CASE REPORT

Buttock wounds: beware what lies beneath

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SUMMARY

A 25-year-old man presented to a major trauma centre with multiple stab wounds, most significantly to the right buttock. Triple-phase CT revealed no acute bleeding and his wounds were closed. In the month following injury, he re-presented seven times to the emergency department (ED) complaining of bleeding and wound breakdown. After his seventh ED attendance, he was examined under general anaesthesia. Intraoperatively, profuse arterial bleeding was encountered and the local major haemorrhage protocol was activated. The on-call consultant vascular surgeon attended and definitive control was achieved. A large haematoma had acted to tamponade ongoing arterial bleeding and an underlying pseudoaneurysm: a finding not reported, but present, on the initial CT angiogram. Following 24 hours in the intensive care unit, he was transferred to the surgical ward and discharged 4 days later. Regular review in the outpatient department over the following 9 weeks monitored successful wound healing.

BACKGROUND

This case emphasises the potential magnitude of vascular injury that can result from penetrating trauma to the gluteal region. This mechanism of trauma is becoming increasingly common. A recent paper highlights a rise in gang-related violence with attackers attempting to render their victims dependent on a colostomy bag (dinking) by an act perceived to be less punishable by law as the intention was not to kill.¹

We highlight some potential pitfalls in managing trauma patients with stab wounds to the buttock. This patient suffered life-threatening consequences from his injuries yet was repeatedly discharged from the emergency department (ED) despite ongoing symptoms. We reinforce the importance of early involvement of interventional and vascular radiologists in the initial management of such patients. The learning points are relevant to ED physicians, general and vascular surgeons and radiologists.

CASE PRESENTATION

A 25-year-old man was brought by ambulance to a major trauma centre after an alleged assault. He had sustained stab wounds to his right buttock and thigh which were actively bleeding, as well as a superficial wound to his left knee. He arrived at the hospital tachycardic (heart rate 119 beats per minute) and hypotensive (blood pressure 74/43 mm Hg) suggesting significant blood loss and putting him in stage II–III circulatory shock. After initial

assessment and resuscitation with 3 L of intravenous crystalloid and one unit of red blood cells, he was stabilised and transferred for a triple-phase CT scan of his abdomen and pelvis including precontrast, arterial and venous phases. No active bleeding was reported. At the time of imaging, a gauze pressure dressing and pelvic binder were in situ.

As the patient remained haemodynamically stable after resuscitation, he was transferred to the surgical trauma ward for monitoring and wound closure. The surgical registrar attended to close the wounds and removed the pelvic binder, in place for haemostasis. Once removed, profuse bleeding was noted from the buttock wound and thus the binder was replaced and closure of the wounds delayed for a further 3 hours when better haemostasis was noted. The man was discharged home the day after the injury.

Unfortunately, the man returned to the ED 1 week later complaining of bleeding from the wound. He was diagnosed with a likely infected haematoma but preferred conservative management of this and was discharged with oral antibiotics. Five days later, he was seen again in the ED with ongoing pain and bleeding from the buttock wound. On this occasion, the sutures were removed and a large haematoma was evacuated, associated with a large amount of bleeding. The wound was packed, and he was observed in the ED before being discharged home.

Over the next 3 weeks, he was seen in the ED on a further five occasions complaining of bleeding from the buttock stab wound, sometimes after stresses such as riding a bike or sneezing. On each occasion, he was reviewed by the surgical team, and the wound was found not to be actively bleeding and so was packed and the patient discharged. On his seventh presentation to ED, 1 month post injury, it was agreed to take the patient to theatre for an examination under anaesthesia and evacuation of haematoma.

INVESTIGATIONS

An enhanced CT scan of the abdomen and pelvis on first presentation to ED: this was reported as showing no extravasation of contrast to suggest active bleeding from either the right buttock or thigh wounds. A note was made of a pelvic binder in situ and a bundle of gauze compressing the right buttock. This scan was initially reported by a radiology registrar and seconded by a consultant radiologist.

Careful inspection of images post hoc by a specialist vascular radiologist highlighted a small

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Figure 1 A 5 mm rounded enhancement identified on a CT scan of the abdomen and pelvis, in keeping with a small pseudoaneurysm of the right obturator artery, with a small surrounding haematoma. Identified during a post hoc review of the images by a vascular interventional radiologist. Three-dimensional reconstruction of the pseudoaneurysm was not possible.

pseudoaneurysm of the right obturator artery seen best on the venous phase and associated with a small local surrounding haematoma (figure 1).

DIFFERENTIAL DIAGNOSIS

- ▶ Continued bleeding from vessel (superior gluteal artery, inferior gluteal artery, obturator artery, internal pudendal artery)
- ▶ Pseudoaneurysm
- ▶ Haematoma—simple/infected
- ▶ Wound infection.

TREATMENT

On the patient's seventh admission to the ED with oozing from the wound, he underwent an examination under general anaesthesia by the general surgical team. The patient was placed in the left lateral position. The old, granulating stab entry wound was excised and multiple underlying clots evacuated followed by profuse arterial bleeding. This was thought most likely to be from a branch of the internal iliac artery. The wound was extended and packed. The on-call consultant vascular surgeon was contacted and the local major haemorrhage protocol activated. Haemostasis was eventually achieved using multiple pledgeted prolene sutures, ethibond, Liga clips and loop nylon for deep tension sutures. The patient received 10 units of packed red cells, 9 units of fresh frozen plasma, 2 units of both cryoprecipitate and platelets and tranexamic acid. The estimated blood loss was 4–5 L. Postoperatively, the patient was treated on the intensive care unit for 24 hours before being moved to the vascular surgery ward.

