



Bilateral femoral neck stress fracture following bilateral total knee arthroplasty: a case report

Selami ÇAKMAK¹, Mahir MAHİROĞULLARI¹, Mustafa KÜRKLÜ², Cemil YILDIZ²

¹Department of Orthopedics and Traumatology, GATA Haydarpaşa Training Hospital, İstanbul, Turkey;

²Department of Orthopedics and Traumatology, Gülhane Military School of Medicine, Ankara, Turkey

In the treatment of degenerative knee arthritis, total knee arthroplasty is a commonly performed surgery. After knee replacement, stress fractures at lower extremity may rarely occur due to changes in lower extremity alignment and biomechanical axis. We report an 82-year-old woman with a bilateral femoral neck stress fracture 3 years after bilateral total knee replacement. Physicians should be aware of this rare complication and these fractures should be treated without any surgical delay.

Key words: Femoral neck; stress fracture; total knee arthroplasty.

Total knee arthroplasty (TKA) is a common procedure for degenerative diseases of the knee. Although there have been new developments in implant designs and surgical techniques, complications related to arthroplasty have increased along with the increasing numbers of arthroplasty performed each year. The most common complications are infection, loosening and instability. Rare complications such as stress fractures of the femoral neck can also be seen after TKA.

Femoral neck stress fractures usually occur in army recruits, athletes and hyperactive children in normal bones and in patients with rheumatoid arthritis, osteoporosis or extensive steroid treatments.^[1-4] Femoral neck fracture following TKA is a rare condition. In the English literature, we found only 25 cases of femoral neck stress fracture reported after TKA and only 2 following bilateral TKA.^[5-16] We report a case of rare bilateral femoral neck stress fracture following bilateral TKA.

Case report

An 82-year-old woman admitted to our clinic with pain and varus deformity at both knees in August 2005 (Fig. 1). We performed bilateral TKA for bilateral gonarthrosis. Her clinical and roentgenographic examinations were normal in the follow-up period (Fig. 2). Approximately 33 months after knee prosthesis, she was admitted to the orthopedic department with right groin pain and inability to stand or walk on the right leg. Pain had begun 2 weeks prior to presentation and the patient took pain-relief. There was no history of trauma or fall. Right hip joint movement was restricted with flexion and rotation. Hip and pelvis radiographs showed femoral neck stress fracture at the right hip (Fig. 3). An additional non-displaced fracture at the left femoral neck was also detected (Fig. 4). The displaced femoral neck fracture was treated with bipolar hip replacement. The non-displaced femoral neck fracture was fixed with three cannulated screws (Fig. 5). The patient had no

Correspondence: Selami Çakmak, MD, Ass. Prof. GATA Haydarpaşa Eğitim Hastanesi, Ortopedi ve Trtavitmatoloji Servisi, Üsküdar, İstanbul, Turkey.

Tel: +90 505 - 774 58 30 e-mail: selamicakmak2000@yahoo.com

Submitted: March 26, 2011 **Accepted:** November 3, 2011

©2012 Turkish Association of Orthopaedics and Traumatology

Available online at
www.aott.org.tr
doi:10.3944/AOTT.2012.2662
QR (Quick Response) Code:



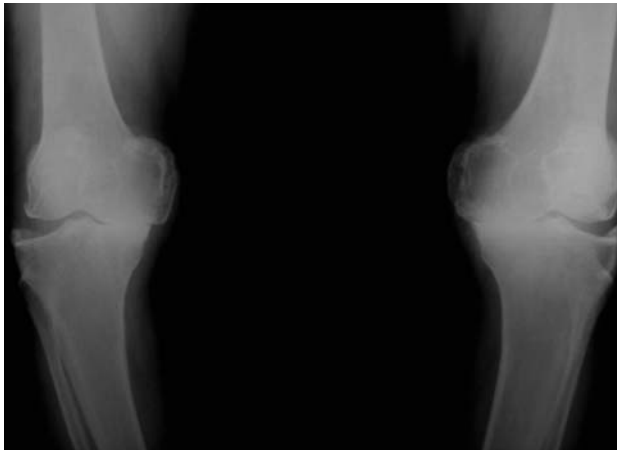


Fig. 1. Bilateral osteoarthritis of both knees with severe varus deformity.

pain and was able to walk without any disturbance after 18 months following surgery.

