CHARACTERIZATION OF CORTICAL BRAIN MALFORMATIONS DURING DEVELOPMENT OF FETUSES WITH SPINA BIFIDA UNDERGOING IN UTERO NEURAL TUBE DEFECT REPAIR

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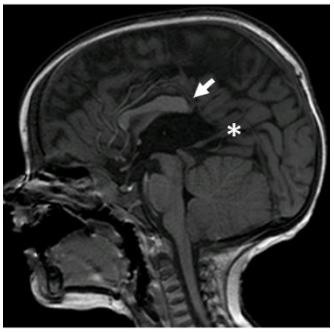
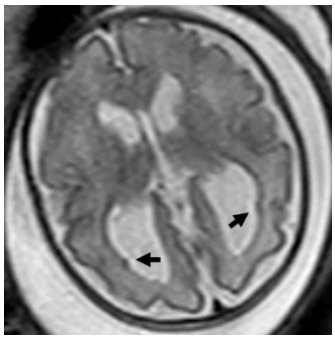
OBJECTIVES There are few studies characterizing developmental cortical malformations in fetuses with neural tube defects (NTDs). In our study, we examined the incidence and progression of malformations of the corpus callosum, brain parenchyma, and vascular system from 24 wks gestation to 1 yr postnatally.

STUDY DESIGN Longitudinal retrospective cohort study examining brain abnormalities seen on MRI in 57 fetuses who underwent prenatal NTD repair (27 Fetosc. and 30 Open). Presurgery MRIs were obtained in all cases and 6 weeks postsurgery in 54 cases (26 Fetosc. vs. 28 Open). At 1 year, MRI scans from 22 open and 16 fetoscopic repaired infants were reviewed.



RESULTS GA at surgery, GA and age at MR scans were similar between groups. The most common anomalies of cortical migration were corpus callosum dysgenesis (Preop:Open: 50% vs Fetosc.:40.7% p=0.48; 6 wks postop:Open:57.1% vs Fetosc.:50% p=0.59; Postnatal:Open:86.4% vs Fetosc.:87.5% p=1.0) and nodular heterotopia (Preop:Open: 3% vs Fetosc.:0% p=1.0; 6 wks postop:Open:11% vs Fetosc.:12% p=1.0; Postnatal:Open:32% vs Fetosc.:19% p=0.36).



The incidence of both corpus callosum anomalies and nodular heterotopia was found to increase with gestational age. Intracranial hemorrhage was identified in 17.24% of cases preop (Open: 23.33% vs Fetosc.:10.71% p=0.22). By 6 wks postop, all cases of intracranial hemorrhage were found to have resolved. Postnatally, 5.13% of cases (Open: 4.55% vs Fetosc.:5.88% p=1.0) were identified to have intracranial hemorrhage. Delayed sulcation, lissencephaly, polymicrogyria, pachygyria, and schizencephaly were not detected in any prenatal or postnatal MRI.

CONCLUSION Atypical abnormalities of the cerebral parenchyma in fetuses with NTDs include corpus callosum dysgenesis, nodular heterotopia, and intracranial hemorrhage. Corpus callosum dysgenesis and nodular heterotopia are identified more with increasing gestational age, whereas intracranial hemorrhage more likely occurs early during gestation. These findings are relevant in considering candidates for fetal intervention and interpreting postoperative fetal brain findings.