OBSERVATIONS

Renal Function Following Fluorescein Angiography in Diabetic Patients With Chronic Kidney Disease

Intravenous fluorescein angiography has been widely used in evaluating diabetic retinopathy. Diabetic patients in whom fluorescein angiography is crucial are likely to have chronic kidney disease (CKD) because retinopathy and nephropathy usually progress in parallel. Although numerous reports have been published concerning the development of adverse reactions after fluorescein angiography (1–3), to the best of our knowledge, it has never been debated in the literature whether fluorescein (noniodinated contrast media) induces nephropathy as does iodinated radiocontrast. Therefore, we conducted this hospital-based retrospective cohort study to determine whether fluorescein angiography is associated with deterioration of renal function in diabetic patients with CKD.

Among consecutive diabetic patients undergoing fluorescein angiography to assess retinopathy at the Department of Ophthalmology, Diabetic Center, Tokyo Women's Medical University Hospital, between 1 August 2003 and 31 August 2008, those who had serum creatinine measurements at both baseline (within 30 days before fluorescein angiography) and follow-up (within 30 days after fluorescein angiography) were identified. Finally, patients with an estimated glomerular filtration rate (eGFR) at baseline <60 ml/min per 1.73 m^2 were studied. Upon fluorescein angiography, 2.5 ml of 10% sodium fluorescein solution was injected into the antecubital vein over 5 s. GFR was estimated using the following Modification of Diet in Renal Disease study equation, modified for Japanese patients (4): eGFR (ml/min per 1.73 m^2) = $0.741 \times 175 \times (\text{age [years]})^{-0.203} \times (S_{Cr}\ [\text{mg/dl}])^{-1.154} \times (0.742\ [\text{if female}])$, where S_{Cr} is serum creatinine. Patients were classified by eGFR according to the Kidney Disease Outcomes Quality Initiative guidelines (30–59, 15–29, and <15 ml/min per 1.73 m^2 for stages 3, 4, and 5, respectively) (5). All data are expressed as means ± SD. The paired Student's *t* test was used to compare eGFR before and after fluorescein angiography.

A total of 128 diabetic patients (29 female and 99 male) met the inclusion criteria and were studied; mean ± SD age was 60 ± 11 years (range 30–87). Among the patients, 90, 28, and 10 had stage 3, 4, and 5 CKD, respectively. Serum creatinine levels were measured 11 ± 10 days before and 13 ± 9 days after fluorescein angiography. There was no significant change in eGFR before and after fluorescein angiography in patients overall (35.5 ± 12.4 and 36.1 ± 13.6 ml/min per 1.73 m^2; $P = 0.168$). In a subgroup analysis by CKD stage, no significant differences were observed in eGFR before and after fluorescein angiography, respectively: 42.1 ± 7.0 and 42.9 ± 8.8 ml/min per 1.73 m^2 for 90 patients with stage 3 CKD ($P = 0.137$), 23.5 ± 5.0 and 23.5 ± 6.2 ml/min per 1.73 m^2 for 28 patients with stage 4 CKD ($P = 0.991$), and 10.1 ± 4.1 and 10.1 ± 4.3 ml/min per 1.73 m^2 for 10 patients with stage 5 CKD ($P = 0.870$).

The current study showed that in diabetic patients with CKD, eGFR did not change significantly following fluorescein angiography at any CKD stage, suggesting that fluorescein hardly affects renal function even in diabetic patients carrying a greater risk of a significant loss in kidney function. Prospective studies will be required to confirm these results and determine whether fluorescein angiography is associated with higher incidence of adverse effects in CKD patients.

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