Magnetic resonance imaging of stentless xenografts for reconstruction of right ventricular outflow tract


Abstract
The objective was to overcome allograft shortage during the Ross operation; stentless xenografts were carefully evaluated for hemodynamic behavior and valve deterioration during medium term follow-up. Between January 10, 1994 and January 4, 1996 nine adult patients (age 31-51 years) underwent aortic valve replacement with an autologous pulmonary valve and right ventricular outflow tract reconstruction with the Edwards Prima or Medtronic Freestyle xenograft. One patient was dead early and one late, both from noncardiac reasons. Forty-eight to 66 months follow-up was available for 7 patients and was performed with physical examination in the outpatient clinic, transthoracic echocardiography (TTE), and magnetic resonance imaging (MRI). Two patients received 29-mm valves and the remaining 27-mm valves. No reoperation became necessary during follow-up. Preoperative left ventricular ejection fraction ranged from 20% to 84%, median 61%, mean 59% ± 18%. At latest follow-up left ventricular ejection fraction was 49% to 70%, median 57%, mean 58% ± 8%. TTE showed no calcification of the xenograft wall or cusps. MRI revealed good autograft function with no evidence of stenosis in any patient. Four patients showed no and three trivial regurgitation. Right ventricular outflow tract-stenosis could not be seen in any patient. Calculated gradients of the xenograft valves ranged from 2 to 6 mm Hg, median 3 mm Hg (mean 3.1 ± 2.4 mm Hg) and calculated EOA ranged from 2.0 to 4.0 cm², median 2.8 cm². MRI supported these findings and showed pliable xenograft cusps in all patients. Right ventricular function was well preserved in all patients. In adult patients right ventricular outflow tract reconstruction with stentless xenografts can be performed safely and intermediate-term results are encouraging. During medium-term (5-7 years) follow-up no calcification or deterioration of valve function occurred with excellent hemodynamic behavior.