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Impact of hemodialysis in patients undergoing bypass surgery for peripheral arterial disease - 10-year follow-up study

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Background: Although lower extremities bypass surgery has been commonly performed as the standard option to treat peripheral artery disease (PAD) even in patients on hemodialysis (HD) as well as general population, poorer prognosis still remains major problems in this specific population. In this 10-year follow-up study, we investigated the impact of HD after surgical revascularization in patients with PAD.

Methods: A total of 660 patients undergoing successfully bypass surgery were enrolled. Patients with acute limb ischemia were excluded. We compared 392 HD patients with 428 limbs and 268 non-HD (NHD) patients with 296 limbs during 10 years follow-up period. Primary endpoint was defined as major adverse cardiovascular events (MACE) including all-cause death, non-fatal myocardial infarction and stroke. Second endpoint was major adverse limb events (MALE) including any revascularization and major amputation. To minimize the differences of clinical characteristics between the two groups, propensity score adjusting with all baseline variables was performed.

Results: Prevalence of diabetes (53.3% vs. 35.2%), critical limb ischemia (77.5% vs. 52.1%) and infra-popliteal artery (48.2% vs. 19.6%) were higher in HD group compared to NHD group ($p < 0.0001$ in all), inversely, age was younger in HD group than in NHD group (67 ± 9 years vs. 71 ± 9 years, $p < 0.0001$). The 30-day mortality rate was comparable (3.1% in HD group

vs. 1.5% in NHD group, $p = 0.19$). The 10-year event-free survival rate for MACE was significantly lower in HD group compared to NHD group (45.3% vs. 67.4%, $p < 0.0001$) and for MALE (60.0% vs. 80.0%, $p = 0.0007$), respectively. After propensity score adjustment, the freedom rate from MACE was still lower in HD group compared to NHD group [45.6% vs. 67.6%, hazard ratio (HR) 1.89, 95% confidence interval (CI) 1.33–2.72, $p = 0.0003$], however, the rate from MALE was statistically comparable between the two groups (65.7% vs. 76.9%, 1.27, 95% CI 0.87–1.90, $p = 0.21$). Furthermore, although the 10-year limb salvage rate was crudely lower in HD group compared to NHD group (80.6% vs. 91.6%, HR 1.57, 95% CI 1.05–2.40, $p = 0.0027$), it was comparable after propensity score adjustment (89.4% vs. 90.1%, HR 1.09, 95% CI 0.59–1.88, $p = 0.79$). Also, the mortality rate was consistently lower in HD patients (adjusted HR 2.37, 95% CI 1.62–3.50, $p < 0.0001$).

Conclusion: The long-term freedom rate from MACE and mortality was markedly lower in HD patients compared to non-HD patients. However, the rate from MALE, especially limb salvage rate was similar between HD and NHD after adjustment for clinical characteristics. These results suggest that detection at the early stage of PAD may potentially improve the poor outcomes in this high risk population.