Rotation Title: Anesthesia for ENT Surgery
(Included in the General Anesthesia and Outpatient Anesthesia Rotations)

I. Definition: This rotation includes anesthesia for all ear, nose and throat surgery. Residents are exposed to ENT cases while on General Rotations and on the Out-Patient Rotation.

II. Curriculum: During the general rotation, the resident will manage anesthetic care for patients undergoing a variety of ENT surgical procedures. Anesthetic care includes preoperative assessment of the patient, the formation of an anesthetic plan, intra-operative application and management of the anesthetic plan, patient monitoring, safe emergence and postoperative care. The surgical procedures include airway laser cases, airway endoscopies, head and neck cancer procedures including reconstructive facial surgery, nose and sinus surgery , laryngeal and tracheal reconstructive surgery , tonsillectomy & adenoidectomy, uvulopalatopharyngoplasty, tracheotomy, and ear surgery .While managing these anesthetics, the resident will have to work in close proximity with the surgeon and learn to safely share our primary field, the airway, while having less access to the patient.

The resident will manage difficult and abnormal airways as he or she deals with these patients. We will discuss methods for assessing the airway including clinical examination, radiographic studies and consultation with the surgical team. The curriculum includes a discussion of The ASA Difficult Airway Algorithm and its application to clinical situations. Alternative methods for securing the airway such as awake and/or fiberoptic intubation are practiced. Stress is placed on formulating a plan of action before tackling a difficult airway. The resident will discuss emergency techniques such as transtracheal ventilation and cricothyrotomy and practice them on a model or a patient.

During this rotation, the resident is expected to review airway anatomy and physiology. The detailed knowledge of laryngeal anatomy and physiology helps the resident understand the implications of the various disease states and their treatment.

A major part of the curriculum deals with laser surgery and the application of safety guidelines to laser procedures in the airway.

III. Performance Assessments:

A. Self Assessment
You (the resident) are to check each box as the material is mastered. Self reflection on your own competencies is critical.

B. Faculty Assessment
Faculty will periodically review your self assessment and discuss their assessments of your competencies. The overall scores on the six competencies will be reported to you at least weekly.

C. Mentor Assessment
Your mentor should meet with you quarterly and review your entire portfolio. The mentor should report areas in which you have deficiencies (for your level of training). This report may be to you and/or to the program director as determined by your mentor.

IV. Assessed Competencies (Performance Criteria):

A. Patient Care At the conclusion of the rotation, residents should be able to ...

□ 1. Administer anesthesia for the procedures mentioned under Medical Knowledge (below).
□ 2. Evaluate an abnormal airway using clinical skills, radiological studies and consultation with the surgeon and patient's record.
□ 3. Select, modify and prepare the appropriate endotracheal tubes for laser procedures.
□ 4. Modify the anesthetic mixture to minimize the risk of fire in airway laser procedures.
□ 5. Practice safety precautions for the patient and operating room staff during laser procedures.
□ 6. Perform jet ventilation using the Sander's injector for laser cases performed with no endotracheal tube in place.
□ 7. Administer anesthesia for rigid and flexible airway endoscopy.
□ 8. Control the hemodynamic changes caused by rigid airway manipulation.
□ 9. Treat the cardiovascular changes caused by the use of epinephrine and cocaine in nasal surgery.
□ 10. Insert an antecubital central line.
□ 11. Manage anesthesia for major head and neck cancer procedures, including patient monitoring, fluid management and postoperative pain control.
□ 12. Evaluate the various specialty endotracheal tubes available and utilize them in the appropriate situations.
□ 13. Perform elective fiberoptic intubation on patients with normal airways under general anesthesia.
□ 14. Perform topical anesthesia of the airway including transcricoid membrane injection of local anesthesia.
□ 15. Administer propofol for general anesthesia and for awake sedation.
□ 16. Practice cricothyrotomy, needle cricothyrotomy and jet ventilation on the training model.
□ 17. Support the airway by utilizing positive airway pressure in situations of partial or potential upper airway obstruction.
□ 18. Prevent or modify postoperative nausea and vomiting by using appropriate doses of antiemetics.

