Overview of Pediatric Surgery

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Approach to the Pediatric Surgical Patient

• Introduction (parents, child)
• Calm demeanor
• Ask permission
• Distraction useful
• Look, listen, feel; painful parts last
• No invasion in child’s bed

Fluid and Electrolyte Management

• Maintenance (metabolic needs + insensible losses)
• Replacement (tubes, drains, wounds)
• Third space loss

Fluid and Electrolyte Management

• Volume
• Rate
• Composition

Fluid and Electrolyte Management

• Maintenance Fluids
  0-10kg  100cc/kg/day or 4cc/kg/hr
  10-20kg  50cc/kg/day or 2cc/kg/hr
  over 20 kg  20cc/kg/day or 1cc/kg/hr
• Composition
  Neonates D5W
  Infants   D5.25NS
  Children  D5.45NS

Fluid and Electrolyte Management

• Replacement fluids (NG losses, drains)
  Replace at set intervals with what is lost (measure it!)
Fluid and Electrolyte Management

• Third Space Losses
  Intravascular to Interstitium
  Must be estimated
  Result of “leak” from inflammation,
  change in hydrostatic or colloid pressure

• Thus, postop regimen =
  Maintenance+Replacement+3rd Space loss

Nutrition Basics

• Infants need 100kcal/kg/day to grow
• Add more for metabolic stress
• Standard formula = 20 cal/oz
• Can be enriched via concentration, sugars,
  MCT oil, etc.

• TPN for inability to use
gut(sugars,fats,amino acids)

Hernias

• Patent Processus Vaginalis(indirect)
• Hernia=involve of viscus in sac
• Direct,femoral unusual
• Sliding hernia
• High ligation of sac

Hydroceles

• Communicating
• Non-communicating

Cryptorchidism

• Incomplete descent
• Almost always associated with a hernia(not
  v.versa)
• Orchidopexy age 1 year

Wilm’s Tumor

• Nephroblastoma-most common
  intraabdominal tumor of childhood
• 5% bilateral; extension to renal vein, IVC
• Rx: radical nephrectomy
• Postop: chemo-radiation
• Staging based on histology, spread
• Over 90%cured
Rhabdomyosarcoma

- Most common soft tissue tumor in children
- Peak age 5; 38% head and neck; 21% GU; 18% extremities; 7% retroperitoneum; 7% trunk
- Prognosis by site, histologic type(embryonal)
- Rx: surgical excision/bx; chemo-radiation

Neuroblastoma

- 3rd most common pediatric malignancy
- 40% under age 2; 90% under age 10
- Origin: neuroblasts in SNS
- May spontaneously regress or mature
- Adrenal gland 40%; ganglia 25%; chest 20%; pelvis 5%
- 60% metastatic at diagnosis(bone marrow)

Neuroblastoma

- Rx: Surgery/bx; chemoradiation to shrink those unresectable
- Prognosis: strongly age related

Hypertrophic Pyloric Stenosis

- Age 6 weeks(hypertrophic)
- Projectile, non-bilious emesis
- Weight loss a strong clue
- Hyopochloremic, hypokalemic metabolic alkalosis
- Ddx: GERD, antral web, gastroenteritis
- Rx: resuscitation, then the perfect operation

Intussusception

- Age 6mos-2years
- Ileo-colic with lymphoid hyperplasia lead point.
- Seasonal variation
- DDX: constipation, gastroenteritis
- Rx: ACBE for dx/rx
  OR for reduction failure

Gastroesophageal Reflux

- Hypotonic LES/dysmotility
- Association with neurologic disorders
- Delayed gastric emptying
- Rx: elevate HOB, small frequent feeds, motility agonists
- Surgery: FTT, medical complication, near death episodes
- Fundoplication/gastrostomy/pyloroplasty
Appendicitis

- Peak age 5-14
- Most common cause of surgical abdomen
- Dx: localizing RLQ tenderness with guarding
- Rx: Appendectomy

Pediatric Trauma

- Primary Survey
- Secondary Survey
  N.B. NGT
  keep warm
  reassure
  be wary of tachycardia

Pediatric Trauma

- Diagnostic tests
  CXR, KUB
  CT
  US
  DPL
  Chemistries

Pediatric Trauma

- Non-operative management of stable solid organ injury
- No other injuries mandating OR
- Transfusion requirement <40% blood volume
- Outcomes excellent with little long term morbidity (adhesions)

Esophageal Atresia

- 90% associated with TE fistula
- Proximal atresia; distal TE fistula
- Associated anomalies: VACTERL
- Dx: tube in pouch; distal bowel gas
- US to determine aortic arch
- Rx: esophago-esphagostomy with division of fistula

Diaphragmatic Hernia

- Pleuroperitoneal membrane failure
- Resultant herniation and compression
- Pulmonary hypoplasia and hypertension
- Dx: CXR with NGT
- Rx: Repair
  ECMO
- 60% mortality
Gastroschisis
- Obliterated umbilical vein
- No sac
- 10% associated jejunoileal atresias
- Rx: primary closure if possible
- Often prolonged ileus

Omphalocele
- Cranial, caudal and lateral abdominal folds
- Sac present (may be ruptured)
- May be extensive (Pentalogy of Cantrell)
- Higher incidence of anomalies
- Rx: primary vs prosthetic closure

Necrotizing Enterocolitis
- Necrotizing infection of the premature gut
- Also associated with cardiac failure, cyanosis, indomethacin, early feeds
- Dx: feed intolerance, distension, pneumatosis, thrombocytopenia
- Rx: medical support; operate for free air or intractability

Neonatal Intestinal Obstruction
- Malrotation!
- Duodenal atresia
- Jejunoileal atresia
- Colonic atresia
- Meconium ileus
- Hirschprung’s disease
- Anorectal malformations

Congenital Lung Malformations
- Sequestration
- Congenital Cystic Adenomatoid Malformation (CCAM)
- Congenital Lobar Emphysema

Intersex Anomalies
- Male pseudohermaphrodite (Testicular Feminization)
- Female pseudohermaphrodite (Adrenogenital syndrome)
- True hermaphrodite
- Mixed gonadal dysgenesis