Delaying Surgery After PCI Cuts Kidney Injury

BY MITCHEL L. ZOLER

FORT LAUDERDALE, FLA. — Combining coronary artery catheterization and cardiac surgery in the same hospital admission was linked to a significantly increased risk for acute kidney injury, compared with performing the surgery during a second, later hospitalization, a single-center study of more than 600 patients showed.

Acute kidney injury (AKI) in cardiac surgery patients represents an important complication. Results from an earlier study linked it to significantly worse long-term survival, Dr. Robert S. Kramer said at the annual meeting of the Society of Thoracic Surgeons.

"If there is a way to safely manage patients medically between catheterization and surgery, that should be done, to mitigate the potential for acute kidney injury," said Dr. Kramer, director of cardiac surgery research at Maine Medical Center in Portland. He acknowledged that some patients have urgent medical reasons to undergo cardiac surgery within days of their percutaneous coronary intervention (PCI), such as patients with an acute MI, life-threatening coronary anatomy, or another acute syndrome that mandates quick surgery. However, in many other cases, cardiac surgery becomes scheduled during the same hospital admission as PCI because of convenience for the patient, the surgeon, or other physicians involved with the case.

"We want cardiac surgeons to look at the whole picture and consider whether it would be better for the patient to go home and settle down if there is no reason to act right now," he said in an interview. "We hypothesize that there may be an opportunity to reduce the incidence of acute kidney injury by moving patients who may be safely changed from the urgent to nonurgent category."

The study reviewed 722 consecutive patients who underwent cardiac surgery subsequent to PCI at Maine Medical Center during 2008. The analysis excluded 41 patients who required emergency procedures while hospitalized, 5 who were on dialysis, and 8 who did not have cardiac catheterization in the days or weeks before their surgery, leaving 668 patients in the study. Surgery occurred during a subsequent hospitalization following catheterization in 211 patients, while in 457, surgery followed catheterization during the same hospitalization. Among patients with delayed surgery, the period between catheterization and surgery averaged 39 days. In patients who had both procedures in one admission, the delay between catheterization and surgery averaged 3 days.

The patients' average age was 68 years, and about a quarter were women. Patients with immediate surgery and those with delayed surgery were similar in the prevalence of most comorbidities and clinical characteristics. The immediate-surgery patients had a significantly higher prevalence of coronary artery disease, 83% compared with 75%; a higher prevalence of MI during the week preceding surgery, 25% compared with 1%; a higher prevalence of a left ventricular ejection fraction of less than 40%, 14% compared with 8%; and a higher prevalence of an elevated white cell count.

The rates of elective and urgent surgery, respectively, were 86% and 14% in the patients whose surgery was deferred for a second hospitalization, compared with 13% and 87% in patients who had their catheterization and surgery in a single hospitalization. Coronary bypass surgery alone occurred in 53% of the deferred patients and 60% of those with a single hospitalization, with the other surgeries divided between valve alone or valve plus bypass.

The incidence of AKI during or immediately after surgery was 34% in the patients who came back to the hospital a second time for their surgery and 50% in those who had their surgery soon after their catheterization, a statistically significant difference. Dr. Kramer and his associates used an AKI definition devised by the AKI Network: a creatinine measure that increased by at least 50% over baseline or that rose by at least 0.3 mg/dL over baseline. All patients in the review had their serum creatinine levels measured at baseline and several

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Primary PCI in STEMI: Stick to Culprit Lesions

BY BRUCE JANCIN

SNOWMASS, COLO. — Primary percutaneous coronary intervention for patients with ST-elevation MI and multivessel disease is best limited to the culprit vessel in hemodynamically stable patients, according to the first large population-based study on this issue to include long-term outcomes.

Staged PCI of other lesions causing residual ischemia can safely be done later during the same hospitalization or during the next few months, Dr. Spencer B. King III reported at a conference sponsored by the American College of Cardiology. Indeed, the analysis of New York State PCI Registry data showed that risk-adjusted mortality with a strategy of staged PCI on additional vessels within 60 days was comparable to that of culprit-vessel primary PCI alone.

Prior studies examining the topic of culprit-vessel versus multivessel PCI in STEMI patients have generally been small, short-term, and conflicting in their findings. As a result, practices vary widely, with some cardiologists restricting themselves to opening only the culprit vessel, others opting to treat additional lesions at the time of primary PCI, and still others waiting a day, several weeks, or months before addressing lesions shown on the basis of stress testing or fractional flow reserve to be a likely source of residual ischemia.

"There are a host of different opinions out there on how to deal with this," observed Dr. King, the conference program director and president of St. Joseph's Heart and Vascular Institute, Atlanta.

To help bring clarity to the situation, he and his coinvestigators compared mortality through 42 months of follow-up in STEMI patients with multivessel disease who underwent primary PCI in New York State, where reporting of PCI outcomes is mandatory, from January 2003 through June 2006 (JACC Cardiovasc. Interv. 2010;3:22-31).

Mortality rates were significantly lower in 458 hemodynamically stable patients whose revascularization was limited to the culprit vessel than in an equal number of propensity-matched patients who underwent multivessel revascularization at the time of primary PCI. (See box.)

On the other hand, mortality rates in hospital and at 12, 24, and 42 months of follow-up were similar in 259 patients who underwent culprit-vessel PCI only and in 259 propensity-matched patients who had staged multivessel revascularization during the index hospitalization; in fact, the staged multivessel PCI group showed a consistent trend for fewer deaths at all time points.

Similarly, among 538 patients who underwent culprit-vessel PCI only and were alive at 60 days, mortality rates at 12, 24, and 42 months of follow-up were not statistically different compared with those in an equal number of propensity-matched patients who had staged multivessel revascularization within 60 days on a nonemergency basis. Once again, there was a consistent albeit nonsignificant trend for lower mortality in the staged multivessel revascularization group.

