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Throat Pack: A Surgical Necessity or a Threat to Patient Safety?

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Throat Pack: A Surgical Necessity or a Threat to Patient Safety?

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LESSON OBJECTIVES

Upon completion of this lesson the reader should be able to:

1. **Define the term "sentinel event."**
2. **Explain the frequency and risks associated with retained foreign objects following a surgical procedure.**
3. **Describe the percentage of unintentional retained mouth or airway foreign objects reported to the Joint Commission.**
4. **List the commonly articulated justifications for the use of a throat pack during head and neck surgical procedures.**
5. **Describe the complications associated with the use of a throat pack.**
6. **Describe the potential complications of throat packs that can occur during operative dental procedures.**
7. **Summarize behaviors among operative team members that may lead to the failure of throat pack removal at the conclusion of the surgical procedure.**
8. **State who bears the responsibility for removal of the throat pack at the conclusion of the operative procedure.**
9. **Define explicit procedures that can be employed to decrease the risk of throat pack retention.**
10. **Discuss the use of radiofrequency identification technology to track and detect retained surgical sponges.**

Current Reviews for Nurse Anesthetists® designates this lesson for 1.5 contact hours in Patient Safety / Risk Management.

Introduction

The placement of a pharyngeal pack (throat pack) is common and, perhaps for some surgeons, is a routine practice for dental, maxillofacial, nasal, and selected neurosurgical procedures. However, there is a lack of published evidenced-based literature to support the safety and benefit of the throat pack. Candidly the available evidence establishes considerable morbidity with its routine placement. **An unintentionally retained throat pack presents the gravest threat to patient safety** by creating a potentially fatal airway obstruction.

The retention of a throat pack, like other retained objects, is considered a sentinel event by the Joint Commission. A "sentinel event" is defined as an unexpected event leading to death, or the risk of physical or psychologic injury. Sentinel events result in the undertaking of a root-cause analysis in an attempt to identify failures for the identification and elimination of coupled actions to prevent a similar event.

Unintentionally retained foreign objects following a surgical procedure are the most frequently reported sentinel events to The Joint Commission.

Table 1
Justification for Throat Pack Use

- Prevention of post-operative nausea and vomiting (most common).
- Prevention of aerodigestive contamination with blood and surgical debris.
- Inhibit systemic absorption of vasoconstrictive agents introduced during nasal surgical procedures.
- Containment of an air leak with the use of an uncuffed endotracheal tube or uncuffed tracheostomy.
- Stabilization of the endotracheal tube during neurosurgical or prone procedures.
- Protection of oropharyngeal structures during laser surgical procedures.

From October 2012 through March 2018, there were 308 reports of retained foreign objects following a surgical procedure. Retained packing defined as gauze or other absorbent material was responsible for 30 of these reported sentinel events (9.7%), 13 of which involved the mouth or airway (4.5%). The National Health Service of England defines a retained throat pack as a "never event". A retained throat pack occurred 16 times between 2013 and 2015, with 6 additional cases between 2015 and 2016.

This lesson will review the use of the throat pack by examining commonly used material for the throat pack, the responsibilities for placement and removal, the complications associated with their employment, and the recommended procedures to ensure a retained throat pack is a "never event".

What is the Justification for the use of a Throat Pack?

The placement of a throat pack for intraoral and head and neck surgical procedures is customary. The stated purpose is to assist with the removal of blood, secretions, and debris (such as during dental restoration), thus preventing blood clot and debris accumulation in the pharynx while ensuring a patent airway prior to endotracheal extubation. Six common justifications for the insertion of a throat pack are outlined in Table 1.

The evidenced-based literature fails to support a decrease in post-operative nausea and vomiting, the most often cited justification for throat pack use.

While these may appear to be reasonable and justified (e.g., the protection of oral structures during oropharyngeal/laryngeal laser procedures), the evidenced-based literature fails to buttress a reduction in, nor an increase in, complications associated with throat pack use. Complications associated with throat pack use include pharyngeal mucosal abrasion or laceration, sore throat, vocal hoarseness, ingress into the gastrointestinal tract (compelling an endoscopy for removal), and hypoxia (when retained), prompting emergent re-intubation. Unmistakably the underlying risk of the throat pack is when its placement has been overlooked at the conclusion of the surgical procedure with the potential development of life-threatening airway obstruction; as a result, many authors have suggested that their use be abandoned.

