Neurodevelopmental outcome after absent or reversed end diastolic flow in the umbilical artery during fetal spina bifida repair

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Objective
Absent or reversed end diastolic flow (AREDF) in umbilical artery (UA) Doppler are known phenomena during fetal interventions such as fetal spina bifida (SB) repair. The clinical importance of these Doppler findings and the impact on children’s outcome is not yet clarified.

Methods
Between 2010 and 2019 132 patients underwent fetal SB repair at our center. The pre-, intra- and postoperative ultrasound data was reviewed for AREDF-UA. The group with AREDF-UA was compared to the group with normal UA Doppler during the intervention. Primary endpoint was the neonatal and two years outcome. To assess the neurological development the Bayley scale III of infant development (BSID III) was used. Secondary endpoint was the FIGO-Score of the CTGs at 1,2 and 6 hours postoperatively and their correlation to the AREDF UA flow.

Results
None of the fetuses showed AREDF before SB repair. In 107 patients (82%) normal UA-Doppler and in 23 (18%) AREDF-UA was observed during or immediately after SB surgery. Hereof, 17 (13 %) cases showed an AEDF-UA and 6 (5 %) cases a REDF-UA. On the first day after SB-surgery the AREDF-UA disappeared in all 23 cases. GA at delivery, UA-pH, 5-minute Apgar and birth weight were comparable between both groups and there was no difference regarding the neurodevelopmental outcome at 2 years of age (p > 0.05). Further, no significant difference in the CTGs at 1, 2 and 6 hours postoperatively between the groups (p >0.05) was found.

Conclusion
AREDF-UA during fetal SB repair did not negatively influence perinatal or two years neurodevelopmental outcome compared with a normal UA-Doppler. The postoperative CTGs after a short-term phase of AREDF-UA during SB-repair recover similarly as in normal UA-Doppler cases.