Late deterioration of right ventricular dilatation after transannular patching in total repair of tetralogy of Fallot

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Background

The influence of different surgical techniques in patients with Tetralogy of Fallot (TOF) on long-term outcome is still a matter of controversy. Transannular patching is suspected to be responsible for late pulmonary regurgitation (PR) and arrhythmias, however, the effects on the timecourse of right ventricular (RV) dilatation are largely unknown. Accordingly, the purpose of this study was to investigate the influence of the surgical technique on RV dilatation and PR in adult TOF patients who underwent total repair in infancy.

Methods

Thirty-two repaired TOF patients who underwent 53 magnetic resonance examinations were included, with a mean follow-up of 21.1 ± 7.6 years. A transannular patch was used in 15 patients (47%), patch closure of a right ventriculotomy in 6 patients (19%), while in the remaining 11 patients (34%) no patch was used during repair. Right ventricular end-diastolic volume (RVEDV), right ventricular end-systolic volume (RVESV) and PR fraction were assessed. Bivariate correlation analysis was performed to evaluate possible correlations between time after repair and the haemodynamic parameters.

Results

Mean PR for all patients was 31.8 ± 20.8 %; patients without a transannular or RV patch had a mean PR of 18.3 ± 14.8 %, while patients with a transannular patch had a mean PR of 40.9 ± 21.1 % ($P < 0.001$). There was no correlation between the time after total repair and the amount of PR in any group. In patients without a transannular patch the time after repair did not correlate with the RVEDV ($R^2 = 0.03$, $P = 0.95$) or the RVESV ($R^2 = 0.01$, $P = 0.35$), however, in patients with a transannular patch, there was a linear correlation between the time after repair and the RVEDV ($R^2 = 0.51$, $P < 0.01$) and the RVESV ($R^2 = 0.39$, $P < 0.01$), indicating a late deterioration of right ventricular volumes.

Conclusion

Transannular patching is associated with long-term moderate to severe PR and leads to late deterioration of RV volumes. Our findings suggest that the use of a transannular patch should be limited as much as possible in infants with TOF. Furthermore, early pulmonary valve replacement in patients with a transannular patch should be considered.

Figure 1. Correlation between time after total repair of tetralogy of Fallot and right ventricular dilatation