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## Femoral artery thrombosis in an 11-year old boy due to a blunt trauma

IOANNIS PATOULIAS<sup>1</sup>, IOANNIS PANOPOULOS<sup>2</sup>, GEORGIOS PITOULIAS<sup>3</sup>,  
THOMAS FEIDANTISIS<sup>1</sup>, DIMITRIOS PATOULIAS<sup>4</sup>

<sup>1</sup>First Department of Pediatric Surgery, Aristotle University of Thessaloniki Greece,  
General Hospital “G. Gennimatas”, Greece

<sup>2</sup>Department of Pediatrics, General Hospital “G. Gennimatas”, Thessaloniki, Greece

<sup>3</sup>Department of Vascular Surgery, Aristotle University of Thessaloniki Greece,  
General Hospital “G. Gennimatas”, Greece

<sup>4</sup>Second Propedeutic Department of Internal Medicine, Aristotle University of Thessaloniki,  
General Hospital “Hippokraton”, Greece

**Corresponding author:** Dimitrios Patoulias, M.D., M.Sc., Ph.D. candidate  
Konstantinoupoleos 49, Thessaloniki, Postal code 54642, Greece  
Phone: +30 231 022 50 83; E-mail: dipatoulias@gmail.com

**Abstract:** An 11-year old boy presented with a blunt trauma in the right inguinal area after a bicycle accident. Initial clinical picture was indicative of decreased arterial blood supply to the right lower extremity and the diagnostic confirmation was made with a colour flow Doppler ultrasonography. During operative investigation, a thrombosis of the common femoral artery, 3.5 cm in length, was found. The thrombotic part of the femoral artery was removed and replaced with a venous graft taken from the major saphenous vein, before the saphenofemoral junction. Postoperative course was uneventful. Traumatic thrombosis of the common femoral artery as a result of a blunt trauma is very rare, as only 4 relevant cases have been described previously.

**Keywords:** femoral artery, blunt trauma, arterial thrombosis, venous graft, major saphenous vein.

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### Introduction

Types of vascular injury include incomplete transection, dissection of the vascular wall, development of a pseudo-aneurysm or arterio-venous communication and thrombosis. Bicycle accidents of varying severity count up to 500,000/year in the United States, while 5–10% cause serious injuries. In the United States, an average

of 5 cases of children vascular injury is reported annually [1–3]. The most common type are penetrating injuries (31.8%), followed by blunt force injuries (29%) and multiple injuries (25%) [1]. The mechanism of injury is: motorcycle accident (60%), fall from a bicycle (20%) and fall from height (20%). The most common location is the femoral artery (25%) followed by the brachial artery (22%) [3]. Iatrogenic vascular injuries comprise about one-third of vascular injuries in childhood, usually up to the second year of life [3]. Penetrating injuries are diagnosed promptly, whereas blunt ones may be misdiagnosed or missed during initial evaluation.

Herein, we describe a very rare case of a traumatic thrombosis of the common femoral artery as a result of a blunt trauma from a bicycle handle during a fall, which is very rare.

### Case description

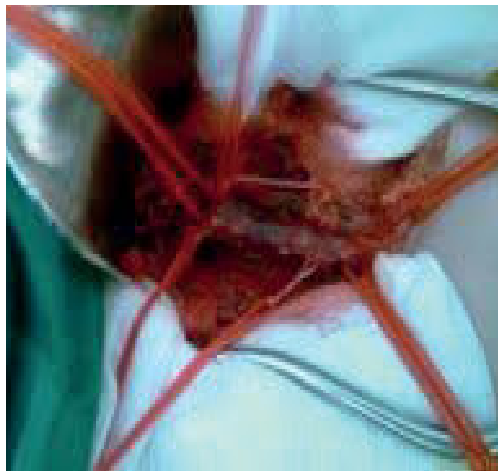
An 11-year-old boy fell accidentally from his bicycle and developed a blunt trauma in the right inguinal area because of a steering handle during the fall. The clinical presentation was indicative of reduced arterial blood supply to the right lower extremity — compared to the left one: paleness, lower temperature, reduced muscle strength, lower intensity of the arterial pulsations at the posterior tibial and the dorsalis pedis arteries. Diagnosis was confirmed with a colour flow Doppler ultrasonography, which revealed blockage of the blood supply along with the presence of a clot in the lumen, at the level of the first part of the common femoral artery, directly below the inguinal ligament.

During urgent surgical investigation, a thrombosis of the common femoral artery was found at a length of 3.5 cm, accompanied with a blunt trauma of the muscular layer and fragmentation of the endothelium (Fig. 1–3).

Thrombotic arterial part was removed and was replaced with an inversed graft taken from the last part of the major saphenous vein, prior to the saphenofemoral junction (Fig. 4, 5).

Postoperative course of the patient was uneventful. Patient was placed on low-molecular weighted heparin in prophylactic dose for 5 days, followed by oral administration of 100 mg of aspirin daily for a month. Patient was re-evaluated — both clinically and by ultrasonography — in 1 and 6 months post-surgery. Re-evaluation revealed that the graft was practically “arterialized”. Physical activity of the patient was fully restored one month after the surgical intervention.

