Prenatal Predictors of Survival, Pulmonary Hypertension, and ECMO in Isolated CDH Undergoing Expectant Management, A Systematic Review and Meta-analysis

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Background and Hypothesis: Congenital diaphragmatic hernia (CDH) is a severe developmental defect affecting 1-4 per 10,000 births, characterized by left/right-sided defect, or mixed with herniation of abdominal contents into thorax, with resultant lung hypoplasia and persistent pulmonary hypertension (PHTN). The study investigates prenatal predictors of survival to hospital discharge, PHTN and the need for ECMO in fetuses with isolated CDH undergoing prenatal expectant management.

Project Methods: We performed a systematic literature review on prenatal diagnostic tests in fetuses with isolated CDH undergoing expectant management. Primary outcomes included survival-to-hospital discharge, persistent PHTN within 28 days, and ECMO need. Newcastle Ottawa Scale assessed quality of studies. Meta-analysis performed when two or more studies reported on the same test. Subgroup analysis performed according to CDH side.

Results: 161 full-text articles between 2000-2022 were assed for eligibility; 48 met inclusion criteria. 45 reported on survival, 12 on ECMO need, 8 on PHTN; quality of studies was moderate. Studies included were retrospective (81%) or prospective (19%) regarding fetuses undergoing expectant management (77%), or mixed tracheal occlusion and expectant management (20%). Most studies included mixed (41%) or left-sided (47%) CDH. Survival predicted by TFLV, o/e-TFLV, o/e-TFLV <30%, LiTR, o/e-LHR, o/e-LHR <25%, percentage herniated liver, MSA, stomach position in mid-chest, and liver up. ECMO need predicted by o/e-TFLV, o/e-LHR, and PPLV. These results were confirmed through subgroup analysis of only left-sided lesions. PHTN was predicted by presence of intrathoracic liver (OR-1.96, 95%CI 1.14,3.37, I^2-0%); this was not significant after left-sided subgroup analysis.

Conclusion and Potential Impact: In fetuses with CDH, FLV and presence/percentage of intrathoracic liver predict survival. FLV measurements predict ECMO need. Presence of intrathoracic liver may predict persistent PHTN; further studies are needed. Accurate prognostication of CDH severity would aid patient triage, resource mobilization, and identification of high-risk CDH infants in need of advanced treatment including ECMO or identification of candidates for fetal intervention procedures.