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Efficacy of the Ultrasound Dilution Technique in the Surveillance of Vascular Access in Hemodialysis Patients

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Objectives : Surveillance of vascular access is an important issue because vascular access is life-saving for hemodialysis patients. Various methods such as ultrasound dilution technique (UDT), static intra-access pressure ratio, and duplex ultrasonography are suggested, but the most useful test is not specified. We analyzed the efficacy of UDT in the surveillance of vascular access in hemodialysis patients.

Methods : We retrospectively investigated 27 patients who underwent surveillance of vascular access using UDT and were treated with percutaneous transluminal angioplasty (PTA) more than once in chronic hemodialysis patients between August 2014 and December 2016.

Results : The mean age of the patients was 55 ± 11 years. Male patients were 14 (52%). The primary cause of end-stage renal disease included diabetes mellitus 15 (56%), hypertension 7 (26%), glomerulonephritis 3 (11%) and others 2 (7%). The types of vascular access consisted of 14 (52%) arteriovenous fistula and 13 (48%) arteriovenous graft. The changes of blood flow rate, Kt/V, and blood volume measured with UDT before and after PTA were significantly improved. Age was significantly correlated with changes in blood volume measured by UDT before PTA ($r = 0.532$, $P = 0.016$), but not with Kt/V or blood flow rate.

Conclusions : UDT can detect vascular access problems much better than Kt/V or blood flow rate in elderly patients. Therefore, surveillance using UDT in elderly patients should be performed more actively.

Keywords : Hemodialysis, vascular access, surveillance, efficacy