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The authors have nothing to declare

The usefulness of magnetic resonance imaging of the heart and aorta in the diagnostic work-up in girls with Turner syndrome

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Background

Congenital heart defects are found in 50% of girls with Turner syndrome (TS). The evaluation of cardiovascular system is therefore an important element in the diagnostic work-up of TS and is of particular significance of further cardiologic monitoring, safety aspects of recombinant growth hormone treatment (rGH) and any pregnancy planning.

The aim of the study was to assess the cardiovascular system in girls with TS with magnetic resonance imaging of the heart and aorta (CMR and angio MR).

Patients and Methods:

MRI and angioMR was performed in 30 children with TS. For the analysis of selected 26 girls. The mean age was 14.65 years (rang 9 – 18 years), weight 47.81 kg (rang 20 – 71 kg), height 148.62 cm (rang 128 – 163 cm), body surface area (BSA) 1,39 m^2 (range 0,87 – 1,71). CMR was performed using 1,5 T Magnetom Avanto machine (Siemens). AngioMRI was performed with a gadoline contrast agent and type TWIST sequence. With a volumetric method using a CINE sequence the morphology and function of left and right ventricle were obtained. „Phase contrast" type sequences served for the assessment of a flow through the aorta and pulmonary truncus.

Results:

Aortic diameters were measured at nine levels with maximum-intensity projection (MIP) images.

Regression analysis of diameters in relation to BSA demonstrated linear relationship between the cross-sectional aortic diameters and the square root of BSA ($BSA^{0.5}$).

Diameters were described regression function $(-3{,}48+25{,}42*BSA^{0.5})$ mm for aortic sinus, $(-1{,}52+20{,}39*BSA^{0.5})$ mm for sinotubular junction, $(1{,}07+18{,}94*BSA^{0.5})$ mm for ascending aorta, $(3{,}67+15{,}35*BSA^{0.5})$ mm for at the origin of brachiocephalic, $(-4{,}62+21{,}26*BSA^{0.5})$ mm for first transverse segment, $(-4{,}43+19{,}3*BSA^{0.5})$ mm for second transverse segment, $(2{,}16+13{,}24*BSA^{0.5})$ mm for isthmic region, $(6{,}21+9{,}08*BSA^{0.5})$ mm for descending aorta, $(6{,}61+7{,}33*BSA^{0.5})$ mm for diaphragm.

The results were compared to ranges developed by Kaiser et al. Comparison of the correlation coefficient of the regression of the study group and the regression function Kaiser revealed in the 7 to 9 levels aortic statistically significant difference.

ASI (aortic stenosis index) >2,5 cm/m2 was in 1 patient.

Fig. 1 Aortic diameters were measured at nine levels

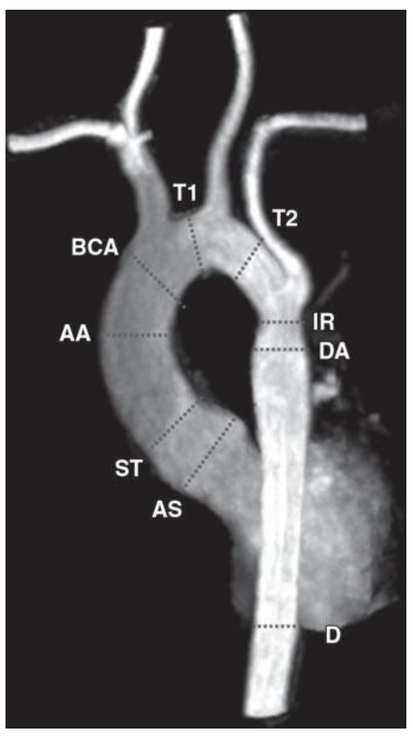
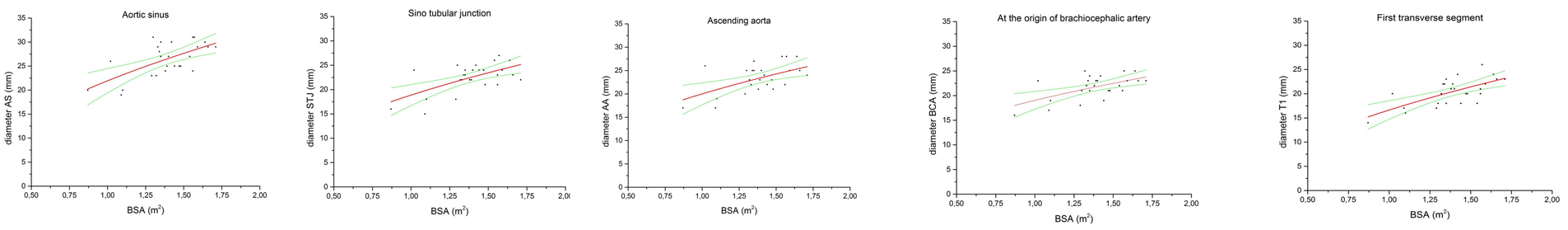
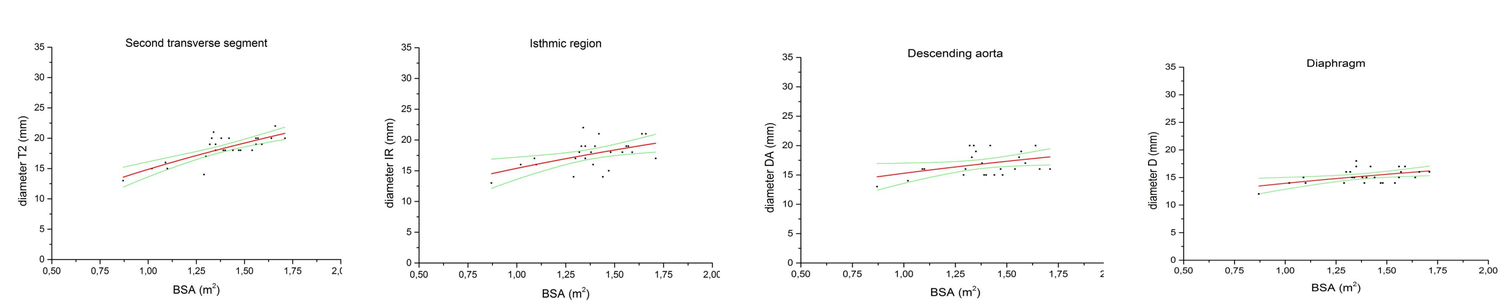


Fig 2. Regression analysis of aortic diameters in relation to BSA





Conclusions

1. CMR, particularly angioMRI, allows to detect vascular abnormalities of the aorta.
2. The aorta diameters in correlation to BSA are bigger comparing to normal population.
3. AngioMRI is important for prognosis and planning further medical care.

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Syndromes : Mechanisms and Management

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