B. Medical Knowledge: The resident should understand:

□ 1. Airway anatomy
□ 2. Topical anesthesia
□ 3. Airway evaluation
□ 4. Laser safety
□ 5. Nerve block of the airway
□ 6. Vasoconstriction
□ 7. Cocaine
□ 8. Airway sharing
□ 9. Endobronchial surgery
□ 10. Glomus tumor
□ 11. Epiglotitis
□ 12. Retropharyngeal abcess
□ 13. Angiodema of the airway
□ 14. Post-tonsillectomy bleeding

15. Laser Airway Procedures
    - □ a. Define Laser principles.
    - □ b. Classify the various kinds of lasers used in ENT procedures.
    - □ c. Review the risks of laser use in the airway.
    - □ d. Apply safety principles to airway laser procedures.
    - □ e. Appraise the available endotracheal tubes for laser procedures and select the appropriate one.
    - □ f. Formulate a safe anesthetic plan for airway laser surgery.
    - □ g. Summarize a plan of action to deal with airway fires.
    - □ h. Explain the principles of venturi jet ventilation when used during laser procedures on the larynx or trachea via a rigid bronchoscope or laryngoscope.
    - □ i. Evaluate propofol and narcotic mixtures for these procedures and compare with an inhalation technique.
16. Endoscopies
    - □ a. Describe the sequence of events during a pan-endoscopy.
    - □ b. Plan an anesthetic including patient monitoring, for fiberoptic or rigid bronchoscopy.
    - □ c. Summarize the possible complications of pan-endoscopy.
    - □ d. Explain the rationale for eliminating nitrous oxide from the anesthetic mixture during apneic periods.
    - □ e. Discuss apneic oxygenation and the speed of rise of $PaCO_2$ during its use.
    - □ f. Review neuromuscular monitoring for depolarizing and non depolarizing block, including the diagnosis of phase II block.
    - □ g. Rank the various techniques available for control of the hemodynamic response to rigid laryngoscopy and bronchoscopy.
17. Major Head and Neck Cancer Procedures
    - □ a. Summarize the common co-existing problems in head and neck cancer patients.
    - □ b. Evaluate the monitoring modalities available and the rationale for avoiding the use of neck veins for central monitoring.
    - □ c. Describe the rationale for use of intracardiac E KG tracing during antecubital central line placement.
    - □ d. Discuss intraoperative fluid management of these cases.
    - □ e. Plan a general anesthetic for a patient undergoing a glossectomy or mandibulectomy with free flap reconstruction.
    - □ f. Prescribe and administer pain medication to insure a comfortable and smooth emergence for the patient at the end of the procedure.
    - □ g. Critique the methods available for prevention of hypothermia and their utility in head and neck cases.
    - □ h. Describe the rationale for the use of a neuromuscular stimulator or nerve conduction monitor by the surgeons and its influence on the planned anesthetic.
    - □ i. Describe the end result of various laryngeal surgical resections such as hemilaryngectomy, supraglottic and total laryngectomy.
18. Nose and Sinus Surgery
    - □ a. Review the interaction of catecholamines and inhalation anesthetic agents.
    - □ b. Critique the use of cocaine & epinephrine as mucosal vasoconstrictors by ENT surgeons.
    - □ c. Describe possible contraindications to the use of cocaine.
    - □ d. Discuss the management of inadvertent intravascular injection of epinephrine
    - □ e. Plan emergence and extubation in the presence of pharyngeal blood.
    - □ f. Review anesthetic management for patients with asthma and nasal polyps.

19. Laryngeal Reconstructive Surgery / T -tube insertion
    - □ a. Reconstruct the natural history of laryngeal and tracheal injury and stenosis.
    - □ b. Review the clinical picture and differential diagnosis of tracheal stenosis.
    - □ c. Review the presentation and clinical management of acute laryngeal trauma.
    - □ d. Describe the Montgomery T -tube and its use as a stent in reconstructive surgery.
20. Uvulopalatopharyngoplasty (UPP)
    - □ a. Interpret a polysomnogram report to stage sleep apnea patients.
    - □ b. Evaluate the degree of airway compromise in patients scheduled for UPP.
    - □ c. Review the pathophysiology of sleep apnea.
    - □ d. Plan a general anesthetic and airway management plan for a patient with sleep apnea.
21. Tracheotomies
    - □ a. Describe the anatomy and placement of a tracheotomy.
    - □ b. Review the possible complications of tracheotomy.
    - □ c. Contrast the anesthetic management for a tracheotomy performed for long term ventilation to that performedd acutely for airway obstruction.
22. Vocal Cord Injections and Arytenoid Medialization
    - □ a. Review the anatomy of the larynx.
    - □ b. Draw the appearance of the vocal cords in various nerve injuries.
    - □ c. Discuss the rationale behind vocal cord medialization procedures.
    - □ d. Review the major causes for vocal cord paralysis.
23. Tonsillectomy and Adenoidectomy (T&A)
    - □ a. Draw the lymphatic structures in the head and neck area.
    - □ b. Review the complications of T &A.
    - □ c. Design a safe anesthetic technique for T&A, including premedication and postoperative pain control.
    - □ d. Compare various methods for managing a bleeding tonsil.
24. Ear Surgery
    - □ a. Review the anatomy of the middle and inner ear and the course of the facial nerve in relation to the ear structures.
    - □ b. Discuss the causes of the high incidence of post operative nausea and vomiting in ear surgery.
    - □ c. Summarize the effect of N_2O diffusion on the middle ear.
    - □ d. Describe the fluid and ventilation management for intracranial ear procedures.
    - □ e. Classify the paragangliomas of the head and neck.
25. Difficult Airway Management
    - □ a. Review the innervation of the upper airway, larynx and trachea.
    - □ b. Describe topical anesthesia of the airway for awake intubation.
    - □ c. Summarize the ASA Difficult Airway Management Algorithm.
    - □ d. Plan an induction technique for a difficult airway and an alternative plan for managing a “cannot ventilate-cannot intubate scenario”.
    - □ e. Review the anatomy of the cricothyroid membrane.
    - □ f. Describe needle cricothyrotomy.
    - □ g. Compare the pressure required for transtracheal ventilation in adults and children using the Sander's injector.
    - □ h. Describe the possible complications of transtracheal ventilation.
    - □ i. Diagram emergency cricothyrotomy.
    - □ j. Summarize the principles of fiberoptics and name the various parts of the fiberoptic scope.

