

Three-dimensional ultrasound evaluation of lung volume in fetuses with abdominal wall defect

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Objective

This study aimed to evaluate lung volume (LV) in fetuses with abdominal wall defect (AWD) using three-dimensional (3D) ultrasound (US) and to correlate AWD with the type (omphalocele and gastroschisis) and size of the defect and neonatal morbidity and mortality.

Methods

This prospective observational study included 72 pregnant women with fetuses with AWD and a gestational age <25 weeks. Abdominal volume, 3D US LV, and herniated volume were acquired every 4 weeks up to 33 weeks. LV was compared with normal reference curves and correlated with abdominal and herniated volumes.

Results

Omphalocele ($p < 0.001$) and gastroschisis ($p < 0.001$) fetuses had smaller LV than normal fetuses. LV was positively correlated with abdominal volume (omphalocele, $r = 0.86$; gastroschisis, $r = 0.88$), whereas LV was negatively correlated with omphalocele-herniated volume/abdominal volume ($p < 0.001$, $r = -0.51$). LV was smaller in omphalocele fetuses that died ($p = 0.002$), were intubated ($p = 0.02$), or had secondary closure ($p < 0.001$). In gastroschisis, a smaller LV was observed in fetuses discharged using oxygen ($p = 0.002$).

Conclusion

Fetuses with AWD had smaller 3D LV than normal fetuses. Fetal abdominal volume was inversely correlated with LV. In omphalocele fetuses, a smaller LV was associated with neonatal mortality and morbidity.