Follow-up will take place annually until the 18th year of age, in order to assess the symmetric growth of both lower extremities and the relevant arterial blood supply, in the context of the dynamically changing requirements due to growth and physical activity.



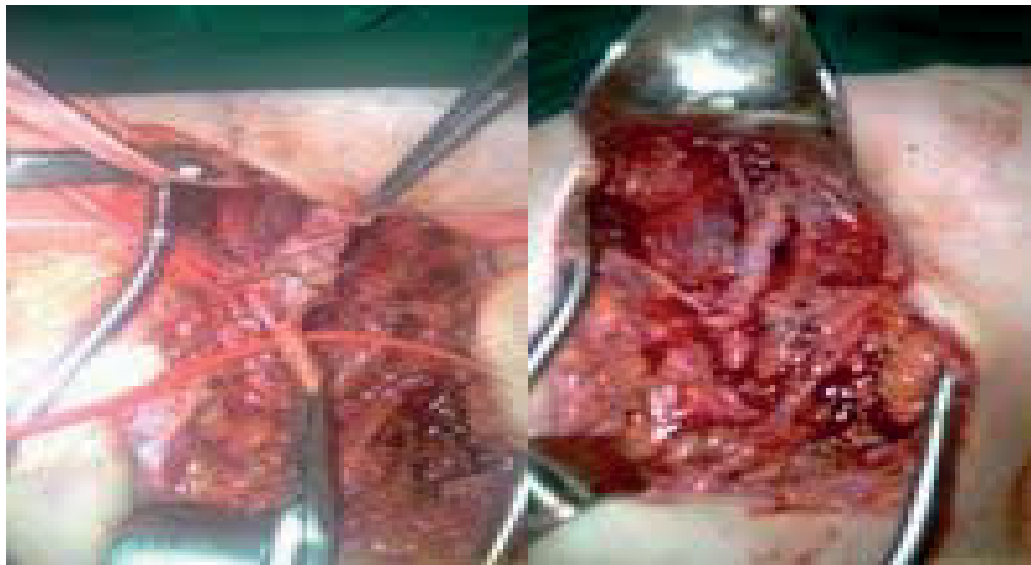
**Fig. 1.** Notice the anterior wall of the common femoral artery with macroscopic indication of a crushing trauma.



**Fig. 2.** After incision of the anterior wall of the common femoral artery, the clot inside the lumen is seen.



**Fig. 3.** After clot removal, the endothelial fragmentation of the common femoral artery in 3 parts is shown.



**Fig. 4, 5.** Restoration of the continuity of the common femoral artery by using an inverted graft taken from the last part of the major saphenous vein. In Figure 5 the complete restoration is shown.

## Discussion

The treatment of vascular injury during childhood is a remaining challenge due to specific anatomic features, and the underlying physiology and pathophysiology, such as: the small lumen of the blood vessels, their poorer support from the neighboring tissues, the small width of arterial walls, the tendency for vascular spasm during injury because of their elasticity and lastly the greater volume of blood supply adjusted to body weight.

Due to the direct contusion caused by the bicycle steering-handle, the common femoral artery was crushed between the pubic tuberculum and the caput of the femur. In blunt traumas, vascular spasm of the injured artery is common. The method of choice for the diagnosis is the colour Doppler ultrasonography [3]. Arteriography as a diagnostic method in a child with arterial trauma carries the risk of causing or spreading a thrombosis in 43% of cases [4–5]. However, valuable time for diagnosing arterial trauma should not be wasted, especially for exclusion of vascular spasm, which rarely lasts more than 3 hours [3]. In general, ischemia of the lower extremity should not exceed 6–8 hours, in order to ensure survival of the limb. Due to the small duration of ischemia of the limb (<4 hours) in our patient, compartment or revascularisation syndrome (Haimovici) did not occur [6].

Treatment of arterial injury can be achieved with [1, 2, 6]:

- restoration of the arterial continuity primarily, if the length of trauma is less than 2 cm
- use of arterial graft (inferior hypogastric artery)
- use of an inversed venous graft taken from the major saphenous, the internal jugular or the basilic vein
- use of a synthetic graft (polytetrafluorethylene-PTFE)

Utilization of a graft taken from the major saphenous vein, before the sapheno-femoral junction, is considered as a reliable and practical treatment option. Regarding the treatment of vascular injury during childhood, use of synthetic grafts should be considered as the last treatment option [7]. Furthermore, there is no experience to date concerning their biological behavior, concerning the time they remain patent and their capacity to meet the dynamic, metabolic needs of the growing extremity [7]. Finally, when the ischemia lasts more than 6–8 hours, use of a temporary arterial bypass (bypass shunting) for the preservation of the arterial blood supply to the lower extremity is indicated [8].

### Conflict of interest

None declared.

### Acknowledgment

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