

EP05.41 Mediastinal shift angle (MSA) and its association with neonatal mortality in fetuses with isolated left congenital diaphragmatic hernia.

Donatella Gerulewicz-Vannini, Edgar Hernandez-Andrade, Dejian Lai, Ramesha Papanna, Eric P. Bergh, Jimmy Espinoza , Gustavo Vilchez Lagos, Sami Backley, Felicia Lemoine, Matthew T. Harting, Ashley H. Ebanks, Anthony Johnson.

Department of Obstetrics and Gynecology and Reproductive Sciences, Division of Fetal Intervention, McGovern Medical School at UTHealth Houston, Houston, Texas U.S.A. Department of Pediatric Surgery, McGovern Medical School at UTHealth Houston, Houston, Texas U.S.A.

Objective

□ The mediastinal shift angle (MSA) estimates the lateral displacement of the heart in the fetal thorax. We aimed to evaluate the MSA's performance in predicting neonatal mortality in fetuses with left isolated congenital diaphragmatic hernia (CDH) as an isolated marker, and in combination with other ultrasound and MRI predictors.

Methods

□ MSA was obtained by ultrasound in a cross-sectional four-chamber view of the thorax in 96 fetuses with left isolated CDH. MSA was calculated by drawing two lines from a common point from the skin edge posterior to the spinous process of the thoracic vertebrae, the first line dividing the thorax into two halves, and the second line directed to the lateral border of the right atrium (**Fig 1**). Additionally, the observed/expected (O/E) lung-to-head ratio LHR, O/E total fetal lung volume (TFLV), and percentage of liver herniation (%LH) were obtained. ROC analysis, prediction, and associations with neonatal mortality were evaluated

Results

□ Neonatal mortality was 28.1% (27/96). The areas under (AU) the ROC curve for neonatal mortality for MSA and O/E LHR were 0.69 and 0.75, respectively. The best MSA cut-off value was 35° with 85.2% sensitivity and 67.1% specificity; aOR 11.75 (95% CI 3.63-37.97; $p < 0.0001$).

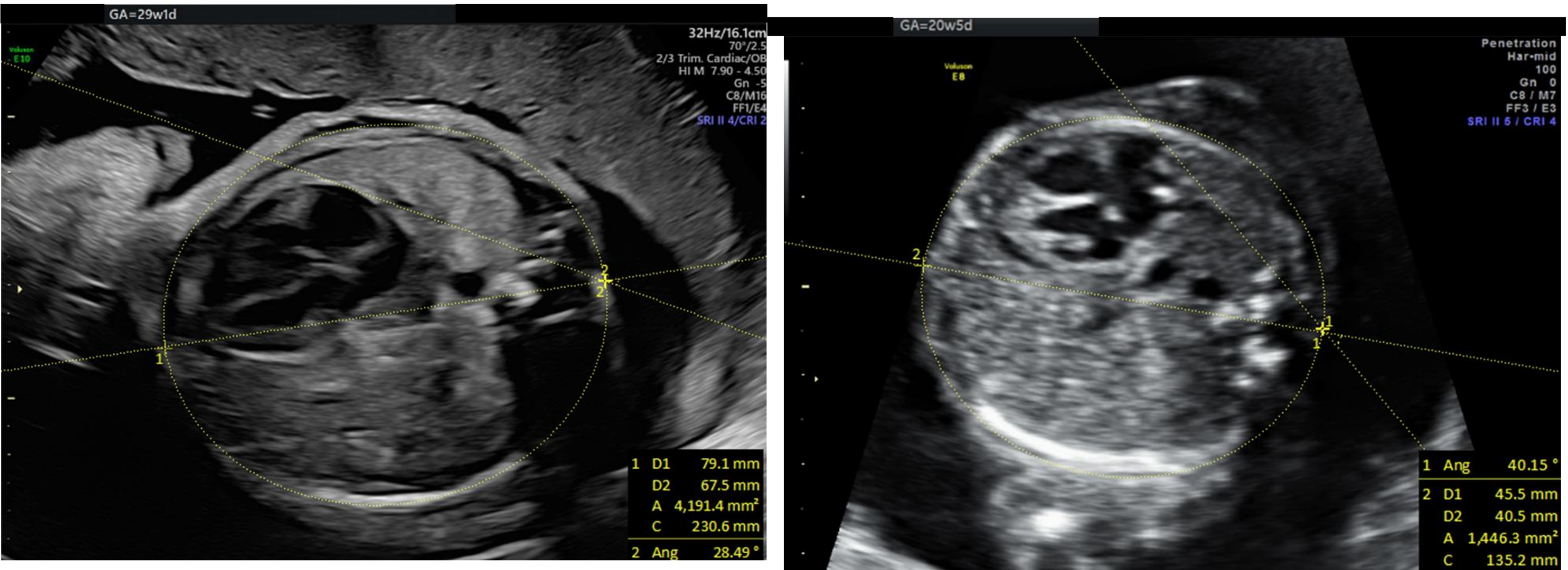


Fig 1. The mediastinal shift angle (MSA). The circle helps to define the boundaries of the thorax to establish the common point on the back of the spine to start the angle, and to identify the middle point in the anterior thoracic wall. The second line is drawn from the common point in the back of the spine to the lateral border of the right atrium, a) MSA <35° ; b) MSA ≥35° .

