



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Development of a Hip Fracture Risk Prediction Model in Korean Maintenance Hemodialysis Patients: A Nationwide Cohort Study

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Objectives : Hip fracture is a major skeletal complication in patients undergoing maintenance hemodialysis (HD) and is associated with substantial morbidity and mortality. However, practical risk prediction tools specifically tailored to HD populations remain limited. We aimed to develop a nomogram to estimate 3- and 5-year hip fracture risk using nationwide HD Quality Assessment–linked claims data in Korea.

Methods : We conducted a nationwide retrospective cohort study using data from the HD Quality Assessment program linked with National Health Insurance claims collected between October and December 2015. The index date was January 1, 2016. Patients with a prior history of hip fracture were excluded. Incident hip fracture was defined as the presence of ICD-10 codes for hip fracture recorded as the primary diagnosis or first secondary diagnosis during a 1-year ascertainment window between 2016 and 2017. Cox proportional hazards regression models were used to identify predictors and construct nomograms for estimating 3- and 5-year hip fracture risk. In addition, sex-stratified models were developed to account for potential sex differences in fracture risk.

Results : A total of 28,491 patients receiving maintenance HD were included (mean age 61.2 ± 12.8 years; women 41.4%). During follow-up, 555 patients experienced hip fracture. Key predictors included age, body mass index, diabetes, stroke, prior fracture history, serum albumin, and phosphorus. Extended models additionally incorporated dialysis vintage, pulse pressure, ferritin, and sex. Risk stratification based on predicted probabilities demonstrated clear separation of hip fracture–free survival curves across risk groups (log-rank $p < 0.001$), and hip fracture–free survival differed significantly by sex ($p < 0.001$).

Conclusions : We developed a nomogram incorporating routinely available clinical and laboratory variables to estimate 3- and 5-year hip fracture risk in a nationwide Korean HD cohort. This tool may facilitate individualized risk assessment and support targeted surveillance and preventive strategies in patients undergoing maintenance hemodialysis.

Figure 1_Nomogram for Predictors in overall patients.jpg



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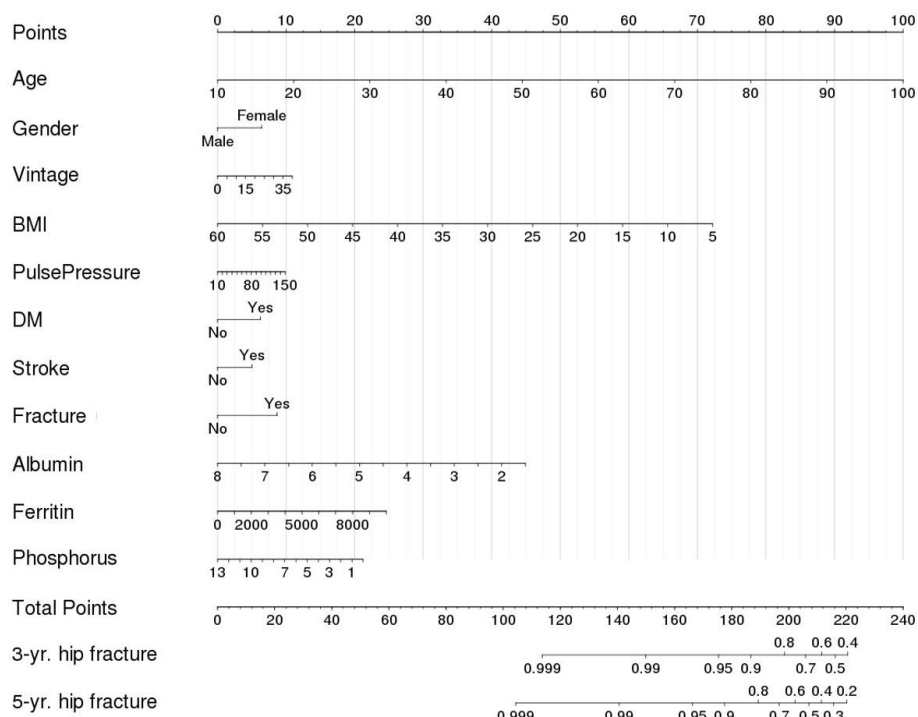
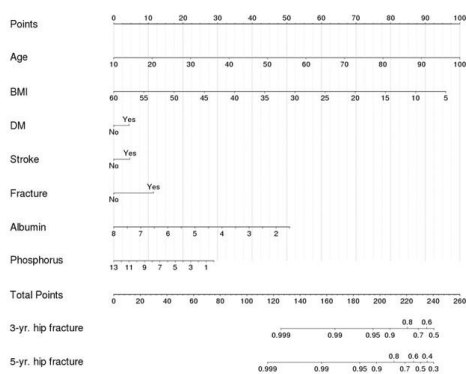


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A) Nomogram for prediction in men



B) Nomogram for prediction in women