Discussion

Incidence of complications following TKA is increasing in accordance with the number of TKAs performed among older patients. Stress fractures of the femoral neck are rare. Pubic ramus fractures, subtrochanteric femur fractures and distal femoral and proximal tibial fractures are also stress fractures seen after TKA.^[17-19]

Distraction forces focus at the superior cortex of the femoral neck depending on the differences in the weight-bearing axis of the involved leg after TKA, especially in patients with large corrected deformities. Varus deformity occurs primarily, resulting in femoral neck fractures with cyclic loading after full weight-bearing in osteoporotic and sedentary patients. Patients with serious knee pain have poor mobility and



Fig. 3. With pelvis radiographies, femoral neck insufficiency fracture can be seen easily at the right hip but undisplaced femoral neck fracture at the left hip may be overlooked easily.

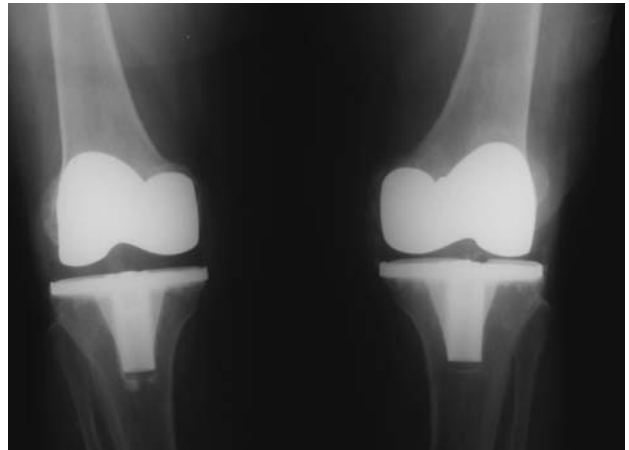


Fig. 2. Total knee prosthesis was performed for both knees.

less activity level before TKA. This poor mobility and advanced ages increase incidence of osteoporosis. After TKA and correction of the axis of extremity, loadings over the femoral neck will increase and increasing activity levels with painless knees on osteoporotic bones can cause stress fracture of the femoral neck. Atalar et al.^[5] reported a patient immobilized in a long leg cast for 2 months following revision total knee replacement. They suggested that a stress fracture may



Fig. 4. With hip radiography of the left hip, femoral neck fracture can be seen at the superior region.

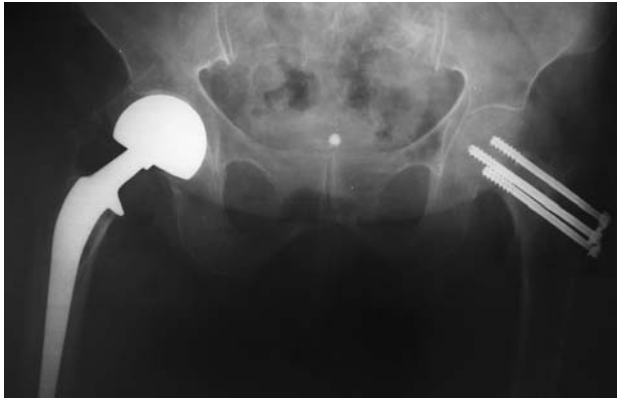


Fig. 5. Bipolar partial hip replacement was performed for displaced femoral neck fracture at the right side and fixation with cannulated screws was performed for undisplaced femoral neck fracture at the left side.

develop due to this long casting time and the patient's osteoporosis. These factors contribute to the occurrence of femoral neck stress fracture, although sufficient scientific evidence for this fracture has not been reported.^[5-11]

Patients undergoing TKA after extended periods of low activity levels and poor mobility must be observed closely and a detailed weight-bearing program must be set. In patients with groin pain (especially in osteoporotic, sedentary patients) physicians should be on alert for stress fracture of the femoral neck following TKA. Because these stress fractures are usually missed at the first clinical examination, they are initially treated with medication. History of TKA of the involved extremity and time elapsed after replacement are important signs of stress fracture. According to the literature, the interval between total knee replacement and stress fracture varies from 2 to 17 months. In our case, this interval was 33 months and longer than that reported in the literature. This may be explained by the slow increase in mobility and activity level of the patient due other medical pathologies (mild congestive heart disease and hypertension). Our late occurred case also highlights the fact that stress fracture may occur as late as the 33rd postoperative month.

