Gastro-cardiac angle - A novel method to predict liver herniation in left congenital diaphragmatic hernia

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Objective
To evaluate the effectiveness of the Gastro-cardiac angle in the prediction of intrathoracic liver herniation in patients with left-sided congenital diaphragmatic hernia (CDH).

Methods
This is a retrospective cohort study between January 2015 and April 2016 of fetuses with left-sided CDH who had a prenatal sonographic examination and delivered in our fetal medicine center. The antenatal scans were retrospectively analysed to measure the angle between the apposing borders of the heart and the stomach in the same sections as that used to measure the Lung Head Ratio. The presence or absence of liver during the surgical operation was ascertained from the operation notes.

Results
A total of 52 cases were included. Two cases of right CDH and six cases where stomach was partially or fully intra-abdominal were excluded. Correlation between the gastro-cardiac angle and the presence/absence of liver herniation was assessed using receiver operating curves (ROC) and DPR. The optimal cut-off value obtained was a gastro-cardiac angle of 54.5°. Receiver-operating characteristic (ROC) analysis indicated an area under the curve (AUC) of 0.996 that corresponded to a test accuracy of 97.2% with a sensitivity and specificity of 100% and 96.4% respectively and predictive values of 88.9% (+) and 100% (−). The Kappa value obtained was 0.923, thereby showing almost perfect agreement between the variables.

Conclusion
Gastro-cardiac angle is a useful tool in predicting the presence or absence of liver herniation in Left CDH. A cut-off value of 54.5° was associated with intra-thoracic liver with very high sensitivity and specificity.