Pregnancy Outcome in Women with Bioprosthetic Heart Valves

Amir Jamshid Khamoushi, MD; Fahimeh Kashfi, MSc;
Mohammad Bagher Tabatabaei, MD; Saeid Hosseini, MD;
Majid Maleki, MD; Feridoun Noohi, MD

Abstract

Background- To avoid the fetal and maternal risks associated with anticoagulant therapy during pregnancy, the use of bioprostheses has been advocated for young women with cardiac valve disease who may later wish to bear children. The aim of this historical cohort study was to evaluate pregnancy outcome in women with bioprosthetic heart valves.

Methods- Fifteen women who became pregnant after bioprosthetic heart valve replacement were followed during 28 pregnancies. Eleven had undergone isolated mitral, 3 had aortic and 1 had tricuspid valve replacement. Their ages at the time of surgery ranged from 14 to 31 years (mean 19.85±5.54).

All the women were in sinus rhythm at the time of gestation. No embolic episodes occurred either after surgery or during pregnancy, labor or the puerperium.

Results- Fetal loss occurred in 7 of the 28 pregnancies (25%), and was due to abortion (N=5), pre-maturity and neonatal death (N=2). No congenital malformation was seen. The mean birth weight in 21 pregnancies was 3082c, and only 1 newborn had low birth weight (2100gr). Two cases of rapid degeneration of bioprosthetic valves leading to reoperation occurred in two patients, one in the 7th month of pregnancy and the other 4 months after delivery.

Conclusion- Bioprosthetic valves can be considered the most suitable prosthetic heart valve employed in women of childbearing age because anticoagulants can be avoided, so the risk of embryopathy following the use of anticoagulant drugs is omitted. **(*Iranian Heart Journal.* 2002, 2003; 3(2&3): 13-18)**

Key word: pregnancy outcome < bioprosthetic heart valve

The selection of a suitable prosthetic heart valve for women of childbearing age remains a challenge, and pregnancy in women with cardiac valve prostheses has always presented a serious problem.[9]

Patients with mechanical heart valves require long-term anticoagulant therapy during gestation. However, no method of anticoagulation is risk-free. The administration of coumarinics is associated with an increased incidence of fetal loss and birth defects, and the various heparin regimens that have been used in these cases result in a greater risk of maternal thromboembolism, valve thrombosis and death.[8,9]

Candidates for bioprosthetic valves would be elderly patients, patients who are noncompliant or have contraindications to anticoagulant, patients in normal sinus rhythm, and young females desirous of future pregnancy.[6]

Biological prostheses have afforded successful pregnancy without fetal wastage or congenital anomalies and without significant maternal morbidity or

From the Department of Cardiovascular Surgery, Shaheed Rajai Cardiovascular Medical Center, Mellat Park, Vali Asr Avenue, Tehran, Iran
Correspondence to A. J. Khamoushi, MD, Shaheed Rajaie Cardiovascular Medical Center, Mellat Park, Vali Asr Avenue, Tehran, Iran
Email: khamoushi@rhc.ac.ir Fax: + (9821) 2042026

mortality.[3,5] Unfortunately, the long-term duration of tissue valves is short, and their use in these women implies the need for reoperation. Furthermore, there has been concern that bioprosthetic valves deteriorate at an accelerated rate during pregnancy.[4,8] The aim of this study is to determine maternal and fetal outcome in 15 women with bioprosthetic valves operated on at our center and the effect of pregnancy on the durability of these valves.

Methods

To evaluate the pregnancy outcome in patients with prosthetic cardiac valves, we selected 1510 female patients (12-45 years old) who underwent cardiac valve replacement at Shaheed Rajaie Center from 1978 to 1998. We were able to contact 410 of them and we found that 124 of them had experienced pregnancy. Twenty-eight pregnancies were observed in 15 patients with bioprostheses. Six of them had 1 pregnancy; 6 had 2; 2 had 3, and 1 had 4 pregnancies. The mean age of these women was 19.85±5.54 years old (range 14 to 31) at the time of prosthesis implantation.

Isolated mitral valve replacement was performed in 11 women, isolated aortic valve implantation in 3 patients and isolated tricuspid replacement in 1 patient. The bioprostheses in 15 operations were Hancock standard porcine, Carpentier-Edwards standard porcine, Sorin and Ionescu-Shiley valves.

Obstetric care was provided in other institutes. Information about the peripartum and postnatal periods was obtained from the patients themselves. The statistical analysis of data was performed with descriptive statistic methods.

Results

Of 410 patients with prosthetic valves, 15 patients with bioprostheses had 28 pregnancies (Table I). Twenty babies with normal birth weight were born at full term and 3 were born prematurely. There were 2 neonatal deaths of the 3 preterm deliveries. There were 5 abortions (17.9%), 1 spontaneous and 4 induced abortion, (2 elective & 2 therapeutic). There were 12 vaginal deliveries and 11 cesarean sections. There were no congenital abnormalities. The mean birth weight in 21 pregnancies was 3082 ± 512gr; only 1 new born had low birth weight (2100gr). Twenty-Six pregnancies were without maternal complications, and two cases of the degeneration of bioprosthetic valves leading to reoperation occurred in two patients: one in the 7th month of pregnancy and the other 4 months after delivery.

