Successful Surgical Repair of Superficial Femoral Artery-Vein Injury Caused by Gunshot in a Two-Year Child: A Case Report

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ABSTRACT

Paediatric vascular injuries, though rare, can cause severe morbidity and mortality. A two-year boy presented in hypovolaemic shock after an accidental gunshot wound. Doppler ultrasonography revealed superficial femoral artery transection and haematoma. Emergency surgery confirmed a complete transection of the superficial femoral artery and vein. Embolectomy and end-to-end anastomosis were performed. Postoperative Doppler showed no vascular pathology, but sciatic nerve inflammation with foot drop was noted. After anticoagulant cessation, the patient was referred to neurology. At three-month follow-up, surgical recovery was complete. Prompt repair of both arterial and venous injuries is crucial in paediatric vascular trauma to prevent irreversible damage.

Key Words: *Vascular injury, Superficial femoral artery transection, Gunshot wound, End-to-end anastomosis*.

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INTRODUCTION

The surgical approach to gunshot wounds of the lower extremities was first added to the literature by military reports.[1] Vascular injuries in the paediatric age group are rare, even in busy paediatric trauma centres. Although these injuries are not common, they can be a significant cause of mortality and morbidity.[2] Due to the rarity of paediatric vascular injuries, there is limited research on this topic in the literature. Therefore, treatment approach guidelines have not yet been fully established. The challenges associated with surgical techniques, the risk of limb loss, and the lack of standardised protocols make paediatric vascular injuries an important area requiring further investigation.[3] Irreversible ischaemia and amputation are common outcomes of superficial femoral artery injuries. As with all arterial injuries, prompt treatment is essential. The collateral network in this area is relatively weak, making the risk of amputation from injuries quite high. Additionally, the superficial femoral vein is the main venous structure responsible for drainage in the leg, which explains why injuries to this vein are particularly dangerous.[4]

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CASE REPORT

A two-year boy was admitted to the emergency room after accidentally shooting himself at home. Possible bullet entry and exit wounds were observed on the inner and outer areas of his right leg. Upon arrival, his general condition was poor and was confused.

His blood pressure was 60/30 mm Hg, SpO_2: 87-89%, and his heart rate was 190-200 beats per minute (bpm). He was intubated under emergency conditions, and efforts were made to stabilise his clinical condition.

In the initial blood tests, haemoglobin (Hb) was 8.8 g/dL. Fifteen minutes later, it dropped to 5.6 g/dL. While the patient's condition was borderline with inotropic support, a bedside Doppler ultrasound was performed, revealing arterial injury and a large haematoma in the suprapopliteal region.

Due to the patient's deteriorating condition, he was taken to surgery urgently without further imaging. An incision was made at the injury site in the suprapatellar medial region, where a massive haematoma was evacuated, and active arterial bleeding was observed. Upon further careful exploration, the superficial femoral artery and vein were found to be transected. The proximal and distal sections of both vessels were skeletonised and exploration continued. Heparin was administered at 50 u/kg. Both vessels were then gently embolectomised using a 2Fr Fogarty catheter, clearing fresh thrombus material from both the artery and vein. The vein was sutured one by one with a 6-0 Prolene suture, and an end-to-end anastomosis was performed. The artery was also anastomosed in the same manner (Figure 1).

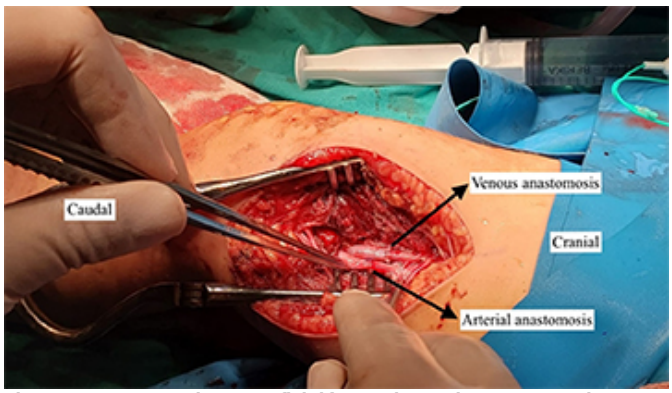

Figure 1: Intraoperative superficial femoral vascular anastomosis.

