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Middle cerebral artery peak systolic velocity in fetuses with transposition of the great arteries.

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Objectives

- To examine peak systolic velocity in the middle cerebral artery (MCA-PSV) in fetuses with transposition of the great arteries (TGA). Further, to evaluate the hypothesis that the unique distribution of oxygenated and deoxygenated blood in fetuses with TGA might lead to fetal anemia, hence influencing MCA-PSV.

Methods

- This retrospective study included all singleton fetuses born with postnatally confirmed TGA at Copenhagen University Hospital Rigshospitalet between 2016 and 2023.
- Data on MCA-PSV, neonatal hemoglobin, and specific diagnoses were manually retrieved from pre- and postnatal patient files.

Results

- 52 cases with of 205 MCA-PSV measurements (GA 20+0 to 39+1).
- Median MCA-PSV MoM was 1.09 (IQR 0.96;1.20) with an increase from 0.97 (IQR 0.86;1.15) at GA 20+0-24+6 to 1.13 (IQR 0.95;1.19) at GA 35+0-39+1. Not significant after accounting for multiple measurements ($p=0.089$).
- No differences in MCA-PSV MoM values between cases with and without surgical closure of a ventricular septal defect (VSD).
- The median neonatal hemoglobin concentration was 16.4 g/dL (IQR 15.3-17.2 g/dL). For children with TGA with and without surgical closure of a VSD, the hemoglobin concentration was 16.6 g/dL (IQR 15.0-17.7 g/dL) and 15.8 g/dL (IQR 15.6-16.4 g/dL), respectively ($p=0.507$).
- MCA-PSV MoM was correlated to neonatal hemoglobin, where higher MCA-PSV was associated with a lower hemoglobin (-4.81 (95% confidence interval $-7.21;-2.41$))

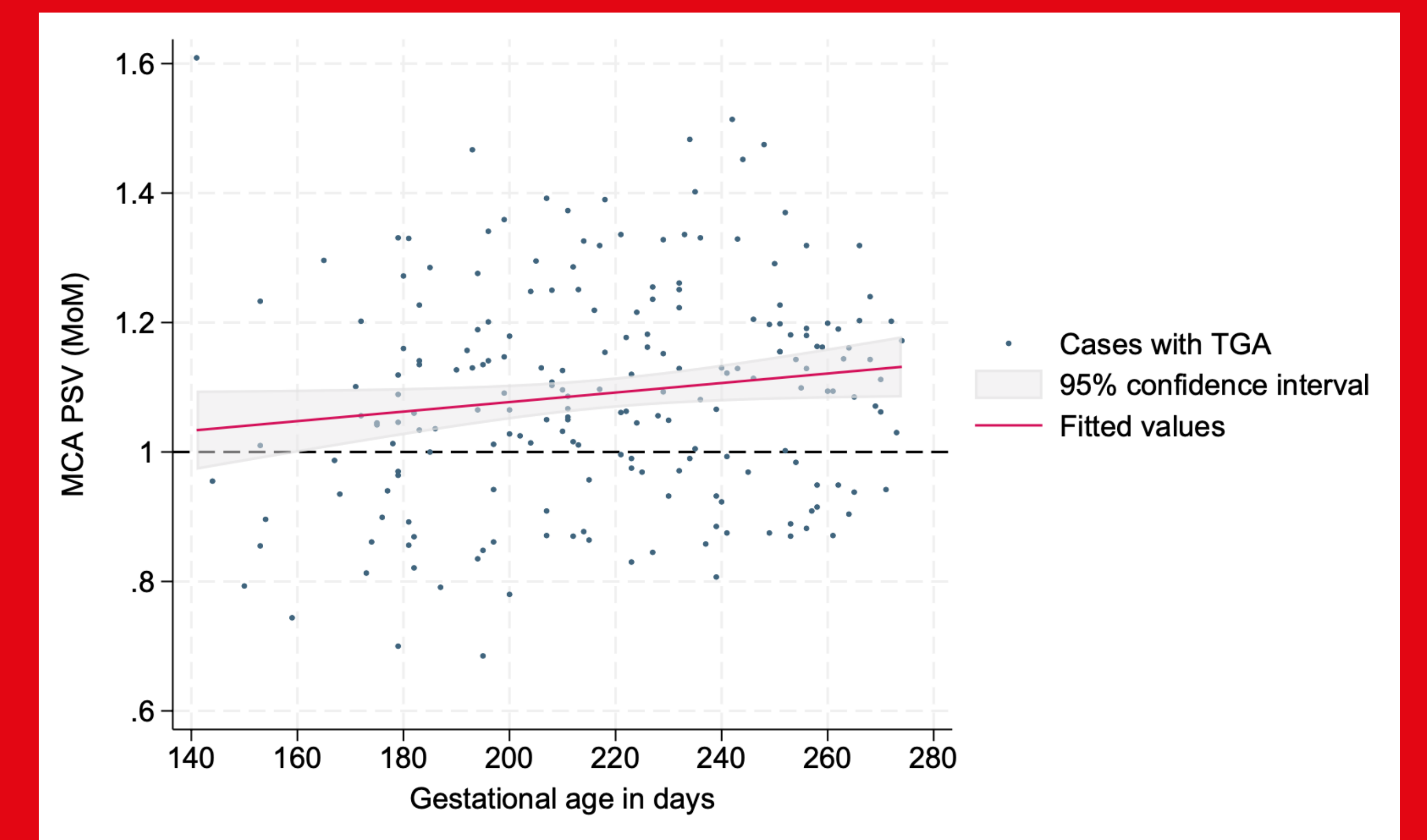


Figure 1. MCA-PSV: middle cerebral artery peak systolic velocity; MoM: multiple of the median; TGA: transposition of the great arteries.

Conclusion

- The study adds to the limited evidence on MCA-PSV in fetuses with TGA, supporting a trend of increasing MCA-PSV MoM with gestational age, though not significant when accounting for multiple measurements.
- A correlation was found between MCA-PSV MoM and neonatal hemoglobin, where higher MCA-PSV was linked to lower hemoglobin.
- However, the data do not support that fetuses with TGA have an elevated MCA-PSV due to fetal anemia.