

PCRRT Protocol: Perioperative Cardiac Risk Reduction Therapy

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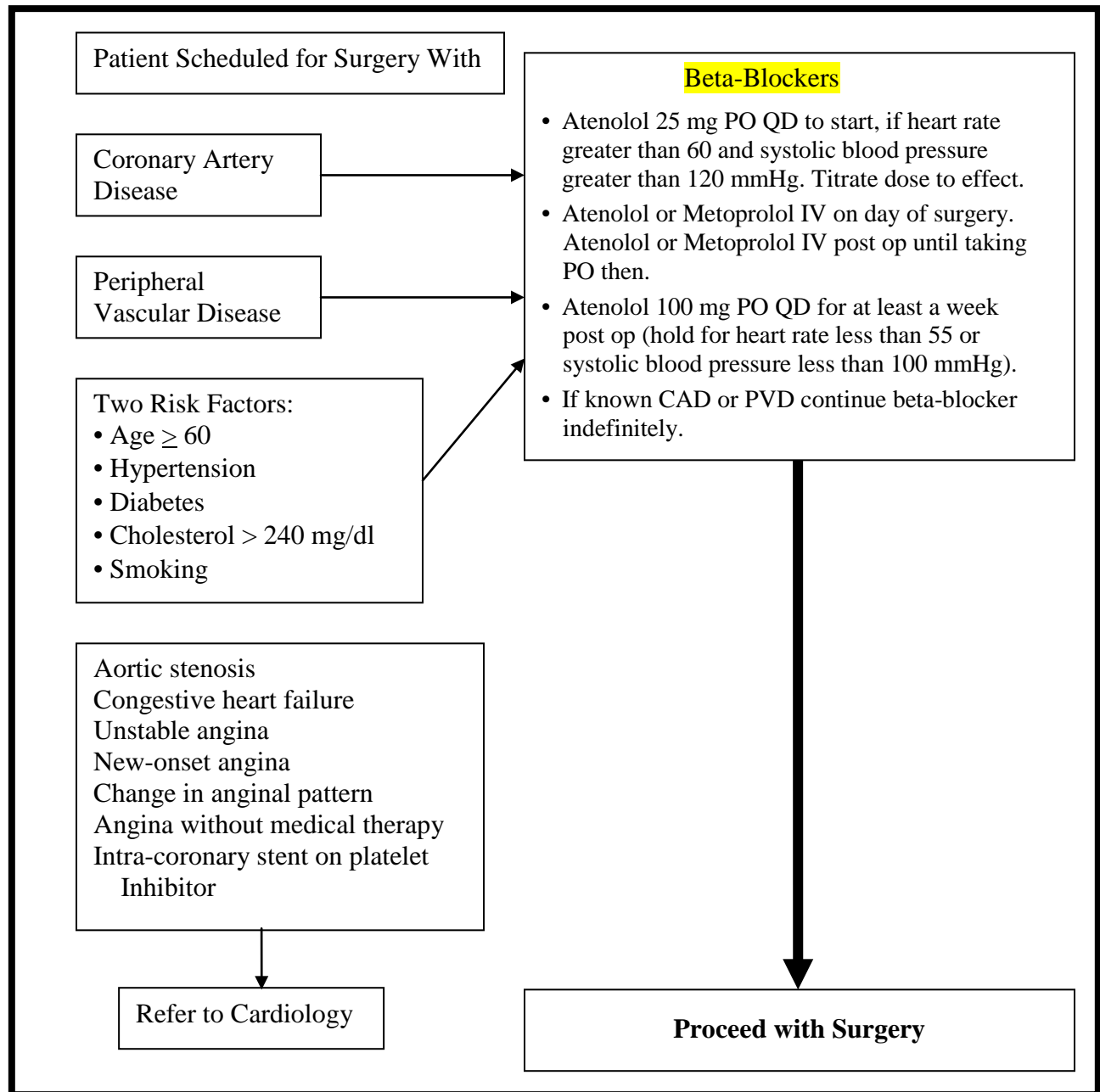
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1. All patients who either have coronary artery disease (CAD), peripheral vascular disease (PVD), or two risk factors for coronary artery disease (age ≥ 60 , cigarette smoking, diabetes, hypertension, cholesterol ≥ 240 mg/dl) should be on perioperative beta blockade unless they have a specific intolerance to beta-blockers. Patients with renal failure or renal insufficiency may also benefit from therapy.
2. Beta-blockade should be started as soon as the patient is identified as having CAD, PVD, or risk factors. If the surgeon identifies the patients as having risk, the surgeon should start the medication. If the anesthesia preop clinic identifies the patient, it should be started in the preop clinic. If the patient is not identified until the morning of surgery, intravenous atenolol or metoprolol can be considered but is less optimal. Optimally, the drug is started prior to the day of surgery, atenolol 25 mg PO QD is an appropriate starting dose.
3. Beta-blockade should be continued until at least 30 days postoperatively.
4. The optimal time to start beta-blockade is at the time of identification of the risk. This process should be multi-tiered to avoid missing patients. The culture must change for the maximal number of patients to be treated. Try:
 - a. The surgeon starts the patient on a beta-blocker if they have CAD, PVD, or two risk factors. Atenolol 25 mg PO QD is an appropriate starting dose.
 - b. If a medical or cardiology consult is requested by surgery, the most common advice is start a beta-blocker.
 - c. The anesthesia preop clinic checks to see if the patients at risk are on a beta-blocker. If the patient is not adequately blocked the dose is increased.
 - d. On the day of surgery the anesthesia providers may increase the dose or treat with intravenous beta-blockers. Intravenous metoprolol in 5 mg boluses is used. Standard dose is 5 mg IV (hold for heart rate less than 50 or systolic blood pressure less than 100 mmHg). Intraoperative doses are used as needed. The patient is also re-dosed in the PACU post-op as needed.
