

Background

- What is Rapid Sequence Intubation (RSI)?
 - A process to ensure oxygen delivery in a decompensating patient or difficult airway (O_2 Sat >90% with a face mask and with 100% inspired O_2)
 - Other indications for RSI;
 - Prevent aspiration
 - Provide a direct route to suction the trachea
 - Medication administration
- Who may require RSI?
 - Trauma or burn patients
 - Any patient that has an impending loss of their airway
- Physiologic effects of intubation
 - Both sympathetic and parasympathetic nervous systems are stimulated → increased release of catecholamine's → HR increases (approx. 30 bpm), BP_{art} increases (approx. 20-25 mmHg), increase in arterial wall pressure.
 - Manual process of intubation also stimulates the upper respiratory reflexes → induces cough → induce bronchospasm and may increase ICP
- Complications
 - Aspiration in patients that have a full stomach (gag reflex)
 - Combative behavior

Seven "P's" of RSI (Duration of time=10 minutes) *Pharmacist Role

- Preparation- Obtain medications and equipment
- Preoxygenation-increase O_2 levels to 100%
- Pretreatment-ancillary medications
- Paralysis with induction (T0)- Sedation, followed by paralysis medication is being administered
- Protection and positioning- Cricoid pressure via Sellick maneuver
- Placement with proof-confirm placement, secure tube, etc.
- Post-intubation Management- long-term sedation, analgesia, or paralysis if needed

Pretreatment agents

- Medications that play a role in mitigating the adverse effects of intubation and future medications.

- Agents
 - L.O.A.D (lidocaine, opioid, atropine, defasciculating agents)
 - Lidocaine
 - MOA: Na-channel blocker that blocks the depolarization of neurons
 - Uses: Class 1B antiarrhythmic agent
 - Role in RSI: decreases ICP, thought to decrease CV response, suppresses cough reflex
 - Dose: 1.5 mg/kg (3 minutes before intubation)
 - Onset: 45-90s
 - Duration: 10-20m
 - Metabolized by the liver
 - Who should get lidocaine?
 - Patients with suspected elevated ICP (closed head injury, traumatic brain injury)
 - Severely asthmatic patients-controversial
 - Who should NOT get lidocaine?
 - Anesthetic allergy
 - Severe bradycardia
 - Severe heart block (unless pacemaker)
 - Receiving dofetilide, amiodarone or MAOIs
 - Opioids (mainly, Fentanyl)
 - MOA: bind to the mu-opioid receptor
 - Uses: Analgesia
 - Use in RSI: to limit post-intubation BP elevation
 - Dose: 1-3mcg/kg IV
 - Onset: immediate
 - Duration: 1hour
 - Side effects:
 - When administered IV push, reports of chest rigidity with IV fast push- Give over 30-60secs to avoid
 - Hypotension
 - Who should get fentanyl?

- Patients at risk of ICP
- Ischemic heart disease
- ICH
- Aortic aneurysm
- Who should NOT get fentanyl?
 - Patients that are hemodynamically unstable that are relying on sympathetic tone to maintain BP
- Atropine
 - MOA:
 - Uses: Prophylaxis of bradycardia (mainly pediatric patients)
 - Doses: 0.01-0.02 mg/kg (peds dose) or 0.5-1 mg/kg (adult dose)
 - Onset: 30 sec
 - Duration: 4 hours
 - Who should receive atropine?
 - Mainly pediatric patients due to vagal response that can cause bradycardia
 - Patients receiving a second dose of succinylcholine
 - Patients receiving ketamine
- Defasciculating agents
 - Not commonly used at JHH
 - MOA: non depolarizing NMB (e.g., rocuronium) at 1/10th the intubation dose
 - Use in RSI: to prevent fasciculation's that can occur with Succinylcholine that cause increase in ICP and potassium
 - Dose: 0.06 mg/kg
 - Onset: 1-2 min
 - Duration: <5-10min
 - Side effects: myalgia, increased ICP

