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Clinical Research

Cardiac, Obstetric, and Fetal Outcomes During Pregnancy After Biological or Mechanical Aortic Valve Replacement

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ABSTRACT

Background: The aim of this study was to assess pregnancy-related cardiac, maternal, and fetal outcomes in women who underwent aortic valve replacement (AVR).

Methods: From 1978-2011, 67 women < 40 years of age underwent 74 isolated AVRs (52 mechanical prostheses and 22 bioprostheses). All patients were prospectively followed at our dedicated valve clinic. Patients with Turner syndrome, previous hysterectomy, or tubal ligation were excluded. Cardiovascular, obstetric, and fetal outcomes were gathered from medical records and telephone interviews.

Results: A total of 27 pregnancies were reported in 14 patients (bioprosthetic AVR, n = 20; mechanical AVR, n = 7). In the bioprosthetic AVR group, the following adverse events occurred: hospitalizations for syncope (n = 2), prosthetic valve deterioration after pregnancy necessitating reintervention 6 months postpartum (n = 1), miscarriages (n = 9), and preterm birth (n = 1). In the mechanical AVR group, the following adverse events occurred: embolic myocardial infarctions with a decrease in systolic function (n = 2; 1 pregnancy was

RÉSUMÉ

Introduction : Le but de cette étude était d'évaluer les résultats cardiaques, maternels et fœtaux, liés à la grossesse chez les femmes qui avaient subi un remplacement valvulaire aortique (RVA).

Méthodes : De 1978 à 2011, 67 femmes < 40 ans ont subi 74 RVA isolés (52 prothèses mécaniques et 22 bioprothèses). Toutes les patientes ont été suivies de manière prospective à notre clinique de valves cardiaques. Les patientes qui avaient un syndrome de Turner, avaient subi une hystérectomie ou une ligature des trompes ont été exclues. Les résultats cardiovasculaires, obstétriques et fœtaux ont été recueillis dans les dossiers médicaux et lors des entrevues téléphoniques.

Résultats : Un total de 27 grossesses ont été rapportées chez 14 patientes (RVA par bioprothèse, n = 20; RVA par bioprothèse mécanique, n = 7). Dans le groupe ayant subi un RVA par bioprothèse, les événements indésirables suivants sont survenus : hospitalisations en raison d'une syncope (n = 2), dégradation de la prothèse valvulaire exigeant une nouvelle intervention 6 mois après la grossesse (n = 1),

Little is known about pregnancy-related outcomes after different types of aortic valve (AV) replacement (AVR), and there are no clear data to support a consensus on the ideal AV substitute for women of childbearing age. Significant cardiovascular physiological changes occur during pregnancy that can affect prosthetic performance. Plasma volume and cardiac output increase progressively from the first to the third trimester of gestation, with a significant decrease in systemic vascular resistance, resulting in a hyperdynamic circulation.[1] In addition, pregnancy is associated with a hypercoagulable state, which places women with mechanical aortic prostheses at higher risk of thromboembolism and prosthetic valve thrombosis.[2] Furthermore, warfarin, which crosses the placental barrier, is associated with teratogenicity in up to 6% of fetuses.[3] Although the use of heparin is not associated with teratogenicity, it remains less efficient in preventing prosthesis-related thromboembolic events.[4]

In contrast, bioprosthetic valves have the advantage of not requiring anticoagulation. Young women may, however, experience more rapid prosthetic valve deterioration because of the higher hemodynamic load during pregnancy and are therefore potentially at higher risk of early reoperation,[5,6] although recent studies have failed to demonstrate this association.[7-9] These different considerations must be taken into account when counselling young women with AV disease on the best AV substitute. A number of reports have previously been published but have been inconclusive, mainly because of the very small number of pregnancies per study.[10-15]

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terminated and 1 was completed), miscarriage (n = 1), postpartum bleeding (n = 1), urgent cesarean section for placental abruption (n = 1), and preterm birth (n = 1).

Conclusions: Findings from this study suggest that pregnancies in women with mechanical AVRs are associated with a higher risk of cardiac and obstetric adverse events. Thus, from this limited cohort, it appears that pregnancies in women with bioprostheses are safer than those in patients with mechanical AVRs.

avortements spontanés (n = 9) et naissance prématurée (n = 1). Dans le groupe ayant subi un RVA par prothèse mécanique, les événements indésirables suivants sont survenus : infarctus du myocarde par embolie associés à une diminution de la fonction systolique (n = 2; 1 grossesse a été interrompue et 1 a été menée à terme), avortement spontané (n = 1), hémorragie de la délivrance (n = 1), césarienne urgente en raison d'un *abruptio placentae* (n = 1) et naissance prématurée (n = 1).

