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Fetal Ventricular Measurement in Determination for Intrauterine Closure of Myelomeningoceles

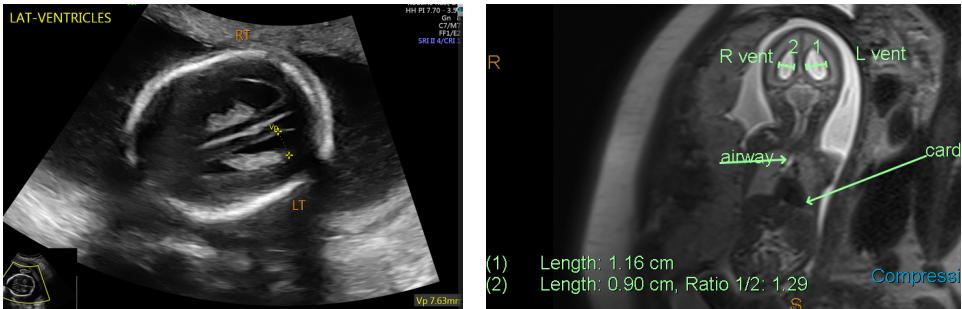
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Intro

Prenatal closure of myelomeningoceles has been shown to decrease the need for shunting at one year of age and improve composite mental and motor function scores. Post-hoc analysis of the MOMs trial however, reported that fetuses with ventricular width of >15 mm at the time of intrauterine screening (19-25 weeks) received no benefit from prenatal closure with regards to need for treatment of hydrocephalus (Tuliplan, et al, JNS PEDS, 2015). This data has led to a change in counseling and practice for prenatal closure. However, little is documented regarding the details of ventricle measurement, modality, and timing. We have analyzed our results of ventricle measurement with ultrasound (US) and fetal magnetic resonance imaging (MRI).

Methods

Eight consecutive neonates who underwent prenatal myelomeningocele repair at Children’s Mercy Fetal Health Center were reviewed. We compared the dates of prenatal US and fetal MRI. We calculated differences in ventricle measurements between the two modalities.



Patient 3 – US and MRI showing down ventricle size 7.6 and 11.6 respectively . Imaging done 1 day apart.

| Gest. Age @ US (weeks.d days) | Ventricle size (mm) on US (R/L) | Ventricle size (mm) on MRI (R/L) | Difference between MRI and US (mm) | Time difference between studies (MRI-US) (weeks.days) |
|-------------------------------|---------------------------------|----------------------------------|------------------------------------|---|
| 24.4 | 5.9*/7.6 | 7.5*/8.4 | 1.6 | -2.6 |
| 18.1 | 11.4*/13.8 | 11*/13 | -0.4 | 0.1 |
| 20.5 | 9.6/7.6* | 9.0/11.6* | 4 | 0.1 |
| 21.3 | 3.6/4.7* | 7/7* | 2.3 | 0.1 |
| 23.1 | 5.3/8* | 6.7/7.5* | -0.5 | 0 |
| 21.2 | 4.6/5.9* | 9.4/8.4* | 2.5 | -0.4 |
| 23.5 | 5.4*/6.3 | 7.0*/8.9 | 1.6 | -0.6 |
| 22.5 | 14.3/13.4* | 17/16* | 2.6 | 0.6 |

*down ventricle

Results

The average gestational ages at fetal US and MRI were 21.8 and 21.4 weeks, respectively. Often the two imaging modalities were performed only days apart (average 0.375 weeks). US and MRI measurements showed average down ventricle sizes of 7.7 mm (range 4.7-13.4 mm) and 9.5 mm (range 7.0-16.0 mm), respectively. The average discrepancy between the two imaging modalities was 1.9 mm with MRI more often measuring larger.

Conclusion

US and MRI provide different results in regards to fetal ventricle size. MRI most often estimated ventricle size to be larger than US. This holds true regardless of timing between the images. Standardization of timing and modality to measure fetal ventricle size should be established. If treatment recommendations are going to be offered or withheld based on the 15 mm “rule” method of fetal imaging must be taken into account.