# Right sided congenital diaphragmatic hernia: A rare neonatal emergency 

Sir,

Congenital diaphragmatic hernia (CDH) occurs in 1 in 5000
live births. Right sided lesions are rare (10-15\%) compared with left sided $(85 \%)$ as liver plugs the opening. Right congenital diaphragmatic hernia carries disproportionately
high mortality and morbidity. Presence of liver herniation is a predictive of poor outcome. ${ }^{[1]}$ It results in caval compression, reduced preload and impaired cardiac output. ${ }^{[2]}$

A 4-day-old baby weighing 2.3 kg born by vaginal delivery at 36 weeks. He was diagnosed antenatally as a case of CDH . In view of respiratory distress he was intubated. Ventilation was instituted by keeping peak inspiratory pressure (PIP) of $20 \mathrm{~cm} \mathrm{H}_{2} \mathrm{O}, \mathrm{FiO}_{2}$ of 0.6 and respiratory rate of $60 / \mathrm{min}$. Circulatory support was started in the form of dopamine infusion and intravenous fluid. His echo revealed moderate pulmonary hypertension. Chest X-ray showed multiple intestinal loops with liver herniation in right sided hemithorax and severe mediastinal shift in the left side [Figure 1]. His ABG revealed $\mathrm{pH}-7.25, \mathrm{PCO}_{2}-44 \mathrm{mmHg}, \mathrm{PO}_{2}-88$ $\mathrm{mmHg} \mathrm{HCO}_{3}-18 \mathrm{mEq} / \mathrm{L}$ and lactates $-1.5 \mathrm{ummol} / \mathrm{L}$. His preductual and postductal $\mathrm{SpO}_{2}$ differed by $5 \%$. Hb was $15 \mathrm{~g} \%$ and the rest of the investigations were normal. After 3 days of stabilization child was posted for surgical repair of the hernia.

Inside operation theater routine monitors (electrocardiogram, noninvasive blood pressure, $\mathrm{SpO}_{2}, \mathrm{EtCO}_{2}$, temperature) were attached. Neonatal resuscitation trolley was kept ready. Baseline parameters of heart rate $144 / \mathrm{min}$ and BP-66/40 mmHg were noted. His preductal $\mathrm{SpO}_{2}$ was $95 \%$ and posductal saturation was $90 \%$. Continuous nasogastric suctioning was done. Intravenous (IV) fentanyl 5 ug and IV atracurium was given. Pressure controlled ventilation was started with PIP of $20 \mathrm{~cm} \mathrm{H}_{2} \mathrm{O}$, respiratory rate of $50 / \mathrm{min}$ with $\mathrm{FiO}_{2}$ of 0.7 . Anesthesia was maintained with oxygen, air and sevoflurane. The anaesthetic goal was to avoid hypoxia, hypotension and hypothermia, which increases pulmonary vascular resistance and


Figure 1: Chest X-ray showing intestinal loops and liver herniation
worsens the right to left shunt. A right subcostal incision was made. Liver and bowel loops were reduced [Figure 2]. The defect in right hemidiaphragm was closed. Child remained stable throughout the surgery. Duration of surgery was 2 h . Intraoperative blood and fluid loss were replaced with Isolyte P. Child was electively ventilated postoperatively. IV morphine infusion was started for sedation. Muscle relaxants were avoided, and spontaneous respiration was encouraged. Child was extubated on POD 5, but could not tolerate extubation and was reintubated on the same day. On POD 8 again trial for extubation was given which he tolerated well.

The goal of preoperative stabilization includes blood pressure normal for gestational age, preductal $\mathrm{SpO}_{2}$ of $85-95 \%$, lactate $<3 \mathrm{mmol} / \mathrm{L}$, urine output $>2 \mathrm{ml} / \mathrm{kg} \cdot{ }^{[3]}$ This was achieved in our case. Ventilation strategy first described by Wung et al. was used in this case. ${ }^{[4]}$ It aims at achieving adequate tissue oxygenation with minimal barotrauma. It consists of limiting PIP $<25 \mathrm{~cm}$ $\mathrm{H}_{2} \mathrm{O}$, permissive hypercapnia ( $\mathrm{PaCO}_{2}$ between 45 and 60 mmHg ). This strategy has shown to increase in survival and decreased use in extracorporeal membrane oxygenation. Continuous nasogastric suctioning should be done to prevent bowel distension and further lung compression.

Until date, there are no uniform guidelines for the management of CDH. Many centers lack advanced neonatal care facilities affecting the prognosis. However, still conventional technique have shown good outcome. ${ }^{[5]}$

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Figure 2: Right congenital diaphragmatic hernia with reduced contents (liver and intestine)

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