The most common justification, the prevention of post-operative nausea and vomiting following the ingestion of blood and secretions, is not supported by the literature. Three prospective controlled trials of nasal sinus surgery have failed to demonstrate a benefit in decreasing aerodigestive contamination and in post-operative nausea and vomiting. The considered selection of anesthetic agents (for individuals with an increased incidence of postoperative nausea and vomiting) and antiemetics, along with gastric emptying at the conclusion of the surgical procedure, is a more effective strategy.

Throat pack placement increases the incidence of post-operative sore throat. The containment of an air leak from an uncuffed endotracheal tube or tracheostomy may be corrected with the insertion of a cuffed endotracheal or tracheostomy tube. Additionally, the containment of inspiratory gases (namely oxygen) is important in minimizing the risk of operative fires during airway and head and neck surgical procedures. The endotracheal tube can be stabilized in the prone positioned patient with a rolled-gauze bite block that extrudes from the mouth, placed laterally between the maxillary and mandibular molars, and lying adjacent to the endotracheal tube.

Throat Pack Placement

The throat pack, historically in the U.K., has been

placed by anesthetists, but in the United States is generally placed by the primary surgical team. There are a variety of insertion techniques, materials utilized, as well as the length (total volume) placed within the pharynx. A gauze roll is the conventional material used for the throat pack, although other material including foam may be used to act as a pharyngeal tampon. Gauze is a translucent open weave material made of cotton. The gauze utilized for the throat pack should have an imbedded radiopaque identifier to aid in its detection should the pack be swallowed, and to ensure its removal prior to anesthetic emergence (see below). The gauze may be inserted dry or more commonly following wetting with normal saline. The throat pack may be inserted in a blind fashion with a digit or forceps but may also be placed under direct visualization with the aid of a laryngoscope.

Pharyngeal mucosal abrasions and lacerations may result from the blind insertion of either dry or wet gauze material. Dense packing with a large volume of material into the hypopharynx may compress the mucosa of the hypopharynx resulting in post-operative vocal hoarseness, dysphagia, or aphonia. Dense packing and compression may impair venous drainage resulting in venous engorgement of pharyngeal structures (e.g., swelling of the tongue), delaying endotracheal extubation at the conclusion of the surgical procedure.

Complications of throat pack placement include pharyngeal abrasion/laceration, dysphagia, vocal hoarseness, and venous engorgement of pharyngeal structures.

Placement of the throat pack should be clearly announced at the time of its placement and, like the surgical time out, should be announced to all the surgical team members (operating room nurses, scrub techs, and anesthesia providers). When placed as an element of the surgical procedure, the throat pack should be listed and assimilated into the surgical sponge count.

A multitude of recommendations appear in the literature suggesting methods for continued identification of the intraoperative presence of the throat pack. These include extending a portion of the pack outside the mouth to be easily identified, attaching a distal end of the pack to the endotracheal tube with tape (or a suture placed through the packing material and tied around the endotracheal tube) or taping the distal end to the patients' cheek or jaw. Securing the packing to the endotracheal tube, however, could result in an unintended extubation or displacement of the throat pack. Extending the distal end of the throat pack outside the mouth to remind the surgical team of its presence may be advantageous but could also interfere with the operative procedure. As an example, operative dental procedures rely upon the use of dental hand pieces for removal of dental caries, polishing of dental fillings and the preparation of teeth for dental crowns. These instruments are compressed air-driven turbines with rotations up to 180,000 revolutions per minute. These could inadvertently ensnare the exposed throat pack and cause patient injury.

Table 2
Human Factors Increasing the Risk of Retained Throat Pack

- Surgical Team unfamiliar with head and neck surgical procedures.
- Failure of Operative team to announce placement.
- Failure to communicate presence of throat pack by surgical nursing staff and/or anesthesia providers during handoffs.
- Throat pack material unaccounted for in surgical count.
- Additional throat pack material placed intraoperatively.
- Throat pack placement overlooked by surgical team at conclusion of surgical procedure.
- Unexpected surgical emergency distracting surgical team.
- Unexpected rapid emergence from anesthesia.
- Additional surgical or diagnostic procedures following primary surgical procedure.
- Failure of surgical team to communicate throat pack removal at conclusion of surgical procedure.

Wet or Dry gauze packing is the most common material used for the throat pack.

