

Managed Care Clinical Corner: Chest Pain

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CASE

History: A 75-year-old female was admitted for elective total hip replacement (THR). There is a background of longstanding hypertension treated with metoprolol 50 mg/day. Aside from a decreased ability to walk because of her hip disease, she is completely free of symptoms.

Physical Examination: Blood pressure 160/76; pulse 64; S₄ (fourth heart sound) heard at apex.

Pertinent lab studies: Electrocardiogram (ECG) with sinus rhythm, Q waves with T-wave inversion in leads II, III, AVF. Chest x-ray was interpreted as no active disease.

Clinical Course: After preoperative consultation with a cardiologist, a dobutamine echocardiogram was performed. It was reported to be normal.

The patient was admitted to the hospital at 0600 hours on the morning of surgery and the THR was uneventful. Postoperatively, she was monitored in a regular medical-surgical unit.

On postoperative day 2, the patient acutely developed chest pain and shortness of breath, which progressed to pulmonary edema requiring intubation. Total creatinine kinase (CK) (an enzyme elevated and used as a diagnostic criteria for myocardial infarction [MI]) was 850 with an MB of 110. (The two subunits are elevated with an acute MI.) ECG was unchanged except for sinus tachycardia. Following diuresis of 2200 cc, she was extubated within 24 hours.

On postoperative day 4, the patient was without chest pain or breathlessness with persistent sinus tachycardia of 116/minute. Intravenous digoxin 0.5 mg was given twice over a 4-hour period. 20 minutes following the second dose, she developed ventricular fibrillation with cardiac arrest. She was re-intubated and transferred to CCU.

On postoperative day 5, the patient was extubated, the rest of the hospital course was uneventful, and the patient was discharged.

A Word From the Editor

Managed care has brought into even sharper focus the appropriate use of hospital, technological, and pharmaceutical resources. Cost effectiveness is now an integral part of clinical problem solving and is included in any mention of "best practice." In this first of an ongoing series of columns, one aspect of the medical management of surgical care is presented. Two cardiologists consider both the clinical aspects of the case (Dr. Knopf), as well as the managed care implications (Dr. Carver). I offer a final commentary.

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Editor, "Managed Care Clinical Corner"

The Clinician's Observations

This elderly female was to undergo elective THR. She was asymptomatic, but had longstanding hypertension and an ECG suggestive of an age-indeterminate MI. Based on the American College of Cardiology/American Heart Association guidelines, a noninvasive test such as a dobutamine echocardiogram was indicated to evaluate preoperative risk. This was interpreted as normal and the risk of operative complications was thought to be low.

Her intra-operative course was uneventful and therefore she was appropriately placed in a nonmonitored unit postoperatively. No information is given for postoperative day 1. However, elderly patients with longstanding hypertension and an S₄ gallop must be considered to have some evidence for left ventricular diastolic dysfunction with a low tolerance for the dramatic postoperative fluid shifts that can occur during THR surgery. Certainly, recordings of fluid input and output as well as weights would be inexpensive and helpful; these are simple maneuvers that

provide excellent guidance for care. Postoperative ECGs should have also been obtained. Prophylactic use of subcutaneous heparin should also be made.

On post-operative day 2, she developed evidence of a non-q wave MI with pulmonary edema severe enough to warrant intubation. The absence of ECG changes, a modest CK rise, and the preoperative normal stress echocardiogram suggest fluid overload leading to a subendocardial MI without epicardial coronary artery disease (CAD) or pre-existing diastolic dysfunction with epicardial CAD. Pulmonary emboli are always a concern in postoperative THR patients. A two-dimensional echocardiogram and Swan-Ganz catheter were performed to evaluate the wall function and ejection fraction of the heart, as well as to hemodynamically monitor the patient. Use of intravenous diuretics as well as nitroglycerin would be advantageous to eliminate fluid and maximize the blood flow to the heart by arterial dilatation. Additionally, systemic anticoagulation with heparin should be given, since epicardial CAD is a possibility as well as pulmonary emboli. Neither of these can be adequately diagnosed at this point because of the patient's instability.

