Advances in the Management of Perioperative Patients' Thirst

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PURPOSE/GOAL

To provide the learner with knowledge of best practices related to the management of perioperative thirst.

OBJECTIVES

1. Discuss the incidence and etiology of perioperative thirst.
2. Identify key factors related to mitigating perioperative thirst.
3. Describe safety factors affecting the management of perioperative thirst.

ACCREDITATION

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APPROVALS

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ABSTRACT

In response to an increase in osmolarity or a decrease in plasma volume, surgical patients often experience thirst during the perioperative period. Thirst causes intense discomfort for patients, but perioperative nurses and health care providers have received minimal direction on how to address this concern. This article presents evidence related to the advances in the management of patients' thirst and discusses clinical strategies that perioperative personnel can safely implement for their patients during the preoperative and postoperative periods. The Thirst Study and Research Group at Londrina State University, Brazil, developed the Thirst Management Model to provide a standardized method for perioperative personnel. Four pillars comprise this model: identification of thirst, measurement of thirst, safety assessment for the management of thirst, and application of relief strategies. This evidence-based model should assist perioperative nurses with translating knowledge and scientific evidence into clinical practice to provide safe patient care.

Key words: *thirst, thirst relief, thirst management model, patient discomfort, symptom management.*

Thirst is a multifaceted symptom that is influenced by a variety of environmental and individual factors, including personal health conditions (eg, disease); motivational, cognitive, affective, social, and cultural variables; and life habits.[1] It is a homeostatic response to increased osmolarity or decreased plasma volume that triggers the desire for water or fluid consumption to restore these parameters to their physiological reference points.[2,3]

Perioperative patients may experience thirst before and after surgery. Since 2010, nurse researchers have examined the effects of thirst on the patient's surgical experience,[4-9] the intensity of his or her symptoms based on a specific scale for rating perioperative thirst,[10] aspects related to evaluating the safety of thirst relief methods,[11,12] and postoperative thirst relief strategies.[13-16]

Recent scientific advances, including the discovery of the neuroanatomical pathway that explains the preabsorptive mechanism for thirst satiety,[17] point to a new approach to the management of perioperative thirst; however, the absence of logical organization of the evidence regarding care hinders safe and effective thirst relief for perioperative patients. The Thirst Study and Research Group at Londrina State University, Brazil, researched and developed the Thirst Management Model (TMM) for use in perioperative areas. This model organizes the available

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scientific evidence about perioperative thirst acquired and provides clinical steps that perioperative nurses can take in the immediate preoperative and postoperative periods to help relieve patients' thirst.

PERIOPERATIVE PATIENT THIRST

As a subjective symptom, perioperative thirst affects patients undergoing surgery and results in intense preoperative and postoperative discomfort for patients in all age groups.[4,8] Left untreated, thirst generates severe distress for patients, and nurses should investigate its relevance in clinical practice during the perioperative period.[8,18,19]

Although studies on patients' thirst during the preoperative period are scarce, the available evidence indicates that when ranking discomforts, patients rank fear of thirst second in the preoperative period. In addition, evidence indicates it is the second most frequently experienced discomfort in the immediate postoperative period (IPP).[19] Surgical patients are at high risk for developing osmotic or hypovolemic thirst.[20-22] The prevalence of thirst is high in the IPP, ranging from 75%[23] to 89.6%[8] of adult patients, 88.5% of pediatric patients,[24] and 97.6% of bariatric surgery patients reporting this symptom.[25] The intensity of the reported thirst also is high, described as presenting at an average of 6.7[14] to 8.2[26] on a verbal numeric scale of 0 to 10.