The placement of a label upon the patient's or surgeons forehead stating, "throat pack", following throat pack placement, or a label in proximity to

Table 3
Procedures for Reducing the Risk of Throat Pack Retention[1]

Visual Examination	Documentation
Place label on patient (Forehead). Label removed following throat pack removal	Perform formalized, recorded 2- individual accountings of throat pack insertion and removal
Place label on artificial airway device (endotracheal tube)	Record insertion and removal of throat pack on instrument/swab count board
Attach throat pack to artificial airway device (tape or suture placed through throat pack)	
Leave throat pack protruding from mouth for easy identification	
[1]NPSA recommends use of 2 procedures from each column	

National Patient Safety Agency 2009 Reducing the risk of retained throat packs after surgery - Safer Practice Notice NPSA/2009.

the flowmeters on the anesthesia machine, on the anesthetic ventilator, or placing a wrist band label around the anesthesia provider with the written words "throat pack" have also been suggested (See Figure 1). In the case of a handoff between anesthesia providers, a wrist-band label must be placed upon the anesthesia provider assuming care. As a reminder to all surgical team members, a non-removable sign attached to the interior of the operating theater door with a sliding tab specifying "throat pack" can be utilized to forewarn all team members of the throat pack's presence. While these methods may ensure all operating team, members are aware of the presence of a throat pack and its removal (see below), placement of the throat pack into the operating room safety checklist may reduce communication failures at the conclusion of the operative procedure.

Throat Pack Removal

Unintentionally retained throat packs continue to be reported to the Joint Commission and The National Health Service of England, regardless of the use of multiple recommendations to ensure their removal. A retained throat pack may result in a potentially fatal airway obstruction following endotracheal extubation if not promptly recognized. Human behaviors may be operative in the failure to remove the throat pack at the conclusion of the surgical procedure (Table 2). Some noted human factors include incomplete anesthesia and operative nursing team handoffs that fail to communicate the presence of the throat pack, distractions among the surgical team during the accounting of surgical instruments and sponge swab count, disruptive behavior from operative team members, unexpected intraoperative operative emergencies, the addition of subsequent packing during the surgical procedure that is not communicated nor accounted for in the sponge swab count, the addition of secondary surgical or diagnostic procedures, unexpected rapid emergence from anesthesia, and failure of the surgical team to communicate throat pack removal, and other operative team members (nursing and anesthesia) failing to verify the throat pack removal. While the surgical team member who placed the throat pack should be responsible for its removal at the conclusion of the surgical procedure, **all operative and anesthesia team members within the operating room should have accountability to confirm and communicate throat pack removal.** Prior to anesthetic emergence, an operative/anesthesia team debriefing should be conducted, which indicates a correct sponge count (throat pack included) and explicitly communicates the removal of the throat pack.

Following throat pack removal, the previously deployed reminder labels (patient forehead, anesthesia machine, anesthesia provider wrist band) would be removed. When using the non-removable sign attached to the interior of the operating theater door with a sliding tab specifying "throat

Figure 1

pack", the tab is moved to cover the word "throat pack" to indicate that the throat pack has been removed.

When placed, the throat pack should become a part of the surgical gauze/swab count.

To verify throat pack removal at the conclusion of the surgical procedure, clinical case reports of retained throat packs suggest that a laryngoscopy be performed by the anesthetist to authenticate its removal and it ensure there is no pharyngeal retention of additional packing or debris. Following throat pack removal, and when not contraindicated, this author passes a flexible suction catheter through the oropharynx into the stomach. Not only does this facilitate gastric decompression, but a difficult or failed passage may suggest a potential pharyngeal obstruction that may necessitate a direct pharyngo-laryngoscopy prior to anesthetic emergence.

While the majority of throat packs are not intended to be retained in the immediate postoperative period, those that may deliberately remain in the intubated patient in the surgical intensive care unit require rigid protocols to ensure all are aware of the throat pack presence, and to authenticate the removal prior to endotracheal extubation.

A label asserting "throat pack" may be placed on the patient's or surgeon's forehead, on the anesthesia machine, or attached to the anesthesia provider's wrist as a reminder of the presence of a throat pack.

A recently introduced technology is the use of radiopaque gauze and gauze packing that includes a radiofrequency chip embedded within the gauze (radiofrequency identification technology- RFID) to aid detection following the surgical procedure. While radiopaque gauze may be identified on x-ray, radiofrequency identification technology facilitates the immediate detection (without the required time to obtain an operative x-ray) of retained gauze packing. At the conclusion of the surgical procedure and prior to anesthetic emergence, the scanning detector is placed over the patient, (in the case of the throat pack, over the patient's neck). Should the throat pack remain, the detector will alert the surgical team to its presence.

