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These patients are at high risk for needing extracorporeal membrane oxygenation (ECMO) support.
[ECMO indications found here](#)

Infant with CDH in NICU receiving pre-operative care

Respiratory Management

- Avoid overdistension
- Allow permissive hypercapnia
 - Goal pCO₂ of 45 - 65 mmHg
 - pH > 7.20 with adequate contralateral lung recruitment on chest X-ray
- Titrate ventilator rate to ensure adequate minute volume, while maximizing synchronization of breaths
 - 30 - 40 breaths per minute
 - 40 - 60 breaths, if the infant is sedated
- Place transcutaneous CO₂ monitor
- Transition to HFOV if CMV fails, PIP > 28 cm H₂O, or infant has a pneumothorax
- > 2 hours following birth, preductal saturation levels should be kept between 85 - 95% (levels of 80% may be acceptable on an individual basis, if **adequate indications of organ perfusion**)
- For more information, please refer to [Oxygenation and Ventilation Management](#)

Cardiovascular Management

- See **ECHO Timing**
- **Acute Pulmonary Hypertension Management**
- Hemodynamic Management
 - Maintain mean BP > 40 mmHg and < 65 mmHg
 - Initiate treatment for hypotension (10 - 20 mL/kg NS should be considered, if not already done during delivery room resuscitation)
 - If hypotension persists following fluid bolus, consider inotropic and/or vasopressor medications
 - Norepinephrine (0.05 - 0.5 mcg/kg/min)
 - Epinephrine (0.01 - 0.5 mcg/kg/min)
 - Milrinone (0.25 - 0.5 mcg/kg/min)
 - If vasopressor-resistant hypotension, add vasopressin (0.1 - 1.0 mU/kg/min)
 - Dopamine may worsen pulmonary hypertension and should be avoided
 - If adding a second vasoactive agent, initiate hydrocortisone (1 mg/kg/dose every 8 - 12 hours)
- Avoid hypertension (hypertension can create unnecessary exposure to catecholamines, may impede systemic blood flow and oxygen delivery, and can worsen LV function)

Fluid, Electrolyte, Nutrition Management

- NPO with Replogle tube
- Initiate hydration with fluids 60 - 80 mL/kg/day and advance as tolerated until surgery, up to 120 - 140 mL/kg/day
- Use birth weight (*dry weight*) for initial fluid calculations
- Consider Nephrology consultation for CRRT, if more than 10% fluid overloaded despite using diuretics and/or SCUF or if nutritional goals are not met within one week
- Once the infant no longer has labile pulmonary hypertension, start daily weights
- Strictly monitor input and output (use a Foley catheter only if the infant is heavily sedated or receiving muscle relaxers)

Indications of Adequate Oxygen Delivery and Organ Perfusion

- Lactate < 3 mmol/L
- Urine output > 1 mL/kg/hour
- pH > 7.2
- Physical exam (*skin color/mottling*)

Abbreviations:

CMV = Conventional mechanical ventilation
 CRRT = Continuous renal replacement therapy
 HFOV = High-frequency oscillatory ventilation
 PIP = Peak inspiratory pressure
 SCUF = Slow continuous ultrafiltration
 SMOF lipids = Lipid emulsion of soybean oil, medium-chain triglycerides, olive oil, and fish oil
 TPN = Total parenteral nutrition

Continue Pre-Operative Support

- Initiate ventilator weaning, if after 6 hours of life and infant is stable
- Initiate TPN/SMOF lipids within first 24 hours of life
 - Target parenteral caloric values of 100 - 110 kcal/kg/day
 - Goal of 2.5 - 3 gm/kg/day protein
 - Goal of 3 gm/kg/day lipids

Surgical Management
Repair is not a surgical emergency

ECHO Timing

- Limited echocardiogram 2 - 6 hours of life (if hemodynamically stable on low ventilator settings and low FiO₂ needs, this ECHO should be deferred until 24 hours of life)
- Complete full ECHO within 24 - 48 hours, obtain full ECHO sooner if prenatal concern for ductal dependent lesion
- Complete second ECHO within 5 - 7 days
- Complete additional ECHOs as clinically indicated

[Considerations for Nurses and Families](#)

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