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Comparative evaluation of the changes in the cardiac geometry and left ventricular performance after mitral valve repair or replacement with total chordal preservation.
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Background: The importance of preservation of mitral valve subvalvular apparatus for maintaining the cardiac geometry and long term ventricular mechanics and contractile function has been emphasized in several experimental and clinical studies. We tested the hypothesis that mitral valve replacement with total chordal preservation is comparable to mitral valve repair in maintaining the left ventricular geometry and preserving the left ventricular systolic function.

Methods: 62 patients undergoing isolated surgical correction of mitral insufficiency for 6.06 years (14 months to 26.75 years) had mitral valve repair (MVR), 36 patients (12 male, mean age 52 years, range 30 to 77) had completed subvalvar replacement preserved replacement (MVR). Echocardiography was done preoperatively, 6 months and 1 year to measure left ventricular long and short axis dimensions and volumes in systole and diastole, LVmass, left atrial dimension in systole (LADs), Pulmonary artery systolic pressure (PASP) and Left ventricular ejection fraction by Simpson’s method (LVEF2d). Body surface area was recorded individually.

Results: Patients between MVR and MVR groups had no significant difference in age, LV long and short axis length (LL, SL), LV volumes index both in systole and diastole (LVIv, LVIi), LV mass index (LVMI), LVEF2d, LADs and PASP before operation. LL in diastole significantly shortened only in patients with MVR group at 1 year compared to pre-operation (p = 0.015). SL in diastole shortened in MVR group at 6 month (p = 0.009) and further reduced at 1 year (p=0.004). However, in patients with mitral valve repair, only SL in systole and diastole shortened at 6 month and 1 year (p = 0.003 and p = 0.022 respectively), LVId decreased at 6 month (MVR: p = 0.002, MVR: p = 0.011) and continued to decline at 1 year in both groups (MVR: p = 0.001, MVr: p = 0.028). LVId trend to decrease at 1 year only in MVR group (p = 0.056). LVMI reduced at 6 month (both p = 0.013) and further decreased at 1 year in both groups (MVR: p = 0.006, MVr: p = 0.009). PASP declined at 6 month in both groups (MVR: p = 0.0005, MVr: p = 0.012) and further decreased at 1 year in MVr group (p = 0.035). However, LADs remained unchanged. LVEF2d was in normal range. Conclusion: Mitral valve replacement with total chordal preservation in comparison to mitral valve repair can provide equivalent protection to the left ventricular geometry and preservation the left ventricular systolic function.

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Opening and closing characteristics of normally functioning stentless aortic bioprostheses.
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Background: Stentless aortic bioprostheses (SV) have advantages in hemodynamics and durability compared with stented prostheses. However, the implantation technique could prevent the independent mobility of the sinuses of Valsalva, increasing the mechanical stress on leaflets. Thus, the influence of this implantation technique does not preserve the independent mobility of the sinuses of Valsalva, and the systolic contact of the leaflets and aortic wall indicate that the implantation technique does not preserve the independent mobility and the dynamic function of Sinuses of Valsalva. Whether these differences will affect long-term durability remains to be evaluated.

Objective: To evaluate echocardiographically the opening and closing characteristics of the SV leaflets and compared them with those of normal aortic valves.

Methods: Transthoracic echocardiographic examination was performed to 18 patients with SV (group A) and 20 healthy individuals (group B). Conventional M-mode tracings were recorded from paraesthesal long axis view. Three different phases of aortic valve motion were analysed: a rapid opening (time and velocity), a slow systolic closure (% systolic displacement) and a rapid closing motion (time and velocity). Ejektion time and the presence of systolic contact of an aortic leaflet and aortic wall were also studied.

Results: Group A Group B p
ET (ms) 315 311 NS
SD (%) 25 27 NS
ROV (cm/sg) 41 34 NS
ROV (cm/sg) 32 33 NS
ROV (mm) 71 69 0.01
RCV (cm/sg) 10 15 0.01
Systolic contact (%) 14 9 <0.001

Aims: To compare the performance of small-size (19-21) Carpentier-Edwards stented bioprostheses and On-X mechanical valves through pressure-flow relationship during DSE.

Method: DSE (doses 5-20 micrograms/Kg/min) was used to assess mean gradient (MG) and effective orifice area (EOA) at rest and stress in 12 patients with Carpentier-Edwards bioprosthesis (CE19 n=4,CE21 n=8) and 11 patients with On-X mechanical valves (OnX19 n=5,OnX21 n=6). All patients had normal left ventricular systolic function (EF=50%), normal dynamics of biological and mechanical leaflets (at echo and cinefluoroscopy). The echo-stress studies were performed late after surgery (mean 16.7 months, range 5-32 months).

Results: Each group demonstrated significant increase in cardiac output and stroke volume at DSE. At rest and stress MG (mmHg) was 20.2±7.1 and 29.2±7.1 for CE19, 17.5±4.1 and 28.8±7.2 for CE21, 16.8±7.5 and 34.4±13.3 for ONX19, 12.6±3.8 and 23.7±6.0 for ONX21. EOA (cm²) at rest and stress was 1.07±0.13 and 1.15±0.14 for CE19, 1.22±0.13 and 1.30±0.19 for CE21, 1.17±0.19 and 1.32±0.19 for ONX19, 1.84±0.18 and 1.76±0.27 for ONX21. The ONX21 group differed from other groups because of milder MG at rest and stress (p<0.05) and larger EAO at rest and stress (p<0.01).

Conclusions: Biological and mechanical small-size aortic prostheses have mild increase of MG at stress, however On-X 21 demonstrate a better performance at rest and during stress. Subtle changes in the hemodynamic function of small aortic prostheses can be accurately detected by analysis of pressure-flow relationship and calculation of EOA with DSE.