A large haematoma had acted to tamponade significant arterial bleeding from a vessel in the right parasacral region. Review of CT imaging from the first admission indicates this was likely the right obturator artery with associated formation of a pseudoaneurysm.

Imaging

A postoperative CT angiogram was performed immediately following surgery to look for continued bleeding and

consideration for embolisation. It did not demonstrate active haemorrhage related to the gluteal region. Significant artefacts from surgical clips were noted at the site of injury. A further CT pelvis with contrast was performed 2 days postoperatively. No active bleeding was reported by both specialty registrar and consultant radiologists.

OUTCOME AND FOLLOW-UP

The patient was closely followed up in the outpatient clinic, initially with weekly appointments, attending six times over a 4-month period. The deep tension sutures were removed and with daily Lyofoam dressing changes by district nurses, the wound has healed well by secondary intention.

DISCUSSION

One major trauma centre reports a fourfold increase in gluteal and perineal stab wounds in recent years.¹ As in this case, most injuries occur in young men^{1,2}; however, they only account for 2%–3% of all reported penetrating injuries.^{3,4} Shot and stab injuries are both reported, with small bowel, rectum or colon injuries seen more commonly following gunshot wounds. Vascular injuries are seen more commonly following stab wounds, and have been reported to cause significant morbidity and also, infrequently, mortality.^{3,5,6} It has been suggested that injury location can help determine whether severe underlying injury is likely. The buttock can be divided into 'upper' and 'lower' zones by the intertrochanteric line. One study found that 66% of upper zone gluteal stab wounds were associated with neurological, vascular or visceral injuries requiring invasive or surgical intervention.⁷ However, lower zone injuries have also been reported to cause life-threatening injuries and so this distinction, when choosing who to image, may not be useful.⁸

Potential vascular injuries following gluteal stabbings include transection, dissection, laceration, pseudoaneurysm and arteriovenous fistula formation. The development of a pseudoaneurysm following a stab wound to the buttock is infrequently described.⁹ A handful of case reports describe pseudoaneurysm formation post stab wounds in other anatomical locations such as the axilla,¹⁰ intercostal artery,¹¹ renal artery¹² and femoral artery.¹³ One case report describes a pseudoaneurysm following a stab wound to the buttock. In this case, the wound was explored and sutured under local anaesthetic at the time of injury. Three months later, the patient presented with neurological symptoms in the left lower limb and a mass in the left buttock and was diagnosed with an inferior gluteal artery pseudoaneurysm. Following unsuccessful embolisation, it was repaired operatively with no further complications.⁹

Several authors recommend that penetrating buttock injuries should be treated as life-threatening injuries until investigations such as CT imaging prove otherwise.^{2,7,14,15} One recent review synthesised the sparse evidence to devise a management algorithm for penetrating gluteal injuries.¹⁶ It is suggested that patients in hypovolaemic shock should progress directly to surgery. Patients who are stable enough should undergo contrast CT with angiography followed by a definitive treatment modality, if required. Potential conservative options for the management of stable patients include wound packing or 'selective non-operative management'. This includes consideration of endovascular procedures such as angioembolisation of a bleeding vessel. Interventional radiology techniques are increasingly used in the management of injured buttock vessels and should be considered as the first 'damage control gluteal procedure'.¹⁶

Learning points

- ▶ Penetrating injuries to the buttock area should be treated as potentially life threatening. Algorithms exist to aid decision-making and should be made available to clinicians.
- ▶ A high index of suspicion for subtle findings should be applied when examining radiological images for patients with penetrating buttock trauma. The involvement of a vascular radiologist is advised.
- ▶ Patients re-presenting to hospital with ongoing bleeding from buttock stab wounds should be considered for an urgent digital subtraction angiogram with the view of embolisation.

Lunevicius *et al* suggest five accepted indications for endovascular intervention in penetrating buttock trauma. Those relevant to our case are first, external bleeding from a wound initially treated conservatively with a deeper injury difficult to assess surgically and second, a pseudoaneurysm.¹⁶ In our case, given the presence of a small pseudoaneurysm on initial CT imaging, a digital subtraction angiogram may have allowed embolisation of the pseudoaneurysm. Other indications for endovascular intervention include continued bleeding after gluteal or abdominal surgery, a 'cardiovascularly unstable' patient or a patient with CT-proven injury to a branch of the internal iliac artery and haemodynamic instability. The last two of these indications would have been relevant in our case had the patient not been stabilised after initial resuscitation.

Note should be made of the difficulty in interpreting CT imaging in these patients as scans are usually obtained supine with pressure applied to the gluteal region. As in our case, pelvic binders and packing or pressure dressings may be applied in ED for haemostasis. These may further complicate the interpretation of imaging obtained as they further tamponade active bleeding, leading to a potential underestimation of active haemorrhage.

In summary, patients presenting with recurrent bleeding after high-risk penetrating gluteal injuries warrant further imaging in the form of a digital subtraction angiogram. This will allow for endovascular intervention such as angioembolisation that may obviate the need for, or reduce the risks of, surgical intervention.

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