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PART ONE

Coexisting Diseases

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ANTERIOR MEDIASTINAL MASS

PAUL STRICKER, MD

BACKGROUND

- Most common cause: lymphoma
- Suspect in pts presenting for cervical mass biopsy.
- Other dxs: neuroblastoma, teratoma, germ cell tumor, bronchogenic cyst, foregut cyst, lymphangioma, mesenchymal tumor
- Symptoms due to compression of anatomic structures
- Symptoms worse when supine
- Symptoms may be relieved by lateral or upright position.
- Clinical: cough, hoarseness, dyspnea, wheezing, orthopnea, stridor, chest pain, syncope, SVC syndrome, tracheal deviation, retractions
- Asymptomatic or nonspecific: fever, fatigue, weight loss

PREOPERATIVE ASSESSMENT

- Preoperative radiation tx may interfere with accurate histologic dx & optimal tx regimens.
- Physical exam: orthopnea, tracheal deviation, jugular venous distention, wheezing, retractions, unilateral decreased breath sounds
- CXR: tracheal deviation, tracheal compression, abnormal cardiothymic silhouette
- Echo: direct compression of cardiac chambers and/or great vessels, pericardial effusion
- CT: assess severity & location of tracheal compression
- Preop sedation: avoid or give in monitored setting
- Antisialagogue (e.g., glycopyrrolate) useful

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- Obtain IV access prior to OR, ideally in lower extremity.
- Correct preexisting dehydration or hypovolemia.

INTRAOPERATIVE MANAGEMENT

- Potential catastrophic airway or cardiovascular collapse during induction of anesthesia
- Monitors: std; A-line for great vessel or cardiac compression
- All sized endotracheal tubes and rigid bronch immed avail in OR
- For severe cases, ECMO or CPB stand-by
- Liberal fluid administration if great vessel/cardiac compression
- Position: semi-recumbent, sitting, or lateral
- Local anesthesia without sedation is safest strategy, but not feasible for small children.
- Most important to avoid airway/CV collapse: MAINTAIN SPONTANEOUS VENTILATION
- Mask or LMA OK
- Ketamine allows spontaneous ventilation & provides sympathetic stimulation.
- Sevoflurane or IV agents OK if titrated to avoid apnea
- Paralysis & controlled ventilation OK for mild cases, but no way to predict safety
- Tx of airway obstruction: positive pressure, change position to lateral, sitting or prone if CV arrest
- Rigid bronch may bypass airway obstruction.
- ECMO or CPB as lifesaving measure

POSTOPERATIVE CONCERNS

- Airway obstruction may occur postop during recovery.
- Recover in lateral or semi-recumbent position.
- Titrate opioids: avoid apnea.

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ASTHMA

SANJAY M. BHANANKER, MD, FRCA

BACKGROUND

- Incidence: 7–19%
- Cause: chronic inflammation & mucus hypersecretion of lower airways
- Symptoms: airway hyperreactivity with variable degrees of airflow obstruction
- Strong association with atopy and allergy

PREOPERATIVE ASSESSMENT

- Note severity and frequency of acute exacerbations, precipitating factors.
- Elicit history of drug therapy, especially systemic steroids, to gauge severity.
- If acute exacerbation or URI within 6 wks, consider postponing elective surgery.
- Premed: inhaled beta-2 agonist, steroids (daily meds)
- Anxiolysis with oral midazolam; fear, stress, excitement, or hyperventilation can provoke acute attack

INTRAOPERATIVE MANAGEMENT

- Mask induction with sevoflurane or IV induction with propofol or ketamine
- Minimize airway manipulation.
- Face mask or LMA preferred
- Avoid histamine-releasing drugs: thiopental, morphine, mivacurium, succinylcholine.
- All volatile anesthetic drugs, propofol and ketamine are bronchodilators.
- Administer stress dose of IV hydrocortisone if pt on oral prednisone.

