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Objectives

Left atrium (LA) size and function play a critical role in left ventricular filling and can change due to e.g. mitral valve diseases and left ventricular dysfunction. Therefore, LA volumes, reservoir and conduit function are potential markers for cardiovascular outcome. Real-time 3D echocardiography (RT3DE) allows non-invasive evaluation of left atrial volume changes throughout the cardiac cycle without geometric assumptions. However, pediatric reference values are missing.

Aim: To develop percentiles for pediatric left atrial volumes in RT3DE and to add to the understanding of the dynamic LA function.

Methods

- Multicenter prospective study
- RT3DE of the LA in 325 healthy children and adolescents (0.03-256 months, 2.4–93 kg).
- Full Volume-Datasets over 4 heart cycles (3D volume rate $27.7 \pm 8.47/s$)
- Philips ie 33 or GE Vivid 7 (transducers X5-1, X7-2, V9).
- Data analysis by TomTec Imaging Systems 4.6.3.9 (4D LV-Function) (Fig.1)

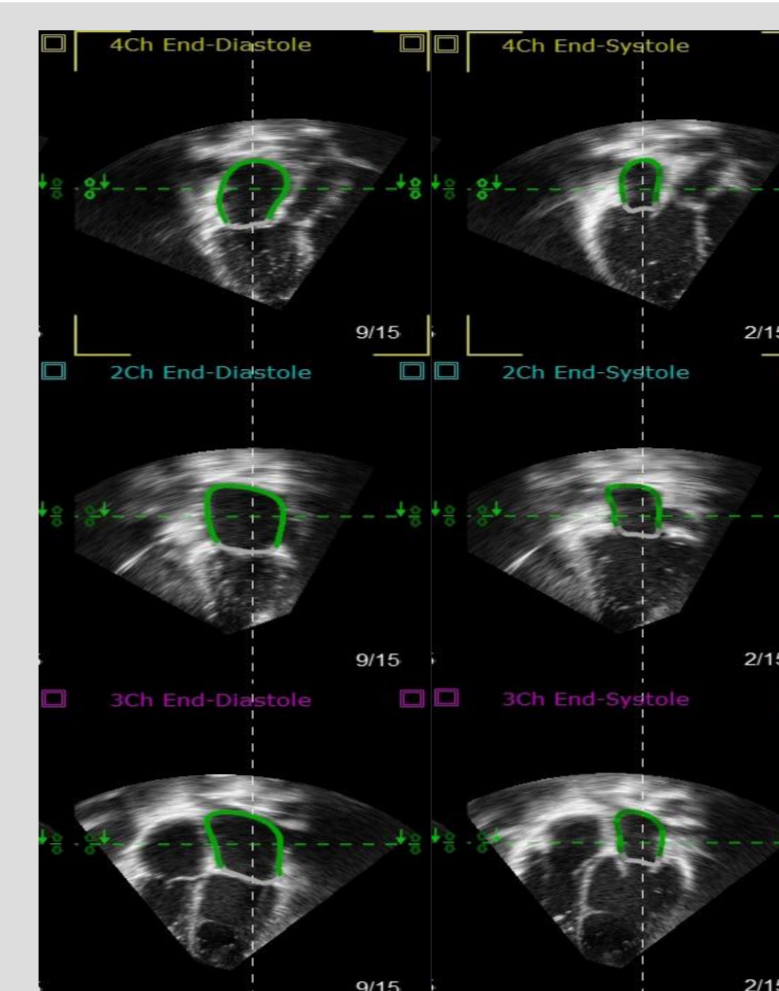


Fig. 1

- Maximal and minimal LA volume (V_{max} , V_{min}).
- In 236 children determination of the volume prior to the active contraction of the LA (V_{preA}) by visually identifying the moment of the rebound of the mitral valve as well as the p-wave in ECG.
- Duration of atrial systole and diastole (Fig. 2).

