Setting up a beta-blocker protocol to prevent cardiac complications

What if there was a way to reduce the risk of cardiac complications of non-cardiac surgery by as much as 90% in your OR? What if this risk could be reduced in a cost-effective manner without new equipment or more personnel?

Research evidence shows that a substantial proportion of cardiac events may be prevented with use of beta-blockers given perioperatively—providing a relative reduction in risk between 30% and 90%. Beta-blockers decrease the heart rate, reducing the demands surgery places on the heart.

Cardiac events, such as myocardial infarction (MI), angina, and congestive heart failure, occur in 5% of patients undergoing noncardiac surgery on average and in as many as 30% of patients at highest risk.

A 2002 report from an American College of Cardiology/American Heart Association task force notes that current studies “suggest that appropriately administered beta-blockers reduce perioperative ischemia and may reduce the risk of MI and death in high-risk patients.”

The National Quality Forum (NQF) Safe Practices for Better Healthcare recommend evaluating each patient having elective surgery for risk of an acute ischemic cardiac event during surgery and providing prophylactic treatment with beta-blockers. The Safe Practices were partially derived from 3 safety “leaps” from the Leapfrog Group, a consortium working to improve health care.

The Leapfrog Group recently added perioperative beta-blockade in vascular surgery patients to its list of key indicators, according to Andrew D. Auerbach, MD, MPH, assistant professor of medicine at the University of California, San Francisco.

‘Hard stuff’

Though evidence of the efficacy of perioperative beta-blockade has been reasonably strong for almost 8 years, it has not been widely incorporated into practice, says Dr Auerbach, who has been the lead author in many publications on perioperative beta-blocker use.

“This is hard stuff—more complicated than antibiotics for SSI [surgical site infection] prevention in terms of clinical complexity,” Dr Auerbach told OR Manager. Also, prophylactic perioperative beta-blockade is a relatively new concept. Not many physicians know much about it yet, and they don’t have anyone to learn from. Some are concerned that the evidence base is not sufficient to make a strong commitment to a beta-blocker protocol at this time, he said.

Nevertheless, more OR managers are being asked by physicians to develop a protocol for perioperative beta-blockers.

Dr Auerbach suggests that questions to address when setting up a protocol include:

• Which patients should be targeted?
• Who identifies the patients?
• Who orders the agent?
• Who determines which agent to use?
• When should the agent be started, and when should it be stopped?

‘Start it up’

Key to starting a perioperative beta-blocker protocol is a physician champion who believes in the benefits of beta-blockade, says Patricia Conte, RN, BSN, CNOR. Conte, who is director of surgical services at OSF St Joseph Medical Center, Bloomington, Ill, began setting up a perioperative beta-blocker protocol about 3 years ago for the 5-room inpatient OR.
Perioperative beta-blocker protocol
Medical center staff flow

Preadmission testing (PAT) identifies patient as candidate through use of inclusion/exclusion criteria.

PAT nurse notifies anesthesia and OR scheduling, and a sticker is attached to the patient information.

OR scheduling will make a notation on the OR schedule to alert staff as to use of the protocol.

Nurse admitting the patient places orders and sticker on the chart.

OR staff will transport patient to preop holding, allowing enough time to place patient on monitor and establish baseline.

Anesthesia provider manages beta-blockade intraop and in the PACU.

Preop holding staff double-checks that orders and sticker are on chart.

Postoperatively, surgical nurse notifies the primary care physician and/or surgeon that patient is to receive beta-blockers and documents that notation.

Surgical nurse monitors vital signs and administers beta-blocker per protocol.

Surgical nurses calls primary care physician and/or surgeon if problem or if beta-blocker is held per protocol.

Source: OSF St Joseph Medical Center, Bloomington, Ill.
The anesthesiologists were the most interested and involved in getting the protocol started and implemented, though the other physicians were supportive, notes Conte.

“Our chief of anesthesia was passionate that this could save lives, and the anesthesiologists really wanted to get the ball rolling on a protocol,” she says.

Anesthesia section committee members drafted a plan for a protocol and sent it to the departments of medicine, surgery, cardiology, and the medical executives to get input and buy-in from other physicians.

The cardiologists were especially positive about the plan, but they didn’t want to administer the protocol because they are not involved with patients coming in for noncardiac surgery, says Conte.

A protocol and algorithm were drafted by nurses and anesthesiologists to be administered by nursing and anesthesiologists, with the preadmission testing (PAT) nurse identifying patients to receive beta-blockers up front. (See flow sheet, p 9.)

**Identifying patients**

St Joseph has a PAT department where the majority of patients are assessed before surgery. Patients who are unable to come to the PAT are interviewed by telephone.

Either way, the PAT nurse identifies patients as candidates for perioperative beta-blockade, using inclusion/exclusion criteria (sidebar), and then notifies the anesthesia providers. An anesthesiologist interviews the patient, makes the final decision for the protocol, and writes an order to proceed.