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- If intraoperative wheezing occurs:
  i. Rule out kinked ET tube or bronchial intubation
  ii. Give 100% oxygen, deepen anesthesia with propofol, ketamine, or volatile agents
  iii. IV lidocaine 0.5–1 mg/kg bolus
  iv. Use low respiratory rate and long expiratory time to avoid intrinsic PEEP
  v. Nebulized beta-2 agonist such as albuterol via ET tube or LMA

POSTOPERATIVE CONCERNS

- Deep extubation for pts with uncomplicated airway avoids risk of bronchospasm during emergence.
- If awake extubation planned, nebulized prophylactic beta-2 agonist, IV lidocaine
- Humidify supplemental oxygen, ensure adequate systemic hydration: dry anesthetic gases and O_2 are potential triggers for asthma.

ATRIAL SEPTAL DEFECT (ASD)

LUIS M. ZABALA, MD

DISEASE CHARACTERISTICS

- Definition: opening in the atrial septum except patent foramen ovale (PFO)
- 7–10% of all CHD
- Incidence of PFO in adults: 25%
- Pathophys: extra load on right side of the heart (L to R shunt)
- Magnitude of shunt relates to size of defect, ventricular compliance, & pulmonary artery pressures.
- L to R shunt: RA & RV enlargement
- Pulmonary vascular changes develop from long-standing volume overload.

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6 Atrial Septal Defect (ASD)

- Majority of pts are asymptomatic during childhood.
- In adulthood, extra load on RV leads to CHF, failure to thrive, recurrent respiratory infections, & symptomatic supraventricular dysrhythmias.
- Pulm htn in up to 13% of nonoperated pts

PREOPERATIVE ASSESSMENT

- CXR: RA & RV enlargement.
- ECG: right or left axis deviation possible; incomplete RBBB from stretch in right bundle of His
- Echo: secundum or primum defect; mitral regurg from anterior leaflet cleft.
- Ventricular dysfunction possible from long-standing volume overload
- Cardiology consultation for symptomatic pts
- Premed: PO midazolam (0.5 mg/kg) or PO pentobarbital (4 mg/kg)
- Caution with oversedation & hypoventilation: can worsen PVR & RV fn

INTRAOPERATIVE MANAGEMENT

- Std monitors during noncardiac surgery or transcatheter closure of ASD
- Symptomatic or complicated pts may require additional monitoring.
- Intracardiac surgical repair requires extracorporeal circulation and arterial invasive monitoring.
- Central venous monitoring at discretion of anesthesiologist
- Transesophageal echo helpful to assess de-airing of left heart & adequacy of surgical repair
- Inhalation induction generally safe
- Inhalation agents, narcotics, muscle relaxants, and/or regional anesthesia usually well tolerated
- De-bubble all IV lines.
- Atrial dysrhythmias common in adult unrepaired pt

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POSTOPERATIVE CONCERNS

- Immediate or early tracheal extubation possible following uncomplicated surgical repair of ASD
- Pts with good ventricular function prior to repair do not require inotropic support.
- Dopamine 3–5 mcg/kg/min usually sufficient for ventricular dysfunction
- Pulm htn may occur in older pts after ASD repair; use aggressive ventilation & milrinone.
- Pts with unrepaired ASD undergoing noncardiac surgery should be monitored closely for CHF due to volume overload or atrial dysrhythmias.
- Titrate analgesia to pain control without vent depression.

CEREBRAL PALSY

NATHALIA JIMENEZ, MD, MPH

BACKGROUND

- Definition: static motor encephalopathy
- Secondary to perinatal or early childhood (<2 yr) CNS injury
- Incidence 2.4 per 1,000 live births
- 4 categories: spastic (quadriplegia, diplegia, hemiplegia), dyskinetic (dystonia, athetosis, chorea), ataxic (tremor, loss of balance, speech involvement), mixed
- Assoc with developmental delay, visual & cognitive abnormalities, & motor problems possible with normal cognitive function
- Require multiple surgeries: mainly orthopedic (spinal fusion and release of limb contractures)
- Bulbar motor dysfunction predisposes to GE reflux, swallowing disorders & loss of airway protective mechanisms leading to chronic aspiration, recurrent pneumonia, hyperactive airways

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- Seizures in 30%: continue anticonvulsant on day of surgery & reinstitute early in postop period
- Baclofen used for muscle spasms, can cause urinary retention & leg weakness
- Abrupt baclofen withdrawal may cause seizures; overdose assoc with decreased consciousness & hypotension

PREOPERATIVE ASSESSMENT

- Premedication tolerated in most pts; reduce dose or avoid if hypotonic
- Anticholinergic will decrease secretions in pts with bulbar dysfunction.