Several factors contribute to the emergence of patients' thirst. In the preoperative period, absolute fasting for prolonged periods[27,28] (eg, more than six hours[29]) and preoperative anxiety and fear[30] trigger hormonal reactions that result in decreased saliva production, which dries the oral cavity. In the intraoperative period, medications, orotracheal intubation, and bleeding can cause dehydration.[29,31] In clinical practice, the Thirst Study and Research Group researchers observe that thirst can continue to increase during surgery, culminating in intense patient discomfort in the IPP; but perioperative team members may not routinely value, identify, measure, or treat this symptom.[7]

Given its complexity, perioperative thirst requires a theoretical framework to help researchers evaluate the evidence generated and make recommendations for clinical practice. Symptom management theory contextualizes the interrelationships of the patient, environment, and the health and disease domains and their dimensions (ie, patient's experience, management strategies, and repercussions of the symptom).[32] The TMM is a product of symptom management theory and clinical experiences. This model presents standardized, validated, and structured scientific evidence via four pillars: identification of thirst, measurement of thirst, safety assessment for the management of thirst, and application of thirst relief strategies.

Identification of Thirst

The first pillar of the TMM is the identification of patients' thirst. Although the surgical patient presents several predictive factors for thirst (eg, dry mouth, parched lips, thick tongue, lack of saliva), the health care team members often do not value thirst as a relevant concern.[6,7,31,33] This diverges from the patient's perception; the patient often considers the experience of thirst to be worse than hunger and sometimes even pain.[5,9]

Perioperative personnel should understand that even when experiencing the intense distress caused by thirst, most patients may not verbalize it spontaneously.[6] In the IPP, 75%[23] to 89.6%[8] of patients most likely will experience thirst. Results of one study showed only 22 of 182 (12%) patients spontaneously verbalized about thirst.[8] In another study of 386 postanesthesia patients, 116 (38.3%) spontaneously verbalized about thirst.[34] There are no similar published studies regarding patients' verbalizations of thirst during the preoperative period.

Perioperative personnel should understand that even when experiencing the intense distress caused by thirst, most patients may not verbalize it spontaneously.

The Thirst Study and Research Group researchers believe that among the factors that stimulate this unwillingness to speak up may be a culture of strictly maintaining patients' fasting in the preoperative and immediate postoperative periods. This dogma is repeated and emphasized to the patient, who remains silent, even when experiencing intense thirst throughout the entire perioperative period, considering it necessary for safe and successful surgery.[6]

Perioperative personnel should investigate the patient's thirst rather than assuming that silence indicates an absence of the condition.[6] Although the patient may not mention thirst, he or she may exhibit signs of thirst (ie, dry mouth, lips, and throat; complaints about a thick tongue, lack of saliva, a bad taste in the mouth, and the desire to drink water).[10,18]

Perioperative personnel should assess patients for signs of perioperative thirst and ask them directly if they are thirsty. Patients recovering from procedures for which they received general anesthesia are able to verbalize discomfort, and the health care team member should record the patient's responses about thirst preoperatively and during the IPP. In Brazil, two institutions included the evaluation of thirst in postanesthesia care unit (PACU) records, making the nursing care in relation to thirst explicit.

Perioperative personnel can use the Perioperative Thirst Discomfort Scale to identify and characterize discomfort as a result of thirst in surgical patients; its use may assist perioperative personnel with providing targeted care.

Measurement of Thirst

The second pillar of the TMM involves measuring patients' thirst. It may be challenging for health care personnel to measure this subjective symptom. Laboratory tests that evaluate blood osmolarity, arginine vasopressin peptide (AVP), and angiotensin II dosage may indicate hydroelectrolytic imbalances.[35]

The patient's perception expressed through self-report is an indicator for measuring thirst.[36] Researchers completed a literature review and found 10 randomized clinical trials that reported a positive correlation between change in osmolarity and the patients' perception of thirst.[21] Additional researchers found a correlation between perception of thirst and concentration of AVP.[35]

Instruments available to evaluate thirst in the surgical patient do not address all aspects of the symptom.[18] Because thirst is multifactorial, perioperative personnel should evaluate the intensity of the symptom and the patient's resulting discomfort. However, the available validated instruments only target specific populations (eg, dialysis patients, intensive care unit patients) rather than perioperative patients.[10]