Initial radiographic studies may not always detect a fracture. In these cases, bone scintigraphy is helpful for early diagnosis. Early diagnosis determines treatment options; as internal fixation or conservative resting treatment may be sufficient in undisplaced fractures, partial or total arthroplasty will be necessary in displaced fractures.

Total knee prosthesis design may also play a role in the development of stress fractures. It has been empha-

sized that hinge prostheses may change knee kinematics and lead to increasing stress forces at the tip of the femoral components and more proximal parts.^[11-12] Stress fractures can be easily overlooked if physicians are not alert of their possibility.

In conclusion, the risk of stress fracture of the femoral neck following total knee replacements are higher in patients with low pre-replacement activity levels, those with high deformity angles at the knees and high osteoporotic bones. Physicians must be aware of this rare complication in patients with sudden groin pain to prevent displacement and the necessity for prosthetic replacement.

Conflicts of Interest: No conflicts declared.

References

1. Blickenstaff LD, Morris JM. Fatigue in fracture of the femoral neck. *J Bone Joint Surg Am* 1966;48:1031-47.
2. Gurdezi S, Trehan RK, Rickman M. Bilateral undisplaced insufficiency neck of femur fractures associated with short-term steroid use: a case report. *J Med Case Rep* 2008;2:79.
3. Devas MB. Stress fractures of the femoral neck. *J Bone Joint Surg Br* 1965;47:728-38.
4. Miller F, Wenger DR. Femoral neck stress fracture in a hyperactive child. A case report. *J Bone Joint Surg Am* 1979;61:435-7.
5. Atalar H, Aytakin MN, Gunay C, Yavuz OY. Stress fracture of the femoral neck as a complication of revision arthroplasty of the knee: a case report. *Acta Orthop Belg* 2008;74:418-20.
6. Fipp G. Stress fractures of the femoral neck following total knee arthroplasty. *J Arthroplasty* 1988;3:347-50.
7. Lesniewski PJ, Testa NN. Stress fracture of the hip as a complication of total knee replacement. Case report. *J Bone Joint Surg Am* 1982;64:304-6.
8. McElwaine JP, Sheehan JM. Spontaneous fractures of the femoral neck after total replacement of the knee. *J Bone Joint Surg Br* 1982;64:323-5.
9. Hardy DC, Delince PE, Yasik E, Lafontaine MA. Stress fracture of the hip. An unusual complication of total knee arthroplasty. *Clin Orthop Relat Res* 1992;(281):140-4.
10. Rawes ML, Patsalis T, Gregg PJ. Subcapital stress fractures of the hip complicating total knee replacement. *Injury* 1995; 26:421-3.
11. Joshi N, Pidemunt G, Carrera L, Navarro-Quilis A. Stress fracture of the femoral neck as a complication of total knee arthroplasty. *J Arthroplasty* 2005;20:392-5.
12. Pankaj A, Malhotra R, Logani V, Bhan S. Bilateral femoral neck fractures following total knee arthroplasty: a case report and review of literature. *Arch Orthop Trauma Surg* 2007;127: 549-52.
13. Palanca MD, Albareda J, Seral F. Subcapital stress fracture of the femoral neck after total knee arthroplasty. *Int Orthop* 1994;18:308-9.

14. Hendel D, Beloosesky Y, Weisbort M. Fracture of the hip after knee arthroplasty – an unusual case with pain in the knee. *Acta Orthop Scand* 2001;72:194-5.
15. Brooks S. Ipsilateral subcapital fracture of the femoral neck following total knee replacement. *J R Coll Surg Edinb* 1987;32:366-7.
16. Cameron HU. Femoral neck stress fracture after total knee replacement? A case report. *Am J Knee Surg* 1992;5:41-3.
17. Smith MD, Henke JA. Pubic ramus fatigue fractures after total knee arthroplasty. A case report. *Orthopedics* 1988;11:315-7.
18. Kumm DA, Rack C, Rütt J. Subtrochanteric stress fracture of the femur following total knee arthroplasty. *J Arthroplasty* 1997;12:580-3.
19. Thienpont E, Simon JP, Spaepen D, Fabry G. Bifocal pubic stress fracture after ipsilateral total knee arthroplasty in rheumatoid arthritis. A case report. *Acta Orthop Belg* 2000;66:197-200.