The CA-1 resident on their ENT anesthesia rotations, shall be responsible for mastering all material listed in Appendix A. These will be assessed by written and oral examinations.

C. Practice Based Learning and Improvement: At the conclusion of this module, the resident should be able to …

☐ 1. Learn the airway module and achieve a score of at least 80% on its evaluative examination

☐ 2. Demonstrate case counts showing involvement in variety of ENT cases

☐ 3. Research all outcomes of patients via postoperative visits

☐ 4. Look up and report to attending physicians the scientific evidence for the appropriate surgical care and anesthetic care of both usual and unusual cases. This should be done at least weekly. A copy of this report may be placed in your portfolio.

D. Interpersonal and Communication Skills: The resident will …

☐ 1. Define airway management in advance with surgical team for airway sharing cases

☐ 2. Define the best location for elective tracheostomy (OR vs ICU)

☐ 3. Identify laser hazards to the OR team

☐ 4. Define airway priorities to PACU personnel

E. Professionalism: The resident will …

☐ 1. Ensure complete preparation for anticipated difficult airway management

☐ 2. Demonstrate respect for the use and proper care for fiberoptic bronchoscopies

☐ 3. Develop a sustained interest in learning the skills of airway management

F. Systems-Based Practice: At the conclusion of this module, the resident should be able to …

☐ 1. Understand the airway resources available, including location of difficult airway cart, and expert faculty

☐ 2. Understand the costs to society of sleep apnea, obesity, childhood streptococcal infections, otitis media, etc.

☐ 3. Understand applications of physics and biomedical engineering to medicine, especially advances in LASER systems, cochlear implants, the artificial larynx, etc.

☐ 4. Understand governmental and private payor systems for young children undergoing ENT procedures

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Appendix A: Medical Knowledge expected to be mastered during CA-1 ENT Rotation

Lecture 18

Electrical; Fire and Explosion Hazards: Basic Electronics

1) Source of Ignition; Static
2) Prevention: Grounding, Isolation Transformers
3) Macro and Micro Current Hazards
4) Safety Regulations; National Fire Protection Association (NFPA) Standards

Lecture 19

Lasers and Airway Fires

1) Lasers, Laser Safety, Laser-safe Endotracheal Tubes
2) Airway Fires

Lecture 72

Vasoconstrictors

1) Non-Adrenergic Vasoconstrictors: Vasopressin and Congeners

Lecture 84

Hypertension

1) etiology, pathophysiology, course of disease
2) drug treatment, interactions with anesthetics, risk of anesthesia
3) intraoperative or postoperative hypertension
a) differential diagnosis and treatment

Lecture 109

Morbid Obesity / Anesthesia for Bariatric Surgery

1) preanesthetic evaluation and management
2) pharmacologic considerations
3) anesthetic management (airway, ventilation, monitoring, venous access)
4) postoperative management (ventilation, analgesia)

Lecture 120

Thyroid and Parathyroid Disease

1) hyperthyroidism
   (a) metabolic and circulatory effects
   (b) anesthetic management
   (c) thyroid storm
2) hypothyroidism
   (a) circulatory and metabolic effects, myxedema coma
   (b) substitution therapy
   (c) anesthetic implications
3) complications of surgery: hypocalcemia, recurrent laryngeal nerve injury, diagnosis and treatment
4) hyperparathyroidism; physiological effects
5) hypoparathyroidism; postoperative manifestations and treatment

Lecture 155

Otolaryngology (ENT) anesthesia

1) airway endoscopy
2) microlaryngeal surgery
3) laser surgery: hazards, complications
4) jet ventilation