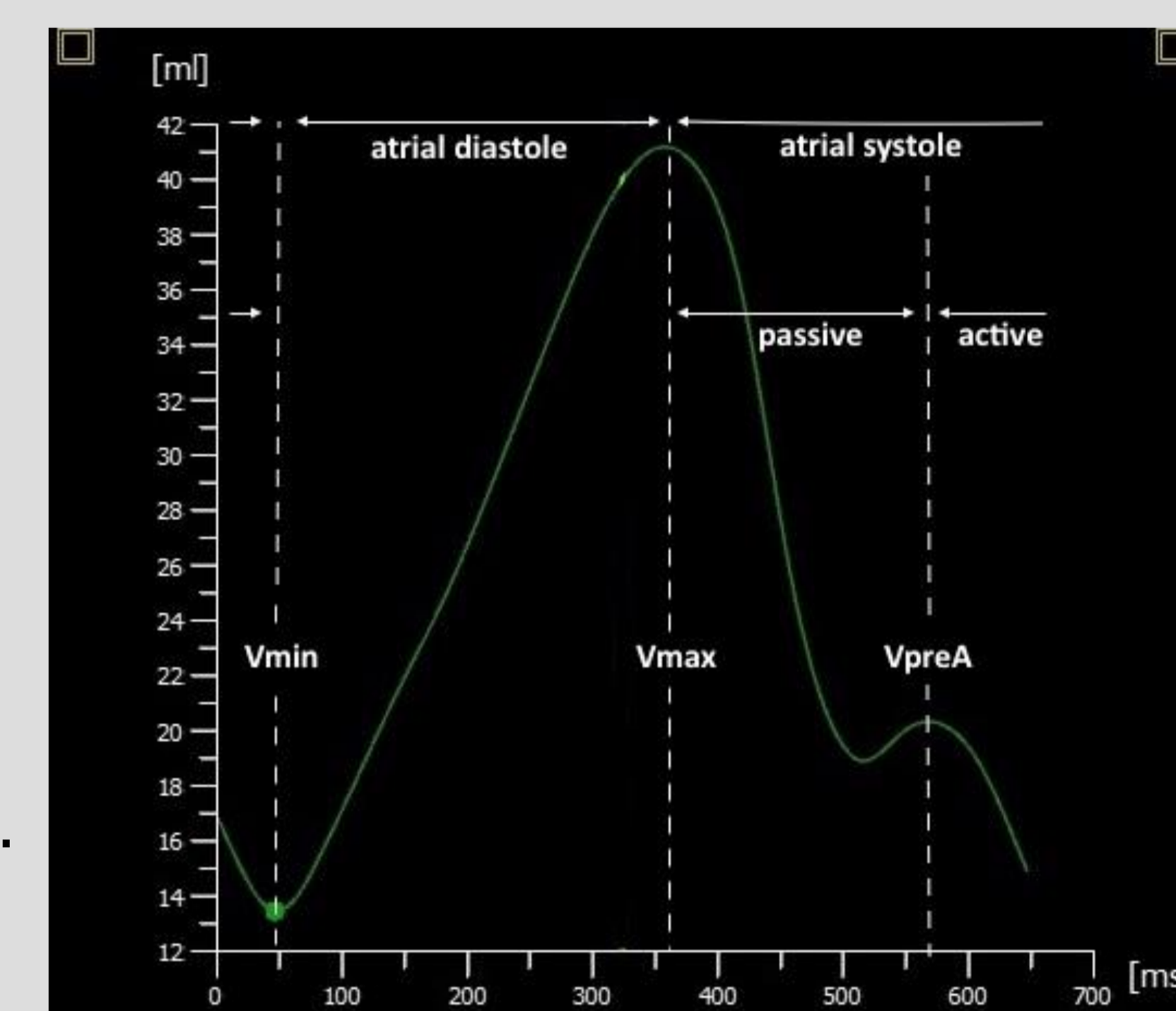
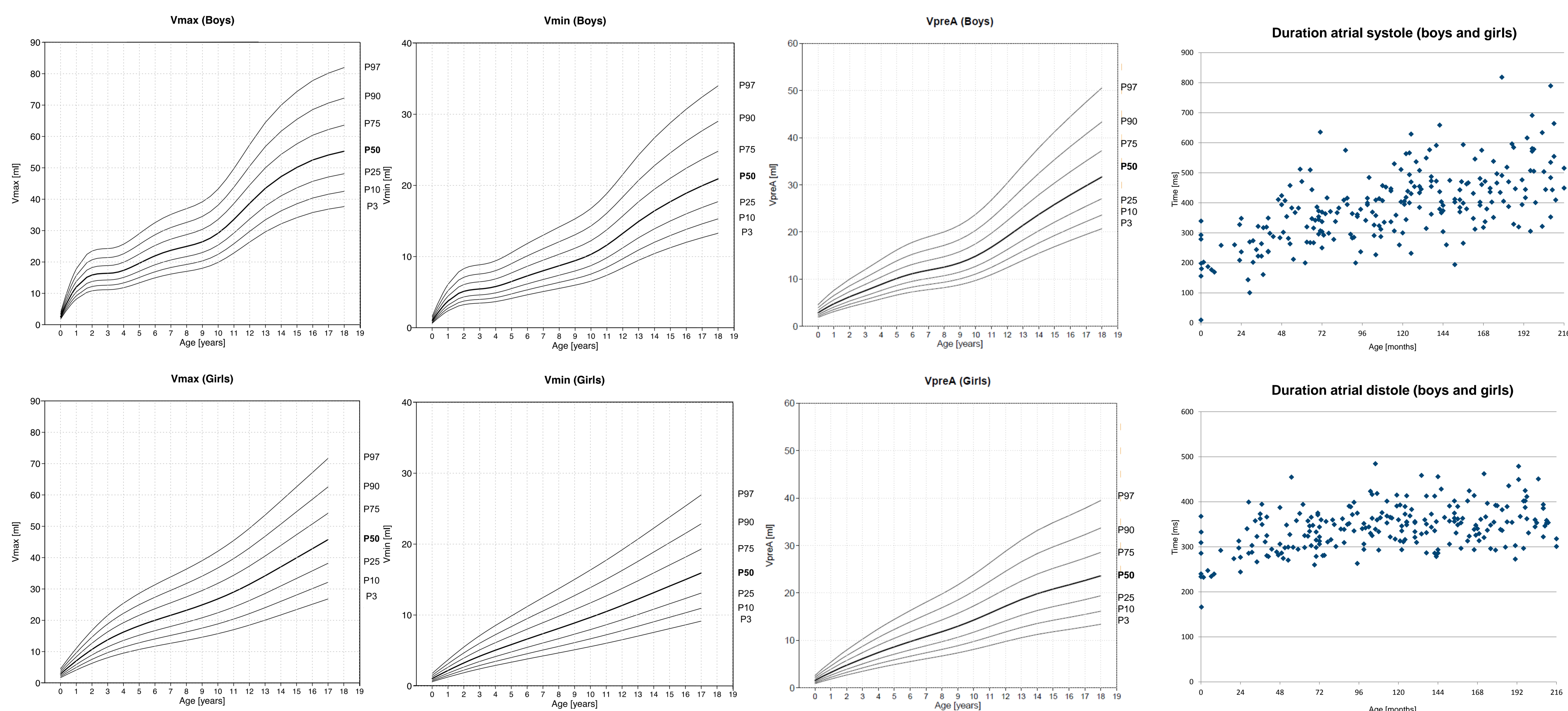


Fig. 2

Percentiles for V_{max} , V_{min} and V_{preA} were created using the LMS method¹.



Intraobserver variability
 V_{max} : mean bias $-0.3 [-2.8-2.3]$ ml, V_{min} : mean bias $-0.3 [-2.1-1.5]$ ml

Interobserver variability
 V_{max} : mean bias $0.8 [-5.4-7.1]$ ml, V_{min} : mean bias $0.6 [-3.4-4.7]$ ml

Conclusion

- Percentiles of the so far largest European study population with a special focus on small children
- LA volumes can be assessed noninvasively by RT3DE
- Percentiles of the left atrium as a possible parameter in longitudinal follow up in children with pathological heart condition

Acknowledgements

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References

- 1 Cole and Green (1992). *Statistics in Medicine*, 11 (10), 1305-1319.