

## Effect of hemoperfusion on protein energy wasting and long-term prognosis in patients on maintenance hemodialysis

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**[ Abstract ] Objective** To explore the effect of hemoperfusion (HP) combined with hemodialysis (HD) (HD+HP) on protein energy wasting (PEW) and long-term prognosis in patients on maintenance HD (MHD). **Methods** A prospective multicenter cohort study was conducted. Adult MHD patients who completed PEW assessment and underwent regular dialysis between July 2015 and July 2021 at 23 hemodialysis centers in Guizhou Province were selected. Demographic characteristics, physical indicators, laboratory indicators, 3-day diet diary and HP treatment data of the subjects were collected. The patients were divided into different groups according to the presence or absence of HP, the frequency of HP treatment and the type of cartridge, and then relevant indicators were compared. Multivariate logistic regression model and Cox proportional regression model were used to analyze the influence of HP treatment on PEW risk in MHD patients. Meanwhile, Kaplan-Meier method was used to plot the survival curve. **Results** A total of 4 623 MHD patients (2 789 males and 1 834 females) aged (53.7±15.9) years were included in the study, with a median dialysis age of 64.3 (44.3, 92.3) months. There were 3 429 (74.2%) MHD patients treated with HD+HP, and 1 194 patients (25.8%) were not treated with HP. According to the 2008 diagnostic criteria of the International Society for Renal Nutrition and Metabolism (ISRNM), the incidence of PEW was 26.0% (1 204/4 623). Multivariate logistic regression analysis showed that female ( $OR=2.48$ , 95%CI: 1.55-3.95,  $P<0.001$ ), diabetes ( $OR=1.75$ , 95%CI: 1.08-2.83,  $P=0.024$ ) and high-sensitivity C-reactive protein (hs-CRP) ( $OR=1.02$ , 95%CI: 1.01-1.03,  $P=0.003$ ) were risk factors for PEW, while treatment with HD+HP ( $OR=0.51$ , 95%CI: 0.31-0.87,  $P=0.012$ ) and elevated triglyceride levels ( $OR=0.62$ , 95%CI: 0.48-0.80,  $P<0.001$ ) were protective factors. Cox hazard ratio regression showed that among different HP treatment frequencies and cartridge types, 2 times/month ( $HR=0.40$ , 95%CI: 0.17-0.95,  $P=0.037$ ), 3 times/month ( $HR=0.44$ , 95%CI: 0.23-0.85,  $P=0.014$ ), 4 times/month ( $HR=0.54$ , 95%CI: 0.34-0.85,  $P=0.008$ ), HA130 ( $HR=0.57$ , 95%CI: 0.36-0.89,  $P=0.014$ ) and HA230 ( $HR=0.30$ , 95%CI: 0.15-0.63,  $P=0.001$ ) had protective effects on the occurrence of PEW in MHD patients. The all-cause mortality rate was 11.3% (521/4 623) at 33 (24, 48) months of follow-up. Kaplan-Meier analysis showed that patients undergoing 4 times/month HP treatment ( $\chi^2=36.78$ ,  $P<0.001$ ) and using HA230 ( $\chi^2=9.46$ ,  $P=0.002$ ) had the highest survival rate. **Conclusion** Treatment with HD+HP is a protective factor for PEW in patients with MHD, and 4 times/month HP treatment or HA230 significantly reduces the risk of PEW and all-cause mortality in patients with MHD.

**[ Key words ]** Renal dialysis; Hemoperfusion; Protein energy wasting; Maintenance hemodialysis

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