The U.K. National Patient Safety Foundation in 2009 published procedures intended to reduce the risk of a retained throat pack (See Table 3). They recommended the use of two procedures from each column (visual and documentation). There must be defined protocols that communicate the presence and ensure the removal of throat packs at the conclusion of a surgical procedure.

Summary

Throat packs are commonly employed for oropharyngeal and head and neck surgical procedures. The contemporary literature demonstrates that their use can represent a threat to patient safety. The most common justification for throat pack placement is a reduction in postoperative nausea and vomiting. However this justification is not supported by evidenced-based literature. Throat pack placement increases the incidence of postoperative sore throat. Several human factors are operative in the retention of the throat pack at the conclusion of the surgical procedure. The operative team should have defined protocols that communicate the presence and ensure the removal of the throat pack. The entirety of the operative and anesthesia team members have accountability to confirm and communicate throat pack removal prior to anesthetic emergence.

Suggested Readings

Athanassoglou V, Patel A, McGuire B, Higgs A, Dover MS, et al. Systematic review of benefits or harms of routine anesthetist-inserted throat packs in adults: practice recommendations for inserting and counting throat packs. Anaesthesia 2018,73,612-618. An evidenced-based consensus statement regarding the use of throat packs by anesthetist in the U.K.

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A review of retained foreign objects reported to the Joint Commission.

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Tips for Your Clinical Practice: Key Points

- The **use of throat packs** is variable, controversial and rarely evidence based.
- The clinical significance and danger of **throat pack retention** is real; their use can lead to significant morbidity and mortality.
- The practice of whether a throat pack should be used, in light of its **risk/benefit profile,** is increasingly under assault.
- When a throat pack is used, surveys indicate that there is often disagreement between surgeons and anesthesia providers about who has the **responsibility for throat pack removal**.
- When a throat pack is used, the operative team should have a well-defined and adhered-to protocol to **communicate the presence** and **ensure the removal** of the throat pack.

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LESSON

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POST-STUDY QUESTIONS

1. **A "sentinel event" is described by the Joint Commission as:**
   - □ A. A "never event".
   - □ B. An unexpected event leading to death, physical, or psychologic injury.
   - □ C. Root-cause analysis.
   - □ D. Human factors that lead to patient injury.

2. **What was the occurrence of retained throat packs as reported by The National Health Service of England between 2015 and 2016?**
   - □ A. 2 identified cases.
   - □ B. 6 identified cases.
   - □ C. 13 identified cases.
   - □ D. 16 identified cases.

3. **Of the 308 unintentionally retained foreign objects reported to the Joint commission between October 2012 and March 2018, what percentage involved the mouth or airway?**
   - □ A. 2%
   - □ B. 4.5%
   - □ C. 6%
   - □ D. 9.7%

4. **The MOST COMMON justification for the use of a throat pack is:**
   - □ A. Preventing aerodigestive contamination.
   - □ B. Containment of air leak from uncuffed tracheostomy.
   - □ C. Stabilization of endotracheal tube during prone procedure.
   - □ D. Prevention of postoperative nausea and vomiting.

5. **A RECENTLY INTRODUCED technique that can detect retained gauze packing prior to anesthetic emergence is:**
   - □ A. X-ray detection.
   - □ B. Attaching the packing to the endotracheal tube.
   - □ C. Radiofrequency identification.
   - □ D. Performing a laryngoscopy.

6. **What is the drawback of attaching the distal portion of the throat pack outside the mouth to identify its presence during operative dental procedures?**
   - □ A. Increased incidence of unintended intraoperative extubation.
   - □ B. Risk of high-speed dental hand pieces ensnaring the throat pack.
   - □ C. Increase risk of gastric contamination by dental debris.
   - □ D. Increase the incidence of postoperative sore throat.

7. **Which of the following may result in the failure to remove a throat pack at the conclusion of the surgical procedure?**
   - □ A. Operative team debriefing with correct operative sponge/swab count.
   - □ B. Short surgical procedure.
   - □ C. Failure nursing/anesthesia handoff to communicate presence of throat pack.
   - □ D. Surgical team announcement of throat pack removal.

8. **Responsibility for the removal of the throat pack at the conclusion of the surgical procedure lies with:**
   - □ A. The primary surgeon.
   - □ B. The anesthesia provider.
   - □ C. The operating room nursing staff.
   - □ D. All operative and anesthesia team members within the operating room.