Perioperative pain management and opioid-reduction in head and neck endocrine surgery: An American Head and Neck Society Endocrine Surgery Section consensus statement

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Abstract
Background: This American Head and Neck Society (AHNS) consensus statement focuses on evidence-based comprehensive pain management practices for thyroid and parathyroid surgery. Overutilization of opioids for postoperative pain management is a major contributing factor to the opioid addiction epidemic however evidence-based guidelines for pain management after routine head and neck endocrine procedures are lacking.

Jay K. Ferrell and Maisie L. Shindo are co-first authors.
Methods: An expert panel was convened from the membership of the AHNS, its Endocrine Surgical Section, and ThyCa. An extensive literature review was performed, and recommendations addressing several pain management subtopics were constructed based on best available evidence. A modified Delphi survey was then utilized to evaluate group consensus of these statements.

Conclusions: This expert consensus provides evidence-based recommendations for effective postoperative pain management following head and neck endocrine procedures with a focus on limiting unnecessary use of opioid analgesics.

KEYWORDS
head and neck endocrine surgery, multimodality pain management, opioid addiction, parathyroidectomy, patient education, postoperative pain management, thyroidectomy

1 INTRODUCTION AND BACKGROUND

The opioid addiction epidemic is one of the most pressing public health issues currently confronting the United States. Between 1999 and 2018, nearly 450 000 people died as a result of opioid-related drug overdoses. While the majority of these deaths were initially attributed to prescription opioids, beginning in 2010 and onward an increasing number of deaths have been linked to heroin and illegal synthetic opioids (e.g., fentanyl). Based on statistics from 2018, the most recent year with available data, men between the ages of 25–44 represented more than two-thirds of opioid-related deaths with the Northeastern and Midwest regions of the United States being the most heavily impacted. While the etiology of this crisis is complex and multifactorial, physicians’ opioid prescribing practices have clearly been identified as a major contributing factor and have come under increased public scrutiny.

Paradoxically, the overprescribing of opioids was unduly influenced by well-intentioned yet misdirected policies such as The Joint Commission’s designation of pain as a “5th vital sign” in 2001 and the Hospital Consumer of Healthcare Providers and Systems (HCAHPS) Survey linking hospital reimbursement to patients’ self-reporting of satisfactory pain control. These systematic changes coupled with the aggressive opioid advertising campaigns during the 1990s to early 2000s proved to be a dangerous combination and set the stage for the current crisis of addiction. In response, current public health approaches are emphasizing the importance of preventing secondary opioid use disorder—primarily through evaluating and improving opioid prescribing practices.

Evidence-based guidelines to assist surgeons with proper outpatient opioid prescribing or alternatives pain management approaches are lacking. Additionally, patient factors—unrelated to the surgical procedure—can drive postoperative opioid consumption and include complex issues such as preexisting substance addiction, chronic pain disorders, and other underlying medical and psychiatric conditions. If patients’ comorbidities and apprehensions are not appropriately addressed preoperatively, the risk of persistent opioid use increases as they may be used by patients to manage symptoms beyond temporary, postoperative pain. Lastly, physician-specific factors—including varying degrees of pain management knowledge, perceived convenience of opioids for postoperative pain control, and the lack of education for risk-stratifying and appropriately tailoring pain management regimens—can further contribute to the relative risk of secondary opioid dependence. A recent systematic review of studies published on or before January 2018 found no appreciable data on optimal postoperative pain regimens for thyroid and parathyroid surgery. However, several contemporaneous studies have since reported that postoperative opioid requirements are minimal and are further reduced when alternative pain control interventions are successfully employed. Surgeons’ acceptance and preferential use of non-opioid and alternative analgesic strategies have improved. However, as the field continues to lack prospective, evidence-based guidelines for postoperative pain management after head and neck endocrine surgery, this paper outlines consensus statements formulated by members of the Endocrine Surgery Section of the American Head & Neck Society (AHNS-ES) utilizing available evidence in the current literature.
2 | METHODS

