

## (10) Summary

### **Aims**

To evaluate right atrial (RA) function in patients before and after atrial septum defect (ASD) closure and in patients following corrective surgery of tetralogy of Fallot (TOF) using echocardiography and tissue Doppler imaging (TDI).

### **Patients and methods**

Thirty patients [aged 22 (2-70) years] with secundum type ASD before and 1 week after surgical (n=11) or Amplatzer Septal Occluder (ASO) closure (n=19) and 50 asymptomatic TOF patients following corrective surgery [aged 13 years (6-56 years), follow-up period 7.5 years (1-28 years)] were included in the study. Two-dimensional echocardiographic and TDI examination were performed in all subjects. The RA areas were determined in three different phases from apical four chamber view ( $A_{max}$ : maximal area;  $A_a$ : area at the onset of electrocardiographic P wave;  $A_{min}$ : minimal area). The RA active emptying area fraction [ $AEAF = (A_a - A_{min}) / A_a * 100\%$ ] was taken as an index representing global atrial pump function. TDI derived systolic, early diastolic and late diastolic strain rate peaks ( $A_{SR}$ ) were measured from RA and right ventricle (RV). Of the 50 TOF patients, 20 underwent MRT examination in order to quantify the right ventricular (RV) systolic function.

## Results

In ASD patients the RA  $A_{\min}$  ( $p=0.003$ ),  $A_a$  ( $p=0.000$ ) and  $A_{\max}$  ( $p=0.001$ ) were significantly higher than in the normal subjects. There was no significant difference in AEAF or RA strain rates between the two groups before ASD closure. The AEAF and  $A_{SR}$  were significantly reduced after surgical ASD closure but showed no significant difference after interventional occlusion.

In TOF patients the RA  $A_{\min}$  ( $p=0.000$ ),  $A_a$  ( $p=0.000$ ) and  $A_{\max}$  ( $p=0.013$ ) were significantly higher than in normal subjects. The AEAF and the RA strain rates were significantly lower in TOF patients compared to normal subjects ( $p=0.005$ ). TOF patients with RV ejection fraction (EF) less than 50% showed a significantly higher  $A_{SR}$  when compared to those with RV EF over 50% ( $p=0.021$ ).

## Conclusion

Right heart volume overloading in ASD patients has little influence on the RA pump function. RA pump function is reduced after surgical ASD closure but preserved through the interventional procedure. RA pump function is generally reduced in patients after corrective surgery of TOF, however, their RA pump function may be relatively enhanced to compensate RV dysfunction. TDI is a promising method to quantify regional right atrial performance and supplies additional and early information about cardiac function.

Key words: Atrial function, Atrial septal defect, Echocardiography, Tetralogy of Fallot,

Tissue Doppler imaging