The TMM proposes evaluating the intensity of the patient's thirst and the resulting discomfort in the preoperative and immediate postoperative periods. The researchers used visual analogue, verbal numerical, and face scales to measure thirst intensity. To address the gap in the measurement of discomfort as a result of thirst, the Thirst Study and Research Group developed and validated the Perioperative Thirst Discomfort Scale (PTDS) (Figure 1).[10]

The PTDS evaluates seven attributes on a scale of 0 to 2 with total scores ranging from 0 to 14; higher scores indicate greater discomfort. This scale obtained high content validity index (CVI), internal consistency, and interrater equivalence results.[10] Perioperative personnel can use the PTDS to identify and characterize discomfort as a result of thirst in surgical patients; its use may assist perioperative personnel with providing targeted care.[8,10]

Researchers studied 203 patients during the IPP and found a moderate positive correlation (Spearman rank correlation = 0.474, $P < .05$) between thirst intensity and discomfort.[8] In a separate randomized clinical trial of 102 preoperative patients, researchers found a strong correlation (Spearman rank correlation = 0.841, $P < .0001$) between thirst intensity and discomfort.[37] Patients cited all seven of the evaluated attributes of the PTDS, indicating the sensitivity of the instrument.[8,37]

Safety Assessment for the Management of Thirst

The systematic evaluation of criteria that influence safety in the administration of thirst relief methods is the third fundamental pillar of the TMM.[11,12] Although the prevalence and intensity of thirst in the IPP are already known, some health care personnel fear the development of adverse respiratory events arising from the early introduction of fluids and therefore may not implement effective methods to relieve thirst. The focus of this pillar is to prevent pulmonary aspiration, hypoxemia, and airway obstruction. Reduction in the level of consciousness,[11,38] residual action of neuromuscular blockers,[38] and hypothermia[38] are significant factors for the occurrence of these events.

Perioperative Thirst Discomfort Scale (PTDS)			
Is the patient thirsty?	( ) Yes ( ) No		
Spontaneous complaint?	( ) Yes ( ) No		
I am uncomfortable because:			
	Not uncomfortable	A little uncomfortable	Very uncomfortable
My mouth is dry.	0	1	2
My lips are dry.	0	1	2
My tongue is thick.	0	1	2
My saliva is thick.	0	1	2
My throat is dry.	0	1	2
I have a bad taste in my mouth.	0	1	2
I want to drink water.	0	1	2
Final score:			

Figure 1. Perioperative Thirst Discomfort Scale. *Adapted with permission from Martins PR, Fonseca LF, Rossetto EG, Mai LD. Developing and validating the Perioperative Thirst Discomfort Scale.* Rev Esc Enferm USP. *2017;51:e03240.* https://doi.org/doi:10.1590/s1980-220x2016029003240.

Researchers developed and validated the Safety Protocol for Thirst Management (SPTM) for adults as an instrument for application in PACUs. When validating the instrument, the researchers completed two different steps. First, they evaluated the content to ensure its relevance and determine the CVI; for this instrument CVI = 1. Next, the researchers used the kappa coefficient (κ) to evaluate interrater agreement between the SPTM results in the target population. Results approaching 1.0 indicate higher agreement among evaluators.[39] The interobserver reliability showed almost perfect agreement for nurses (κ = 0.968) and nursing technicians (κ = 0.867).[12] The SPTM includes three evaluation criteria: level of consciousness, protection of the airways, and the absence of nausea and vomiting (Figure 2).[11,12]

For children who are 3 to 12 years of age, researchers developed the Safety Protocol for Pediatric Thirst Management (SPPTM).[40] This protocol includes the same criteria as the SPTM, with an additional assessment of intentional limb movement and respiratory patterns. The SPPTM obtained a CVI of 0.94 and an almost perfect interrater agreement (κ = 0.98).[40]

Thirst assessment criteria

Perioperative personnel should assess a patient's level of consciousness to determine return of protective reflexes, respiratory drive, and the ability to maintain a clear airway.[11,12,38] An awake patient can support his or her respiratory status, but patients who have a decreased level of consciousness may experience adverse respiratory events.

