CASE REPORT

Blunt abdominal trauma: A rare cause of acute lower limb ischaemia due to plaque embolus originating from an atherosclerotic common iliac artery

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Introduction

The common iliac artery is rarely injured in blunt trauma to the abdomen. We report the first description of an acute common femoral artery occlusion by plaque embolus dislodged from an atherosclerotic common iliac artery caused by blunt injury to the infraumbilical region of the abdomen. The early recognition of this rare complication of blunt abdominal trauma with prompt surgical intervention resulted in the complete restoration of function to the lower limb.

Case report

A 54-year-old male chronic smoker, who worked in a poultry slaughterhouse, was admitted to our emergency department after his right arm was caught accidentally in a poultry washing machine. As he retrieved his arm from the machine, the drum of the machine gave way and landed on his abdomen, pinning him down. He was freed with the help of his co-workers and was brought to hospital within 2 h. On admission, his vital parameters were stable. He sustained a superficial laceration to his right arm, abrasions over his lower abdomen and lower back (Figs. 1 and 2). His main complaint was that of a painful right lower limb which was pale, cool and pulseless from the knee downwards. There was right foot drop and paraesthesia from the ankle downwards. The femoral pulse was well felt. A diagnosis of acute right lower limb ischaemia secondary to blunt abdominal trauma was made. The rest of his physical examination was completely normal. The routine radiographs and blood tests were unremarkable. In view of the recent trauma to the abdomen, an urgent computed tomography aortogram (CTA) was performed and the findings discussed with an interventional radiologist. It demonstrated intra-luminal flaps at proximal right common iliac and right external iliac vessels (Fig. 3), with filling defects or intra-luminal flaps in right internal iliac, right common and superficial femoral arteries (Fig. 4). There was also narrowing of the left common iliac artery, indicating pre-existing atherosclerotic disease. Background atherosclerotic disease of the infra-renal abdominal aorta was evident. There was no evidence of a pseudoaneurysm. The initial diagnosis of either an acute embolus or a traumatic dissection of the right common femoral artery (CFA) was made. The infra-abdominal organs were unremarkable. Two treatment options were discussed with the interventional radiologist, the option of a pre-operative angiogram, with the possibility of endovascular treatment, and the option of open surgery. As the acute changes were in the right CFA, we decided to perform open surgery.

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He was sent to the operating theatre, prepared for an on-table angiogram and underwent an emergency operation within 6 h of the trauma. Intra-operatively, a dislodged circumferential plaque embolus was found causing complete occlusion at the right CFA, just proximal to the bifurcation of the CFA to the superficial femoral artery (SFA) and the profunda femoris artery (Fig. 5). A right CFA embolectomy was performed with a size 4 Fogarty catheter. The catheter passed down to the ankle easily without any resistance. Good backflow was obtained after embolectomy. The catheter was also passed up proximally to the bifurcation of the aorta as well as the profunda femoris artery without much resistance. An angiogram was not performed after embolectomy. The arteriotomy was repaired with a vein patch harvested from the inferior epigastric vein. Intra-operative serial arterial blood gases were normal.

Post-operatively, the blood flow to right lower limb was restored with a palpable dorsalis pedis pulse. We did not perform a fasciotomy to the lower limb. He was monitored in the high dependency unit for 24 h before being transferred to the general ward. He made an uneventful recovery with the resolution of all presenting symptoms including the foot drop and parasthesia. He was discharged on the fourth post-operative day with smoking cessation advice.

Discussion

This patient had acute ischaemic limb due to an acute occlusion of the right common femoral artery as a result of a plaque embolism from the right common iliac artery. There is evidence of severe atherosclerotic disease of his contralateral iliac arteries and aorta on the CT aortogram secondary to chronic cigarette smoking. The circumferential plaque embolus is a direct consequence of plaque fracture in the right common iliac artery from blunt trauma to the infraumbilical region of the abdomen.

Acute thromboembolism associated with blunt trauma injury has been reported in the literature. Hertzer [3] and Beless et al. [2] reported acute ischaemia secondary to thromboembolic debris from an atherosclerotic abdominal aorta as a result of blunt trauma to the abdomen. Ali et al. [1] described the occlusion of the external iliac and common femoral arteries by thromboemboli dislodged from a pre-existing abdominal aortic aneurysm from a blunt trauma to the abdo-
men. These reports involved diseased aortas and blunt trauma. The common iliac arteries lie deep in the pelvis and less vulnerable to blunt trauma when compared to the abdominal aorta. Our case report is the first to describe the occlusion of the common femoral artery by a fractured plaque embolus dislodged from an atherosclerotic common iliac artery caused by direct blunt trauma with anterior–posterior compression injury to the infraumbilical abdomen region.

We elected to perform an urgent computed tomography aortogram (CTA) of the abdomen and pelvis to assess the status of his intra-abdominal organs and arteries before taking him to the operating theatre. CTA is the investigation of choice in the setting of blunt abdominal trauma without hypotension and in the presence of acute unilateral lower limb ischaemia. A potential alternative method to investigate the vascular anatomy would be to perform a duplex ultrasonography. The advantage of this method is that it is quick, economical and does not carry any risk of contrast nephropathy. The main disadvantages of this test are that the accuracy is operator dependent and it is a limited examination. Abdominal tenderness may also limit this examination in acute trauma setting.

After discussing with the interventional radiologist, we elected to perform an open surgery. The initial impression was a possible traumatic dissection of the common femoral artery. Such a lesion would not be suitable for endovascular stent repair due to its mobility over the hip joint. The endovascular approach may also require the use of regional thrombolysis, which may precipitate haemorrhage in the presence of recent blunt abdominal trauma.

The intra-operative finding of a plaque embolus in the common femoral artery affirms the accuracy and decision for the CT aortogram. The size 4 Fogarty catheter was able to reach down to the ankle without any resistance and good backflow post-embolectomy was obtained. An angiogram was deemed unnecessary. We used a vein patch for the repair of the arteriotomy as the right common femoral artery had arteriosclerosis. The inferior epigastric vein was chosen instead of the long saphenous vein (LSV) because of the patient’s pre-existing peripheral vascular disease and we wanted to preserve the option of using the LSV for a bypass procedure in the future.

An intra-operative fasciotomy was considered but not performed. This decision was derived after the evaluation of normal intra-operative serial blood gases and the rapid re-vascularisation of the limb after trauma. The risk of developing acute compartment syndrome was low. We continued to monitor the patient for acute compartment syndrome in the high dependency unit in first 24 h, with a view to perform a fasciotomy should the symptoms arise.

Summary

Acute lower limb ischaemia due to plaque embolism originating from the common iliac artery secondary to blunt abdominal trauma is rare and not previously reported. Surgeons dealing with trauma should be aware of this rare but possible source of acute embolus in patients with vascular disease.

A computer tomographic aortogram is the investigation of choice as it allows the visualisation of the vessels as well as the intra-abdominal organs. Early recognition of this rare condition and prompt surgical intervention can result in the resolution of symptoms and an excellent outcome.

References

1. Ali MR, Norcross ED, Brothers TE. Iliac and femoral artery occlusion by thromboemboli from an abdominal aortic aneurysm in the setting of blunt abdominal trauma. J Vasc Surg 1998;27:545–8.
2. Beless DJ, Muller DS, Perez H. Aortoiliac occlusion secondary to atherosclerotic plaque rupture as the result of blunt trauma. Ann Emerg Med 1990;19:922–4.
3. Hertzer NR. Peripheral atheromatous embolization following blunt abdominal trauma. Surgery 1977;82:244–7.