Review
PRINCIPLES OF PEDIATRIC SURGERY

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Learning objectives

• By the end of this lecture final year student should be able to;
• Construct the difference of pediatric physiology and pathology from adults
• List different congenital anomalies of significance
• Identify common surgical problems of children
• Propose investigations for common diseases of children
• Propose treatment plan for common pediatric diseases
VACTERL
Dr. Robert E. Gross summarized the essential challenge of pediatric surgery as follows:

"Those who daily operate on adults, even with the greatest of skill, are sometimes appalled—or certainly are not at their best—when called upon to operate on and care for a tiny patient."
Pediatric Surgical Themes: Pitfalls and Pearls

- Children are not little adults, but they are little people.
- Dehydration
- Fluid over load
- Children whisper before they shout—Rapid deterioration
  - tachycardia,
  - bradycardia,
  - hypothermia
  - fever,
  - recurrent emesis, or feeding intolerance
- Always listen to the mother and the father.
- Pediatric tissue must be handled delicately
NEWBORN PHYSIOLOGY

• Smaller size,
• immature organ systems,
• and differing volume capacities
• present unique challenges toward perioperative management.
Cardiovascular

- Capillary refill
- The size of the liver is a reasonable gauge of intravascular volume.
- Cardiac output in the newborn period is rate dependent, and the heart has a limited capacity to increase stroke volume to compensate for bradycardia.
Pulmonary

- The lungs are not completely developed at birth and continue to form new terminal bronchioles and alveoli until about 8 years of age
- Lung immaturity is one of the greatest contributors to morbidity and mortality
- Reduced production of surfactant,
- The respiratory rate for a normal newborn may range from 40 to 60 breaths/min
- Respiratory distress is heralded by nasal flaring, grunting, intercostal and substernal retractions, and cyanosis.
Cold Stress

• Newborn infants must be maintained in a neutral thermal environment because they are at great risk for cold stress.
• Continued cold exposure leads to decreased perfusion and acidosis
• Risk factors for the development of hypothermia in infants
  • relatively large body surface area,
  • lack of hair and subcutaneous tissue, and
  • increased insensible losses.
Infection

- The neonate is relatively immunodeficient, with reduced levels of immunoglobulins and the C3b component of complement
<table>
<thead>
<tr>
<th>WEIGHT</th>
<th>VOLUME</th>
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<tbody>
<tr>
<td>Premature &lt; 2.0 kg</td>
<td>140-150 mL/kg/day</td>
</tr>
<tr>
<td>Neonates and infants 2-10 kg</td>
<td>100 mL/kg/day for first 10 kg</td>
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<tr>
<td>Children 10-20 kg</td>
<td>1000 mL +50 mL/kg/day for weight 10-20 kg</td>
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<tr>
<td>Children &gt; 20 kg</td>
<td>1500 mL +20 mL/kg/day for weight &gt; 20 kg</td>
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TRAUMA
LESIONS OF THE NECK
• Torticollis
• Cervical lymphadenopathy
Esophageal Atresia and Tracheoesophageal Fistula
Fredet-Ramstedt pyloromyotomy. A. Pylorus delivered into wound and seromuscular layer incised. B. Seromuscular layer separated down to the submucosal base to permit hemiation of mucosa through the pyloric incision. C. Cross-section demonstrating the hypertrophied pylorus, depth of incision, and spreading of muscle to permit mucosa to be hemiated through the incision.

The complications of pyloromyotomy include perforation of the mucosa (1 to 3%), bleeding, wound infection, and recurrent symptoms due to inadequate myotomy. When perforation occurs, the mucosa is repaired with a stitch that is placed to tack the mucosa down and reapproximate the serosa in the region of the tear. A nasogastric tube is left in place for 24 hours and taped securely to prevent it from reinjuring the repaired mucosa. The outcome is generally very good.

**Intestinal Obstruction in the Newborn**

The cardinal symptom of intestinal obstruction in the newborn is bilious emesis. Prompt recognition and treatment of neonatal intestinal obstruction can truly be lifesaving.
Hypertrophic Pyloric Stenosis
Intestinal Obstruction
ABDOMINAL WALL

Abdominal Wall Defects
CONGENITAL DIAPHRAGMATIC HERNIA
CHILDHOOD SOLID TUMORS
Hirschsprung's Disease
Imperforate anus
Biliary atresia