In pediatric patients, the presence of voluntary and purposeful movements complements the evaluation of consciousness scales for children. The ability to move intentionally may indicate reversal of general inhalational anesthetics and neuromuscular blockers in children.[41]

Adverse respiratory events may occur in patients experiencing residual action of neuromuscular blockers.[38] The presence of protective airway reflexes provides evidence that neuromuscular blockers and other anesthetic agents have worn off. Two major reflexes protect the upper airways: coughing and swallowing.[42] Both reflexes allow assessment of the patient's ability to clear any foreign material in the upper airways. Perioperative nurses should

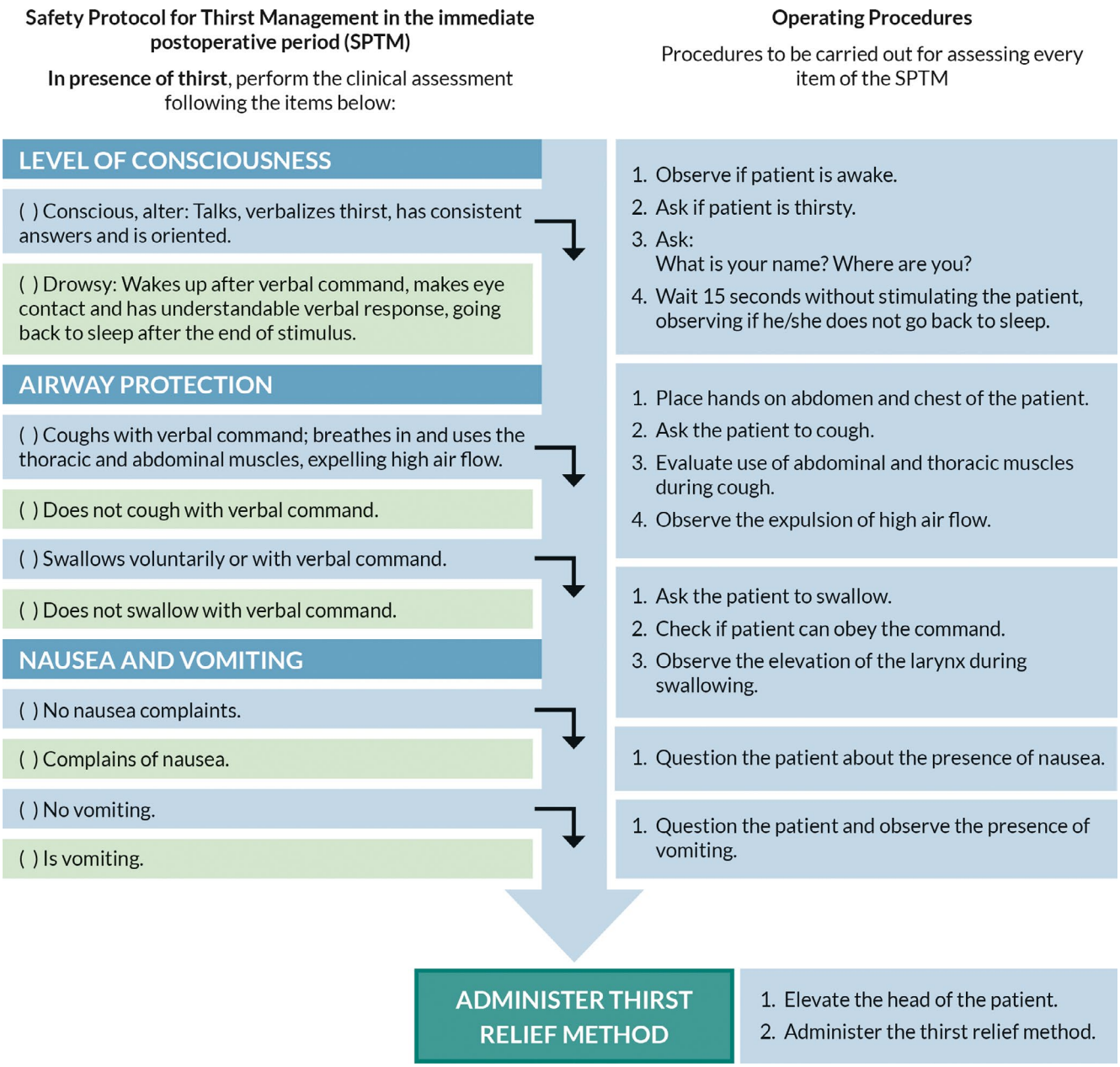

Figure 2. Safety Protocol for Thirst Management. *Adapted from Nascimento LA, Fonseca LF, Rosseto EG, Santos CB. Development of a safety protocol for management thirst in the immediate postoperative period.* Rev Esc Enferm USP. *2014;48(5):834-843 and Nascimento LA, Fonseca LF, Santos CB. Inter-rater reliability testing of the safety protocol for thirst management*. J Perianesthes Nurs. *2018;33(4):527-536, with permission from Elsevier for the American Society of PeriAnesthesia Nurses.*

assess patients for these reflexes before beginning thirst mitigation postoperatively.

Coughing is a natural mechanism that helps protect the respiratory tract from substances that may compromise airflow. Coughing comprises four phases (ie, receptorial, inspiratory, compressive, and expiratory) and may be either voluntary and spontaneous or involuntary.[43] During the receptorial phase, activation of the receptors present in the airways occurs. This is followed by the inspiratory phase, during which a stimulus provoked in the receptors opens the glottis. Next, the glottis and vocal cords close and there is a strong contraction of the abdominal and other expiratory muscles in the compressive phase. This action increases the intrapulmonary pressure and compression of the alveoli and bronchi, which are important for the dynamic