Of concern is the persistent tachycardia. If this is due to left ventricular dysfunction, a 2-D echocardiogram and/or a Swan-Ganz catheter would have been helpful prior to the administration of digoxin. Additionally, in the absence of an S₃ (third heart sound) or symptoms of dyspnea, digoxin is unnecessary. Other possibilities of postoperative tachycardia should have been excluded, including postoperative pain, infection/fever, hypoxia, and abnormal volume status. Certainly, now that the patient is reintubated for a cardiac event, assessment of her electrolytes, pulmonary function, and cardiac status is mandated.

Managed Care Discussion

The issue of preprocedure screening for noncardiac surgery has been recently reviewed in detail with a plethora of new recommendations.¹⁻⁴ The presence of an abnormal ECG in a patient with no clinical manifestations of CAD is not in itself an indication for preoperative diagnostic testing. Rather, it serves as a marker that this patient requires added vigilance for intra- and postoperative care.

In fact, a "normal" dobutamine echocardiogram may actually provide a false sense of security by offering the appearance that this patient falls into a low-risk category not requiring anything other than routine processing through the course of her hospital stay.

From a managed care viewpoint, the major issue still reverts to the concept of clinical appropriateness

of what we do as physicians. I believe the most cost-effective use of resources for this patient and others like her involves total care delivery and not the rote or routine application of a battery of preoperative tests that either lead to additional testing (which may be invasive and more hazardous) or "clearance" without additional follow-up care. I agree with Bodenheimer¹ that the critical questions to consider are the assessment of atheroma rupture risk and not the presence of an atheroma as well as the planning of preoperative, intra-operative, and postoperative care rather than the pre-operative testing pathways.

Therefore, treatment should be directed in the following manner.

- Attempts should be made to reduce the stress and associated surge of catecholamines immediately prior to the procedure. Several strategies are available to effect this plan. They include scheduling elective surgery as a second or later case rather than first, the use of hotel facilities contiguous to the hospital for the preoperative night when available, the development of a "hotel" rate in the hospital when the only service necessary is the provision of a bed for sleep, or for preoperative hospital admission on the day prior to the elective procedure in high risk patients who require more than just a bed for sleep. Attention to this alone should help to prevent some percentage of postoperative complications that extend the length of stay and increase the cost of care.
- The continuation of baseline medication on the day of and throughout surgery is another simple yet crucial maneuver. This may be especially true for beta-blockers and other anti-anginal, anti-hypertensive medications. Chronically used insulin or steroids would never be withheld during surgery, but it is not unusual for other medications to be held or not restarted in the immediate post-operative period.
- Proactive vigilance for subtle signs of ischemia and fluid overload on a regular schedule in patients at risk. This becomes especially important on days two and three postoperatively, when the overall situation appears to be less acute, a general sense of relief among medical staff is evident since the patient survived without difficulty through the operating room and the first 24 hours, and patient activity level begins to be increased.

As a cardiologist with experience in managed care, I would admit this woman one day prior to surgery and continue her beta-blocker and aspirin medications on the day of surgery and post-operatively. I would be

very careful to avoid fluid overload beginning in the recovery room and as long as she was normotensive, and would demand a negative fluid balance from the day of admission. In addition, I would do this using basic clinical bedside skills and tools available, avoiding invasive monitoring.

Although retrospective vision is always 20/20, I feel confident that most of the postoperative complications could have been avoided with a more aggressive approach to care and that the overall outcome would have been better and the cost of care reduced for this patient.

Afterword

Both cardiologists independently agree on the optimal management of this patient. The following sums up a few key points in the management of chest pain.

First, preoperative assessment should include testing when clinically appropriate as stated by both authors. The planning of care should be the "clinical pathway."

Second, strict vigilance of fluid status in high risk patients is inexpensive, universally available, and critical in postoperative patient management. In addition, persistent sinus tachycardia is a sign of an underlying problem and requires assessment of cause rather than treatment directed solely at slowing the rate of the heart.

Lastly, optimal care in this case transcends any relationship to insurance type. In fact, in a strict managed care setting, the oversight of an outside reviewer and re-direction of care may actually have improved care and possibly outcome in a way not possible in a strict indemnity environment. Such oversight would include precertification (guidelines and reminders for proactive preoperative/intra-operative/postoperative management), case management, and concurrent review (holding physicians accountable for daily care) prior to discharge.

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