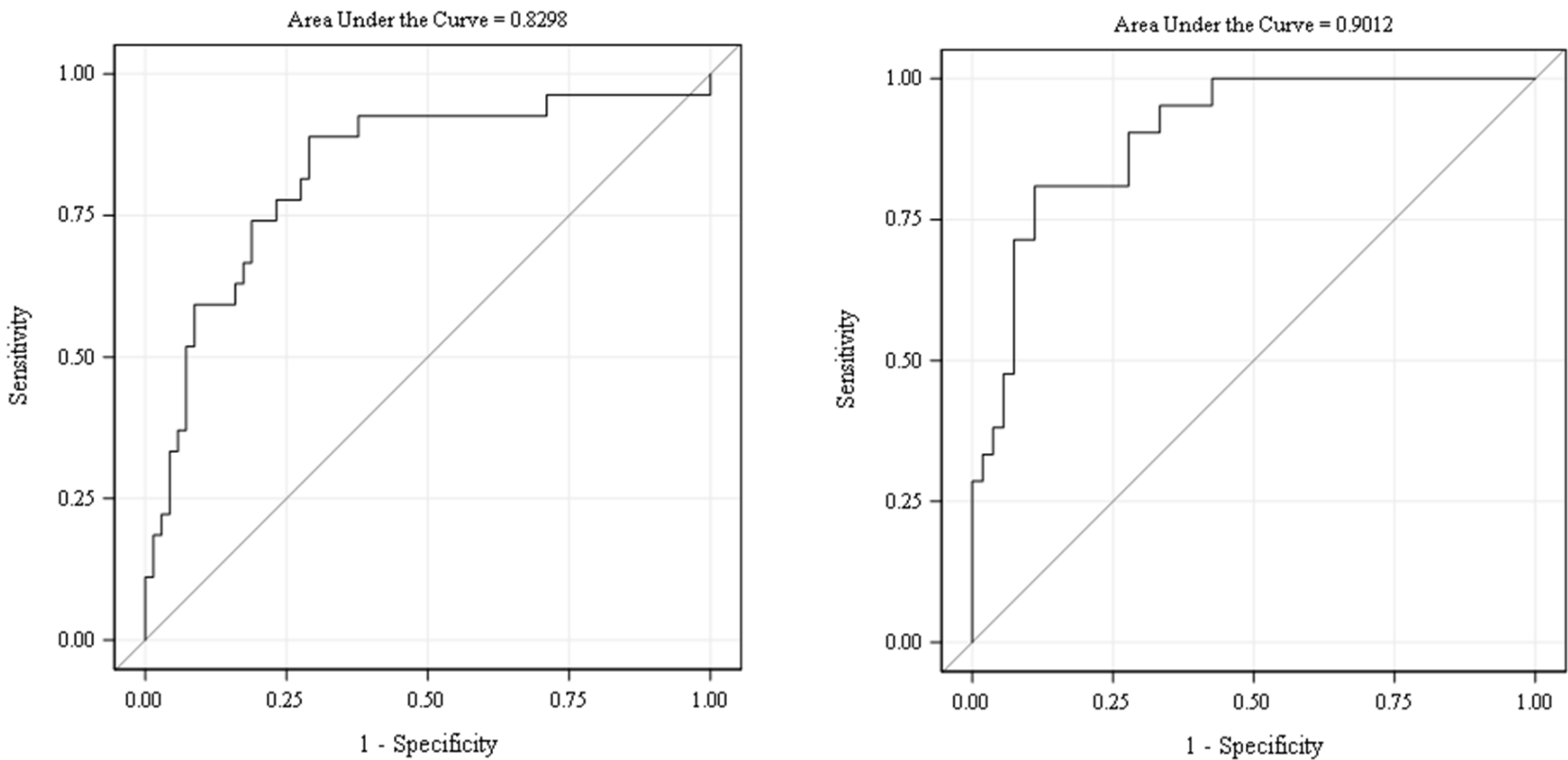


Fig 2 Receiver operating characteristic (ROC) curve for predicting neonatal death among fetuses with isolated left congenital diaphragmatic hernia: combining a) mediastinal shift angle (MSA), and observed/expected lung-to-head ratio (O/E LHR); and b) MSA + O/E LHR, + observed/expected total fetal lung volume.

Results

- Among fetuses with O/E LHR >25% (n=75), mortality was 16% (12/75), MSA ≥35° showed an AU-ROC of 0.72 with 83.3% sensitivity and 71.4% specificity, aOR 12.5 (95% CI 2.49-62.76; $p=0.002$).
- Logistic regression showed a significant correlation between MSA and O/E LHR (-0.48, $p < 0.001$), between MSA and O/E TFLV (-0.36, $p=0.005$), and between MSA and %LH (0.43, $p=0.001$).
- When MSA and O/E LHR were combined, the AU-ROC for neonatal mortality was 0.832; when MSA, O/E LHR, and O/E TFLV were combined, the AU-ROC was 0.901 (**Fig 2**).

Conclusion

Mediastinal Shift Angle (MSA) is a good predictor of neonatal mortality in fetuses with left isolated CDH.

The prediction improves when MSA, O/E LHR and O/E Total Fetal Lung Volume are combined.