

anticoagulation during pregnancy¹⁴. In women with venous thromboembolism, LMWH has become the anticoagulant of choice. In women with mechanical heart valves, data are more limited and there has been some concern regarding the efficacy of heparins with respect to the prevention of valve thrombosis. In these patients, the maternal and fetal risks and benefits must be carefully explained before choosing one of the aforementioned three strategies. When an UFH or LMWH strategy is selected, careful dose monitoring and adjustment are recommended.

Warfarin freely crosses the placental barrier and can harm the fetus, but it is safe during breast-feeding. The incidence of warfarin embryopathy (abnormalities of fetal bone and cartilage formation) has been estimated at 4% to 10%; the risk is highest when warfarin is administered during weeks 6 through 12 of gestation. When administered during the second and third trimesters, warfarin has been associated with fetal central nervous system abnormalities. The risk of warfarin embryopathy may be low in patients who take 5 mg or less of warfarin per day.

UFH does not cross the placenta and is considered safer for the fetus. Its use, however, has been associated with maternal osteoporosis, hemorrhage, thrombocytopenia or thrombosis (HITT syndrome), and a high incidence of thromboembolic events with older generation mechanical valves. UFH may be administered parenterally or subcutaneously throughout pregnancy; when used subcutaneously for the anticoagulation of mechanical heart valves, the recommended starting dose is 17,500 to 20,000 U twice daily. The appropriate dose adjustment of UFH is based on an activated partial thromboplastin time (aPTT) of 2.0 to 3.0 times the control level. High doses of UFH are often required to achieve the goal aPTT because of the hypercoagulable state associated with pregnancy. Lower doses of UFH may be appropriate for anticoagulation in certain cases, such as the prevention of venous thromboembolism during pregnancy. Parenteral infusions should be stopped 4 hours before cesarean sections. UFH can be reversed with protamine sulfate.

Low-molecular-weight heparin (LMWH) produces a more predictable anticoagulant response than UFH and is less likely to cause HITT. Its effect on maternal bone mineral density appears to be minimal. LMWH can be administered subcutaneously and dosed to achieve an anti-factor Xa level of 1.0 to 1.2 U/mL 4 to 6 hours after injection. Although there are data to support the use of LMWH in pregnant women with deep vein thrombosis, data on the safety and efficacy of LMWH in pregnant patients with mechanical valve prostheses are limited. Experience with these agents is accruing.

In summary, anticoagulation in the pregnant patient can be difficult because of the risk profile associated with each drug regimen. In planned pregnancies, a careful discussion about the risks and benefits of warfarin, UFH, and LMWH will help the patient and physician involved to choose an anticoagulation strategy. Unplanned pregnancies are often diagnosed partway through the first trimester.

It is advisable to stop warfarin when the pregnancy is discovered and to use UFH or LMWH, at least until after the 12th week. Dosing regimens for warfarin, UFH, and LMWH may vary by diagnosis; detailed dosing guidelines have been published¹⁴.

SUMMARY

- Heart disease during pregnancy encompasses a wide spectrum of disorders. Basic concepts to bear in mind include the following:
- Blood volume and cardiac output rise during normal pregnancy, reaching a peak during the late second trimester.
- Preexisting cardiac lesions should be evaluated with respect to the risk they impart during the stress of pregnancy.
- Contraindications to pregnancy include severe pulmonary hypertension or Eisenmenger's syndrome, cardiomyopathy with NYHA Class III or IV symptoms, history of peripartum cardiomyopathy, severe uncorrected valvular stenosis, unrepaired cyanotic congenital heart disease, and Marfan syndrome with an abnormal aorta.
- Awareness of major cardiac drug classes that are contraindicated during pregnancy is important for the treatment of hypertension and heart failure during pregnancy.
- Anticoagulation during pregnancy presents unique challenges because of the maternal and fetal side effects of warfarin, unfractionated heparin, and LMWH.

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