INTRAOPERATIVE MANAGEMENT

- Contractures make positioning and IV access difficult.
- Impaired temp regulation due to hypothalamic dysfunction
- Monitor temperature and use warming measures.
- Inhalation induction safe unless severe reflux
- Increased sensitivity of succinylcholine: use only in emergency situations
- Decreased sensitivity to non-depolarizing muscle relaxants: requires higher doses
- Increased sensitivity to inhaled anesthetics and opioids: use lower doses
- Awake extubation in OR

POSTOPERATIVE CONCERNS

- Pain assessment difficult due to inability to communicate: use modified behavioral pain scales
- Regional techniques for postop analgesia recommended
- Low-dose benzodiazepines (diazepam) to prevent/treat muscle spasms

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COARCTATION OF THE AORTA

SCOTT D. MARKOWITZ, MD

BACKGROUND

- Prevalence: 8% of pts with CHD
- Coexisting bicuspid aortic valve, arch hypoplasia, other heart defects
- Hypertension is usually present pre-repair and may persist postop.
- May be repaired with balloon dilation or surgical correction end-to-end anastomosis or subclavian flap arterioplasty
- Residual or recurrent coarct may occur early or late: eval by right arm vs. leg BP & Doppler echo.

PREOPERATIVE ASSESSMENT

- ECG & echo: ventricular hypertrophy/dysfunction, valve dysfunction, residual coarct
- BP measurements in all extremities, identification of previous recurrent laryngeal nerve injury
- Antihypertensive regimen assessed and instructions for day of surgery medication administration given

INTRAOPERATIVE MANAGEMENT

- SBE prophylaxis even after repair
- If pre-repair: BP monitoring on pre-coarct artery (usually right arm except in cases of aberrant subclavian artery)
- If post-repair: monitors accurate in any extremity, except if residual coarct
- Left arm BP unreliable after subclavian flap repair
- Caution with intercostal blocks if intercostal arteries dilated

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POSTOPERATIVE CONSIDERATIONS

- Std pain management: opioids & NSAIDs
- Monitor for arrhythmias; resume antihypertensive therapy as appropriate.

CRANIOFACIAL SYNDROMES

SALLY E. RAMPERSAD, MB FRCA

BACKGROUND

- Premature fusion of one or more skull sutures
- Major component of several congenital syndromes: Crouzon, Saethe-Chotzen, Pfeiffer, Carpenter, Aperts

PREOPERATIVE ASSESSMENT

- Previous anesthetic records: airway issues & management
- Examine for obstructing mass (cystic hygroma, large tongue in Beckwith-Wiedemann syndrome; micrognathia/retrognathia in Pierre Robin); limited mouth opening, limited neck mobility, facial asymmetry (Goldenhars).
- Abnl ear form & position indicate other facial anomalies.
- Inform family of potential airway complications.
- Snoring, daytime somnolence, or hx of stridor may indicate significant airway obstruction.
- Cleft lip/palate are part of other syndromes (eg, CHARGE, trisomy 18, velocardiofacial syndrome).
- Associated anomalies: ear, renal, CV
- Avoid pre-op sedation in pts with potential airway obstruction, or administer with anesthesiologist present.
- PO or IV atropine (0.02 mg/kg) as antisialagogue/vagolytic
- Prepare different sizes of facemasks (air-filled cushion for asymmetric face), LMAs, oral & naso-pharyngeal airways, endotracheal tubes, fiberoptic bronchoscopes, stylets.

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