



# Femoral artery occlusion secondary to a spontaneously “migrated” hip prosthesis: case report

Kendiliğinden “yer değiştiren” kalça protezine bağlı gelişen femoral arter oklüzyonu: Olgu sunumu

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A 77-year-old male patient was admitted to the hospital with a worsening acute ischemia of the left lower extremity. The patient, who had a coxarthrosis and was being followed by the orthopedic clinic, had undergone a total hip prosthesis, with a revision performed at the sixth month of its placement. The physical examination revealed the absence of the femoral, popliteal and distal pulses of the left lower extremity. The left hip movements were painful and limited in external rotation posture. Doppler ultrasonography showed an acute occlusion of the left common femoral artery due to the dislocated hip prosthesis, and right-to-left femorofemoral expanded polytetrafluoroethylene graft bypass was carried out. After successful surgery and an uneventful postoperative period with palpable femoral and popliteal pulses, the patient was put on low molecular weight heparin and referred to orthopedics once the ischemia had subsided with the intervention. Case reports regarding occlusions due to migration of total hip prosthesis are rare in the literature. The emphasis of this case report is to describe one such case.

**Key Words:** Femorofemoral bypass; hip prosthesis dislocation; lower extremity acute ischemia; total hip prosthesis; vascular occlusion.

Yetmiş yedi yaşındaki erkek hasta hastaneye sol alt ekstremitede giderek kötüleşen akut iskemi bulgularıyla başvurdu. Hastanın hikayesinden, ortopedi kliniğinde kokartroz tanısıyla total eklem protezi uygulandığı ve altı ay sonra protezinin revize edildiği öğrenildi. Fiziksel incelemede sol alt ekstremitede distal nabızlarının femoral arter düzeyinden itibaren alınmadığı saptandı. Sol kalça hareketleri ağrılı ve dış rotasyon duruşu sınırlı idi. Doppler ultrasonografide sol ortak femoral arterde akut tıkanıklık olduğu saptandı ve hastaya sağdan sola femoro-femoral politetrafloroetilen greft ile baypas uygulandı. Başarılı cerrahi ve sorunsuz ameliyat sonrası palpabl femoral ve popliteal atımlı hastaya düşük molekül ağırlıklı heparin verildi; hasta ortopedi kliniğine tedavisinin devamı için sevk edildi. Literatürde total kalça protezinin yer değiştirmesine bağlı vasküler oklüzyonlar ile ilgili bildirilmiş olgu sunumlarının nadir olması nedeniyle bu ilginç olguyu ve uyguladığımız cerrahi girişimimizin sonuçlarını paylaşmak istedik.

**Anahtar Sözcükler:** Femoro-femoral baypas; kalça protezi dislokasyonu; alt ekstremitede akut iskemisi; total eklem protezi; vasküler oklüzyon.

Vascular injuries are among the most common complications after surgical interventions.<sup>[1]</sup> Various complications, which develop subsequent to hip joint operations, are reported in the literature.<sup>[2-9]</sup> Vascular anatomy of this region carries the risk of vascular complications like pseudoaneurysm, arteriovenous fistulas, vascular wall lacerations, and thrombosis due to orthopedic interventions.<sup>[2-5]</sup> Furthermore, prosthesis dislocation is a common complication following total hip arthroplasty.<sup>[10]</sup> However, an arterial occlusion

due to compressions of a migrated prosthesis is rare in the literature. This report aims to present an unusual vascular compromise, which developed secondary to a migrated hip prosthesis and manifested with acute ischemia of the lower extremity as expected.

## CASE REPORT

A 77-year-old male presented to the Emergency and Trauma Unit, Department of General Surgery, Istanbul Medical Faculty, Istanbul University with

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**Fig. 1.** Digital subtraction angiography revealing the “migrated” hip prosthesis compressing the left external iliac artery and the thrombosis at this level.

left lower extremity pain. His past medical history revealed total hip prosthesis (THP) for left coxarthrosis in 2004 and a revision for a spontaneously dislocated THP six months later. He was an ex-smoker (35 packs/year; abstained 20 years ago). On admission, blood pressure was 130/90 mmHg, heart rate was 102 beats/min and body temperature was 38.5°C. Laboratory tests revealed hematocrit (Hct): 29.7%, hemoglobin (Hb): 9.4 g/dl, white blood cell (WBC): 9600/ $\mu$ l, platelet (Plt): 586000/ $\mu$ l, blood urea nitrogen (BUN): 19 mg/dl, creatinine: 1.2 mg/dl, blood glucose: 109 mg/dl, total cholesterol: 150 mg/dl, prothrombin time: 12.3 sec, activated partial thromboplastin time: 27.2 sec, international normalized ratio (INR): 1.00, erythrocyte sedimentation rate (ESR): 132 mm/hour, and high-sensitive C-reactive protein (hsCRP): 232.0 mg/L.