2.1 | Expert panel and manuscript review process

An expert panel of otolaryngologists-head and neck surgeons and general surgeons was selected from the membership of the AHNS-ES. Additionally, the president of the patient advocacy group ThyCa (GB) was added to this group. The initial four panel members (J.K.F, M.L.S., B.C.S., and G.W.R.) created an outline and draft statements. When this iterative process was complete, a draft was then sent to the wider panel for commentary. Based on the feedback received, panel members provided input through an iterative electronic survey which supported a quantified assessment of consensus, as further described below. The survey, draft, and relevant references were shared with the complete author panel. Two rounds of surveys were performed, with new statements in the second round based on panelist input. Once the survey data was analyzed and results confirmed, the manuscript was distributed for comment by the AHNS Quality of Care Committee and final approval from the AHNS Council.

2.2 | Literature review

Systematic reviews of the literature were undertaken prior to completing the modified Delphi survey. The PubMed and Cochrane databases were initially searched to identify relevant publications from 2000 through April 2020 with an emphasis on contemporary reports. Key words included “head and neck surgery,” “head and neck endocrine surgery,” “thyroidectomy,” “parathyroidectomy,” “perioperative pain management,” “postoperative pain,” “pain management,” “analgesics,” and “opioids.” Reference lists of all eligible articles were secondarily searched for additional relevant studies. The resulting list of abstracts was initially screened to identify potentially relevant articles for each topic. Section authors reviewed the resulting literature and search strategies were expanded or refined, as appropriate. The final selection of literature included meta-analyses and systematic reviews as well as randomized controlled trials wherever possible. In the absence of high-level data, case series and non-randomized studies in head and neck cancer surgery patients or randomized controlled trials and systematic reviews outside of head and neck endocrine surgery, were considered.

2.3 | Modified Delphi method and data analysis

A modified Delphi method was utilized to quantitatively determine whether statements achieved consensus.\textsuperscript{17,18} The survey was delivered to the group electronically, thereby blinding panelists to the responses of other members of the group. These results were analyzed using a numerical Likert scale with the following anchor points: 1 (strongly disagree); 3 (disagree); 5 (neutral); 7 (agree); and 9 (strongly agree). Statements were defined as achieving consensus if there was a mean score of 7.0 or greater and 0 to 1 outlier responses, or a mean greater than or equal to 7.0 and 2 outliers with neither outlier value lower than 5 (neutral). Non-consensus was the default if these criteria were not met. Outlier responses were defined as any rating at least 2 Likert points away from the mean. Statistical analysis was performed utilizing Stata 12.0 (College Station, TX).

3 | RESULTS

3.1 | Modified Delphi results

The finalized survey included 13 statements, developed from the initial iterative draft process. Response rates to the survey were 100\% (\(n = 16\) of 16). Consensus was achieved in 12 of the statements. However, statement 1C did not reach full consensus with a calculated mean of 7.5 (min \(= 3\); max \(= 9\), a median of 8.5, and 3 respondents not in agreement.

3.2 | Multimodality pain management

Statement 1-A. Multimodality, non-opioid medication regimens can be used successfully as first-line pain management in head and neck endocrine surgery (consensus).

Statement 1-B. Preoperative non-opioid pain medications can mitigate postoperative pain and reduce patients’ overall opioid requirements (consensus).

Statement 1-C. In addition to proper surgical technique, intraoperative strategies—including selective use of regional anesthesia and non-opioid general anesthetic agents—may be beneficial in reducing the need for postoperative opioids after thyroid and parathyroid surgery (non-consensus).

Statement 1-D. Non-opioid medications and adjunctive strategies can effectively manage pain after head and neck endocrine procedures and reduce postoperative opioid requirements (consensus).

