1. PREOPERATIVE

History
• Previous anesthesia experience?
• Health History: Coronary artery disease, asthma, hypertension, kidney or liver disease, or reflux?
• Social History: Smoke, drink, or abuse drugs?
• Medications and allergies: Consumption on day of surgery?
• Family History: Anesthesia complications?
• Last Meal? Teeth status? EKG? Labs?

Physical Exam
• Cardiopulmonary exam
• Airway Exam: Predicting the ease of tracheal intubation is a function of:
  1. Atlanto-occipital joint extension should be greater than 35 degrees to ensure exposure of the glottic opening during direct laryngoscopy.
  2. Thyromental distance is the distance from the notch of the thyroid cartilage to the tip of the mentum and if greater than 6 cm is correlated with an easier direct laryngoscopy.
  3. Mallampati airway evaluation serves as a predictor of difficult intubations with class 1 being easier than class 4.

2. PREOPERATIVE

Assessment: Assign an ASA physical status classification

ASA 1: A normal, healthy patient
ASA 2: A patient with mild systemic disease with minimal activity restriction.
Examples include hypertension, asthma, chronic bronchitis, obesity or diabetes mellitus.
ASA 3: A patient with a severe systemic disease that limits activity but is not incapacitating.
Examples include severe diabetes with systemic complications, history of myocardial infarction, angina pectoris, or poorly controlled hypertension.
ASA 4: A patient with severe systemic disease that is a constant threat to life.
Examples include severe cardiac, pulmonary, renal, hepatic, or endocrine dysfunction.
ASA 5: A moribund patient who is not expected to survive 24 hours with or without the operation.
Examples include major multi-system or cerebral trauma, ruptured aneurysm, or large pulmonary embolism.
ASA 6: A declared brain-dead patient whose organs are being removed for donor purposes.

Emergency Operation (E): Any patient in whom an emergency operation is required.

3. PREOPERATIVE

Determine Anesthesia Type:
• Regional Anesthesia:
Involves blocking nerve conduction with local anesthetics producing analgesia intra- and post-operatively. It can be used alone or in conjunction with IV sedation or general anesthesia. Types include spinal anesthesia, epidural anesthesia, femoral nerve block, and brachial plexus block. Drugs used include: Bupivacaine (Marcaine), Lidocaine, and Mepivicaine. For information on specific nerve block techniques, consult www.nysora.com.
• Monitored Anesthesia Care (MAC) or IV Sedation:
A cross between local anesthesia and general anesthesia, MAC or IV sedation enables the patient to breathe independently and stay “light” allowing the patient to respond to verbal commands and move with assistance. IV medications include Midazolam (Versed), Fentanyl, and Propofol.
• General Anesthesia:
Used for most longer surgeries, general anesthesia has three essential characteristics: amnesia (or unconsciousness), analgesia, and lack of movement. General anesthesia requires intubation with an endotracheal tube or laryngomask airway and the use of volatile anesthetic gases.

Prepare the room: Using the pneumonic MS. MAID
Check Machine, Suction, Monitors, Airway supplies, IV equipment, and Drug preparation.

4. PERIOPERATIVE

In holding before going to OR: obtain peripheral IV access
• Pharmacologic Premedication: Midazolam AKA Versed (0.02-0.08 mg/kg IV titrated in 1-2 mg increments), a Benzodiazepine, produces sedation, reduces anxiety, and causes anterograde amnesia.
• Monitors: Applied in OR
  • Pulse Oximeter: measures the peripheral arterial hemoglobin oxygen saturation (SpO2) and reflects the arterial hemoglobin oxygen saturation (SaO2). Apply to a finger on arm opposite the blood pressure cuff to prevent reading interruptions.
  • Automated Arterial Blood Pressure Cuff: place on arm opposite the IV as not to disrupt IV flow. Cuff width should measure 40% of the arm’s circumference; too small/large a cuff will over/underestimate blood pressure.
  • Electrocardiogram: a V lead EKG is typically used. Place “white to right” (i.e. white lead to right shoulder), “smoke over fire” (i.e. black lead to left shoulder and red lead to left lower chest), “when driving, right pushes green gas, left pushes red brake” (i.e. green lead to right lower chest, red to left lower chest), and brown lead at the apex.
• Applied after intubation: Temp. probe (esophageal, skin, or nasal), Capnography (measures end-tidal CO2), A-line (allows continuous recording of systemic BP and provides access to obtain blood for analysis of ABG’s, pH, and electrolytes), BIS monitor (a sensor strip placed on patient’s forehead measures consciousness with a score < 60 correlating with unconsciousness), Twitch monitor (a black-distal and red-proximal electrode is placed over the ulnar nerve to measure neuromuscular blockade).
5. PERIOPERATIVE

