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# CORRESPONDENCE

## Pericardial Effusion in Patients with End-Stage Renal Disease

*To the Editor:*

In patients with end-stage renal disease (ESRD), how often does pericardial effusion occur, what clinical significance does it have, and what is its relation to regular and emergency hemodialysis? To answer these questions, we reviewed the hospital records of 251 patients with ESRD who had been cared for at Lyndon B. Johnson General Hospital in Houston, Texas.

All of these patients were 18 years of age or older, and 89 of them had varying degrees of pericardial effusion. The cause of renal failure in these patients was diabetes mellitus or systemic hypertension in 128, a variety of disorders in 32, and unknown in 91. One hundred thirty-seven patients received regular hemodialysis (RHD) and 114 underwent emergency hemodialysis (EHD).

Pericardial effusion was more prevalent in the EHD group (51 vs 38), and more often severe (7 vs 1). Echocardiographic indications of cardiac tamponade were rare: they appeared in 4 patients in the EHD group and in a single patient in the RHD group.

Length of hospital stay and need for admission to the intensive care unit were comparable in the 2 groups. Twelve patients died during the study period (6 per group). Five of those 12 had pericardial effusion. Yet the effusion was severe in only 1 of those deaths, and in no instance did pericardial effusion cause death.

Of the 4 patients with severe effusion, 1 underwent pericardial window and 3 pericardiocentesis. The fluid was exudative in 3 patients and transudative in 1. Other analyses gave nonspecific findings.

Patients with pericardial effusion, regardless of the dialysis method, were more likely than patients without effusion to have left ventricular systolic dysfunction and cardiomegaly on chest radiographs. Although higher blood urea nitrogen levels were more prevalent in patients who were receiving EHD, this laboratory value did not predict the severity or even the presence of pericardial effusion.

The factors responsible for pericarditis and pericardial effusion in patients with advanced renal disease remain poorly understood. Whereas some studies show that dialysis and renal transplantation reverse the effusion, others show that those complications can develop even when dialysis is performed and regardless of the patient's level of blood urea nitrogen or serum creatinine.<sup>1</sup>

Our growing immigrant population, many members of which enter the United States illegally, puts much of the burden of their healthcare on resource-limited community hospitals such as ours. This becomes especially relevant to the treatment of chronic, costly ailments—

ESRD among them. On the other hand, the need for better access to healthcare is apparent when one considers that early detection of renal disease can prevent or delay the progression to ESRD and its sequelae.<sup>2</sup> Early detection of pericardial effusion is of vital consequence, for this condition typically produces no symptoms or signs before causing tamponade.<sup>3</sup>

In our investigation, pericardial effusion occurred in about one third of patients with ESRD, especially in those who needed emergency hemodialysis. Echocardiographic evidence of cardiac tamponade, however, was rare; and none of the deaths in our study was related to pericardial effusion.

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## Evaluation of Previously Cannulated Radial Arteries

*To the Editor:*

I read with interest the article by Watson and colleagues<sup>1</sup> on the evaluation of previously cannulated radial arteries. I have a number of queries.

The paper fails to mention the time lapse between transradial artery coronary angiography and coronary artery bypass grafting (CABG). This is important, because the incidence of early radial artery (RA) occlusion after prior cannulation has been reported to be between 5% and 20%.<sup>2</sup> Apart from occlusion, there can be damage to the arterial wall, endothelial disruption, damage to the tunica media, perivascular inflammation, and reactive hyperplasia with impaired

vasodilatory capacity, which can occur within 3 months of transradial coronary angiography.<sup>3,4</sup>

The authors mention that “immediately after CABG, each patient had been given verapamil or diltiazem along with systemic heparinization.” Giving heparin after CABG is not a standard practice. What preparation of heparin was given (unfractionated or low-molecular-weight), in what dose, and for how long?

The records inconsistently specified whether the right or left RA had been used for any particular graft. How then could the authors have known whether the RA under study had been cannulated? Hence their contention that they investigated patency in patients who had undergone transradial angiography is not totally true.

Of the 3 occluded grafts, one was known to have been cannulated (and dissected) during coronary angiography. So why was this—a “known-to-have-been-dissected” radial artery—used? Of the 3 occluded grafts, the other 2 could also have been cannulated (or not). Either way, the percentage would be significantly affected.

The authors also fail to mention whether the occluded grafts supplied native arteries that had critical stenosis. It has been documented that radial grafts to arteries with less than 80% stenosis are prone to blockage or will show a string sign.<sup>5</sup>

Kamiya and colleagues<sup>6</sup> have shown that there is a substantially reduced patency rate for previously punctured RA grafts.

We are strong proponents of the RA as a conduit but would advise against using a previously cannulated RA for at least 3 months. This time lapse is not absolute, and we always evaluate the RA by Doppler echocardiography (for size, calcification, and atherosclerosis), in addition, of course, to clinical evaluation with an Allen test.

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*This letter was sent to Dr. Timothy Watson, who responds as follows:*

We wish to thank Dr. Bedi for his time and effort in providing critical commentary on our paper.<sup>1</sup> Most of the patients whose cases were reported in our series underwent revascularization within a few days of their index coronary angiogram, although in one elective case, bypass was performed some 30 days later. The patient with a dissected radial artery (RA) had no alternative conduit options, which therefore mandated our use of this vessel even though there was concern regarding suitability. In all cases, computed tomographic coronary angiography revealed severe (>70%) disease in the proximal native coronary artery before graft insertion; however, this might have represented disease progression during the time after the pre-bypass angiogram, which in some cases was no longer available for review.

In regard to radial identification, when both RAs are harvested, there is always uncertainty about which was used for each graft unless the surgeon made specific note; this clearly could affect the interpretation of our findings. Our comment regarding heparin was a typographical error and should have read “perioperative storage of grafts was in a heparinized solution.”

Immediate radial occlusion after angiography is now an infrequent complication. Newer sheath technology, heparin, and nonocclusive hemostasis have all had an impact on improving RA patency.<sup>2</sup> Nonetheless, it is clear that more minor arterial damage—endothelial or vasomotor disruption—frequently does occur,<sup>3,4</sup> and this clearly can influence the efficacy of the radial graft, particularly if the graft was harvested soon after angiography, before arterial architecture and vasomotor function have recovered. Delaying surgery for a prolonged period after angiography is not always possible, however, because most patients at the current time undergo angiography for an acute coronary syndrome (ACS)—in which instance early risk stratification and revascularization are recommended.<sup>5</sup>

Although we recognize the limitations of our manuscript, we emphasize that it was intended to be thought-

provoking. Broad application of the radial approach has had a major positive impact on the safety of coronary angiography, while offering improved catheter laboratory efficiency. In our unit, this has translated directly into shorter waiting times for elective cases and more rapid discharge from the hospital for those presenting with ACS. Moreover, bleeding- and puncture-related sequelae are now rarities that are almost exclusively associated with femoral access.

Nonetheless, there are clear instances in which radial angiography is less preferable—most notably among patients who need surgical revascularization but have inadequate saphenous veins or other conduits. This circumstance mandates the use of one or both RAs. Similarly significant renal dysfunction that might require the fashioning of an arteriovenous fistula at a later date is also an important contraindication to radial angiography. Most of these individuals can easily be identified before the initial angiographic procedure.

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