Best Picks
Anesthesiology: 2013-2014

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Best Picks Anesthesiology

Clinical Care

Images

Neuroapoptosis
Case 1: 28-week gestational age, premature infant for exploratory laparotomy & takedown ileostomy: intubated at birth, POD 1 extubated; 8 weeks MTT for takedown, postop stridor

Case 2: 2 intubations without cuff, then takedown, 3.0 MTT; extubation day 3, stridor resolved after rx.

Case 3: full term for G-tube. 3.5 MTT; extubated POD3, stridor; craniosynostectomy POD 7; same tube, no stridor

MicroCuff TT

Cuffs are cylindrical in shape

Cuffs fixed closer to the tip of the TT; no Murphy eye

Cuffs made of thinner material: ultra thin (10 microns) polyurethene
Cuffed versus Uncuffed Endotracheal Tubes in Pediatric Anesthesia
The Debate Should Finally End

Cases 1 & 2: size 3 Microcuff tube, yet “manufacturer recommends this size only for full-term infants weighing more than 3 kg.”

Case 3: size 3.5 Microcuff tube, yet “manufacturer recommends this size tube only for infants from 8 months to less than 2 yr of age.”

Cuffed versus Uncuffed Endotracheal Tubes in Pediatric Anesthesia
The Debate Should Finally End

Inaccurate capnographic tracing; inaccurate spirometric tidal volume measurement; inaccurate end-tidal anesthetic level measurement; waste and increased cost of inhaled agents; inaccurate capnographic tracing; OR pollution; increased airway fire risk; possible need to change to different size; can’t regulate tracheal seal with change in compliance; increased risk of micro-aspiration

Correspondence

Dunn SM. Cuffed endotracheal tubes are okay for neonates. Anesthesiology. 2013;119(4):991: should have tested for leak

Adult Behaviors in PACU

Subset of Behavioral Interaction-Perioperative Study: postoperative data from 146 patients

Relationship between adult and child behaviors in the postoperative period:

Adults use of distraction & coping/assurance talk seems to keep children from becoming distressed

Reassurance & empathy not harmful, unless child distressed

Vitamin D & Congenital Heart Disease

Hypotonia in Infancy

A 4-week, 3.7-kg infant for muscle & skin biopsy

Three weeks after birth she was admitted for poor feeding and weight gain; hypotonic and somnolent

Muscle biopsy for further therapy

Anesthesia: propofol infusion, fentanyl & rocuronium

6 h afterwards, awake, then over 72 h somnolent, then death: biopsy mitochondrial abnormality

Mitochondrial Disorder

Clinical signs: developmental delay, hypotonia, seizures, cardiomyopathy, respiratory muscle weakness, renal or hepatic insufficiency, and lactic academia

Some of same symptoms in infants susceptible to either MH or profound hyperkalemia

Incidence of mitochondrial myopathies from 11.5 to 25 per 100,000, though higher for muscle biopsy

Which anesthetic best?

Genioglossus & Palatoglossus Muscle Activity
Recovery from Sevoflurane

Risk for LMA failure

Almost 12,000 cases; 102 with failure

Prolonged surgical duration

Head & neck procedures

Inpatient

Congenital abnormalities

Moving patient position or anesthetizing location

Presenting Features

Leak (25%)

Obstruction (48%)

Intractable coughing/bucking (11%).

Before incision-57% of cases; after incision 43%

Why

Longer-duration surgeries & non-outpatient procedures is puzzling

Acquired or congenital airway syndromes

What about LMA modifications

Use of Fluids for Cardiac Surgery

Randomized, double-blind

2-12 yr, elective open heart surgery

50 ml/kg 6% HES 130/0.4 or 5% human albumin-volume replacement & ECC priming

Usual practice including tranexamic acid, heparin & protamine

No specific algorithm for fluid administration

Van der Linden P, et al: Six percent hydroxyethyl starch 130/0.4 (Voluven(R)) versus 5% human serum albumin for volume replacement therapy during elective open-heart surgery in pediatric patients. Anesthesiology 2013; 119: 1296-309
Fluids in Cardiac Surgery

