European Review for Medical and Pharmacological Sciences 2012; 16(4 Suppl): 32-34

Successful embolectomy in a femoral artery thrombosis caused by femoral artery catheterization in a infant

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Abstract. – In infants, the most common cause of femoral artery is thrombosis and iatrogenic arterial injuries usually occur after femoral artery catheterization procedures. Management of this complication includes heparin infusion, thrombolytic agents, interventional radiologic procedures, surgical thrombectomy and by-pass surgery.

Signs of arterial thrombosis developed after femoral artery catheterization procedure in the right lower extremity of 9-month-old female infant with methyl malonic acidemia. Heparin infusion was started after confirming the diagnosis of femoral artery thrombosis by ultrasonography. Because of there was no response to heparin treatment, thrombolytic therapy (t-PA) was started after 24 hours. Again, because of there was no response to all medication, surgical thrombectomy was performed. Was entered right common femoral artery with 3.0 F Fogarty catheter and fresh thrombus material was removed from the proximal and distal segments of the femoral artery. Antegrade and retrograde blood flow was achieved.

After the procedure clinical signs and the symptoms of the thrombosis were resolved rapidly. There were no any complications in the postoperative period.

This case encouraged us for using surgical thrombectomy in the treatment of femoral artery thrombosis in infants who do not respond to medication.

Key Words:
Femoral artery thrombosis, Femoral artery catheterization, Embolectomy, Infant.

Introduction

In infants acute lower extremity ischemia is a rare case of emergency and generally, may occur as a result of coagulation disorders, sepsis, extensive arterial wall spasm and iatrogenic trauma. The most common cause of ischemia is iatrogenic femoral thrombosis. This condition usually develops after arterial or venous puncture procedures[1].

In infants, because of small vessel diameter and tendency to spasm, the risk of thrombosis is much higher than adult[2,3]. Studies on the femoral thrombosis in children is limited. There are no a large-scale studies comparing different treatment options. For this reason, there is not a clear consensus about the treatment. Treatment options are anticoagulation, thrombolytic therapy, surgical thrombectomy and radiological percutaneous transluminal angioplasty[2].

In this paper we reported, case of the 9-month child with femoral artery thrombosis, caused by femoral artery catheterization, who were treated successfully with surgical thrombectomy.

Case Report

Previously diagnosed with methylmalonic acidemia, 9-months, 8 kg weight female infant admitted to our Pediatric Clinic with general poor health and signs of hypovolemia. Femoral vein catheter (3.0 F catheter) was inserted incorrectly in femoral artery for patient vascular access.

After two hours, catheter was taken because of developing right lower extremity coldness and paleness and femoral artery pulse was not obtained. We realized blood flow disorder by Doppler-ultrasound. Heparin infusion (20 IU/kg/h) was started after confirming the diagnosis of femoral artery thrombosis. Since there was no response to heparin treatment, thrombolytic therapy (t-PA 0.4 mg/kg/h) was started with heparin infusion after 24 hour. Because there was no response to all medications, we decided to surgical thrombectomy. The patient under general anesthesia, we found femoral artery under the right inguinal ligament in incision (Figure 1); there was no arterial pulse. We saw tree injuries part on artery, possible due to more than one try with catheter. We made transverse arterotomy after artery suspended. There was no bleeding. Then, we took abundant fresh thrombus material from the 3 cm proximal and 4 cm distal region of the femoral

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artery (Figure 2). The proximal and retrograde blood stream started immediately after embolectomy. Heparin infusion therapy was continued during and after the operation. In the early postoperative period disappeared the patient's leg coldness and paleness and the distal pulses become palpable (Figure 3). There was not any problem of blood stream on doppler ultrasound checking in the postoperative period. During the postoperative period did not occur any complications and the patient transferred to the Pediatric Clinic.

Discussion

After femoral catheterization, occurrence of thrombosis related with a platelet plug caused by the accumulation and aggregation of platelets on the surface of the catheter or when the blood contact with collagen, it initiate intrinsic coagulation mechanism after intimal injury[4,5]. Probably in many cases, occurrence of thrombosis related with both mechanisms simultaneously effect. In our case, we think, occurrence of thrombosis related with femoral vein catheterization and artery injury due to the large number of femoral artery puncture.

Femoral artery thrombosis is usually diagnosed based on clinical findings as color changes (e.g., pallor, mottling, cyanosis), temperature reduction and indirect signs of muscle and nerve ischemia (reduction of motor movements)[6]. Our case was diagnosed in the early period. There was no severe cyanosis but had begun to temperature reduction and color changes as mottling on the extremity (Figure 1).

Some researchers used to radiological imaging and angiography for diagnosis[7]. In our case, we used doppler ultrasound for diagnosis.

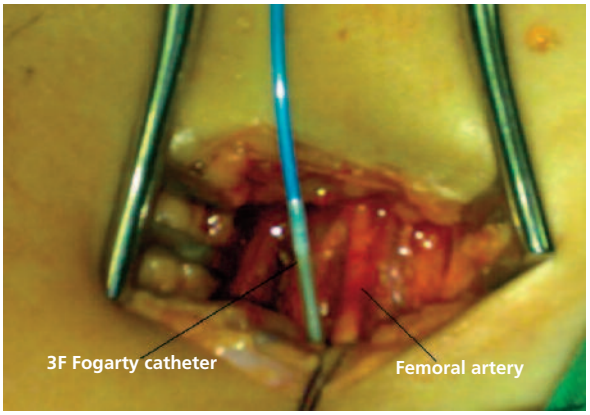

Figure 1. An image of the beginning of the operation.

Figure 2. An image of thrombus.

There are four basic approach for the treatment of thromboses as catheter withdrawal and infusion of heparin initiation, the thrombolytic initiation, percutaneous transluminal angioplasty (PTA) and last alternative is surgical thrombectomy and additional procedures[8,9]. In our case, first we chose catheter withdrawal and infusion of heparin initiation, then we chosed surgical thrombectomy.

Figure 3. An image after the operation.

Ino et al[10] administered heparin infusion for 48 hours to 526 pediatric patients who distal pulses were not palpable after catheterization. Nevertheless, distal pulses were not palpable in 13 patients after medication. Then they administered streptokinase or urokinase intravenously to these 13 patients. 11 of these patients recovered. Two patients needed to thrombectomy. Ade-Ajayi et al[9] administered thrombolytic therapy (t-PA) to four patients and made surgical thrombectomy to two patients who had arterial occlusion related with catheterization; amputation was necessary for two patients who had administered thrombolytic therapy (t-PA) and amputation was not necessary for patients who had thrombectomy. Smith et al[11] published a series of 5 infants under one year; only one of the patients had postoperative palpable pulse after femoral thrombectomy; in three of the patients, although normal blood flow was achieved during the operation, pulse was not retrieved in the early postoperative period and one of patients had postoperative palpable pulse after development of collateral circulation in a month of post-operative. Chaikof et al[12] published a series of 5 infants under six month; only two of the patients had postoperative palpable pulse.

Thrombectomy technique in infants is quite difficult and due to the extremely small diameter of blood vessels and may cause a lot of complications as vascular damage and pushing thrombus to the distal region. According to these data, thrombectomy success was found quite disappointing in infants and femoral thrombectomy procedure have not been reported in infants in the last decade. But in our case, there were no any complications and it was successful thrombectomy.

In conclusion, although thrombectomy in infants is quite difficult and may cause a lot of complications, successful thrombectomy can reduce the loss of extremities in the infants with femoral artery thrombosis who could not be treated with medications.

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