Preoperative Electrocardiograms

Obsolete or Still Useful?

THE anticipated value of the preoperative electrocardiogram for the assessment of perioperative cardiac risk has changed over the past decades. Initial risk scores included preoperative electrocardiogram variables as a prognostic factor for the occurrence of perioperative cardiac events; in recent years, however, the value of a routine preoperative electrocardiogram has been questioned. The current American College of Cardiology/American Heart Association guidelines recommend a preoperative resting 12-lead electrocardiogram only for patients with at least one clinical risk factor undergoing vascular surgical procedures and for patients with known coronary heart disease, peripheral arterial disease, or cerebrovascular disease who will undergo intermediate-risk surgery. On the other hand, in asymptomatic patients undergoing low-risk surgery, preoperative resting 12-lead electrocardiogram is not recommended.

However, the existing evidence gives little guidance on how to proceed with preoperative electrocardiogram screening in low- or intermediate-risk patients undergoing low- or intermediate-risk surgery. As the prevalence of an abnormal electrocardiogram rises with age, it is still common practice in many surgical centers to perform routine preoperative electrocardiogram in the older patient population. The American Society of Anesthesiologists task force for preoperative evaluation recognized that electrocardiogram abnormalities are higher in older people but did not reach consensus with regard to a minimal age at which preoperative electrocardiogram should be performed. In addition, it remains unclear whether the presence of other clinical variables should prompt anesthesiologists to ask for a preoperative resting electrocardiogram. This question is addressed in the study by Correll et al., who attempted to identify specific patient-related factors that may predict the presence of significant preoperative electrocardiogram abnormalities.

The information provided in this paper is of special interest in several ways. From a clinical point of view, the basic question relates to the need for obtaining a preoperative electrocardiogram in a patient without documented coronary artery disease undergoing noncardiac surgery. Collection of such additional test makes only sense when it will alter the perioperative management strategies in these patients. Therefore it has to be decided which electrocardiogram abnormalities are considered to be of sufficient importance to trigger the need for further evaluation and potential treatment. In this respect it may be helpful during the preoperative screening to have some indication as to which patient characteristics can potentially predict the existence of such major electrocardiogram abnormalities.

The study by Correll et al. provides some insights in this issue. They defined a number of “major” electrocardiogram changes that would prompt them to an additional action (further assessment and evaluation before proceeding to surgery) in preoperative patient management. These major electrocardiogram abnormalities included major Q-waves, ST-segment alterations, T-wave changes, Mobitz type II or higher blockade, left bundle branch block, and atrial fibrillation. The clinical variables constituting an independent risk factor for the presence of these electrocardiogram alterations were age above 65 yr, history of angina, congestive heart failure, high cholesterol, myocardial infarction, and severe valvular disease.

The attractive approach of this study is that it addresses the problem from the perspective of the preoperative clinician who has to make a decision regarding the advisability of performing an additional electrocardiogram. Nevertheless, the ultimate question, whether this additional testing will improve patients’ outcome, still remains unanswered. Indeed, although it may be of interest to recognize the patient risk factors associated with major electrocardiogram abnormalities, this approach will have little clinical implication in the absence of strong data indicating that such identification will result in fewer cardiac complications.

Therefore the key question remains whether abnormalities observed on preoperative electrocardiogram in a patient without documented or suspected risk factors for coronary artery disease will have an additive value for the prediction of perioperative cardiac complications, beyond the information obtained from clinical history. A recent study reported that abnormalities (bundle branch block) observed on preoperative electrocardiogram were related to the occurrence of postoperative myocardial infarction and death but that it did not improve prediction beyond risk factors identified on patient history. Furthermore, since coronary revascularization is not considered to be indicated in an asymptomatic patient, incidental findings of Q-waves or bundle branch block on a preoperative electrocardiogram in the asyp-
tomatic patient will not lead to a decision to perform revascularization. Finally, several randomized studies have indicated that coronary revascularization is not indicated, even before major noncardiac surgery in intermediate-risk patients, provided an adequate perioperative medical therapy is applied.13,14 On the other hand, it can be expected that the diagnosis of unsuspected coronary artery disease by electrocardiogram criteria may lead to the institution of a pharmacological therapy. However, it should be mentioned that the evidence with regard to the benefit of acute administration of, for instance, β-blockers in patients without active ischemia or a positive stress test still is conflicting.7 It seems therefore that, to date, the diagnosis of abnormal electrocardiogram signs in a patient without clinical symptoms will not substantially alter perioperative management and patient outcome.

The study by Correll et al.11 identified a number of clinical variables that increase the likelihood for an abnormal preoperative electrocardiogram. Will the data of this study substantially alter decision-making with respect to perioperative patient management? The answer is probably no. In the American College of Cardiology/American Heart Association guidelines,7 it is recommended that patients who do not necessitate emergency surgery should be screened for the presence of active cardiac conditions, which include history of ischemic heart disease, history of compensated or previous heart failure, history of cerebrovascular disease, diabetes mellitus, and renal insufficiency (creatinine level greater than 2.0 mg/dl). If one of these conditions is present, patients should be further evaluated and treated when necessary. Therefore, the majority of the clinical variables, identified by Correll et al.11 as constituting an independent risk factor for the presence of major electrocardiogram alterations are also those that according to the guidelines prompt for further evaluation, including 12-lead electrocardiogram.

Does this mean that performing a preoperative electrocardiogram beyond the group of patients considered at moderate or high risk of cardiac events based on clinical considerations has become obsolete? The answer to this question is no. A preoperative electrocardiogram may provide a baseline reference in case the patient develops postoperative cardiac problems. Of note, at least 25% of the myocardial infarctions in the older population appear to have occurred clinically unrecognized, and the risk of recurrent cardiac events in these patients is similar to that in individuals with a recognized myocardial infarction.15 In the absence of such baseline reference, abnormal findings on a postoperative electrocardiogram may falsly be interpreted as new findings, potentially resulting in the performance of additional unnecessary tests and procedures, carrying their own risk for complications.

In conclusion, the study by Correll et al.11 should primarily be viewed as a contribution to the identification of patient in which major preoperative electrocardiogram abnormalities are to be expected. When such abnormalities are observed only at the point of the postoperative electrocardiogram, they may erroneously be taken for a new finding. In such patients, the presence of a baseline tracing for comparison may therefore have important implications for the perioperative management. This shifts part of the discussion from the perioperative risk stratification to the necessity of having baseline references for the correct interpretation of postoperative values of different diagnostic tests.