compression of the airways to increase the velocity of airflow from the lungs and remove the secretions and contents of the tracheobronchial tree.[44] Finally, the expiratory phase comprises the opening of the glottis and vocal cords for the emission of air and secretions of the lungs.[43]

Fluid swallowing comprises three main phases: the oral preparatory stage, oral propulsive stage, and pharyngeal stage.[45] During the pharyngeal stage, the soft palate elevates to close the nasopharynx. The tongue and palate spread posteriorly, squeezing the bolus into the pharynx. The larynx is displaced upward and the epiglottis tilts backward to create a seal.[45] When the patient is asked to swallow, staff members can observe the action of the larynx and epiglottis; if these movements are not present, the patient is not able to meet the swallowing criteria.

Nurse educators should address coughing and swallowing when teaching perioperative team members to use the SPTM and SPPTM. Staff members should learn how to place their hands on the patient's thorax and abdomen to sense the contraction of thoracic and abdominal muscles at the same time with the consequent expulsion of large amounts of air. If spirometers are available in the clinical area, nurses can use them to measure the expired air and help validate return of reflexes. Nurse educators should include hands-on observation of these maneuvers in the clinical environment. The SPTM and SPPTM protocols indicate that when there is any uncertainty about whether the patient can meet the assessment criteria, it is unsafe for the patient to swallow to remedy thirst, and the health care team member should resume the evaluation at a later time.[12,40]

Even after taking antiemetics, 20% to 30% of patients present postoperative nausea and vomiting.[46] Nausea is a conscious sensation arising from the cortical brain regions, and vomiting is a complex reflex of spinal origin.[47] A patient with nausea or vomiting is at increased risk for pulmonary aspiration, which may result in airway occlusion from gastric residues or pneumonitis from the residues lodging in the pulmonary alveoli. Therefore, nurses should consider patients with nausea or vomiting unable to address thirst safely and the patients should continue total fasting. Patients who are not experiencing nausea and vomiting will pass these criteria.