Although opioids have been routinely prescribed for postoperative analgesia, a growing body of literature
suggests that most patients require only a small amount of opioids for adequate pain control. The resulting excess supply of prescription opioids has been identified as a contributing factor to the recent epidemic of opioid addiction. As a result, non-opioid analgesia regimens that employ synergistic pharmacologic agents has become an area of increased focus. While this concept of a “multimodal approach” to perioperative pain is effective in curtailing reliance on opioid medications, it must also account for patients’ specific medical histories and needs. Patients’ postoperative analgesic requirements are impacted by several factors including previous health care experiences, baseline psychiatric/medical comorbidities, and previous use of opiates. Surgeons should also proactively assess for any pertinent history of musculoskeletal injuries, orthopedic or spinal surgeries, or chronic pain syndromes that could be predictive of higher postoperative pain control requirements. Lastly, the value and impact of clinical care pathways, addressing clinicians’ personal biases and perspectives, and patient education in reducing opioids and promoting a successful enhanced recovery after surgery (ERAS) strategy have been clearly demonstrated.

3.2.1 Preoperative non-opioid pain medications

Preoperative acetaminophen

Preoperative acetaminophen is a foundational part of a multimodality pain control approach in thyroid and parathyroid surgery. However, there is limited high quality evidence relating to the preoperative use of acetaminophen for this population. In a prospective, double-blind, randomized trial of patients undergoing robot-assisted endoscopic trans-axillary thyroidectomy, Hong et al. found that preoperative and postoperative intravenous acetaminophen is safe and effective for moderate to severe postoperative pain. In another prospective, double-blind, randomized trial, the preoperative use of intravenous acetaminophen prior to thyroid surgery allowed for reduced intraoperative sevoflurane and postoperative opioid use.

Preoperative gabapentinoids

Gabapentinoids are a class of antiepileptics that have gained popularity as adjunctive analgesic medications. Two recent randomized trials showed beneficial, albeit contradictory, effects of preoperative pregabalin or gabapentin for postoperative pain versus placebo. Kim and colleagues demonstrated a significant reduction in acute postoperative pain, as demonstrated by lower verbal numerical pain scores, with twice daily dosing of pregabalin. In contrast, Brogly et al. demonstrated decreased incidence of chronic (>6 month) incision pain with a single preoperative dose of gabapentin, but they found no significant impact on either acute postoperative pain levels or opioid consumption. Additional studies have reported decreased dosage amounts and frequency of rescue analgesics with the concurrent use of gabapentinoids. Of note, these trials used varying doses ranging between 150 and 1200 mg, and untoward side effects including blurred vision, somnolence, and dizziness were reported. A meta-analysis reported by Arumugam et al. suggested that preoperative gabapentin tended to reduce cumulative 24-h postoperative opioid use in thyroid surgery. Patients should be counseled that postoperative pain remains an “off-label indication” of these medications. The Food and Drug Administration recently placed a “black box” warning due to concerns regarding potential depressive effects on the respiratory and central nervous systems.

Preoperative nonsteroidal anti-inflammatory drugs

Nonsteroidal anti-inflammatory drugs (NSAIDs) are a commonly used pain medications that inhibit cyclooxygenase (COX)-mediated inflammatory pathways—making them particularly useful for acute surgical pain. However, their use in the preoperative setting has historically been limited due to concerns regarding increased bleeding secondary to their antiplatelet activity. Alternatively, selective COX-2 inhibitors (coxibs) have been advocated for postoperative pain due to their reduced effects on normal coagulation. Preoperative administration of both classes of NSAIDs has been shown to have benefits both in reducing postoperative pain levels and decreasing patients’ opioid requirements in the first 24 h after surgery. Moreover, in a study of patients undergoing odontogenic procedures, Viswanath et al. reported that preoperative intravenous ibuprofen was superior to acetaminophen in reducing pain and opioid demand. Regarding intraoperative bleeding, a recent report on the use of preoperative ketorolac in endoscopic sinus surgery showed no increase in intraoperative or postoperative bleeding compared to placebo.

