

# CHOA Delivery Room Protocol

## D-Transposition of the Great Arteries (D-TGA)

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In D-transposition of the great arteries (D-TGA), the pulmonary artery arises from the left ventricle, and the aorta arises from the right ventricle resulting in a parallel circulation. Shunting is required at the atrial, ventricular and/or ductal level to allow for mixing of oxygenated and deoxygenated blood with maximal mixing occurring at the **atrial** level. Although fetal echo is used to assess risk assessment of hemodynamic instability and mixing, these fetal measurements can be unreliable in predicting foramen ovale restriction postnatally. The priority after birth is to determine whether the mixing between systemic and pulmonary circulations is adequate. If the mixing is inadequate, there can be severe hypoxia seen in the newborn, requiring an urgent balloon atrial septostomy, so it is important that patients are stabilized and transferred quickly to the cardiac intensive care unit.

### Prenatal clinical checklist:

1. Is this a high-risk or standard-risk for atrial level restriction based on fetal echocardiographic measurements?
2. Are there additional shunts such as a moderate (or larger) ventricular septal defect seen by fetal echocardiography?
3. Is there evidence of restriction at the ductus arteriosus by fetal echocardiography?
4. Is there any sub-aortic or sub-pulmonary obstruction on fetal echocardiography?
5. Is there evidence of significant ventricular dysfunction (> mild)?
6. Is there any evidence of hydrops?

### Access plan:

1. High-risk or unstable: Low-lying single lumen 5 French UVC without x-ray confirmation.
2. Standard-risk and stable: Place UVC and UAC with x-ray confirmation.
3. Peripheral IV placement in the delivery room if able to place in timely fashion.

### Medication plan:

#### High-Risk:

Have the following available in the delivery room:

1. D10W at 60 ml/kg/day (titrate accordingly if hypoglycemic or risk factors of hypoglycemia)
2. Prostaglandin E 0.01 mcg/kg/min
3. Medications to aid intubation OR for sedation and reduction in metabolic demands:
  - a. Fentanyl IV 1 mcg/kg/dose (fentanyl may be given rapidly if immediately followed by vecuronium)
  - b. Vecuronium IV 0.1 mg/kg/dose or Rocuronium 1 mg/kg dose for neuromuscular blockade
4. Rescue medications to have available, not necessarily drawn up:
  - a. IV atropine (0.02 mg/kg/dose) for bradycardia
  - b. IV epinephrine (0.02 mg/kg/dose) for circulatory collapse
5. Inotropic support (if concern for severe ventricular dysfunction):
  - a. Epinephrine IV infusion (0.02 mcg/kg/min)

#### Standard-Risk:

Have the following available in the delivery room:

1. Medications to aid intubation OR for sedation and reduction in metabolic demands:
  - a. Fentanyl IV 1 mcg/kg/dose (fentanyl may be given rapidly if immediately followed by vecuronium)
  - b. Vecuronium IV 0.1 mg/kg/dose or Rocuronium 1 mg/kg dose for neuromuscular blockade
2. Rescue medications to have available, not necessarily drawn up:
  - a. IV atropine (0.02 mg/kg/dose) for bradycardia
  - b. IV epinephrine (0.02 mg/kg/dose) for circulatory collapse

#### Plan to start after placement of lines:

1. D10W at 60 ml/kg/day (titrate accordingly if hypoglycemic or risk factors of hypoglycemia)
2. Prostaglandin E 0.01 mcg/kg/min

### Additional equipment/supplies:

1. Recommend cuffed endotracheal tube for term infants (if available)
2. Blood pressure cuff
3. Pulse-oximetry monitoring
4. EKG monitor and leads

### Goals for delivery room and transport:

Assessment of degree of hypoxemia. Hypoxemia can occur due to inadequate mixing at the atrial level. Such hypoxemia will be refractory to invasive ventilation and increase in FiO<sub>2</sub>.

Clinical goals in the delivery room/during transport include:

- Maximize oxygen delivery by securing airway and administering 100% FiO<sub>2</sub>
- Optimize mixing systemic and pulmonary circulation by initiating PGE
- Support systemic perfusion

### Delivery room management plan for High-Risk:

High-Risk indications:

- Evidence of atrial level restriction on latest fetal echocardiogram
- Restriction at the level of the ductus arteriosus
- Ventricular dysfunction (>mild)
- Evidence of hydrops

1. Delayed cord clamping per institutional protocol. This may not be feasible in the setting of fetal distress.
2. Follow NRP guidelines for initial resuscitation. Supplemental oxygen and liberal volume resuscitation may be used.
3. Pre-ductal (right UE) oxygen saturations should be >75% by 10 min of life. If hypoxic, identify cause of hypoxia - cardiac vs. respiratory. Cardiac cause of hypoxia is unlikely to resolve with respiratory support. If initiating respiratory support, optimize ventilation using corrective steps, escalate FiO<sub>2</sub> to 100%.
4. If persistent hypoxemia or respiratory distress despite corrective steps of NRP, proceed to intubation.
  - a. If intubating, recommend providing sedation and paralysis through a PIV or low lying UVC to both facilitate intubation and decrease metabolic demand post intubation.
5. If poor systemic perfusion or hemodynamic compromise, the infant may need to be started on inotropy.
  - a. Recommend epinephrine as first line, 0.02 mcg/kg/min
6. Once access is obtained, start PGE at 0.03 mcg/kg/min.
7. Place low lying UVC if not already done.
8. Obtain blood gas if able. Address acidosis and hypercarbia if able.
9. Call CHOA Transfer Center and plan for emergent transfer to AMBH for emergent balloon atrial septostomy.

### Delivery room management plan for Standard-Risk:

Standard-Risk indications:

- No evidence of atrial level restriction on latest fetal echocardiogram
- No evidence of restriction at the ductus arteriosus
- Normal or mild ventricular dysfunction
- No evidence of hydrops

1. Delayed cord clamping per institutional protocol. This may not be feasible in the setting of fetal distress.
2. Follow NRP guidelines for initial resuscitation. Supplemental oxygen may be used.
3. Pre-ductal (right UE) oxygen saturations should be >75% by 10 min of life. If pre-ductal SaO<sub>2</sub><75%, convert to High-Risk Protocol (above) and call CHOA Transfer Center to speak directly with CICU if City Call MD is not on site.
4. If stable, place UVC and UAC. If unstable, place low lying UVC.
5. Obtain blood gas and address any metabolic abnormalities.
  - a. Consider High-Risk Protocol (above) if pH ≤ 7.10
6. Once access is obtained, start PGE at 0.03 mcg/kg/min.
7. Call City Call MD to discuss need for limited echocardiogram to evaluate atrial septum. Mobilize catheterization team at AMBH to prepare for urgent BAS if there are signs of atrial level restriction.
8. Call CHOA Transfer Center and plan for immediate transfer to AMBH.