Adverse respiratory events are related to pediatric morbidity and mortality.[48] Sedatives and anesthetics can depress the central nervous system, causing respiratory failure. The respiratory criteria in the SPPTM evaluates age-appropriate respiratory frequency and the absence of characteristic signs of respiratory effort.

The SPTM and SPPTM allow perioperative staff members to evaluate patient safety concerns and implement appropriate thirst relief methods. Researchers studied 109 adult patients in the IPP to evaluate the effectiveness of the SPTM protocol. Using the SPTM criteria, the researchers observed that after 30 minutes of postanesthetic recovery, 67.9% of patients met the requirements needed to relieve thirst.[49] Although the patient's level of consciousness and protective reflexes may not be lowered or compromised in the preoperative period, personnel should evaluate the safety criteria equally before surgery to provide a baseline for postoperative comparison.

The Safety Protocol for Thirst Management and Safety Protocol for Pediatric Thirst Management allow perioperative staff members to evaluate patient safety concerns and implement appropriate thirst relief methods.

Application of Thirst Relief Strategies

The fourth and final pillar involves thirst relief strategies. This part of the TMM includes the challenge of using an effective, low-volume thirst-relief method. Physiologically, satiety of thirst may be preabsorptive or postabsorptive. Preabsorptive satiety is related to the anticipatory mechanisms and includes activation of oropharyngeal receptors (ie, mechanoreceptors, osmoreceptors, chemoreceptors, and thermoreceptors) that are stimulated by the presence of cold (eg, fluid) or other substances (eg, menthol) in the oral cavity.[17,50] These stimuli inhibit the release of AVP, one of the main regulating hormones for homeostasis.[17,22,50,51] The postabsorptive effect occurs after the initial correction of osmolar deficits and reestablishment of hydroelectrolytic balance.[50]

International protocols indicate a need for a drastic reduction in perioperative fasting and recommend that patients ingest clear liquids up to two hours before surgery, with early reintroduction in the IPP.[27,28] However, in some health institutions in different countries, compliance with shortened fasting time remains low.[52,53]

Key Takeaways

- Many perioperative patients experience thirst, and the evidence indicates it is the second most frequently experienced discomfort in the immediate postoperative period.
- Using scientific evidence acquired in recent years about perioperative thirst, researchers in Brazil created the Thirst Management Model to provide structure and clinical steps that perioperative nurses can take in the immediate preoperative and postoperative periods to help relieve patients' thirst.
- The Thirst Management Model includes four pillars: identification of thirst, measurement of thirst, safety assessment for the management of thirst, and application of thirst relief strategies.
- When completing the safety assessment, perioperative nurses should assess the patient's ability to cough and swallow effectively before implementing thirst management techniques (eg, drinking water) that could result in aspiration.

In clinical practice, the Thirst Study and Research Group researchers observe that long perioperative fasting times with water restriction are greatly related to the fear of respiratory adverse events (eg, bronchoaspiration). Therefore, nurses should consider low-volume strategies that activate preabsorptive satiety in the preoperative period.[17] This can be achieved through stimulation of oropharyngeal thermoreceptors known as *Transient Receptor Potential Melastatin 8* (TRPM8).[54] Menthol substances and cold temperatures activate afferent neural pathways that project to the somatosensory, orbitofrontal, and cingulate cortices, thus generating sensations of alliesthesia and satiety.[17,50,54,55] This action explains the improved performance and acceptability of cold[15,23,26,56-58] and menthol[16,56] strategies for thirst relief.