On physical examination, left hip movements were painful and limited in external rotation posture; he had no trauma anamnesis. Protrusio acetabuli was diagnosed with orthopedic examination. Marked edema and cyanosis were noted on his left leg, and none of the lower extremity pulses were palpable. The left ankle-brachial index (ABI) was 0. Chest radiography and ECG at that time did not reveal any pathology. The color-flow duplex scan and digital subtraction

angiography showed the presence of thrombosis at the left common femoral artery and a dislocated hip prosthesis occluding the external iliac artery (Fig. 1). The infected dislocated hip prosthesis was determined as the cause of the occlusion (Fig. 2). The patient was placed on empiric ampicillin/sulbactam (4x1 g/d intravenously). He was operated immediately. A cross-over femorofemoral bypass with 8 mm expanded polytetrafluoroethylene (e-PTFE) graft (Goretex, W. L. Gore & Associates, Inc. USA) was performed. The postoperative period was uneventful with palpable femoral and popliteal pulses. Left ABI was 100/110. He was placed on low molecular weight heparin (enoxaparin sodium 4000 anti-Xa IU/0.4 ml injectable solution 1x1, Aventis Pharma Specialities, France). Peri-acetabular tissue samples culture collected peroperatively revealed *Enterococcus* spp. Antibiotherapy was changed to vancomycin (4x500 mg/d intravenously). Regional drain was withdrawn on the second day. The patient's leg pains were relieved and edema on the left lower extremity regressed. No fasciotomy was needed. He was referred to the orthopedic clinic for further treatment. He continued to receive vancomycin for 14 days. The prosthesis was explanted and the hip was left as a girdle-stone hip. The patient is under follow-up by both the vascular surgery unit and orthopedics. The 6th month follow-up



**Fig. 2.** Direct X-rays of the pelvis and femur with dislocated prosthesis.

revealed a patent cross-over bypass, and the patient is on the waiting list for a new hip prosthesis placement.

## DISCUSSION

Although vascular structures are adjacent to the hip joint and possible injuries due to various mechanisms may occur, major vascular complications subsequent to THP are rare. Early complications are bleedings due to iatrogenic injuries whereas late complications include pseudoaneurysm, arteriovenous fistulas and arterial occlusions.<sup>[2-9]</sup> A careful anatomic dissection is the most important factor in minimizing the risk of perioperative vascular injury. The treatment approach depends on the mechanism of injury in such injuries. Repair of the vessel may be an option for an acute bleeding.

Arterial occlusions may develop as a result of accompanying diseases such as atrial fibrillation. Intraoperative arterial occlusion in total joint arthroplasty was reported.<sup>[11]</sup> Wilson et al.<sup>[12]</sup> also reported that arterial thrombosis was one of the most common abnormalities identified as vascular injuries associated with elective orthopedic procedures. However, none of these complications was caused by a joint prosthesis dislocation. Arterial occlusion secondary to compression by a dislocated joint prosthesis is a late and uncommon complication.<sup>[7,13]</sup>

Angiography should be performed for late complications like arteriovenous fistula, pseudoaneurysm and thromboembolism. Selective angiography, which would be performed to understand the level of the aneurysm, may also provide an opportunity for treatment with selective embolization.<sup>[8,9,14]</sup> Today, endovascular treatment of arterial injury complications after orthopedic surgery has become an option due to the usefulness and efficacy of this minimally invasive procedure. If embolization fails, aneurysmectomy, patch-plasty or partial resection and grafting may be considered.

For acute vascular occlusions, interventional radiologic detections should be considered primarily in order to detect the level of occlusion and to perform – if necessary - endovascular stent or intraluminal balloon angioplasty. Kwolek et al.<sup>[13]</sup> reported a similar case for which angiography-assisted stent was placed, but femorofemoral bypass was performed because of repeated arterial thromboembolization.

Prosthetic hip joint dislocations are not uncommon, and the majority of prosthetic hip dislocations are caused by trauma. Dislocation is a common complication following THP, which occurs in 2% to 15% of primary arthroplasty patients and in up to 27% of patients after revision of prosthesis.<sup>[10]</sup>

The majority of dislocations occur within the first three months after THP. The reasons for such a dislocation include relaxed soft tissues and immature

scar formation. Dislocations between 4 months and 5 years are usually caused by component malposition or dysfunction of abductor mechanism.<sup>[10]</sup> Posterior dislocation is the most common instability mode and accounts for 75% to 90% of the reported dislocations.<sup>[15]</sup> The femoral artery is the most likely vascular structure to be injured, frequently after an anterior dislocation. Arterial injury may occur, and consequent physical examinations, which include ABI and blood pressure measurements, should be considered. When compared with primary surgery, the dislocation rate has been found to double with revision surgery. The frequency of previous interventions is the most significant risk factor for dislocation.<sup>[16]</sup>

In this case, the spontaneous dislocation was central and occurred in the second year of the prosthesis revision. It was considered to be more appropriate to traverse the occluded segment with femorofemoral bypass and surgery was planned. Acute vascular occlusions due to compression by dislocated joint prosthesis should be treated by standard arterial thrombosis management. The result was excellent with early intervention and appropriate surgical skill.

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