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탄산수소나트륨 수액 전처치를 받은 만성 콩팥병 환자들에서 조영제 신독성의 발생빈도와 위험 인자 분석

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Effect of Isotonic Bicarbonate Fluid on Prevention of Contrast-Induced Nephropathy after Computed Tomography in Patients with Chronic Kidney Disease

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Backgrounds: Contrast-induced nephropathy (CIN) is a common cause of acute kidney injury and is associated with lengthened hospital stays, increased cost, and increased risk of death. Although contrast enhanced computed tomography (CT) is frequently used in clinical practice, CIN after CT is less well established. This study investigated the incidence of CIN after CT in patients with chronic kidney disease (CKD) treated with sodium bicarbonate fluid in outpatient setting.

Methods: This study included 269 adult patients with stable CKD (eGFR < 45 mL/min/1.73m^2 for more than 3 months) undergoing contrast-enhanced CT at Samsung Medical center from October 2009 to February 2011. All patients received isotonic sodium bicarbonate fluid before and after CT in outpatient setting (3ml/kg for one hour before CT and 1ml/kg/hr for six hours after CT). Postexposure serum creatinine was measured at 2-5 days after CT and CIN was defined as an increase ≥25% or ≥0.5 mg/dL in serum creatinine level.

Results: Of 269 patients, male was 66.5% and the mean age was 67.8±10.4 years. One hundred nine patients (40.5%) had diabetes mellitus, 164 patients (61%) had hypertension. Mean baseline serum creatinine was 1.88 mg/dL and eGFR was 34.8 mL/min/1.73m^2. Overall, CIN developed in 12 patients (4.5%). Incidence of CIN were 2.9% (6 out of 207), 8.6% (5 out of 58), and 25% (1 out of 4) in patients with an eGFR of 30-45, 15-30, and <15 mL/min/1.73m^2, respectively. Multivariate analysis revealed that lower eGFR (p for trend=0.016) was independent risk factor of CIN. Total 72 patients underwent a second contrast exposure and 28 patients underwent a third contrast exposure. There was no significant difference in eGFR between the values obtained prior to the CT scans. Nine of 10 patients with CIN, who had available follow up data, improved kidney function with conservative management. One patient started hemodialysis and remained on maintenance dialysis therapy.

Conclusion: The incidence of CIN in patients with CKD after contrast enhanced CT treated with isotonic bicarbonate fluid was 4.5%. Lower eGFR was risk factor for CIN and the outcome was relatively favorable. When repeated CT scans were preformed under appropriate prophylaxis protocol, the decrease of renal function was not significant.

Key Words: 조영제 신독성, 탄산수소나트륨, 전산화 단층촬영
Contrast induced nephropathy, Bicarbonate, Computed tomography