Conclusions : Les résultats de cette étude montrent que les grossesses chez les femmes ayant subi un RVA par prothèse mécanique sont associées à un risque plus élevé d'événements cardiaques et obstétriques indésirables. Par conséquent, cette cohorte limitée semble montrer que les grossesses chez les femmes ayant subi un RVA par bioprothèse sont plus sûres que celles des patientes ayant subi un RVA par prothèse mécanique.

The aim of this study was to determine the cardiac, obstetric, and fetal-related outcomes during pregnancy in women who had previously undergone bioprosthetic or mechanical AVR.

Methods

Population

From 1978-2011, a total of 111 female patients < 40 years of age underwent AVR at the Montreal Heart Institute. Patients with double-valve replacement (n = 14), Turner syndrome (n = 4), hysterectomy (n = 7), or tubal ligation before surgery (n = 19) were excluded from this study. In total, 67 patients who underwent 74 AVRs were included in this study (Fig. 1); there were 52 mechanical prostheses (70%) and 22 bioprostheses (30%). Each reoperation in an eligible patient was considered a new period of follow-up. All patients were prospectively followed in a valve-dedicated clinic. Patients scheduled for AVR were informed of the increased maternal and fetal complications related to the use of anticoagulants with mechanical prostheses as well as the potential risk of accelerated valve degeneration with bioprostheses. Ultimately, the choice of prosthesis was mostly patient driven.

A total of 27 pregnancies was reported in 14 patients (Table 1). Nine patients had bioprostheses (7 Carpentier-Edwards [Irvine, CA] pericardial valves, 2 aortic homografts) and 5 had mechanical prostheses (2 Carbomedics [Sorin

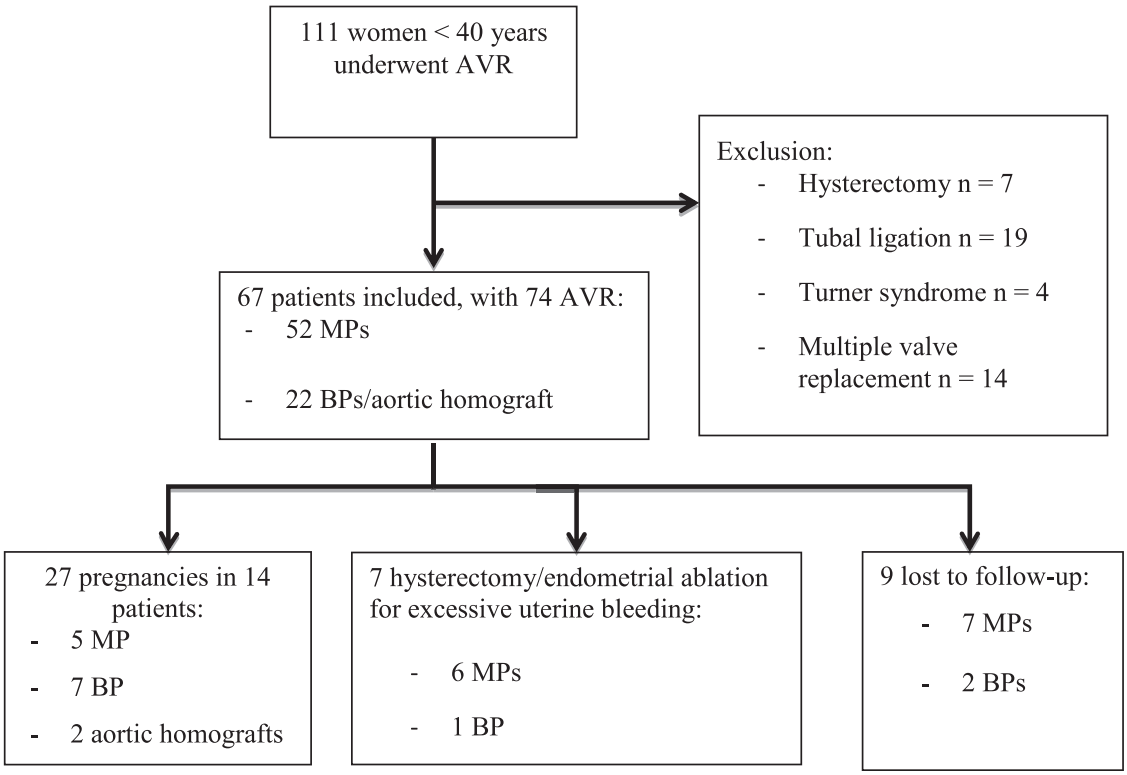

Figure 1. Flowchart of study population. AVR, aortic valve replacement; BP, bioprosthesis; MP, mechanical prosthesis.