Acute Occlusion of a Femoro-Popliteal Bypass Graft after Primary Cementless Total Hip Arthroplasty

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Vascular complications after total hip arthroplasty (THA) are rare and mainly occur after revision surgery, and of these complications, large artery thrombosis is relatively uncommon. Nevertheless, this complication has potentially devastating effects on the affected lower extremity. The authors report a case of acute thrombosis in an iliac artery stent and femoro-popliteal bypass graft after primary cementless THA, and include relevant literature review.

Key words: total hip arthroplasty, occlusion, arteries, bypass graft

Total hip arthroplasty (THA) produces satisfactory results without significant complications in most cases. Generally, vascular complications after THA are relatively rare (approximately 0.08%), and are more commonly encountered after revision surgery. Large artery thrombosis is even more uncommon, but has potentially devastating consequences. In fact, only two previous reports of thrombosis of a bypass graft of a major artery after THA have been published in literature. We encountered a patient with acute thrombosis at the site of an iliac artery stent and femoro-popliteal bypass graft after primary cementless THA. Here, we report this case and include the literature review. Informed consent for publication of case data was taken from the patient.

CASE REPORT

A 77-year-old male patient, with a left femoral neck fracture after a fall, underwent 3 screw fixation at another hospital about 6 months ago before, presenting at our hospital with a complaint of persistent pain. Prior to the femoral neck fracture, he could walk without any limitation.

Physical examination revealed that left hip range of motion was limited (flexion 80°, external rotation 30°, internal rotation 5°, abduction 20°, adduction 20°), and plain radiographs showed non-union of the left femoral neck fracture and limb shortening of about 15 mm (Fig. 1).

He has suffered from diabetes mellitus for 10 years. He had undergone left common iliac artery stent insertion and femoro-popliteal bypass grafting for left femoral artery occlusion about

Figure 1. Anteroposterior radiograph of both hips showing left femoral neck fracture nonunion after cannulated screw fixation. There was a left iliac stent (white arrow) and leg shortening about 15 mm.
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2 years ago. However, we observed no signs of bypass graft occlusion on preoperative arterial angiography (Fig. 2). Preoperatively the pulsation of dorsalis pedis artery of left foot was normal. Motor power and sensation of left lower extremity was normal.

He had been prescribed Astrix 100 mg (Aspirin, Boryung Co. Ltd., Seoul, Korea) once a day, Anplag 100 mg (Sarpogrelate hydrochloride, Yuhan, Seoul, Korea) three times a day and Cumadin 3 mg (Warfarin Sodium, Jeil Pharmaceutical Co. Ltd., Daegu, Korea) once a day.

On the 5th inpatient day, we performed a cementless THA for nonunion of the left femoral neck fracture using a posterolateral approach under general anesthesia and corrected the limb shortening (Fig. 3). The total duration of the surgery was 1 hour 10 minutes and the total intraoperative blood loss was 400 ml. The operative procedure was essentially uneventful.

Four hours after surgery, he complained of inability to dorsiflex the left ankle and numbness of the left foot. A physical examination revealed reduced pulsation of the dorsalis pedis artery and a slightly lower temperature compared to the contralateral foot. Emergency lower limb arterial computed tomographic angiography was performed 4.5 hours after surgery, and revealed a large thrombus just below the left common iliac arterial branch from origin of the external iliac artery to the bypass graft (Fig. 4). The patient was referred to the vascular surgery department and the thrombus was removed 12 hours postoperatively by selective thrombolytic therapy using urokinase by a radiologist specialized in interventional procedures. Briefly, after placing a guide wire in the left proximal superficial femoral artery, urokinase 340,000 units was infused for 4 hours. Distal blood flow was restored after this selective thrombolytic therapy and confirmed by angiography (Fig. 5).

Postoperative heparin (5,000 IU, P/S 500 ml mix, 15 ml/h) was administered for 7 days and aspirin 100 mg was continued. The drain was removed on the first postoperative day and the total amount of drain was 180 ml. The postoperative rehabilitation was delayed for a week because of anticoagulation therapy and we elastic compression dressing was applied for 7 days postoperatively to prevent hematoma formation. The rehabilitation program after 1 week was same as usual. No other compli-

Figure 2. Preoperative lower extremity 3 dimensional computed tomographic angiograph demonstrating no occlusive lesion at left femoro–popliteal bypass graft.

Figure 3. (A) Immediate postoperative anteroposterior and (B) lateral radiographs showing the cementless total hip arthroplasty and equal leg length.
cation such as hematoma or wound problem was noted due to urokinase or heparin.

