Case Report

Vascular Compromise Due to Supracondylar Fracture of the Femur After Total Knee Arthroplasty

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A supracondylar femoral fracture following total knee arthroplasty (TKA) affects the distal femur within 15 cm of the joint line or within 5 cm of the most proximal extent of an intramedullary femoral device.1,2 Stress fractures and intraoperative iatrogenic fractures are excluded.3 Although TKA is a common procedure, periprosthetic supracondylar femoral fractures are rare, and their incidence is estimated between 0.3% and 2.5%.3-5 In approximately 2%-3% of supracondylar femoral fractures, major vessels are injured.6 However, a review of the literature did not reveal any reported cases of vascular compromise caused by periprosthetic fractures of the femur.

CASE REPORT

A 72-year-old woman presented with pain and inability to move her left knee following a fall. Medical history revealed previous bilateral TKA and arterial hypertension. On physical examination, the patient was hemodynamically stable and without signs of cardiopulmonary distress. Swelling and pathologic motion were proximal to the left knee. The foot was pale and cold, demonstrating acute ischemia. No pulses were palpable distal to the superficial femoral artery, and no pedal Doppler signals were found.

Radiographs demonstrated a periprosthetic fracture of the left femur. No signs of prosthetic loosening were seen. Angiogram revealed a 3-cm segment occlusion of the distal superficial femoral artery with angiographic evidence of an acute or chronic ischemia. The segmental superficial femoral artery occlusion was combined with well-developed collateralization and a three-vessel runoff in the calf (Figure 1).

A temporary vascular shunt was placed, and following temporary vascularization, open reduction and internal fixation were performed with a dynamic condylar screw and plate through a lateral approach. An interposition polytetrafluoroethylene vascular graft (Goretex 6 mm; W.L. Gore & Assoc Inc, Flagstaff, Ariz) was placed in situ. Normal postoperative vascular status was noted with palpable pedal pulses and a normal ankle

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Figure 1: Angiography of the left lower limb (A). Occlusion of the distal superficial femoral artery and femoral fracture above the knee prosthesis are seen (B).
brachial vascular index of 1. There were no postoperative complications except for a superficial wound infection, which resolved with debridement and a 3-week course of intravenous antibiotics.

At 3-month follow-up, range of movement of the left knee was 0°–90°. The patient was pain free with normal vascular status and walked with a cane. Radiographs showed good union (Figure 2).

**DISCUSSION**

Chmell et al reviewed periprosthetic fractures after TKA and found these fractures to be caused by minimal trauma, rheumatoid arthritis, prolonged steroid therapy, osteopenia, debris-related osteolytic defects in the distal femur, notching of the anterior femoral cortex, and neurologic disorders. Another risk factor of periprosthetic fracture after TKA is arthrofibrosis of the knee, which adds stress in the distal femoral metaphysis.

Conservative management is inappropriate in periprosthetic fractures when associated with a significant vascular injury with limb-threatening ischemia. The treatment of these fractures necessitates a vascular surgeon to reestablish distal limb perfusion by a temporary shunt, followed by rigid internal fixation of the bone, after which a permanent graft should be installed.

Internal fixation of the fracture depends on the type of the prosthesis. In our case, the prosthesis enabled us to use a condylar screw and plate. Condylar blade plate, spoon plate, or retrograde intramedullary nailing through the notch also were used in similar fractures.

Revision arthroplasty with a longer femoral stem generally is preferred if the prosthesis is loose. However, this solution is less practical in the clinical setting of vascular compromise when internal fixation of the fracture is faster and safer.

**REFERENCES**


**EDITORIAL DISCUSSION**

ORTHOPEDICS: Is it possible the vascular compromise resulted in a combination of TKA and supracondylar fractures only by chance?

Cohen et al: In the distal thigh, the vascular bundle is fixed proximally in the hiatus of the adductor magnus muscle and distally by the arch of the soleus. The lack of elasticity of artierysclerotic vessels makes them further susceptible to the trauma of displaced bone fragments. The combination of vascular injury and supracondylar femoral fracture was previously reported.1

As to the added influence of a knee prosthesis in such injuries, no absolute affirmation can be made as there are no previous cases in the literature. Two factors seem to be implicated: 1) the rigidity of the implants at the articular surface of the femur may shift the destructive vector to the supracondylar region. In other words, fractures under such circumstances do not have the regular intercondylar pattern of a distal femoral fracture, and the trauma energy is exclusively dissipated to the supracondylar area; and 2) patients who undergo TKAs generally are older and therefore vascular rigidity and thrombogenicity secondary to arteriosclerosis are to be expected.

**REFERENCE**


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