Induction Agents

- Goal of induction: to sedate the patient to reduce anxiety/pain/combativeness

- SEDATION TO ALWAYS PROCEED PARALYSIS
- Sedation agents
 - Short-acting barbiturates
 - Thiopental and methohexital are ultra-shortacting
 - Effects: Provide sedation but no analgesia
 - Not used regularly in the present
 - S/E-thiopental has negative CV effects and can cause hemodynamic instability
 - Potential positives
 - Can treat acute seizures
 - Can reduce cerebral blood flow (good for head trauma)
 - Benzodiazepines (primarily midazolam)
 - MOA: modulate GABA
 - Effects: Amnestic, anxiolytic, anticonvulsant, hypnotic
 - Dose: 0.03-0.04 mg/kg
 - Onset: 60-90secs
 - Not recommended for pre-intubation but rather post-intubation sedation
 - Why midazolam and not other agents?
 - Onset and duration vary for each Benzodiazepine
 - Midazolam has the fastest onset and will not have a long duration of action
 - S/E: Respiratory depression
- Miscellaneous
 - Etomidate (Amidate)
 - "gold standard"
 - MOA: Enhances GABA to inhibit excitatory stimuli
 - Effects: sedative, hypnotic, but NO analgesia
 - Onset: 10-15 sec
 - Dose: 0.3mg/kg IV (same dose for adults and peds)
 - S/E: may increase ICP, possible adrenal suppression for 48 hours post-intubation, myoclonus
 - Use in septic patients is controversial due to adrenal suppression.
 - Ketamine

- MOA: NMDA receptor antagonist to prevent the release of the excitatory NT, glutamate
 - Effects: hypnotic, sedative AND analgesic
 - Dose: 1-2mg/kg
 - Onset:1-2 min
 - Duration: 5-15min
 - S/E: increased ICP, increased HR/BP, emergence phenomena
 - Who should NOT receive ketamine?
 - Head traumas
 - Ischemic heart disease
 - Acute coronary syndrome
 - Hypertensive emergencies
 - May be good for HYPOtensive patient
- Propofol
 - MOA: increases GABA activity
 - Effects: sedative, hypnotic but NO analgesia
 - Dose: 1.5-2.5 mg/kg (based on actual body weight)
 - Onset:10-50 sec
 - Duration:2-10 min
 - S/E: hypotension
 - Do not use in patients with a egg or soy allergy
 - Who should receive Propofol?
 - Those with seizure activity or head injuries
 - Not ideal for induction
- Paralytic Agents
 - Depolarizing Neuromuscular blocker (Succinylcholine)
 - MOA: directly block the impulse transmission at the neuromuscular junction
 - Dose:1.5 mg/kg (adults) IV based on actual body weight
 - May be given IM at 4mg/kg (max 150mg). Onset in this case can take up to 5-6 minutes
 - Onset: <1 min
 - Duration:10 minutes

- Effects: paralysis but maintaining consciousness (no not use alone)
- Who should NOT get Succinylcholine?
 - Pediatrics (bradycardia)
 - Renal failure/dialysis
 - Known hyperkalemia
 - Crush injury
 - Severe burns after 2-3 days
- This is kept in the fridge.
- Non-depolarizing neuromuscular blockers
 - MOA: compete and block acetylcholine from binding to the neuromuscular
 - Rocuronium
 - Dose: 1mg/kg
 - Onset: 60 sec
 - Duration:40-60 minutes
 - Who should receive rocuronium?
 - Pediatrics
 - Contraindication to Succinylcholine (e.g., malignant hyperthermia, conditions that precipitate hyperkalemia)
 - In the fridge!
 - Vecuronium
 - Onset:2-3 minutes
 - Duration: 45-65 minutes
 - Only to be used if Succ and Roc are not available.

Post-Intubation Sedation/analgesia

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