EP 19.26: The optic nerves and chiasm in postmortem fetal MRI

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Objective
The aim of this postmortem fetal MRI study was to obtain normal values of optic structures, and to identify pathologic changes.

Patients and Methods
Postmortem fetal MRI scans of 58 fetuses (16-42 gestational weeks) were included. Thirty-three fetuses with normal development of optical structures, and 25 fetuses with pathologies were evaluated. Postmortem imaging was performed within 24 hours of fetal demise using a 3T MR scanner and an eight-channel knee coil. T2-weighted axial images and Image J software were utilized to measure total optic nerve length, maximum diameter of optic nerve (retrobulbar and intracranial), angle between optic nerves, and minimum transverse diameter of optic chiasm. Pearson’s correlation was used with regard to measurements of optic structures and gestational age.

Results
- **Optic nerve length** increased from 10.5 mm to 29.4 mm within 26 weeks.
- **Retrobulbar optic nerve diameter** increased from 0.83 to 2.13 mm (right) and 0.860 to 2.108 mm (left) within 25 weeks.
- **Minimum transverse diameter of optic chiasm** increased from 4.07 mm to 6.71 mm within 24 weeks.
- **The angle of the optic nerves** became increasingly acute with later gestation 111.49 - 75.04° (16-36 GW)

All sizes of optic structures correlated significantly with GA (p<0.001). In young fetuses, the optic nerves had a U-transforming to a V-shape with higher gestational age. Fetuses in the pathologic group showed significant aberrations in one to three parameters.

Conclusion
As measures of fetal optic nerves and chiasm correlate with gestational age, and the shape of the optic chiasm changes characteristically with gestation, developmental deviations that may be part of malformative or acquired conditions, can be detected sensitively on postmortem MR scans.