A staged PCI approach to STEMI patients with multivessel disease makes solid sense to Dr. David O. Williams. "When I was at Rhode Island Hospital, the mean time it took from when the patient hit the door of the cath lab, often fully dressed, to the balloon going up, was 18 minutes," observed Dr. Williams, who is now at Brigham and Women's Hospital, Boston.

"It's very tough to learn much about the patient who's undergoing primary PCI—and their ability to take dual antiplatelet therapy—given the haste with which we do these cases. We're on the clock. When you talk about multiple stents, multiple lesions, I think it might be good to have an opportunity to get to know a little bit more about the background of the patient," he said. ■

Disclosures: *Dr. King is a consultant to BG Medicine, Celonova Biosciences, Cordis, Medtronic, and NorthPoint Domain. Dr. Williams is a consultant to Abbott Vascular, Cordis, and Volcano.*

Mortality Following Culprit- vs. Multivessel PCI in STEMI

	Culprit-Vessel Revascularization at Time of Primary PCI	Multivessel Revascularization at Time of Primary PCI
In-hospital	0.9%	2.4%
12 months	4.2%	5.8%
24 months	4.9%	7.2%
42 months	6.7%	10.4%

Notes: Based on New York State PCI Registry data from 2003 to June 30, 2006. Differences are statistically significant.
Source: Dr. King

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times during and after surgery.

No other perioperative outcome parameters differed significantly between the two groups, including death, Q-wave MI, or stroke. The perioperative mortality rate was 2% in patients with deferred surgery and 4% in those with more immediate surgery.

In an analysis that adjusted for baseline demographic and clinical differences, patients with deferred surgery had a significant, 45% relative reduction in their rate of AKI, compared with patients with more immediate surgery.

Dr. Kramer and his associates documented the potential importance of AKI in a study they reported at the American Heart Association scientific sessions last November in Orlando. During 5-year follow-up of about 4,000 cardiac surgery patients, the survival rate was about 95% in patients who did not have any AKI perioperatively, compared with about 80% in those who experienced AKI.

"Creatinine levels and AKI are surrogates for bad epiphenomenon" in patients following cardiac surgery. "The kidney is the canary in the mine shaft," Dr. Kramer said.

It's unclear what it is about scheduling cardiac surgery several days or weeks following coronary catheterization that cuts the risk of AKI. Contrast administered during coronary catheterization "is a major player, but other factors also play a role. It's not that the contrast clears, but contrast causes tubular injury that has to heal and does heal within a few days." Based on other studies, he speculated that a delay of at least 5 days is ideal.

He cautioned that the finding was limited by the retrospective, single-center nature of the study. But it involved a relatively large number of patients, and creatinine level checks occurred prospectively and uniformly for all patients, eliminating potential ascertainment bias.

Although the findings are just hypothesis generating, Dr. Kramer contended that the findings are compelling enough to warrant an immediate change in practice: Limit cardiac surgery within a few days after catheterization to patients who clearly need rapid intervention. ■

Disclosures: *Dr. Kramer said he had no disclosures relevant to this study.*

A related video is at www.youtube.com/HospitalistNews (search for 72164).

Time to Shut Down Low-Volume Heart Transplantation Centers?

BY BRUCE JANCIN

SNOWMASS, COLO. — Heart transplantation is one of the greatest operations ever devised—but the number of heart transplant centers in the United States needs to be cut by about two-thirds.

That's the considered opinion of Dr. Bruce W. Lytle, professor and chair of cardiothoracic surgery at the Cleveland Clinic Foundation, who notes that International Society for Heart and Lung Transplantation (ISHLT) data show persuasively that transplant program volume is an independent predictor of survival, both short term and at 5 years.

With more than 140 heart transplant programs now in place in the United States, relatively few centers have a reasonable case volume. In fact, the number of high-volume centers is actually declining as centers compete for the extremely limited number of donor organs.

It's a situation that cries out for national regulation, Dr. Lytle said at a conference sponsored by the American College of Cardiology.

"My guess is that organ allocation and utilization will probably be a lot more efficient under those circumstances. So I'd say in this area we've met the enemy and they is us. This is not a local issue, this is really a national issue," the surgeon said.

The ISHLT data show that 30-day mortality is doubled at cardiac transplant centers performing fewer than 10 procedures per year. Of all U.S. centers, 45% consistently do fewer than 10 procedures annually, and during a recent 8-year period fully 66% of centers failed to reach the 10-case mark in all 8 years (Ann. Thorac. Surg. 2008;86:1250-9).

"Any normal person can see we need about a third as many transplant programs as we have in America," Dr. Lytle commented.

Survival 5 years following transplant is currently about 80%, with superb quality of life.

"Cardiac transplantation is really one of the great operations of all time, particularly in this day and age, now that a lot of the immune suppression problems have been dealt with. When we do conservative operations for heart failure, we try to make bad heart failure into better heart failure. Transplantation is the only operation we have that takes someone who is really underwater and can make them absolutely normal. It is a terrific operation," he said.

The trouble is, from a public health perspective cardiac transplantation is relatively ineffective, Dr. Lytle added. Although an estimated 250,000-300,000 Americans under age 75 have class IIIb/IV heart failure and are thus potential candidates for cardiac replacement therapy, the limited donor organ supply means that only about 3,000 transplants can be done annually.

Mechanical replacement using left ventricular assist devices as destination therapy will have a much greater impact in this population than will organ transplantation, he predicted. ■

Disclosures: *Dr. Lytle reported no relevant financial interests.*