An Easy and Effective Procedure to Prevent Radiocontrast Agent Nephrotoxicity in High-Risk Patients

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Dear Sir,

Decline in the glomerular filtration rate with radiographic contrast agents is a frequent and sometimes nonreversible complication in patients with prior renal insufficiency. The newer contrast media have not eliminated this problem: nephrotoxicity has been reported with both low osmolar ionic and nonionic agents [1, 2]. Several clinical studies have shown that the administration of high doses of mannitol and/or furosemide decreases the incidence of nephrotoxicity in high-risk patients. These procedures need careful control and strict replacement of hydroelectrolyte losses. On the other hand, mannitol administration could be dangerous in patients with renal failure.

We have studied the prophylactic effect of plasma volume expansion before and after radiographic explorations in 30 patients with chronic renal failure (serum creatinine higher than $177 \mu\text{mol/l}$, range 185–850). Angiographic studies were done in 17 patients and urographic studies in 13 patients. A nonionic low-osmolarity contrast medium (iohexol) was used in 8 patients, an ionic low-osmolarity contrast medium (ioxaglate) in 8, and an ionic high-osmolarity contrast agent (diatrizoate) in the other 14 patients. No patients were diabetic but 21 patients were on antihypertensive therapy.

The protocol for preventing the nephrotoxicity consisted of an intravenous infusion of 1,000 ml of isotonic saline (0.9%) solution during the 8 h before the contrast agent was administered and another 1,000 ml during the next 8 h. No patient had clinical symptoms of fluid overload at the time of the procedure, and blood pressure was under control in all cases.

We did not observe any variations in serum creatinine during the study: basal level $326 \pm 188 \mu\text{mol/l}$; immediately before the administration of contrast 307 ± 173 ; at 24 h, 312 ± 174 and at 48 h, 314 ± 181 (mean $\pm$ SD). Only 2

patients experienced a significant but reversible increase in serum creatinine (80 and $97 \mu\text{mol/l}$, respectively). The infusion of isotonic saline solution produced a transient increase of the weight of the patients: 61.6 ± 7.8 vs. 60.5 ± 7.7 kg ($p < 0.01$) as well as of the mean blood pressure: 114 ± 18 vs. 106 ± 14 mm Hg ($p < 0.05$). However the variations in body weight and in blood pressure had no effect on the clinical situations of the patients and specific treatment was not needed.

Although dehydration is an important contributing factor to the development of acute renal failure due to contrast agents, adequate hydration before the radio-graphic study does not prevent nephrotoxicity [3]. However, our results show that volume expansion with saline solution before and after the infusion of iodinate contrast decreases the incidence and severity of contrast agent nephrotoxicity in patients with previous renal insufficiency. It is a simple procedure which demands only minimal medical control.

References

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