Gender as a Risk Factor for Contrast Nephropathy: Effects of Hydration and N-Acetylcysteine

NIKITA K. GILL, M.D., ELIZABETH A. PICCIONE, M.D., DIANE A. VIDO, M.S., BARBARA A. CLARK, M.D., RICHARD P. SHANNON, M.D.
Department of Medicine, Allegheny General Hospital, Pittsburgh, Pennsylvania, USA

Summary

Background: In a few studies, N-acetylcysteine has been shown to prevent contrast-induced nephropathy in patients with chronic, stable renal failure undergoing elective procedures. Other studies have shown variable outcomes. Furthermore, the majority of prior studies have mainly studied men, and gender as a risk factor has not been studied.

Hypothesis: The study sought to evaluate the effectiveness of N-acetylcysteine and hydration in unselected patients with both acute and stable renal insufficiency (RI) undergoing urgent or elective cardiac or peripheral angiography.

Methods: We evaluated records of 146 patients with RI undergoing angiography. We compared patients receiving periprocedure hydration and acetylcysteine with patients who were only hydrated or received no pretreatment. We evaluated the 48-h change in serum creatinine between groups and further analyzed the effect of hydration and gender on outcomes.

Results: Demographics and baseline creatinine were similar between groups. Post procedure, the creatinine increased significantly in both groups, but less so in the acetylcysteine group (control: 0.35 ± 0.08 mg/dl; acetylcysteine: 0.14 ± 0.04 mg/dl, p < 0.05). When the control group was further stratified by hydration, the increase in creatinine for the hydrated patients was only 0.17 ± 0.10 mg/dl compared with 0.54 ± 0.12 mg/dl in patients with inadequate hydration. In the control group, women were more likely to receive no preprocedural hydration (59 vs. 40%), had a bigger rise in creatinine, received less protection from hydration alone, but were equally well protected by hydration plus acetylcysteine. In the acetylcysteine group, change in creatinine for women was minimal (+ 0.14 ± 0.07 mg/dl) and not different from men (+ 0.15 ± 0.05).

Conclusion: Unselected patients with acute and chronic RI had no benefit from acetylcysteine beyond that seen with hydration alone. Gender may be a risk factor for contrast-induced nephropathy, with hydration offering less protection in women. Acetylcysteine (with hydration) seems to minimize the gender difference.

Key words: acetylcysteine, contrast nephropathy, gender

Address for reprints:
Nikita K. Gill, M.D.
Division of Cardiology
Allegheny General Hospital
320 E. North Avenue
Pittsburgh, PA 15212, USA
e-mail: ngill@wpahs.org

Received: December 19, 2003
Accepted with revision: July 28, 2004