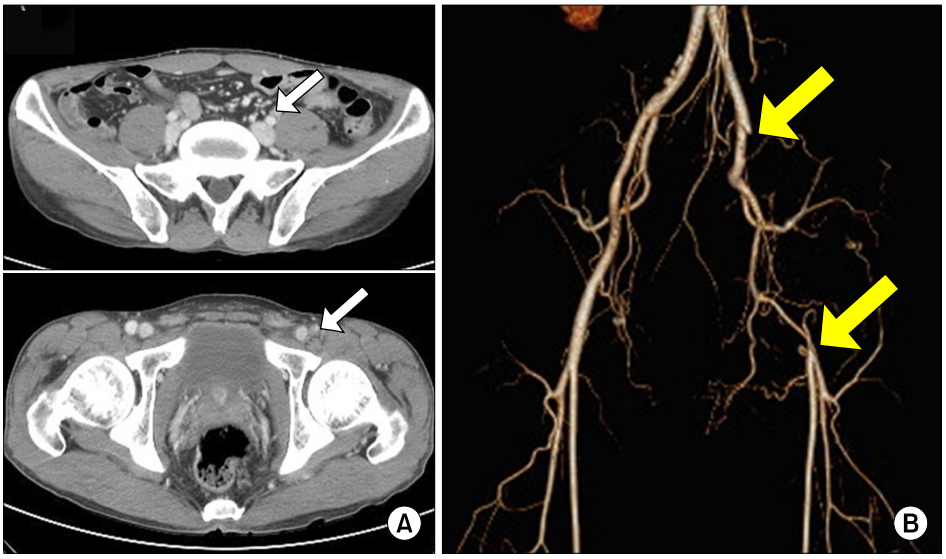

Fig. 1. Preoperative computed tomography angiogram. (A) Horizontal view and (B) reconstructed view show the occlusion of the left external artery and the left common femoral artery (arrow).

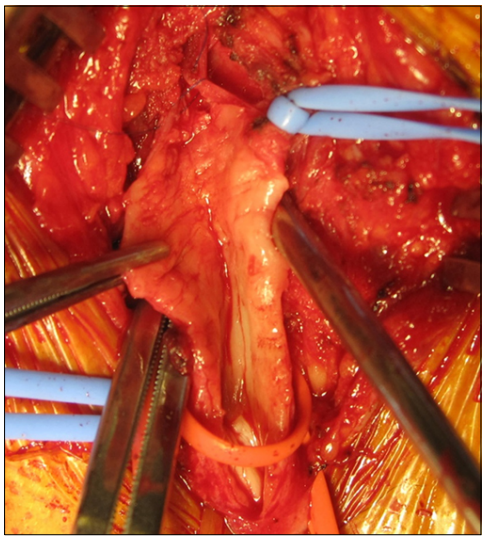

Fig. 2. Operative finding. Left common femoral artery shows the atrophic change and total occlusion to upward.

DISCUSSION

Blunt abdominal trauma may cause peripheral vascular injuries by rapid deceleration or direct compression, although injuries to the external iliac artery and common femoral artery rarely occur after lower blunt abdominal trauma. The occurrence of such injuries without pelvic bone fracture is especially rare and poorly documented. In such cases, the symptoms are commonly delayed, but consequently progress to severe outcomes. This type of injury was first described as motor-scooter handlebar syndrome in 1968, and has been hypothesized to result from compression of the artery by the inguinal ligament [1]. Most external iliac artery and femoral artery injuries are more commonly associated with pelvic bone fractures. However, although such cases are rare, a direct blow to the groin area can produce external iliac or femoral artery interruption. If these injuries occur without bone fractures, they are mostly not noticed in initial trauma treatment due to their relatively minor and non-specific symptoms. Motor vehicle accidents with seat belt injuries are the most common mechanism for this injury. Motorcycle or bicycle accidents, in which the rider sustains a blow to the inguinal region from the handlebar, are the next common mechanism [2]. The mechanisms of injury appear to be direct anteroposterior compression, traction from pelvic bone structures, and shearing forces, which may possibly be accelerated by linear injury lower abdomen and groin [3]. The lesion usually begins as a subintimal dissection or circumferential intimal fracture, from which a subsequent thrombosis develops that may progress to complete occlusion [4]. As in the case described here, an initial injury to the external iliac artery may progress to the common femoral artery, resulting in total obstruction and atrophic changes with atheromatous embolus.

The rarity of this type of injury may contribute to its delayed diagnosis, resulting in increased morbidity. Some studies of blunt iliac arterial trauma have suggested that acute iliac artery occlusion is an unusual clinical manifestation, and

that such injuries may be treated within days, months, or even years after the blunt lower abdominal trauma. Tuech et al. [5] described nine patients with blunt iliac artery trauma, who experienced a median delay to operation of 15 days (range, two days to 36 years). Operative bypass grafting was performed on all injuries. Such findings imply that acute iliac artery occlusion is an unusual outcome of blunt lower abdominal trauma.

The diagnosis of such injuries is based on clinical suspicion, the presence of a pulse deficit, bruit, expanding hematoma, arterial bleeding, poor capillary filling, and cold extremities. Although vessel wall damage may not manifest initially, it can result in thrombosis, subintimal hemorrhage, dissection, or aneurysmal dilatation. These pathologic changes can result in hemorrhage, pain, or ischemia developing remotely from the initial trauma.

Once a vascular injury is diagnosed, operative repair is generally indicated. At operation, the affected artery may appear normal or may be fibrotic and inflamed with an intramural hematoma. A previous study has described the use of an extraperitoneal approach in the treatment of iliac artery injuries [6]. In this procedure, the injured artery is resected and direct end-to-end anastomosis is performed after mobilization of the iliac artery. Sometimes end-to-end anastomosis was found to be impossible, even if the hypogastric artery was divided to gain more length. Autologous vein grafts were used in four cases and synthetic grafts were used in five cases in that study, with good results. Controversy still exists with regard to whether an autologous vein graft or a synthetic graft is preferable. Autologous vein grafting on an injured iliac artery may result in a problematic size mismatch. Some authors have recommended the use of the superficial femoral vein for femoral artery lesions. Several articles have shown evidence that synthetic grafts may be used in cases with substantial contamination and may be resistant to subsequent infection [7].

Ligation of the artery and extra-anatomic bypass grafting is another treatment strategy. In our case, we used a femorofemoral bypass graft. Percutaneous treatment with an endovascular stent has been shown to provide good short-term results [8]. However, in our opinion, stents should not be used due to inadequate consideration of the intimal flap pathology and the relatively young age of the patients. Surgical bypass grafting appears to produce excellent long-term clinical results. Overlooked injuries to the external iliac artery and common femoral artery without preceding bone fracture can result in delayed claudication. Physicians should be aware that blunt trauma to the lower abdomen and groin may cause vascular injury, even in the absence of other immediate manifestations of serious damage.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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