



Hip Fracture in Chronic Kidney Disease Patients: Necessity of Multidisciplinary Approach

The incidence of hip fractures in patients with chronic kidney disease (CKD) is considerably higher than that of the general population (1). Although the management of CKD has improved, surgical treatment of hip fractures in patients with CKD is an ongoing challenge, especially in dialysis patients. There is considerable evidence that hip fractures in patients with CKD predict high mortality. Based on previous studies, the one-year mortality of CKD patients who sustain a hip fracture is up to 70%, and dialysis patients had a 13.7 greater chance of death at one-year post-surgery compared to age and sex matched non-dialysis patients (2,3). Two obvious factors may contribute to the increased mortality among patients on dialysis who sustain a hip fracture: 1) the higher prevalence of comorbidities, 2) the higher rate of numerous postoperative complications.

Individualized surgical treatment according to the patient's condition should be planned and carried out using a detailed preoperative risk assessment (4). The urgent and unexpected nature of hip fracture surgery (HFS) limits the amount of time available to optimize the overall condition of the patient before surgery. It has been thought that earlier surgery provides better results in HFS. However, it is recommended that patients at high risk recuperate before surgery to avoid deterioration caused by the "second hit" of the surgical procedure. Therefore, it is important to find a balance between the timing of surgery and the patient's physical condition. In previous studies, delaying surgery by more than 48 hours in elderly patients with hip fractures led to an increase in post-surgery mortality rates. However, a recent study showed that delaying surgery for several days did not negatively impact the incidence of postoperative adverse events (5).

Clinical outcomes after treatment of a hip fracture in patients on chronic hemodialysis are frequently worsened by complications such as wound hematoma, prolonged drainage, infection, implant failure, and nonunion. Dialysis patients often have a deranged electrolyte balance and are more likely to suffer from anemia of chronic disease or malnutrition, all of which increase the risk of infection. Renal osteodystrophy and osteoporosis can also lead to biological and mechanical failure after HFS (6). Therefore, a team approach involving an expert nephrologist and orthogeriatrician is essential to reduce early complications and early mortality. The use of medications to manage renal osteodystrophy other than osteoporosis can also help improve out-

comes after HFS.

All dialysis patients undergoing HFS should be offered a multidisciplinary assessment and intervention to prevent subsequent osteoporotic fracture. It must be noted that dialysis patients may not receive standard rehabilitation because they are unable to participate in rehabilitation while undergoing dialysis. Another factor adversely affecting patients with CKD following hip fracture is that bisphosphonates are contraindicated in advanced renal impairment. Comprehensive intervention including physical therapy, occupational therapy, and fall prevention along with management of CKD-mineral and bone disorder (MBD) may prevent a secondary fracture after HFS. It is noteworthy that a significant decline in the rates of hip fracture and hospital mortality in CKD patients between 2003 and 2011 was reported in a recent large population study by improvement in management of CKD-MBD (7).

In conclusion, a hip fracture in patients with CKD can have serious consequences and poses a serious challenge for surgeons. Physicians should be aware that a comprehensive treatment approach reduces the morbidity and mortality of hip fractures in CKD patients. We anticipate that the future establishment of a robust protocol for the treatment of hip fractures in patients with CKD will improve postoperative morbidity and mortality.

AUTHOR CONTRIBUTION

Conceptualization: Yoon BH, Koo KH. Writing - original draft: Yoon BH. Writing - review & editing: Yoon BH, Koo KH.

DISCLOSURE

The authors have no potential conflicts of interest to disclose.

ORCID

Byung-Ho Yoon <https://orcid.org/0000-0001-8518-6331>

Kyung-Hoi Koo <https://orcid.org/0000-0001-5251-2911>

REFERENCES

1. Maravic M, Ostertag A, Torres PU, Cohen-Solal M. Incidence and risk factors for hip fractures in dialysis patients. *Osteoporos Int* 2014; 25: 159-65.

2. Karaeminogullari O, Demirors H, Sahin O, Ozalay M, Ozdemir N, Tandoğan RN. Analysis of outcomes for surgically treated hip fractures in patients undergoing chronic hemodialysis. *J Bone Joint Surg Am* 2007; 89: 324-31.
3. Swift O, Ayub A, Mathavakkannan S, de Roeck N. Outcomes following surgery for fractured neck of femur in dialysis patients: a 5-year review from a district general hospital in the United Kingdom. *BMC Nephrol* 2016; 17: 26.
4. Pedersen AB, Christiansen CF, Gammelager H, Kahlert J, Sørensen HT. Risk of acute renal failure and mortality after surgery for a fracture of the hip: a population-based cohort study. *Bone Joint J* 2016; 98-B: 1112-8.
5. Dong C, Wang Y, Wang Z, Wang Y, Wu S, Du Q, Wang A. Damage control orthopedics management as vital procedure in elderly patients with femoral neck fractures complicated with chronic renal failure: a retrospective cohort study. *PLoS One* 2016; 11: e0154906.
6. Song KS, Yoon SP, Lee SK, Lee SH, Yang BS, Park BM, Yang IH, Lee BS, Yeom JU. The results of proximal femoral nail for intertrochanteric fracture in hemodialysis patient. *Hip Pelvis* 2017; 29: 54-61.
7. Kim SM, Liu S, Long J, Montez-Rath ME, Leonard MB, Chertow GM. Declining rates of hip fracture in end-stage renal disease: analysis from the 2003-2011 nationwide inpatient sample. *J Bone Miner Res* Forthcoming 2017.

Related article in this issue on page 2035-41

Byung-Ho Yoon¹ and Kyung-Hoi Koo²

¹Department of Orthopaedic Surgery, Inje University College of Medicine, Seoul Paik Hospital, Seoul, Korea; ²Department of Orthopaedic Surgery, Seoul National University Bundang Hospital, Seongnam, Korea

Address for Correspondence:

Byung-Ho Yoon, MD, PhD

Department of Orthopaedic Surgery, Inje University College of Medicine, Seoul Paik Hospital, 9 Mareunnae-ro, Jung-gu, Seoul 04551, Korea
E-mail: cragy0215@naver.com

Received: 21 October 2017 / Accepted: 23 October 2017