Pregnancy in women with mechanical valve prosthesis is dangerous mainly because of problems originating from oral anticoagulants. Warfarin derivatives, necessary for thromboembolism prevention and avoidance of maternal mortality, have a teratogenic and hemorrhagic effect upon the fetus reflected in a high fetal mortality. Avoidance of oral anticoagulants should result in a normal or nearly normal course of pregnancy in women with prosthetic cardiac valves.

Twenty female subjects with bioprosthetic valve replacement were treated with aspirin as the only antithrombotic drug. This is the largest series of pregnant women with bioprostheses reported in the literature.

**Material and Methods**

From April, 1976 to May, 1982, 20 women with implanted bioprostheses were admitted into the Obstetric Department of Ciudad Sanitaria “La Paz,” Madrid. Patient ages ranged from 22 to 36 years, mean age 26.8 years. Isolated aortic valve replacement was presented six times (four Carpentier-Edwards and two Hancock); mitral valve replacement, seven times (four Carpentier-Edwards and three Hancock); and aortic plus mitral, seven patients (five Carpentier-Edwards and two Hancock). Valve replacement was performed originally for advanced rheumatic valve disease in 14 patients: class 3 (12 cases), class 4 (2 cases) of the NYHA classification. Four patients had aortic valve replacement for bacterial endocarditis and two for annuloaortic ectasia (Bentall and Bonno operation). All patients were in class 1-2 of the NYHA classification when they conceived. Thirteen women had atrial fibrillation throughout pregnancy.

**Antiaggregation**

All patients were receiving platelet antiaggregants (aspirin) throughout pregnancy, delivery, and after the delivery period. Women were given 1 g of aspirin every day (11 women) or 500 mg every 48 hours (nine women).

We studied twenty women who became pregnant after porcine bioprosthetic valve replacement. Six patients had aortic valve, seven mitral, and seven aortic plus mitral valve replacement. All women were treated with aspirin (1 g daily or 500 mg every 48 hours) during pregnancy, delivery, and the postdelivery period. Thirteen patients experienced atrial fibrillation. There were 27 pregnancies with three ending in abortion. Twenty five normal babies were delivered. There was no maternal mortality or morbidity from thromboembolism or hemorrhage. Comparison of the pregnancy course of these women and the general population shows no difference with respect to fetal or maternal morbidity and mortality. Pregnant women with bioprosthetic valve replacement treated with aspirin had normal pregnancies without the risk of thromboembolism. Fetal and perinatal morbidity and mortality was also within normal limits.

**Preoperative Obstetric History**

Eight women had 12 pregnancies prior to the cardiac valve replacement operation. One pregnancy ended in early abortion. Eleven pregnancies ended in normal vaginal deliveries. All babies were full term infants. There were no Caesarean sections, instrumental deliveries, or preterm or dysmature infants.

**Postoperative Obstetric History**

The 20 patients had 27 pregnancies after cardiac valve replacement. Three of them ended in early abortions of unknown etiology. There were no anatomic reports of the fetuses. All 24 deliveries were vaginal, one of them a forceps delivery. Twenty-five healthy babies were born (one twin pregnancy). One baby was born preterm. There were no infants small for gestational age or abnormal.

**Mothers**

There was no maternal mortality or morbidity from the point of view of thromboembolism or hemorrhage. All patients tolerated well the hemodynamic overload of pregnancy, being in class 1 or 2 (NYHA classification) during the pregnancy period.

Pregnancy complications for the 20 women were compared with their obstetric histories prior to valve replacement and with the memorandum of the Obstetrical Department of our hospital (years 1975 to 1980) (Table 1).

**Discussion**

Pregnancy in patients with cardiac valve replacement has been reported to carry an extra risk for mothers and a high fetal mortality. Most patients reported in the literature had mechanical valve prostheses and oral anticoagulation therapy during pregnancy. Thromboembolism was the main cause of maternal mortality and morbidity. The main cause of fetal mortality has been the use of oral anticoagulants. Antivitamin K derivatives produce fetal hemorrhages and have a direct teratogenic effect upon the fetus mainly in the first trimester of pregnancy. A great number of abortions, stillbirths, neonatal mortality, and congenital malformations are due to the use of any warfarin derivative taken during pregnancy.