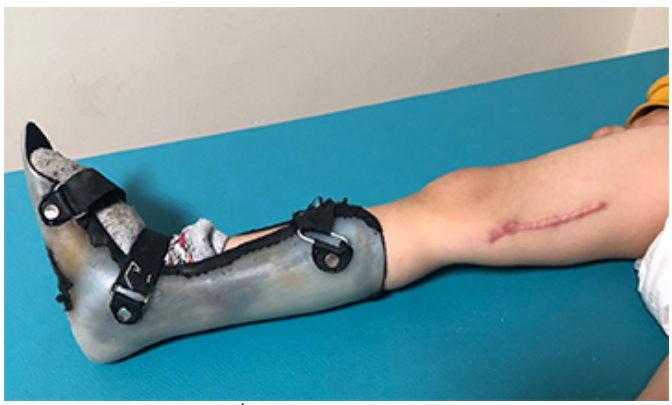

Figure 2: Postoperative 3rd month outpatient clinic follow-up.

Postoperatively, the patient was transferred to the intensive care unit (ICU), where inotropic support was gradually reduced and eventually discontinued. He was successfully extubated. The patient was followed in the ICU for one day and transferred to the ward. Distal pulses were palpable, and there were no signs of venous return disorder in the leg, although a foot drop was noted. The patient was started on low molecular weight heparin at 1 mg/kg and aspirin at 2 mg/kg on the first postoperative day. A Doppler ultrasound performed on the second postoperative day confirmed the integrity of both arterial and venous structures, with no vascular pathology observed. Oedema and inflammation were noted in the sciatic nerve, suggestive of thermal damage.

After a three-day follow-up, the patient's vascular treatment was completed, and all antiaggregant and anticoagulant therapies were stopped. The patient was transferred to the paediatric neurology department for further follow-up and treatment of the nerve injury. At the three-month follow-up, surgical wound healing was complete. He was on regular follow-up at our outpatient clinic while his treatment for drop foot was ongoing and he was using an orthosis (Figure 2).

DISCUSSION

In the current literature, lower extremity vascular injuries are often secondary to trauma and frequently accompany bone fractures. These high-energy injuries increase the risk of limb loss.[5] In our case, there was no bone damage from trauma, but there was thermal damage caused by the gunshot.

Although the use of endovascular techniques in the repair of vascular injuries has increased in recent years, this is generally not the case for peripheral vascular injuries in children. Since the paediatric age group will continue to experience vascular growth, any stent graft material implanted endovascularly cannot provide a permanent solution. Therefore, the open surgical technique remains the most reasonable treatment option.[6] Additionally, any endovascular intervention (including imaging) on a patient whose blood volume had significantly decreased could have increased vasospasm and made the procedure even more challenging.[7]

Making a surgical decision for a two-year child who had been shot and whose general condition was deteriorating, it was essential to avoid any delays and proceed with the operation quickly. To avoid using artificial grafts during surgery, it was important to stretch the artery and vein to a size that allowed for an end-to-end connection. An artificial graft could have clogged quickly and, over time, caused complications due to the growth of the native vessels. Given that the vessel dimensions would increase over time, performing an end-to-end, separate, single-suture anastomosis was necessary. While it was crucial to repair the artery and prevent ischaemia, had we ligated the superficial femoral vein, we might not have been able to prevent compartment syndrome. If compartment syndrome had developed during the postoperative follow-up, the arterial repair we performed would not have restored perfusion, and there could have been a risk of amputation. Therefore, attempting to repair every possible vessel was likely the best surgical strategy.

Peripheral vascular injuries in the paediatric population, if not repaired urgently, can lead to severe clinical conditions ranging from ischaemia to haemorrhagic shock. Gunshot wounds in very young children are exceedingly rare in the literature. Tissue loss, inflammation, and increased oedema related to thermal damage should not deter us. It is important to carefully repair veins as well as arteries. In managing such emergencies, both surgical and anaesthesia approaches must be decisive and swift. It is crucial to remember that every minute lost, especially in the paediatric group, can result in irreversible damage.

PATIENT'S CONSENT:

Signed consent was obtained from the guardians of the patient for the publishing of this case report.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

UY, GBY: Contributed to the design and implementation of the research, analysis of the results, and writing of the manuscript. Both authors approved the final version of the manuscript to be published.

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