P-112

Noninvasive cardiac output measurement at rest and during exercise in pediatric patients following interventional or surgical ASD-closure

Wiegand G., Binder W., Kaulitz R., Riethmüller J., Hofbeck M.
University Children`s Hospital, Tuebingen, Germany

Background:
In the majority of patients secundum ASDs are closed interventionally or surgically prior to the onset of symptoms. Since right ventricular dimensions usually normalize following ASD closure it has been assumed that cardiac function during exercise will be normal in the long-term follow-up. The inert gas rebreathing (IGR) method allows noninvasive determination of the cardiac index (CI) under exercise conditions. The aim of this study was to determine CI at rest and during exercise in the medium term follow-up in children who underwent a surgical or interventional closure of the defect.

Patients/Controls:
Seventeen patients (age 8.8 – 17.3 years) who underwent surgical correction were included together with 17 subjects who received an interventional procedure (age 12.2 – 17.3 years). The current study was performed 6.5-11.6 years after the procedure in all of them. Twelve healthy children (8.5-18.6 years) served as controls.

Methods:
The Innocor system is based on the IGR principle. Patients are breathing over a period of 30 seconds a low concentration mixture of an inert and a blood soluble gas from a closed system. The pulmonary blood flow (PBF) absorbs the blood soluble component, the rate of absorption being proportional to the PBF; the higher the PBF the higher the absorption rate will be, while the inert component is expired unaltered. For exercise testing the standard treadmill protocol of the German Society of Pediatric Cardiology was used. CI, stroke volume (SV) and the heart rate (HR) were determined during rest and at two standardized submaximal exercise levels (level 3 and level 6).

Results:
The CI increased in all subjects under exercise conditions. Neither the SV nor the HR displayed significant differences among the three groups either during resting or exercise conditions. While the HR rose continuously during the exercise test, no increase of the body surface area indexed SV occurred after level 3.

Discussion:
Noninvasive determination of the CI at rest and during exercise with the IGR is feasible in the pediatric age group. In the medium-term follow-up we found no significant differences between patients who underwent surgical or interventional ASD closure as compared to normal controls.