Induction of general anesthesia is usually accomplished by IV meds
• Preoxygenation (100% x 3 min with normal tidal volumes or 100% x 1 min with 8 vital capacity breaths)
• Fentanyl (0.5-0.2 μg/kg) An Opioid, Fentanyl if given 3 minutes prior to induction 1. blunts the sympathetic response often induced by intubation and 2. preemptive analgesia with opioids may reduce the need for analgesics in the post-operative period.
• Lidocaine (1-1.5 mg/kg) A Local Anesthetic, Lidocaine 1. decreases reflexes associated with airway stimulation and 2. decreases the “burn” of propofol entering vein.
• Propofol (1.5-2.5 mg/kg) The most common IV Anesthetic, Propofol produces unconsciousness within 30 seconds and is associated with hypotension, ventilation depression, and decreased incidence of post-op nausea. Emulsified in an egg mixture, beware of egg allergy and propensity to support bacterial growth if used > 6 hours after opening. Can burn while entering vein. Other IV Anesthetics include: Thiopental (3-5 mg/kg, a barbiturate, hypotension, long-lasting), Etomidate (0.2-0.4 mg/kg, no BP changes, may cause seizure and adrenocortical suppression), Ketamine (1-2 mg/kg, causes "dissociative anesthesia").
• Succinylcholine (1-2 mg/kg) A Depolarizing Muscle Relaxant, Succinylcholine is a competitive inhibitor of acetylcholine and depolarizes the postjunctional membrane producing fasciculation and then skeletal muscle paralysis within 30-60 seconds. To prevent fasciculation, use 10-15% of a normal dose of Nondepolarizing Muscle Relaxant. An alternative to Succinylcholine, Nondepolarizing Muscle Relaxants can be used for induction: Vecuronium (0.1 mg/kg), Rocuronium (0.6-1.2 mg/kg), Cisatracurium (0.1 mg/kg). Nondepolarizing Muscle Relaxants are noncompetitive inhibitors of acetylcholine. They are longer-lasting than Succinylcholine and therefore you only want to use it if you are confident that you can intubate and/or bag-mask the patient.

6. PERIOPERATIVE

Intubation
Positioning: To ensure the best view, elevate the patient’s head 8-10 cm with pads under the occiput with extension of the head at the atlanto-occipital angle.

Laryngoscope blade choices: 1. Curved (Macintosh) Blade: tip is advanced between the base of the tongue and the vallecula. 2. Straight (Miller) Blade: tip is advanced over the epiglottis. Laryngoscopes are numbered according to their length; a #3 is used on most adult patients
Direct Laryngoscopy Views: Classified Grade 1-4

Tracheal tube size and length: Tracheal tubes are sized according to the internal diameter in mm. The typical sizes and distance from cuff to mouth is 7mm and 21cm for females and 8mm and 23cm for males.

Confirmation of tube in correct position:
1. Symmetric bilateral movement of the chest with bilateral breath sounds
2. Condensation in the tube
3. Sustained end-tidal PCO₂ > 30 mmHg x 6 breaths

7. INTRAOPERATIVE

*MAC=Metal Axxial Concentration of an anesthetic at 1 atm that prevents response to noxious stimulus in skeletal muscle

