

# Sodium Bicarb a Washout for CIN Prevention in Angiography

BY BRUCE JANCIN  
Denver Bureau

NEW ORLEANS — Periprocedural intravenous hydration with sodium bicarbonate is no more effective than normal saline for prevention of contrast-induced nephropathy in patients undergoing coronary angiography, Dr. Somjot S. Brar reported at a conference sponsored by the American College of Cardiology.

He presented a single-center randomized trial in 353 patients undergoing coronary angiography, all with at least moderate kidney dysfunction, defined as a baseline glomerular filtration rate (GFR) of 60 mL/min per 1.73 m<sup>2</sup> or less. The nonionic low-osmolar contrast agent ioxilan was used in all procedures.

The primary end point—contrast-induced nephropathy (CIN) as defined by a 25% or greater decline in GFR within 4 days—occurred in 13.6% of the sodium bicarbonate group and 13.5% on normal saline, the most commonly used hydration fluid in clinical practice, said Dr. Brar of Kaiser Permanente Medical Center, Los Angeles.

The secondary end point—at least a 25% increase in creatinine—occurred in 16.3% on sodium bicarbonate and 15.4% on 0.9% sodium chloride. No patient subgroup fared significantly better on sodium bicarbonate in the trial, sponsored by Kaiser Permanente. Half of patients in each study arm received

Mucomyst (acetylcysteine); their outcomes were similar to those who didn't.

The incidence of CIN ranged from less than 1% in patients with only one CIN risk factor to 37% in those with six or more. The known CIN risk factors are a low GFR, age greater than 75, diabetes, hypertension, a history of heart failure, anemia, inpatient status, a contrast volume in excess of 150 mL, and



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DR. BRAR

female gender, he added.

Fully 47% of patients who developed CIN had persistent kidney dysfunction, compared with baseline at 2-8 weeks post procedure. Thirty-day all-cause mortality was 2.0% in the sodium bicarbonate group and 1.3% with sodium chloride. One patient in the saline arm went on dialysis within 30 days.

"One of the fundamental problems we have in treating CIN is while we can identify patients at risk for it we obviously don't have any effective way to reduce their risk. Having rates of CIN of up to 37% is clearly unacceptable and something needs to be done for these patients," Dr. Brar said at the conference, also sponsored by the Society for Cardiovascular An-

giography and Interventions.

Ultrafiltration has been proposed as a possible solution. However, it's quite expensive and not widely available. "Perhaps the answer will be intraarterial administration of a pharmacologic agent, where infusion directly into the kidneys might be more effective. I think there are still some possibilities to test," he said.

For now, the best evidence for prevention of CIN remains "hydration, hydration, hydration—and the best fluid we have evidence for is normal saline," according to Dr. Brar.

The theory behind using sodium bicarbonate was it would address both mechanisms involved in CIN. The sodium would attenuate contrast-induced renal vasoconstriction, while the bicarbonate would reduce oxidative stress by raising tubular pH.

One prior randomized trial in which sodium bicarbonate outperformed normal saline in preventing CIN. But that study included patients undergoing a variety of procedures, while the Kaiser study involved a single uniform intervention.

It's also possible that other investigators didn't follow patients long enough to pick up all cases of CIN.

"We had 10 patients in the sodium bicarbonate group who didn't meet criteria for CIN on day 1 or 2 but did on day 3 or 4. This raises the possibility in my mind that with sodium bicarbonate we may delay onset of CIN as opposed to preventing it," he said. ■

## Echo Overestimates PAH in Renal Disease

BY FRAN LOWRY  
Orlando Bureau

ORLANDO — Echocardiography overestimates the true prevalence of primary pulmonary hypertension in hemodialysis patients with end-stage renal disease, according to a study presented at a meeting sponsored by the National Kidney Foundation.

For this reason, hemodialysis patients with echocardiographic evidence of pulmonary artery hypertension (PAH) should undergo right heart catheterization for confirmation, Dr. Ifeanyi Isaiah and colleagues, of Temple University, Philadelphia, wrote in a poster.