 - e. The patient remains on the drug postoperatively for 30 days. If the patient is NPO, the patient receives intravenous metoprolol (5 mg IV Q6). Hold for systolic blood pressure less than 100 mmHg and/or heart rate less than 50 beats per minute. If the patient is taking PO medications, the patient receives atenolol 100 mg PO QD if the heart rate is greater than 65 and the systolic blood pressure is greater than 100 mmHg. If the heart rate is between 55 and 65 the dose is 50 mg. There is a hold order for heart rate less than 50 or systolic blood pressure less than 100 mmHg.
 - f. The patient remains on the drug for at least 30 days postoperatively.
 - g. Many patients should remain on the drug for life (known CAD, known PVD, hypertension).
5. Preoperative testing should be used as needed. If a patient is identified with new-onset angina, unstable angina, a change in the anginal pattern, or congestive failure then further risk stratification is appropriate. If the patient is stable with known CAD, PVD, or two risk factors for CAD, they should be placed on a beta-blocker.
6. Care should be taken with patients with congestive heart failure (CHF), aortic stenosis, intra-coronary stents on platelet inhibitors, or renal failure. All patients who have CHF should be evaluated by cardiology for the initiation of beta-blocker therapy. Beta-blocker therapy has been shown in multiple studies to reduce the risk of death from CHF. Many patients with CHF are improved by beta-blockade but the dose must be titrated carefully with slow increases over time. Patients with aortic stenosis should be evaluated by cardiology and beta-blockade initiated with cardiology supervision. Patients with intra-coronary stents on platelet inhibitors should be seen by cardiology. **WARNING:** Discontinuation of platelet inhibitors in patients with intra-coronary stents can be lethal. Patients with renal failure should be treated with agents but special attention is needed.
7. General Guidelines for the Adoption of Perioperative Anti-Ischemic Prophylaxis. It is difficult to make a protocol for other hospitals because systems work in different ways. However, there are a few basic rules that should be followed. These recommendations are based on six articles that clearly demonstrate the efficacy of the technique in the prevention of perioperative mortality. [1-6] Information on PCRRT can be obtained at www.betablockerprotocol.com.
8. Conflict of interest statement: Neither Dr. Arthur Wallace, nor any member of his family, have a financial arrangement or affiliation with any corporate organization offering financial support or grant monies for this continuing medical education program.

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