Intraop fluid balance less positive in HES than HSA (NS 0.05)

Hemodynamic parameters equivalent

9 in HES & 4 in HSA received no inotropes

Mechanical ventilation time & ICU duration no different

Van der Linden P, et al: Six percent hydroxyethyl starch 130/0.4 (Voluven(R)) versus 5% human serum albumin for volume replacement therapy during elective open-heart surgery in pediatric patients. Anesthesiology 2013; 119: 1296-309
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Neuroapoptosis
Esophageal Atresia

Oral Mass at Birth: Epulis, or Congenital Granular Cell Tumor

Large Retropharyngeal Mass: Airway Management—Problem with Formulas

12 + age {10} (yr)/2 -> 17

(age/4+4)*3 -> 19.5

Redhu S, Varadarajan B: Airway management in a child with a large retropharyngeal mass—a lesson learned: How conventional rules of endotracheal tube fixation can be deceptive. Anesthesiology 2013; 119: 448
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→ Neuroapoptosis
General Anesthesia, Mitochondrial Fission and Fusion & Developing Rat Brain

Mitochondria important for formation of brain circuits

General anesthesia can affect mitochondria morphogenesis near synaptic connections

Isoflurane shown to cause apoptosis that is partially mitochondrial dependent

Mitochondrial mitochondrial matrix in subicular pyramidal neurons- pale and signs of swelling

General Anesthesia, Mitochondrial Fission and Fusion & Developing Rat Brain

Anesthesia promotes significant reactive oxygen species accumulation: increased superoxide dismutase activity, not catalase (scavenging enzymes)

Mfn-2 and Drp-1, maintain mitochondrial dynamics-40% ↓ in cytosolic Mfn-2 protein after GA; 40% ↓ in Drp-1 protein expression cytosol & 50% ↑ mitochondrial fxn

Brosnan H, Bickler PE. 
Xenon neurotoxicity in rat hippocampal slice cultures is similar to isoflurane and sevoflurane. 
Anesthesiology. 2013;119(2):335-344
Xenon vs Halothane: Hippocampal Slices

Brosnan H, Bickler PE. Xenon neurotoxicity in rat hippocampal slice cultures is similar to isoflurane and sevoflurane. Anesthesiology. 2013;119(2):335-344
Xenon, Fentanyl & Isoflurane: Neuroapoptosis

Isoflurane vs Sevoflurane: Developmental Effects

Isoflurane vs Sevoflurane: Developmental Effects

Sevoflurane & Developing Brain

Pups postnatal day 6, received 3% sevoflurane; 30% oxygen or hydrogen; at 7-9 weeks mated with healthy males

Maternal behavior of dams evaluated 1st day after parturition; survival of newborn pups recorded up to 6 days

Takaenoki Y, et al Neonatal exposure to sevoflurane in mice causes deficits in maternal behavior later in adulthood. Anesthesiology 2014; 120: 403-15
Sevoflurane Exposure Neonate, Then Maternal Behavior

Takaenoki Y, et al Neonatal exposure to sevoflurane in mice causes deficits in maternal behavior later in adulthood. Anesthesiology 2014; 120: 403-15
Pup Retrieval

Takaenoki Y, et al. Neonatal exposure to sevoflurane in mice causes deficits in maternal behavior later in adulthood. Anesthesiology 2014; 120: 403-15
Dams, not the Pups; 1st time, not second

Takaenoki Y, et al

Neonatal exposure to sevoflurane in mice causes deficits in maternal behavior later in adulthood.

Anesthesiology 2014; 120: 403-15
Hydrogen Mitigated Impairment (Off-Label Use)

Takaenoki Y, et al
Neonatal exposure to sevoflurane in mice causes deficits in maternal behavior later in adulthood.
Anesthesiology 2014; 120: 403-15
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