Managing Transitional Physiology

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Upon completion of the learning session participants will:

- The learner will list the 5 essentials components for successful neonatal transition
- The learner will describe at least 3 evidence-based strategies to support these 5 essentials components of successful transition

Cardiac Anatomy

Classical Triad

- Preload – the initial stretching of cardiac muscle fibers prior to contraction
- Contractility – ability of sarcomeres to change their contractile force (independent of preload)
- Afterload – the load against which the ventricle must eject blood

Additional Components

- Recoil – a rapid filling phase that occurs during the early stages of diastole
- Torsion – concept of a wringing motion of contraction in oblique layers of fibers that twist the ventricle and squeeze blood towards the outflow tract
- Rotation – as blood enters the heart, it forms highly reproducible rotational flow patterns allowing it to ‘slingshot’ into the ventricles in early diastole

Finnemore et al 2015
**Functional Differences in Fetal Circulation**

- Compliance – 2 x that of the adult heart
- Passive vs Active Ventricular Filling – is lower in the fetus
- Heart Rate – higher in the fetus > reduced diastolic filling time
- Contractility – reduced in the fetus but increases over gestation

**Increased SVR with separation from low-resistance placenta**
- Closure of right-to-left shunts
  - FO closes when LA pressure > RA pressure
- DA: left-to-right flow with mitral closes over days
- Rapid decrease in pulmonary vascular resistance w/ onset ventilation
- Airways: absorption & changes in airway pressure with ventilation
- Increased metabolic rate > increased glucose needs
- Increased catecholamines levels to support blood pressure

**Transitional Circulation in the Preterm Infant**

- Low inherent contractility
- Poor tolerance of high systemic vascular resistance
- Impaired diastolic filling
- Persistence of fetal shunt pathways
1. Clearance of fetal lung fluid
2. Surfactant secretion, and breathing
3. Transition of fetal to neonatal circulation
4. Decrease in pulmonary vascular resistance and increased pulmonary blood flow
5. Endocrine support of transition
Delayed Cord Clamping

- Use a checklist to prepare for all high-risk neonatal resuscitations
- Improve teamwork and communication in the delivery room using briefings, debriefings, and other methods
- Obtain a pulse oximetry reading by 2 min of life and continuously monitor the heart rate and oxygen saturation (all VLBW or infants requiring PPV)
- Maintain normal temperature
- Optimize initial respiratory support

Delivery Room Checklists

- Use a checklist to prepare for all high-risk neonatal resuscitations
- Improve teamwork and communication in the delivery room using briefings, debriefings, and other methods
- Obtain a pulse oximetry reading by 2 min of life and continuously monitor the heart rate and oxygen saturation (all VLBW or infants requiring PPV)
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Best Practices in Supporting Transition

- Level of consciousness
- Spontaneous respirations
- Vagal tone
- Prevention
- Assessment
- Management
- Position
- Microbiome
- Nutrition

(External)
- Temperature
- Light
- Sound

(Internal)
- Blood volume
- Saturation
- Perfusion

State

Pain & Stress

Family

ADLs
Discussion

References

   Seminars in Fetal & Neonatal Medicine, 20, 210-216.
   Clinics in Perinatology, 39(4), 769-783.

References

   a quality improvement comparison study. Pediatrics, 134(5), e1378-e1386.
   43(3), 395-407.
References


www.caringessentials.net