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Facts</th>
</tr>
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<tbody>
<tr>
<td>Sevoflurane</td>
<td>MAC=1.8</td>
<td>Well tolerated for inhalation induction; rapid onset/offset; decreases BP and HR; breakdown product compound A is nephrotoxic in animals keep flows &gt; 2L/min</td>
</tr>
<tr>
<td>Desflurane</td>
<td>MAC=6.6</td>
<td>Airway irritant; decreases BP and HR; rapid onset/offset</td>
</tr>
<tr>
<td>Isoflurane</td>
<td>MAC=1.2</td>
<td>Airway irritant; decreases BP and HR; long onset/offset</td>
</tr>
<tr>
<td>Nitrous Oxide</td>
<td>MAC=104</td>
<td>Well tolerated for inhalation induction; decreases volatile anesthetic requirement; diffuses into gas filled areas (pneumothorax, bowel, middle ear)</td>
</tr>
<tr>
<td>Ephedrine</td>
<td>10-25 mg</td>
<td>Indirect-acting sympathomimetic → stimulates norepinephrine release → raises BP and HR</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>0.05-0.2 mg</td>
<td>Direct-acting sympathomimetic → alpha agonist → raises BP</td>
</tr>
<tr>
<td>Labetalol</td>
<td>0.1-0.5 mg/kg</td>
<td>Alpha-1 and nonselective beta antagonist → lowers BP and HR</td>
</tr>
<tr>
<td>Esmolol</td>
<td>0.2-0.5 mg/kg</td>
<td>Beta-1 antagonist → lowers BP and HR</td>
</tr>
<tr>
<td>Atropine</td>
<td>0.3-0.8 mg</td>
<td>Anticholinergic → increases HR, antiganglionic effect</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>4 mg</td>
<td>Use in beginning of surgery; also used to decrease intra-cranial pressure</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>4 mg</td>
<td>Use 20 minutes prior to the end of surgery</td>
</tr>
<tr>
<td>Vecuronium</td>
<td>0.05 mg/kg</td>
<td>No cardiovascular side effects; hepatic/renal excretion 3-5 min to 20-35 min</td>
</tr>
<tr>
<td>Rocuronium</td>
<td>0.3 mg/kg</td>
<td>Renal failure can extend duration of action 1-2 min to 20-35 min</td>
</tr>
<tr>
<td>Cisatracurium</td>
<td>0.05 mg/kg</td>
<td>Spontaneous hydrolysis in plasma 3-5 min to 20-35 min</td>
</tr>
<tr>
<td>Neostigmine</td>
<td>0.04-0.07 mg/kg</td>
<td>An anticholinesterase, neostigmine “reverses” the depolarizing neuromuscular blocking agents; increases the acetylcholine at muscarinic and nicotinic receptors → causes tachycardia, salivation, and bronchoconstriction- therefore use anticholinergic Glycopyrolate (@ 0.01 mg/kg) to minimize the muscarinic receptor activation. Use if “train of four” shows 4-2 twitches.</td>
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8. POSTOPERATIVE

Deliver patients to Post Anesthesia Care Unit (PACU). PACU nurses will place monitors on patient. The anesthesiologist will leave orders with the PACU nurses for Pain Control:

Morphine 0.03-0.15 mg/kg The prototype Opioid, Morphine produces analgesia, euphoria sedation, decreased ability to concentrate, respiratory depression, an impairment of compensatory sympathetic response, nausea, and vomiting. More effective at relieving dull pain versus sharp, intermittently pain.

Meperidine 0.2-0.5 mg/kg An Opioid, Meperidine (Demerol) is about 1/10 as potent as morphine and is unique in suppressing post-operative shivering. It is structurally similar to atropine and may cause tachycardia and mydriasis.

Hydromorphone 2.4 mg An Opioid, Hydromorphone (Dilaudid) should be used in smaller doses with renal or liver disease and geriatrics.

Ketorolac 30 mg A NSAID, Ketorolac (Toradol) is effective in treating muscular pain and can be used concurrently with an opioid. As it is an NSAID, it causes platelet dysfunction → beware of bleeding and should not be used with renal disease.

Acetaminophen 650 mg

Anti-Emetics:

Ondansetron 4 mg Ondansetron (Zofran) originally developed as an anti-emetic for chemotherapy is useful for post-op nausea and/or vomiting. Black box warning due to QT prolongation seen with large doses.