In this case report, the authors describe the anesthetic management of the patient with tumor masses of the neck, and emphasize the need for constant vigilance of potential airway compromise.

Airway control is always uppermost in the mind of the practicing anesthetist. However, a large percentage of serious anesthetic accidents involve some aspect of airway mismanagement. Marx and his associates found that 25% of the preventable anesthetic deaths were primarily due to some form of airway mismanagement.

The patient presenting with tracheal tumors, post-radical neck dissection with new tumor masses or with any compromised airway results in a challenge to the anesthetist. The scope of this article is to discuss tumors that cause airway compromise. Some general principles for airway evaluation and suggestive guidelines for anesthetic management are included.

The case

A 55-year-old male presented to the ear, nose and throat clinic with difficulty in swallowing, swelling in the right neck and persistent sore throat. His history revealed previous left radical neck dissection with hemimandibulectomy. The patient was assessed preoperatively by the anesthetist via the systems review format and the possibility of an awake intubation was discussed in detail with the patient.

The patient was premedicated with morphine sulfate 10 mg, promethazine HC1 25 mg and glycopyrrolate 0.3 mg. Upon arrival in the operating room suite, the patient was mildly sedated. Prior to laryngoscopy, diazepam 2.5 mg and fentanyl 0.1 mg were given intravenously. Direct laryngoscopy was then attempted. Although direct view of the cords was not possible, the epiglottis could be seen.

It was felt at that time that the patient could be further anesthetized and intubated. After preoxygenation, induction was performed with sodium pentothal 300 mg. Muscle relaxation was facilitated by administering 100 mg of succinylcholine after ease of ventilation was ascertained. Multiple unsuccessful attempts were made at oral intubation.

The patient was then awakened. The otolaryngologist attempted several oral intubations using the Jackson laryngoscope. It was determined that the biopsies of the oral cavity and posterior pharynx must be performed. An awake blind nasal intubation was successfully performed after achieving topical oral and nasal anesthesia. The operative procedure was performed without incident.

Postoperative soft tissue x-rays of the neck and airway revealed adequate free air around the endotracheal tube, and the patient was extubated without incident. (See Figure 1.) This case study demonstrates that although evaluation of the patient prior to anesthesia induction was adequately performed, disastrous results may still occur.

Discussion

Potential or actual supraglottic obstruction becomes critical when general anesthesia is begun.
With certain pathological conditions, the unobstructed airway in the conscious patient becomes impossible to secure and maintain once general anesthesia is begun. Unappreciated deformity of the upper airway prohibits endotracheal intubation, and soft tissue relaxation accompanying the use of muscle relaxants precipitates obstruction. Once the nature and extent of the laryngeal obstruction is known, selection of the safest technique to secure and maintain an airway can then be made.

Large malignant tumors of the epiglottis, pyriform fossa or vocal cords can narrow the airway to less than 4 mm in diameter. These tumors may also be friable, edematous and floppy. Any large tumor of the neck can cause compression and shifting of the trachea. It is to the advantage of the anesthetist and for the safety of the patient to have proper x-ray evaluation of the airway before attempting anesthesia.

Any patient with a partial airway obstruction due to a tumor must be considered to have a compromised airway. The extent of this compromise may not always be clinically manifested. Inspiratory stridor, an important clinical sign, is due to increased turbulent airflow through a narrowed passage. When inspiratory stridor is present in an awake patient, general anesthesia should be avoided until absolute control of the airway is assured. This is accomplished by either an awake intubation or a tracheostomy.

A thorough preoperative evaluation should be accomplished and should include information from the patient as well as charts or records for previous surgeries and intubations if available. Contact the surgeon for information from the indirect laryngoscopy and obtain the laboratory results. Also to be considered are tomograms of the larynx, x-rays of the soft tissues of the neck, and arterial blood gas results. Pulmonary function tests and flow volume loops can help determine the degree of airway obstruction. X-rays, especially tomograms, and contrast studies may clearly delineate the extent of an otherwise vague mass. Preoperative arterial blood gases are important, as CO₂ retention is an ominous sign of respiratory failure.

Assessment of the patient with suspected laryngeal carcinoma requires not only a physical examination, with indirect and direct laryngoscopy, but also a radiological survey. Even when successful, laryngoscopy may not reveal potential airway obstruction. In examining soft tissue x-rays of the neck the valuable information obtained concerning the site of the larynx and the angle of the trachea can be most useful.

The anesthetic management of potential laryngeal airway obstruction includes five options to be discussed. The option chosen depends on the nature of the obstruction as evidenced by x-rays, indirect laryngoscopy, and the patient’s suitability for intubation and general anesthesia.

The following are a suggested number of ways that the anesthetist can manage the patient’s airway:

1. **Awake oral-tracheal intubation.** This procedure is performed under a number of possible combinations of sedation, local and/or topical anesthesia. It necessitates a cooperative patient and adequate mobility of the neck.

2. **Awake nasotracheal intubation.** This procedure is performed blind with the patient in the “all-important” sniffing position and breathing spontaneously. Again, as in the awake oral sequence, combinations of sedation, topical and/or local anesthesia are used.

The flexible fiberoptic laryngoscope can also be helpful, either nasally or orally, with the scope used as a stylet and passed through the cords. The major disadvantage in the fiberoptic technique is that some scope models lack suction capabilities necessary to prevent obstruction by blood and
secretions, thus blocking the operator's view of the anatomy.\(^7,8\)

3. *General anesthesia with spontaneous ventilation*. The third option is inhalation induction of general anesthesia with spontaneous ventilation. This procedure assumes that the patient has proper mobility of the neck. The disadvantage of this technique is prolonged induction and the possibility of obstruction during induction.

4. *Direct laryngoscopy and intubation*. This procedure can be done with thiopental after preoxygenation. If the airway is patent and manageable, then succinylcholine is given for ease of intubation. A direct laryngoscopy or a blind nasal intubation using external visual signs can then be performed.\(^1\) This procedure is generally safe for Type I airway problems, such as vocal cord nodules or carcinoma in situ. Note: succinylcholine should not be used if airway obstruction is present or the ability to intubate or manage the airway is in doubt.

5. *Tracheostomy*. The fifth option is tracheostomy with the patient under local anesthesia. The primary advantage of a tracheostomy is immediate control of the upper airway in a patient who cannot be safely intubated due to tracheal tumor and airway compromise. Tracheostomy is indicated when the preoperative patient's assessment, including lateral neck films and indirect laryngoscopy, indicates that the airway cannot be safely controlled with general anesthesia. The administration of general anesthesia can increase, and in some cases, precipitate upper airway obstruction in patients with laryngeal tumors.

**Conclusion**

The first priority of the anesthetist with a patient presenting with laryngeal tumors is to preserve and protect an adequate airway and prevent a possible disastrous event. As a practicing anesthetist concerned with patient safety, one must be thoroughly informed about the patient including his history, physical examination, x-ray evaluation and indirect laryngoscopy. The importance of the anesthetist performing a comprehensive preanesthetic evaluation cannot be underestimated, in that if the unknown is known, the morbidity and mortality can be prevented or lessened.

**REFERENCES**


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