The patient was followed up for 12 months and the ankle dorsiflexion and numbness had fully recovered. He was able to walk without a walking aid, but there was mild limping.

**DISCUSSION**

Complications after THA are primarily dislocation, loosening, and infection, but vascular complications are uncommon. Furthermore, of the various vascular injuries, occlusion of a large artery is extremely rare. Parfenchuck and Young\(^6\) classified types of vascular complication after THA as hemorrhage due to vessel perforation, pseudoaneurysm, arterio–venous fistula, and thrombosis. However, though vascular complications are uncommon, they should not be overlooked because they are potentially limb or even life threatening.

Only two case reports of major bypass graft occlusion after THA have been published. Trousdale et al\(^7\) performed 14 THAs in 10 patients with aortofemoral bypass grafting. No thrombosis was seen in 10 cases operated by anterior approach, but in 4 cases operated using a posterior approach, one case had thrombosis in bypass graft. In this case, preoperative angiography showed partial occlusion of the bypass graft, and thus, the authors considered that the occlusion resulted from compression of the graft, due to the flexed, adducted, internally rotated position adopted during surgery using the posterior approach. Therefore, they reported when THA is performed on a patient with a history of iliofemoral arterial occlusive disease or of an aortofemoral bypass graft, an anterior approach may help avoid intraoperative graft occlusion and thrombosis.

Parfenchuck and Young\(^6\) also reported a case of intraopera-
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Acute occlusion in a patient with an aortoiliac graft for an abdominal aortic aneurysm. In this case, they concluded that vascular occlusion may have occurred during THA in the absence of any demonstrable preexisting signs or symptoms.

It is known that vascular complications are more common after revision THA. Stubbs et al. reported an iliofemoral artery thrombosis after revision THA using a lateral approach, and Matos et al. reported one case of iliac artery and three cases of iliofemoral artery thrombosis after revision THA. They commented that multiple procedures on same hips resulted in extensive scarring, shortening, and flexion contracture or even fusion, and that these could have caused the arterial occlusion.

Large arterial occlusion can also occur during primary THA. Heyes and Aukland reported two cases of femoral artery thrombosis after primary cemented THA using an anterolateral approach. Simon et al. reported two cases of femoral artery thrombosis after primary THA performed using a posterolateral approach, and Reiley et al. reported a case of femoral artery occlusion after cemented THA due to cement leakage under the transverse ligament (Table 1). We hypothesize that limb lengthening by 15 mm could have stretched the bypass graft in our case and caused the thrombosis, and, as mentioned before, the position adopted while performing the posterior approach could be another reason. Also in this patient, we felt that the junctional area of iliac stent and bypass graft was more vulnerable to be hyperflexed due to the difference of the flexibility between stent and graft and it could have caused the thrombosis.

In order to reduce the likelihood of iliofemoral artery occlusion after THA, the possibility of a vascular complication should be borne in mind. However, immediate intervention is required to salvage the limb when a vascular complication is encountered. In addition, as was the case in our patient, in those with a previous history of arterial occlusive disease and bypass grafting, typical symptoms, such as, pain and signs such as pulselessness and cold limb may not be obvious after arterial occlusion because of well-developed collateral circulation. In our case, the initial symptoms were loss of ankle dorsiflexion and numbness of the foot, which more resembled a sciatic nerve injury or peroneal nerve palsy. Therefore, if a postoperative vascular complication is suspected or there is a history of vascular disease, angiography should be performed promptly to evaluate the entire lower limb affected and consultation with a vascular surgeon should be considered. Preoperatively demonstrated graft patency should not preclude a surgeon from taking necessary precautions and keep a watchful eye on development of postoperative thrombosis.

REFERENCES


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THA, total hip arthroplasty; N/M, not mentioned.


무시멘트성 인공관절 전치환술 후 발생한 대퇴-슬와 이식 혈관의 급성 폐색

박경순 • 윤택림 • 설영준
화순전남대학교병원 정형외과, 관절센터

인공관절 전치환술 후 발생하는 혈관 합병증은 드물고 주로 재치환술 후 발생하며, 그 중 큰 동맥의 폐색은 비교적 흔하지 않다. 그러나 이러한 합병증은 발생하였을 경우 불필요한 대퇴동맥 수술과 대퇴-슬와 동맥 우회 이식 혈관의 급성 폐색이 발생한 증례를 경험하였으며, 이에 문헌 고찰과 함께 보고하고자 한다.

색인단어: 인공관절 전치환술, 폐색, 동맥, 이식 혈관