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혈액투석 환자의 동정맥루 감시 방법으로 혈류량 측정 결과에 따른 혈관조영술 의뢰 시기

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When to Refer Hemodialysis Patients for Elective Angiography according to the Access Flow Surveillance?

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Background: In access flow (Qa) surveillance, the NKF-KDOQI guidelines recommend an intervention referral when graft Qa is <600 ml/min or when Qa has decreased by >25% and falls below 1,000 ml/min, and when fistula Qa is <400-500 ml/min. We performed elective angiography to investigate the rate of significant stenosis according to the monthly surveillance of Qa, when Qa has decreased by >25% in fistulae and grafts.

Methods: In this prospective observational study, the Qa was measured monthly by ultrasound dilution technique. An elective angiography was done when Qa has decreased ⊿Qa) by >25%, regardless of absolute Qa value. A significant stenosis was defined as decrease in vessel diameter by >50%, together with functional improvement of Qa with a successful percutaneous transluminal angioplasty (PTA).

Results: Out of total 68 cases, 51 patients (75%) were male, mean age 62 years old, mean vintage of access 39 months, 37 (54.4%) diabetics, 47 (69.1%) fistulae, and 42 (61.7%) accesses were on the forearm. At the time of angiography, the Qa has decreased from 874±361 ml/min to 536±300 ml/min (-39.1%) in the fistulae, and from 989±330 ml/min to 639±268 ml/min (-37.5%) in the grafts. Elective angiography revealed a significant stenosis in 43 out of 47 cases (91.5%) in the fistulae and in 21 out of 21 cases (100%) in the grafts. In the fistulae, a significant stenosis was found in all cases with ⊿Qa >-30%, regardless of absolute Qa. The ⊿Qa in 4 cases of fistulae without a significant stenosis was between -25% and -30%. In the grafts, a significant stenosis was found in all cases with ⊿Qa >-25%, even when the Qa was >600 ml/min (11/21 cases) or > 1,000 ml/min (2/21 cases). The serial change of Qa in all cases was 910±408 ml/min (previous month of PTA), 567±292 ml/min (at the time of PTA), and 960±374 ml/min (after PTA). The location of stenosis was outflow (84.1%), inflow (2.3%), and mixed (13.6%) in the fistulae, and outflow (100%) in the grafts.

Conclusions: Although it remains unclear that preemptive angioplasty improves fistula or graft survival, our study suggests that the patients need to be referred for elective angiography, when Qa has decreased by >30% in fistulae and grafts, regardless of absolute value of Qa, to prevent future thrombosis.

Key Words: 혈액투석, 동정맥루 감시, 혈관조영술
Haemodilaysis, Angiography