

Longitudinal observed-to-expected lung-to-head ratio in non-isolated congenital diaphragmatic hernia

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OBJECTIVES

To evaluate longitudinal predictors of observed-to-expected lung-to-head ratio (o/e LHR) in non-isolated congenital diaphragmatic hernia (CDH)
To assess differences between structural and genetic subgroups.

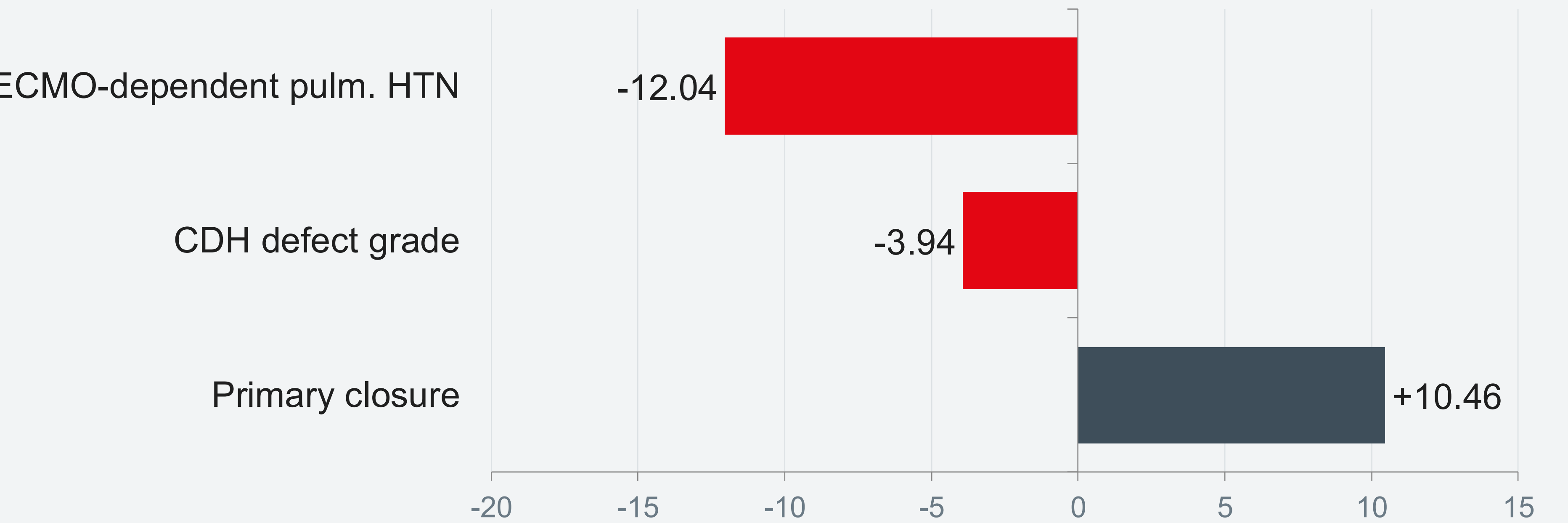
METHODS

This retrospective cohort study included fetuses diagnosed with non-isolated CDH cases with serial ultrasound measurements at a tertiary center between 2012 and 2025.
Cases were categorized into three subgroups:
-structural
-genetic
-structural + genetic.
Longitudinal mixed-effects models evaluated o/e LHR trajectories while adjusting for anatomical severity and postnatal outcomes.

RESULTS

Increasing CDH defect grade was associated with lower o/e LHR (−3.94 per grade increase, p=0.025).
At initial evaluation, the structural+genetic subgroup demonstrated substantially lower o/e LHR than structural only cases (14–20 percentage points difference across models). Interaction terms indicated convergence of o/e LHR values by the second evaluation.
Primary closure was associated with higher o/e LHR (+10.46, p=0.034), while ECMO-dependent pulmonary hypertension was associated with lower o/e LHR (−12.04, p=0.006). Survival and neonatal demise were not independently associated with o/e LHR after adjustment.

FIGURE 1. PREDICTORS OF O/E LHR



Adjusted β coefficients for o/e LHR; defect grade per grade increase; ECMO-dependent pulmonary hypertension. $p = 0.034, 0.025$ and 0.006 respectively. Negative values indicate lower o/e LHR.

AT A GLANCE

Adjusted β coefficients for o/e LHR

−12.04

ECMO-dependent pulmonary hypertension (p = 0.006)

+10.46

primary closure (p = 0.034)

−3.94

per CDH defect grade increase (p = 0.025)

14–20

percentage points lower o/e LHR in structural+genetic at initial evaluation

CONCLUSIONS

- In non-isolated CDH, o/e LHR reflects both anatomical severity and early subgroup differences in disease severity.
- Structural + genetic cases demonstrate more severe pulmonary hypoplasia at the initial prenatal evaluation, although this difference attenuates over time.
- These findings suggest that o/e LHR may capture early subgroup-specific severity patterns in non-isolated CDH, while also reflecting overall anatomical disease burden.