Thoracic Duct Ligation for Anasarca Complicating a Repaired Gastroschisis in a 3-month-old infant

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Summary: We would like to present the case of a 3 month old infant, born full term with congenital gastroschisis, the repair of which was complicated by high output chylothorax leading to hypoproteinemia and severe anasarca. Thoracoscopic thoracic duct ligation was performed in the hope of reducing protein output from bilateral chest tubes, eventually allowing a normal intravascular osmolarity and potentially resolving the anasarca.

Case Report: 3 month old female infant. Her weight the day of surgery was 5200g. Preoperative workup included labs, notable for an albumin 1 g/dl, total protein 2.7 g/dl, hemoglobin 12g/dl and hematocrit of 33 percent. The patient came intubated on an oscillating ventilator, which we continued perioperatively. She was placed in the left lateral decubitus position for a right sided thoracoscopic surgery. The electrocardiogram heart rate was used as marker of hemodynamic stability throughout the case as the intense swelling precluded an accurate BP measurement. The anesthestic was complicated by several episodes of bradycardia which were treated with atropine 0.1-0.2mg and an urgent request to the surgical team to reduce the intrathoracic pressure. Intraoperative resuscitation was necessary due to this hemodynamic instability; PRBCs were administered at 20cc/Kg which arrested any further bradycardic episodes.

Discussion:
- Thoracic duct lymph has a protein concentration of 3 g/dl
- When the thoracic duct leaks into a body cavity in high volume, it can cause hypoproteinemia
- hypoproteinemia → edema

Starling's Forces
- Driving pressure across capillary wall = \( P_{capillary} - P_{interstitium} \) - \( P_{oxygen} \) capillary - \( P_{oxygen} \) interstitium
- net filtration pressure slightly positive
  - small net outward flow of fluid and proteins
  - excess cleared by lymphatics
- hypoproteinemia increased net filtration pressure
- overcame carrying capacity of lymphatics → edema

Management:
- Crystalloid would increase intravascular hydrostatic pressure
  - net filtration pressure would increase further
  - this would worsen the edema due to low osmotic pressure
- PRBCs do not cross continuous capillary walls
  - increased her intravascular oncotic pressure
  - increased her intravascular volume
  - her blood’s oxygen carrying capacity increased, treating the underlying cause for the bradycardic episodes

References: