Six years’ experience with prenatally diagnosed left congenital diaphragmatic hernia
J. P. Garrahan Children Hospital, Capital, Argentina

Objective
To report the experience of a single South American public pediatric hospital with prenatally diagnosed left congenital diaphragmatic hernia (CDH) managed expectantly during pregnancy.

Methods
This is an observational retrospective study of all fetuses diagnosed with left CDH referred to our Fetal Diagnosis and Treatment (FDT) programme and treated postnatally at J. P. Garrahan Children’s Hospital in Buenos Aires, Argentina, between 2013 and 2018. Exclusion criteria for admission to our FDT programme were aneuploidy and multiple or life threatening associated congenital anomalies. Termination of pregnancy is not legal in our country and we don’t offer fetal endoscopic tracheal occlusion (FETO). All patients have been managed by the same multidisciplinary team following predefined prenatal, obstetric, surgical and neonatal protocols (including ECMO criteria). We have subclassified left CDH according to severity of lung hypoplasia assessed by observed-to-expected lung-to-head ratio (O/E LHR) and intrathoracic liver herniation following TOTAL trial criteria. The primary outcome measurements were 90-day survival, ECMO requirement, survival after ECMO therapy, and 90-day oxygen dependency. Other variables under the study included gestational age (GA) at diagnosis, GA at delivery, birth weight, days under mechanical ventilation and days until discharge. Global development at 24 months was evaluated using the Bayley III scale. Data was expressed in median (IQR=Q1-Q3) or percentage.

Results
149 pregnant women were referred to our FDT program with a diagnosis of CDH from 2013 to 2018; 17 were lost to follow up during pregnancy, 12 presented with associated fetal anomalies and 4 died in utero. Finally, 116 were admitted to our NICU. 23 patients have been excluded for this analysis (13 presenting with right CDH, 2 postnatally diagnosed trisomy 21, 1 presenting with fetal atrial flutter, and 7 with incomplete data). In total 93 isolated left CDH had been analysed. GA at diagnosis was 23 weeks (20-27), GA at referral to FDT program 31,2 weeks (28-34). GA age at birth was 37 weeks (37-38) and birth weight was 2880g (2840-3090). Median O/E LHR was 41.3% (35-51.3), 90-day survival was 76.3% (71/93), ECMO requirement was 18.3% (17/93) and 52.9% (9/17) survived after ECMO therapy. 90-day oxygen dependency was 8.4% (6/71). Survivors stayed under mechanical ventilation 19 days (10-27) and 61 days to hospital discharge (36-85).

According to the TOTAL trial severity stratification based on O/E LHR and intrathoracic liver herniation, our severe group encompassed 6.4% (6/93) of patients. Median O/E LHR was 21% (18.2-24.5) and 100% (6/6) presented intrathoracic liver herniation. 90-day survival was 66.6% (4/6) and 25% (1/4) had oxygen dependency, 1 required ECMO and survived. Survivors stayed under mechanical ventilation 22 days (16-46) and 71 days to hospital discharge (60-83). Our moderate group encompassed 44.1% (41/93) of patients. Median O/E LHR was 37% (32-38,7) and 87.8% (36/41) presented intrathoracic liver herniation. 90-day survival was 63.4% (26/41) and 11.5% (3/26) stayed oxygen dependent, 21.9% (9/41) required ECMO and 44.4% (4/9) survived after ECMO therapy. Survivors stayed under mechanical ventilation 21.5 days (13-34) and 76 days to hospital discharge (54-99). Our mild group encompassed 49.4% (46/93) of patients. Median O/E LHR was 51.5% (47-57) and 30.4% (14/46) presented intrathoracic liver herniation. 90-day survival was 89.1% (41/46), and 4.9% (2/41) stayed oxygen dependent, 15.2% (7/46) required ECMO and 57.1% (4/7) survived after ECMO therapy. Survivors stayed under mechanical ventilation 16 days (8-23) and 50 days to hospital discharge (30-80) Global developmental assessment was performed in 28 survivors at 24 months. Developmental delay (development coefficient <70) was found in 14.3% (4/28) of patients and borderline development (development coefficient 70 to 85) in 25% (7/28) of patients.

Conclusion
Considering that global survival for CDH in Argentina is low (33%), our data shows that our FDT program in a tertiary referral ECMO center, with protocolised multidisciplinary care, can build expertise improving survival and reducing morbidity and length of hospital stay in patients with prenatally diagnosed CDH managed expectantly during pregnancy. We look forward to the TOTAL trial shedding light on patient’s selection to better identify those that could benefit from FETO.

90-day survival in expectantly managed left-CDH

<table>
<thead>
<tr>
<th>Severity</th>
<th>90-day Survival</th>
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<tbody>
<tr>
<td>All</td>
<td>76.3%</td>
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<tr>
<td>Severe</td>
<td>66.6%</td>
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<tr>
<td>Moderate</td>
<td>63.4%</td>
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<tr>
<td>Mild</td>
<td>51.5%</td>
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0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%  
All Severe Moderate Mild  
02 free Overall survival