Researchers have studied different methods to trigger anticipatory mechanisms, including those that replace or stimulate salivation to help with patients' complaints of dry mouth and thick saliva. The main substitute is artificial saliva, which helps lubricate oral mucosa, resulting in increased swallowing[59] and decreased secretion of AVP when thirst is lessened temporarily.[2] Salivary stimulants include wet gauze with cold saline,[57] cold water for gargling,[58] gauze frozen with saline solution,[26] ice,[26] and chewing gum.[59,60] Low temperatures, menthol, and mechanical and chemical stimulation of the salivary glands improve salivary flow, swallowing, and the activation of the oropharyngeal receptors.[15]

Because there are few standardized strategies to reduce perioperative thirst, the Thirst Study and Research Group conducted a study in the IPP comparing the efficacy of ice chips versus room-temperature water. The results did not present a statistically significant difference between the groups.[23] The researchers recommended additional studies using a larger amount of ice, and subsequently completed a study using a 10-mL ice popsicle, which provided greater thirst control and comfort to the patients.[14]

To evaluate the efficacy of the popsicle, the Thirst Study and Research Group researchers conducted a randomized clinical trial of 208 patients in the PACU that compared the popsicle with the same volume of water at room temperature. The popsicle was shown to be 37.8% ($P < .01$) more effective than room-temperature water for thirst management. The researchers performed five interventions in a one-hour period; after the second popsicle, there was a significant reduction ($P < .01$) in thirst intensity.[14]

One of the Thirst Study and Research Group researchers also completed a clinical trial of 120 bariatric surgery patients in the IPP, comparing use of a menthol ice popsicle and menthol lip moisturizer with use of a nonmenthol ice popsicle and nonmenthol lip moisturizer.[25] The prevalence of thirst in this population was high (97.6%), and both strategies effectively reduced thirst intensity and discomfort, with no statistical difference between groups. The researchers suggest that both measures activated the same oropharyngeal receptor for stimulation of the anticipatory mechanisms of satiety. An additional study found that patients found the menthol measures package highly pleasant.[56] The Thirst Study and Research Group also developed a mentholated lip moisturizer that has been used extensively in the PACU at their facility, especially when an ice popsicle is contraindicated or patients experience sensitivity to cold.

The researchers observed delays and surgical cancellations during the perioperative period because of a fear of an increase in gastric contents when the patient uses chewing gum. However, a meta-analysis indicated that chewing gum does not increase the gastric volume or acidity enough to increase the risk of bronchoaspiration.[61] Chewing gum combines gustatory and mechanical stimulation of the salivary glands to increase pH in the mouth and salivary flow.[62] As a result, mouth dryness and secretion of AVP is decreased.[61]

To reduce preoperative thirst, the Thirst Study and Research Group researchers evaluated two low-cost strategies.[37,63] In the first randomized clinical trial, the researchers compared maintained fasting with chewing one unit of menthol gum for 10 minutes. There was a significant decrease in the thirst intensity ($P < .0001$) and thirst discomfort ($P < .0001$) in the menthol gum group. The menthol chewing gum also was clinically effective (Cohen's d = 0.60 and 0.79) at reducing patients' thirst intensity and discomfort.[37] The second strategy compared maintained fasting with the use of a 30-mL menthol popsicle on thirst intensity and thirst discomfort three hours before the procedure. There was a significant decrease in thirst intensity ($P < .001$) and discomfort ($P < .001$) after the use of the menthol popsicle.[63]

CONCLUSION

The TMM presents systematized scientific evidence with significant results that are applicable to clinical practice for health care providers to help assuage patients' thirst during the perioperative period. Some of the challenges of its implementation include making team members aware of the relevance of the thirst symptom and overcoming institutional culture and dogmas. Patients have provided positive feedback to health team members about thirst relief strategies, which reinforces use of the model. Although additional research may be needed, this model and the associated assessment tool can help perioperative nurses address their patients' perioperative thirst concerns.

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Continuing Education

Advances in the Management of Perioperative Patients' Thirst

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PURPOSE/GOAL

To provide the learner with knowledge of best practices related to the management of perioperative thirst.