St Joseph is in the process of revising its criteria and weighting each criterion with points to determine more specifically who would benefit from beta-blockade.

Dr Auerbach recommends dividing criteria into minor and major clinical risk factors:

- Patients with no major criteria and 1 or less minor criterion would proceed to the OR with no beta-blockers.
- Patients with 1 or 2 major criteria or 2 minor criteria should be assessed for their functional status level before proceeding to the OR with beta-blockade.
- Patients with 3 or more major criteria should undergo additional risk stratification with noninvasive stress testing before proceeding to surgery with beta-blockade.

**Implementing a protocol**

Hospitals take differing approaches to implementing a beta-blockade protocol and making sure it is carried out. The greatest challenge is how to implement guidelines that ensure all patients are treated appropriately, says Dr Auerbach.

These are his recommendations for implementing a protocol:

- **Know your system:** Understand how patients get from home to surgeon, to anesthesiologist, to hospital, and back home.
- **Know your personnel:** Identify interested and motivated personnel from each health care group—physicians, nurses, pharmacists, and nurse practitioners.
- **Find a common pathway for all patients to take to get to the OR:** If the hospital has a single preoperative clinic, the strongest effort to begin the protocol should be made there.
- **Maintain continuity of beta-blockade in the hospital:** Have a single order set for all patients that is not altered and that follows the patients across the phases of care.
- **Maintain continuity of beta-blockade after discharge:** Develop a system that effectively treats patients short term or for a lifetime.
- **Have a protocol for dose titration:** Have a preprinted algorithm for dose titration.

Kathleen Powell, RN, a PAT nurse, says the hospital has instituted fail-safe measures to ensure a patient’s beta-blocker protocol is implemented correctly. When she identifies a patient, she notifies the scheduling staff of the protocol so they can place a special beta-blocker protocol sticker on their patient information. She also writes a
note on a surgical briefing form used by the OR nurses. This form, which follows the patient from the surgeon’s office into the operating room, includes any special information the OR nurses need to know, such as special positioning and allergies.

When the patient is admitted to the preoperative holding area, the nurse places another beta-blocker protocol sticker on the outside of the chart and places the perioperative beta-blockade standing order sheet in the chart.

**Standing orders**

St Joseph’s preoperative standing order begins with placing candidates for beta-blockade on a cardiac monitor in the preoperative holding area to establish a baseline reading.

If the anesthesiologist who will be administering the anesthesia believes a patient’s heart rate or blood pressure is too low, he or she can cancel the use of beta-blockers. Otherwise, the patient is given atenolol 5 mg slow IV push over 5 minutes. The dosages were determined by the anesthesia section committee.

Postoperatively, patients take atenolol 50 mg by mouth daily for 7 days, unless the heart rate, blood pressure, or mean arterial pressure are too low, or if the patient is short of breath or wheezing or in second- or third-degree heart block. The beta-blocker also is not given if the patient is NPO or if a nasogastric tube is in place. In this case, 5 mg of atenolol can be administered by IV push, but the patient must be on continuous telemetry monitoring to receive IV atenolol.

If the atenolol is not given after surgery, the postoperative care unit nurse notifies the patient’s primary care physician.

In the beginning, the protocol specified that patients were to take their beta-blocker by mouth before coming to the hospital, says Jan Weaver, RN, CNOR, operating room clinical manager. But this required the primary care physician to order the medication and tell the patient to take it. “The coordination of this was not happening,” notes Weaver.

That is why the decision was made to administer the beta-blocker by IV push in the preoperative holding area. In addition, the anesthesiologist has another chance to check the patient and decide before surgery whether the drug should be given.

“One of the important things the preoperative holding nurses must remember is to remind the anesthesiologists to document when they withhold the beta-blocker,” says Weaver. This information is important not only for the patient’s other caregivers but also for data gathering. “When we gather the statistics, it shows the drug was withheld appropriately and not that the patient just didn’t get it,” Weaver says.

Presently, about 5 or 6 patients a month are placed on the beta-blocker protocol. Many patients already take beta-blockers and are not placed on the protocol.

—Judith M. Mathias, RN, MA


**References:**


Criteria for beta-blockade

Indications for use of beta-blockers (identified by the preadmission testing nurse through a phone interview)

Major indicators
The protocol applies if either is identified:
- History of coronary artery disease (previous myocardial infarction, angina, previous positive stress test)
- Previous vascular surgery

Minor indicators
The protocol applies if 3 or more are identified:
- Age 65 or greater
- Hypertension
- Current smoker
- High cholesterol
- Diabetes

If less than 3 minor indicators and no major indicators are identified, the anesthesia provider will determine the need for a perioperative beta-blocker based on the Surgical Risk Index.

Contraindications for beta-blockers (assessed by anesthesia)
- Asthma
- Heart failure
- Heart rate < 55; 3rd-degree heart block
- History of bronchospasm
- Renal failure
- Heart failure
- Raynaud’s phenomenon
- Hypoglycemia

Source: OSF St Joseph Medical Center.