The reported prevalence of PAH in hemodialysis patients ranges from 27% to 40%, but these numbers are based on studies that relied exclusively on echocardiographic estimates of pulmonary arterial pressures to make the diagnosis.

The more accurate way of making the diagnosis is with right heart catheterization, Dr. Isaiah and colleagues wrote.

To establish the true prevalence of PAH in this population, the investigators conducted a retrospective, observational analysis of all echocardiographic and right

heart catheterization studies done in their outpatient hemodialysis unit from January 2000 to December 2006.

Of the 502 patients included in the analysis, the majority (439 patients, or 87.5%) had undergone echocardiography. Pulmonary arterial pressure greater than 40 mm Hg, suggesting the presence of PAH, was documented in 127 of the echocardiography patients (28.9%).

Data for right heart catheterization, which were available for 22 of these 127 patients, showed that 11 (50%) of them had elevated pulmonary arterial pressure.

Although the results showed that pulmonary hypertension may be overestimated, the study also "confirms a higher prevalence of pulmonary hypertension in end-stage renal disease patients receiving hemodialysis than [in] the general population," the investigators wrote.

In addition to providing a more accurate diagnosis of PAH in hemodialysis patients, right heart catheterization is valuable in distinguishing those patients whose elevated pulmonary pressure results from heart failure from those who have isolated PAH with no heart failure, they added. ■

# Contrast-Enhanced Ultrasound Aids in Endoleak Detection

BY ROBERT FINN  
San Francisco Bureau

SCOTTSDALE, ARIZ. — Duplex ultrasound with contrast enhancement delivered by continuous infusion shows promise in the detection of endoleaks following endovascular aneurysm repair, Dr. Ruth L. Bush said at an international congress on endovascular interventions sponsored by the Arizona Heart Institute.

"Our early results strongly suggest that contrast enhancement with a continuous infusion technique could be used as a primary diagnostic imaging modality for follow-up endograft surveillance," possibly replacing CT as the standard for graft surveillance, said Dr. Bush of the Baylor College of Medicine, Houston.

Following endovascular aneurysm repair (EVAR), patients must be assessed periodically for sac size, stent-graft integrity, and endoleaks. CT is a fine imaging modality for this surveillance, but at the cost of substantial doses of ionizing radi-

ation and exposure to iodinated contrast media, which can be nephrotoxic. Furthermore, CT scanning is expensive. According to some reports, more than 65% of postoperative costs following EVAR are related to CT scanning.

Unfortunately, color duplex ultrasound has been shown to have a lower sensitivity and a lower positive predictive value than CT has in this surveillance. Delivery of contrast enhancement in a bolus improves echogenicity and can even detect slow endoleaks that are not visible in CT. But the disadvantage of this technique is that bolus injection of the contrast medium allows for only a short scanning time—less than 10 minutes—so multiple injections are usually necessary. The contrast is provided by microbubbles, which



must be small enough to pass through the pulmonary capillaries. The various gas microbubble contrast media are generally considered safe and to have low toxicity. However, it has proven difficult to maintain these microbubbles in the systemic circulation.

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DR. BUSH

the rate of 4 cc/min to extend the scanning time to 20 minutes or more.

In a preliminary study in 20 patients, contrast-enhanced ultrasound found one type 1 endoleak and nine type 2 endoleaks. In those same patients, color duplex ultrasound found one type 1 endoleak and only four type 2 endoleaks, and CT found

one type 1 endoleak and six type 2 endoleaks.

The patients' body type affected scanning time. The investigators noted a direct relationship between scanning time and body mass index.

And it's important to control scanning parameters carefully. For one thing, the syringe holding the contrast medium needs to be agitated continually to avoid breakdown of the microbubbles.

And it's necessary to optimize the harmonic imaging on the ultrasound machines, decrease the mechanical index and the compression, and adjust the focal zone to be below the aorta.

"All of this was done in an attempt to maintain the integrity of the microbubbles," Dr. Bush said. "If you have a mechanical index turned up too high or the compression and the focal zone adjusted [imperfectly], the microbubbles would shatter and you won't get a good result."

The learning curve for this technique is about 10-15 patients, she said. ■