OBJECTIVES

1. Discuss the incidence and etiology of perioperative thirst.
2. Identify key factors related to mitigating perioperative thirst.
3. Describe safety factors affecting the management of perioperative thirst.

The Examination and Learner Evaluation are printed here for your convenience. To receive continuing education credit, you must complete the online Examination and Learner Evaluation at *http://www.aornjournal.org/content/cme*.

QUESTIONS

1. Perioperative thirst results in intense preoperative and postoperative discomfort only in pediatric patient populations.
   a. true b. false

2. Evidence indicates the incidence of perioperative thirst in the immediate postoperative period ranges from
   a. 10% to 25%. b. 30% to 50%.
   c. 75% to 97.6%. d. 86.5% to 100%.

3. Preoperative _____ and _____ trigger hormonal reactions that result in decreased saliva production, which dries the oral cavity.
   a. anxiety; fear b. anxiety; pain
   c. fasting; cold d. cold; medication

4. Health care team members often do not value thirst as a(n) _____ concern.
   a. subjective b. relevant
   c. objective d. irrelevant

5. As a symptom, patients perceive thirst to be worse than hunger and sometimes even pain.
   a. true b. false

6. Patients may exhibit signs of thirst, including
   1. dry mouth.
   2. a bad taste in the mouth.
   3. the desire to drink water.
   4. lack of saliva.
      a. 1 and 3 b. 2 and 4
      c. 1, 2, and 4 d. 1, 2, 3, and 4

7. The Safety Protocol for Thirst Management and the Safety Protocol for Pediatric Thirst Management address
   1. level of consciousness.
   2. breath sounds.
   3. protection of the airways.
   4. absence of nausea and vomiting.
   5. level of pain.
      a. 4 and 5 b. 1, 2, and 4
      c. 1, 3, and 4 d. 1, 2, 3, 4, and 5

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8. Perioperative nurses should assess patients' ability to _____ and _____ before beginning thirst mitigation postoperatively.
   a. blink; cough
   b. cough; knee jerk
   c. swallow; stretch
   d. cough; swallow

9. Preabsorptive satiety includes activation of oropharyngeal receptors that are stimulated by the presence of _____ and _____ in the oral cavity.
   a. sour flavors; heat
   b. sweet flavors; heat
   c. menthol flavors; cold
   d. solids; menthol flavors

10. International protocols recommend that patients ingest clear liquids up to _____ hour(s) before surgery, with early reintroduction in the immediate postoperative period.
    a. one
    b. two
    c. six
    d. eight

Continuing Education

Advances in the Management of Perioperative Patients' Thirst

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OBJECTIVES

To what extent were the following objectives of this continuing education program achieved?

1. Discuss the incidence and etiology of perioperative thirst.
   Low 1. 2. 3. 4. 5. High
2. Identify key factors related to mitigating perioperative thirst.
   Low 1. 2. 3. 4. 5. High
3. Describe safety factors affecting the management of perioperative thirst.
   Low 1. 2. 3. 4. 5. High

CONTENT

4. To what extent did this article increase your knowledge of the subject matter?
   Low 1. 2. 3. 4. 5. High
5. To what extent were your individual objectives met?
   Low 1. 2. 3. 4. 5. High
6. Will you be able to use the information from this article in your work setting?
   1. Yes 2. No
7. Will you change your practice as a result of reading this article? (If yes, answer question #7A. If no, answer question #7B.)

7A. How will you change your practice? (*Select all that apply.*)

1. I will provide education to my team regarding why change is needed.
2. I will work with management to change/implement a policy and procedure.
3. I will plan an informational meeting with physicians to seek their input and acceptance of the need for change.
4. I will implement change and evaluate the effect of the change at regular intervals until the change is incorporated as best practice.
5. Other: _____

7B. If you will not change your practice as a result of reading this article, why not? (*Select all that apply.*)

1. The content of the article is not relevant to my practice.
2. I do not have enough time to teach others about the purpose of the needed change.
3. I do not have management support to make a change.
4. Other: _____

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