Five of the patients (30%) needed valve reoperation after a mean of 12.5 years.

Table I. Course of pregnancy and delivery

Characteristics	Valves
Patients	15
Pregnancies	28
Deliveries Term Preterm	23(82.1%) 71.39% 10.71%
Abortions Spontaneous Induced	5(17.9%) 1(3.58%) 4(14.32%)
Neonatal deaths	2
Delivery C/S N.V.D	 11(47.83%) 12(52.17%)

Discussion

Bioprostheses have been considered optimal for women desiring to have children to avoid the deleterious effects of anticoagulation, which include fetal malformations caused by the teratogenic effects of warfarin.[10] The concern regarding the use of warfarin during pregnancy is related to the risk of warfarin-induced embryopathy (depressed nasal bridge; nasal hypoplasia; small nasal bones; hypo plastic alae nasi; telacanthus; upper airway obstruction due to choanal stenosis, and punctata epiphyseal dysplasia

From the Department of Cardiovascular Surgery, Shaheed Rajai Cardiovascular Medical Center, Mellat Park, Vali Asr Avenue, Tehran, Iran

of the long bones and the cervical and lumbar vertebral plates) and an increased risk of intracranial bleeding.[4,5]

Tissue valves have a high incidence of deterioration in young patients, which is further accelerated during pregnancy, with a 30 percent expected rate of valve replacement within 10 years.[4,8]

Risks associated with pregnancy in women with prosthetic valves are related mainly to the increased hemodynamic burden and incidence of thromboembolic events as well as to untoward fetal side effects caused by cardiovascular drugs and anticoagulation.[4]

In this study, 82.1% of the pregnancies ended in normal vaginal deliveries or cesarean sections. In the survey by Sbarouni and Oakley,[10] most of the women with a heart valve bioprosthesis went through pregnancy successfully without anticoagulant treatment. The fetal outcome was excellent, and their data for that group did not differ from that for the normal population. In the study reported by Jamieson et al.,[5] there were 70 normal deliveries in 94 pregnancies. They concluded that their study demonstrates the beneficial effect of not requiring anticoagulant therapy during pregnancy.

Pregnancies in women with bioprosthetic heart valves were (are???) likely to be successful. However, there are several reports of valve failure in patients with bioprostheses, necessitating emergency reoperation.[1,2] An increased calcium turnover during gestation may cause this failure.[1,5,10] Bortolotti et al.[2] reported that in 2 of their 7 patients, calcification of porcine xenograft became apparent shortly after delivery. But in the current study, the incidence of this matter was 2 out of 15 patients (13.3%).

Finally, when anticoagulant therapy is not necessary, the course of pregnancy in women with bioprostheses is similar to that of the general population.[7,9]

Acknowlegements

The authors would like to thank Mr Shaeri for having set up the data collection for this study.

References

1. Badduke BR, Jamieson W.R.E, Miyagishima R.T. et al. Pregnancy and childbearing in a population with biologic valvular prostheses. Thorac. Cardiovasc. Surg. 1991; 102:179-86.

2. Bartolotti U, Milano A, Mazzuco A, et al. Pregnancy in patients with a porcin valve bioprosthesis. AM. J. Cardiol. 1982; 50: 1051-4.

3. Born D, Martinez EE, Almeida PAM. et al. Pregnancy in patients with prosthetic heart valves: The effects of anticoagulation on mother, Fetus and neonate. Am Heart J .1992; 124: 413-417.

4. Braun wald, E: Heart disease, a text book of cardiovascular medicine". Vol .one, 6th ed, W.B Saunders, U.S.A 2001 pp: 2172-2186.

5. Jamieson E, Miller DC, Akins C.W. et al. Pregnancy and bioprostheses: Influence on structural valve deterioration. Ann Thorac Surg. 1995; 60: S 282-287.

6. Jones EL. Mitral valve replacement: Indications, choice of valve prosthesis, results, and long-term morbidity of porcine and mechanical valves. J Card Surg. 1994; 9 (2suppl): 218-221.

7. Nunez L, Larrea JL, Gil Aguado M. et al. Pregnancy in 20 patients with bioprosthetic valve replacement. Chest 1983; 84 (1): 26-28.

8. Sadler L, Mccowan L, White H. et al. Pregnancy outcome and cardiac complications in women with mechanical, bioprosthetic and homograft valves. B. J. O .G. 2000; 10 (2) 245-253.

9. Salazar E, Espinola N, Roman L. et al. Effect of pregnancy on the duration of bovine pericardial bioprostheses. Am Heart J 1999; 137: 714-720.

10. Sbarouni E, Oakley CM. Outcome of pregnancy in women with valve prostheses. Br Heart J. 1994; 71: 196-201.

From the Department of Cardiovascular Surgery, Shaheed Rajai Cardiovascular Medical Center, Mellat Park, Vali Asr Avenue, Tehran, Iran

From the Department of Cardiovascular Surgery, Shaheed Rajai Cardiovascular Medical Center, Mellat Park, Vali Asr Avenue, Tehran, Iran