Acute renal failure following cerebral angiography and infusion computerized tomography

Case report

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The authors report a case in which acute renal failure developed following angiography and computerized tomography with infusion of contrast material performed within the same day.

KEY WORDS • acute renal failure • angiography • infusion computerized tomography

Both angiography and infusion computerized tomography (CT) have been reported separately to cause acute renal failure. Since both studies are often performed on the same patient on the same day, the risk of untoward renal difficulties may increase. We report such an occurrence.

Case Report

This 60-year-old diabetic, hypertensive woman presented on October 23, 1978, to Cook County Hospital with a history of findings compatible with an acute incomplete ischemic episode in the distribution of the left middle cerebral artery. She weighed 82 kg. She was placed on supportive therapy, and her neurological status slowly cleared, leaving her with only slight right-sided weakness. On November 2, laboratory testing showed that the patient’s serum creatinine was 1.9 mg/dl, blood urea nitrogen was 42 mg/dl, and venous blood glucose was 155 mg/dl.

On the morning of November 8, the patient underwent cerebral and aortic arch angiography, employing 60 cc of Renographin-76 and 26 cc of Conray-60. A plaque in the distal left common carotid artery was discovered. Approximately 4 hours later, an infusion CT scan was performed using 300 cc of Hypaque-30. The scan was reported as normal. The patient tolerated both studies without apparent immediate difficulties. However, that evening the patient was noted to be oliguric. From November 9 to 11, total urine output was only 50 cc. The patient’s serum creatinine rose to 4.6 mg/dl. She was transferred to the Renal Service where conservative therapy resulted in recovery of normal renal status. On November 19, her serum creatinine was 1.6 mg/dl. Ten days later, a left carotid endarterectomy was performed without incident, and the patient left the hospital in good condition 4 weeks later.

Discussion

Our patient’s general medical condition made her susceptible to renal complications. Hypertensive, diabetic, azotemic, and dehydrated patients are most likely to develop acute renal failure following contrast radiographic study. While the origin of acute renal failure in this patient population is uncertain, a number of mechanisms have been postulated, including Tamm-Horsfall protein precipitation, red-cell aggregation, allergic reaction, uricosuric effect, anoxia, and direct contrast media toxicity.

The relationship between acute renal failure and contrast agent quantity is imprecise. Our patient did not receive an unusual dose of radiographic agent. Moreover, the 4-hour gap between radiographic studies should have prevented an excessive level of contrast agent in the blood. However, the osmotic diuretic effect of the contrast agent used in
the angiogram produced dangerous dehydration prior to the infusion CT scan. While adequate hydration may not prevent complications before a contrast procedure, it is to be recommended especially in diabetic, hypertensive patients. In the future, metrizamide angiography, employing a rather low osmotic, non-ionic contrast agent, may decrease post-angiographic renal difficulties.

Since infusion CT scans may detect cerebral infarction or hemorrhage missed by radionuclide brain scan, the newer examination has been frequently added to the workup of those patients considered for carotid endarterectomy. Physicians should balance the occasional renal difficulties associated with infusion CT scans against the information gained with such studies.

References


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