the immediate postpartum period. In addition, pregnancy is not a contraindication for vaccination against influenza, tetanus, diphtheria, and pertussis (Tdap), and these vaccines are recommended for appropriate individuals.

MATERNAL MORTALITY

Maternal death is defined as death occurring during pregnancy or within 42 days of completion of pregnancy from a cause related to or aggravated by pregnancy, but not due to accident or incidental causes. From 1935 to 2007, the U.S. maternal death rate decreased from nearly 600/100,000 births to 12.7/100,000 births. There are significant health disparities in the maternal mortality rate, with the highest rates among non-Hispanic black women. In 2007, maternal mortality rates (per 100,000) by race were 10.5 among non-Hispanic white women, 8.9 among Hispanic women, and 28.4 among non-Hispanic black women. The most common causes of maternal death in the United States today are pulmonary embolism, obstetric hemorrhage, hypertension, sepsis, cardiovascular conditions (including peripartum cardiomyopathy), and ectopic pregnancy.

As stated above, the maternal mortality rate in the United States is about 12.7/100,00 births. In some countries in sub-Saharan Africa and southern Asia, the maternal mortality rate is about 500/100,000 live births. The most common cause of maternal death in these countries is maternal hemorrhage. The high maternal death rates are due in part to inadequate contraceptive and family-planning services, an insufficient number of skilled birth attendants, and difficulty in accessing birthing centers and emergency obstetrical care units. Maternal death is a global public-health tragedy that could be mitigated with the application of modest resources.

SUMMARY

With improved diagnostic and therapeutic modalities as well as advances in the treatment of infertility, more patients with medical complications will be seeking and will require complex obstetric care. Improved outcomes of pregnancy in these women will be best attained by a team of internists, maternal-fetal medicine (high-risk obstetrics) specialists, and anesthesiologists assembled to counsel these patients about the risks of pregnancy and to plan their treatment prior to conception. The importance of preconception counseling cannot be overstated. It is the responsibility of all physicians caring for women in the reproductive age group to assess their patients' reproductive plans as part of their overall health evaluation.

9 Medical Evaluation of the Surgical Patient

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Cardiovascular and pulmonary complications continue to account for major morbidity and mortality in patients undergoing noncardiac surgery. Emerging evidence-based practices dictate that the internist should perform an individualized evaluation of the surgical patient to provide an accurate preoperative risk assessment and stratification that will guide optimal perioperative risk-reduction strategies. This chapter reviews cardiovascular and pulmonary preoperative risk assessment, targeting intermediate- and high-risk patients with the goal of improving outcome. It also reviews perioperative management and prophylaxis of diabetes mellitus, endocarditis, and venous thromboembolism.

EVALUATION OF INTERMEDIATE- AND HIGH-RISK PATIENTS

Simple, standardized preoperative screening questionnaires, such as the one shown in Table 9-1, have been developed for the purpose of identifying patients at intermediate or high risk who may benefit from a more detailed clinical evaluation. Evaluation of such patients for surgery should always begin with a thorough history and physical examination and with a 12-lead resting electrocardiogram (ECG), in accordance with the American College of Cardiology/American Heart Association (ACC/AHA) guidelines. The history should focus on symptoms of occult cardiac or pulmonary disease. The urgency of the surgery should be determined, as true emergency procedures are associated with unavoidably higher morbidity and mortality risk. Preoperative laboratory testing should be carried out only for specific clinical conditions, as noted during clinical examination. Thus, healthy patients of any age who are undergoing elective surgical procedures without coexisting medical conditions should not require any testing unless the degree of surgical stress may result in unusual changes from the baseline state.

TABLE 9-1 STANDARDIZED PREOPERATIVE QUESTIONNAIRE[a]

1. Age, weight, height
2. Are you:
   Female and 55 years of age or older or male and 45 years of age of older?
   If yes, are you 70 years of age or older?
3. Do you take anticoagulant medications ("blood thinners")?
4. Do you have or have you had any of the following heart-related conditions?
   Heart disease
   Heart attack within the last 6 months
   Angina (chest pain)
   Irregular heartbeat
   Heart failure
5. Do you have or have you ever had any of the following?
   Rheumatoid arthritis
   Kidney disease
   Liver disease
   Diabetes
6. Do you get short of breath when you lie flat?
7. Are you currently on oxygen treatment?
8. Do you have a chronic cough that produces any discharge or fluid?
9. Do you have lung problems or diseases?
10. Have you or any blood member of your family ever had a problem other than nausea with any anesthesia?
    If yes, describe:
11. If female, is it possible that you are pregnant?
    Pregnancy test:
    Please list date of last menstrual period:

[a]University of Michigan Health System patient information report. Patients who answer yes to any of questions 2–9 should receive a more detailed clinical evaluation.

Source: Adapted from KK Tremper, P Benedict: Anesthesiology 92:1212, 2000; with permission.

PREOPERATIVE CARDIAC RISK ASSESSMENT

A stepwise approach to cardiac risk assessment and stratification in patients undergoing noncardiac surgery is illustrated in Fig. 9-1. Assessment of exercise tolerance in the prediction of in-hospital perioperative risk is most helpful in patients who self-report worsening exercise-induced cardiopulmonary symptoms; those who may benefit from noninvasive or invasive cardiac testing regardless of a scheduled surgical procedure; and those with known coronary artery disease (CAD) or with multiple risk factors who are able to exercise. For predicting perioperative events, poor exercise tolerance has been defined as the inability to walk four blocks or climb two flights of stairs at a normal pace or to meet a metabolic equivalent (MET) level of 4 (e.g., carrying objects of 15–20 lb or playing golf or doubles tennis) because of the development of dyspnea, angina, or excessive fatigue (Table 9-2).

Previous studies have compared several cardiac risk indices. The American College of Surgeons' National Surgical Quality Improvement