From 1975, we have been using aspirin for preven-
tion of thromboembolism after bioprosthetic valve replacement. The 20 patients studied here were all treated throughout the pregnancy, delivery, and postdelivery period with this medication. Data from our study show no maternal mortality or morbidity in any of the 27 pregnancies. The abortion rate is similar to the abortion rate of the general population attended to in our hospital and to the abortion rate of the same patient group before cardiac valve replacement. There were no stillbirths, perinatal mortality, or malformed babies. The rate of forceps deliveries and preterm infants is also within the normal range of our general population (Table 1).

All patients dealt with the cardiovascular overload of pregnancy with no difficulties. Digitalis and diuretics were given according to the needs of each individual woman.

This study confirms the data of published case reports and of a collective study. Patients with tissue valves and no anticoagulation therapy behave similar to normal pregnant women. Oakley and Doherty have reported 18 patients with tissue valves and no anticoagulation therapy. There was no maternal mortality. One patient had brain embolism. There was no infant mortality and only one abortion and one infant with harelip.

The patients in our series were particularly prone to thromboembolism because 14 of them had mitral valve replacement (seven had double valve replacement) and 13 experienced atrial fibrillation. There was no single case of thromboembolism in the entire series. We have described a low thromboembolic rate after valve replacement with bioprosthesis when patients were treated with aspirin. Patients with mitral and double valve replacement in atrial fibrillation had a lower thromboembolic rate when they were treated with aspirin than when treated with oral anticoagulants. From the present study, it is concluded that women of childbearing age who wish to have children should have their valve replaced with a tissue valve. Pregnancy in this situation will be similar to that in normal women. Aspirin does not affect fetal development and protects the mother against thromboembolism.

No mother or infant in this study had any clinical evidence of hemorrhage. A word of caution should be given about the use of aspirin near the delivery period. In a recent study on the effects of acetylsalicylic acid on maternal and neonatal hemostasis, it was shown that minor cutaneous bleeding episodes are very common in infants. Although serious hemorrhage was not observed in this study, intracranial hemorrhage has been described in premature infants. Because of the potential harmful effect of aspirin, women with bioprosthesis who are in sinus rhythm should not be treated with acetylsalicylic acid during pregnancy because the risk of thromboembolism in these patients is almost nil. Further data are not available on the risk-benefit balance of aspirin in pregnant women in atrial fibrillation. We would be inclined, however, to use platelet antiaggregants because the potential threat of thromboembolism in this type of patient seems more important than the potential harmful effect of aspirin.

In selection of prostheses for women who wish to have children, consideration should be given to the important deleterious effects that oral anticoagulants have upon the fetus and the mother during pregnancy. Tissue valves allow a normal pregnancy and delivery period independent of the atrial rhythm. The risk of thromboembolism can be controlled with platelet antiaggregants, and there is no need for antivitamin K derivatives. Although limited durability of bioprosthesis is a well-known fact, we believe that this group of patients should have their valves replaced with tissue valves even if they will be at risk of another operation in the future.
REFERENCES


Occupational Health and Safety Institute

The Midwest Center for Occupational Health and Safety will present this course at the University of Minnesota Minneapolis Campus, September 12-23. For information, contact Ms. Ruth K. McIntyre, Director, Continuing Education, Midwest Center for Occupational Health and Safety, 640 Jackson Street, St. Paul 55101 (612:221-3992)

8th International Conference on Lung Sounds

The 8th International Conference on Lung Sounds will be held at the Johns Hopkins University, Baltimore, September 22-23. Call for abstracts: Abstracts should not exceed 200 words in length and should be submitted by August 1. For information, contact Raymond L. H. Murphy, Jr., M.D., 1153 Centre Street, Boston 02130 (617:522-5800).

Pregnancy in Patients with Valve Replacement (Nuñez et al)