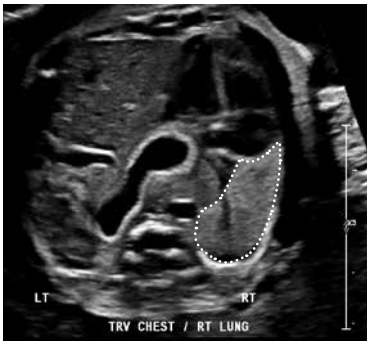
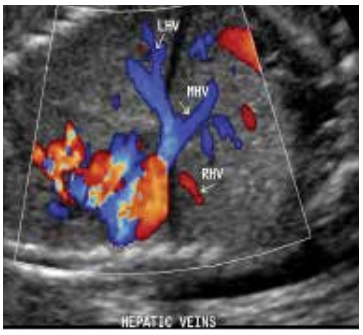
PRENATAL DIAGNOSIS AND MANAGEMENT OF CONGENITAL DIAPHRAGMATIC HERNIA (CDH)

LCDH, AP Method for LHR

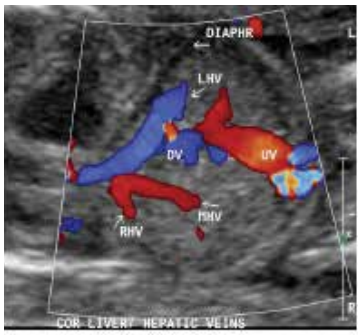


LCDH, Trace Method for LHR

Color Doppler to demonstrate liver position



LCDH, left lobe of liver up, LHV up



LCDH, liver down, all HV down

Protocol for Lung Head Ratio (LHR)

- An axial view of the level of the four-chamber heart should be obtained, taking care to avoid shadows produced by the ribs on the lung to be measured.
- Place the calipers according to the AP Method — anteroposterior (AP) diameter of the right lung and the transverse (TRV) diameter of the right lung. For the Trace Method, outline the periphery of the lung — taking care to avoid the margins of the rib, the wall of the aorta and the pericardium.
- The observed/expected (O/E) LHR, AP Method, is obtained by the TOTAL trial calculator at **https://totaltrial.eu** using the lung and head circumference measurements in millimeters (mm) as well as the gestational age. The TOTAL trial calculator will also calculate the O/E LHR, Trace Method, using the head circumference in mm, the area of the traced lung in mm^2 and the gestational age.
- Calculate the volume of the normal lungs by multiplying the length, width and AP diameters by 0.523 (ellipsoid volume formula).
- Evaluate liver position with use of high-frequency transducers and color Doppler to illustrate the course of the hepatic vein (HV).

$$\text{LHR (AP Method)} = \frac{\text{AP x TRV (mm)}}{\text{Head circumference (mm)}}$$

$$\text{LHR (Trace Method)} = \frac{\text{Lung Area } (mm^2)}{\text{Head circumference (mm)}}$$

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continued >

Lt CDH, liver down, using high-resolution gray-scale to demonstrate liver position

Lt CDH, liver up, using high-resolution gray-scale to demonstrate liver position

UNITED STATES

1,500 CDH births per year

- Most in-hospital neonatal deaths *(Centers for Disease Control and Prevention, 2014)*
- Costliest non-cardiac birth defect *(Kids' Inpatient Database, 2011)*

50% ECMO, 50% Mortality

Each year in the United States, approximately 1,500 babies are born with CDH; 50% require extracorporeal membrane oxygenation (ECMO) and 50% die. This results in the most in-hospital neonatal deaths. In addition, CDH is the costliest non-cardiac birth defect. The use of ECMO increases that cost by 2.5 times.

CHOP (FY 2018)

40 CDH patients

102 CFDT referrals

69 on-site evaluations

35 SDU deliveries

27% ECMO, 93% Survival

At Children's Hospital of Philadelphia (CHOP), in FY 18 we cared for a total of 40 CDH babies. While this is by far the highest volume in the U.S., it only accounts for 2.6% of the U.S. market. The entry point is almost always the Center for Fetal Diagnosis and Treatment (CFDT), where we received 102 referrals and confirmed 69 diagnoses on site. Thirty-five babies were born in our Garbose Family Special Delivery Unit (SDU) while five patients were born at local area hospitals and transferred to CHOP. For the 40 babies cared for in our Harriet and Ronald Lassin Newborn/Infant Intensive Care Unit, ECMO use was 27% and survival through discharge was 93% overall.

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