Preoperative pharmacologic combinations

Multimodality pharmacologic strategies, which synergize the analgesic effects of these non-opioid medications, have shown great promise in providing successful, opioid sparing pain management in thyroid and parathyroid surgery. A recent study by Oltman et al. described a regimen in patients undergoing outpatient thyroid, parathyroid and parotid surgery who received a standardized regimen of meloxicam, acetaminophen, and gabapentin.
The authors demonstrated low resting and peak pain scores, and 60% of patients could avoid postoperative opioids. There were no complications and nearly 90% of patients reported high- to very-high levels of satisfaction. These benefits were confirmed in a larger, follow up study,16 and similar benefits have been demonstrated in other recent reports.43,44

3.2.2 | Intraoperative pain management

Limiting postoperative opioids may be of limited value if these medications are given liberally in the operating room (OR) or the postoperative care unit (PACU)—two locations where medical and nursing staff unaware of an ERAS protocol may unwittingly administer opioids. ERAS may include elements of preoperative patient education, regional nociceptor blockade, formulation of drugs to mitigate pain during surgery, and delineation of efficacious pharmacologic agents and quantities to be administered in the PACU in preparation for discharge. A well-formulated ERAS has been demonstrated to reduce in-hospital morphine milligram equivalents (MME) administration.45,46

Regional anesthesia can be administered in the preoperative holding area or intraoperatively following induction of general anesthesia—either immediately before starting or upon finishing the surgical procedure. It is important to consider that preoperative injections—compared to intraoperative administration—allow for a voice check prior to commencing with surgery. Likewise, acetaminophen can be administered in the preoperative holding area or early-on following induction. Alternatives to opioids may be given intraoperatively to maintain an adequate depth of general anesthesia while lessening or eliminating the need for opioids. Such agents, in addition to standard anesthetic gases, include intravenous propofol and ketamine (Table 1). Regional anesthesia combined with intraoperative use of non-opioid medications is the foundation of an opioid-restricted intraoperative pain regimen.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Common medications used in a multimodal anesthesia strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intervention</strong></td>
<td><strong>Dose</strong></td>
</tr>
<tr>
<td>Ibuprofen (pre- and post-op)</td>
<td>Ibuprofen 800 mg PO</td>
</tr>
<tr>
<td>Gabapentin</td>
<td>CrCl &gt;60: Gabapentin 900 mg PO CrCl 59–30 or age &gt;65: Gabapentin 600 mg PO</td>
</tr>
<tr>
<td>Acetaminophen (pre- and post-op)</td>
<td>Acetaminophen 975 mg PO</td>
</tr>
<tr>
<td>Scopolamine</td>
<td>1.5 mg transdermally Indicated for Apfel score ≥3</td>
</tr>
<tr>
<td>Superficial cervical plexus block (SCPB)</td>
<td>Bupivacaine 0.25% 10 mL bilaterally</td>
</tr>
<tr>
<td>Ketamine</td>
<td>0.25 mg/kg ideal body weight</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>8 mg IV</td>
</tr>
<tr>
<td>Ondansetron</td>
<td>4 mg IV</td>
</tr>
<tr>
<td>Tramadol (post-op)</td>
<td>50 mg PO q6 hours PRN</td>
</tr>
</tbody>
</table>

Abbreviations: CAGB, coronary artery bypass graft; CrCl, creatinine clearance; DM, diabetes mellitus; GI, gastrointestinal; IV, intravenous; NSAIDs, nonsteroidal anti-inflammatory drugs; PO, by mouth; PRN, as needed; SSRI, selective serotonin reuptake inhibitors; TBI, traumatic brain injury.

3.2.3 | Postoperative pain management

A successful non-opioid analgesic strategy for head and neck endocrine surgery continues through the transition to postoperative recovery and discharge.47 In addition to precluding secondary dependence, limiting opioids in the postoperative period prevents constipation, delirium, nausea, and sedentary behavior and their associated complications. The foundation of a successful non-opioid postoperative regimen is scheduled administration of acetaminophen and ibuprofen. Despite concerns of an increased risk of postoperative hematoma with NSAIDs, recent studies have demonstrated no appreciable increased risk for postoperative hematoma.48,49 Gabapentin can also be effective as an adjunct in managing postoperative pain.50,51 Other, non-pharmacologic measures such as frequently applying cold compresses to the incision site can also be useful. Unless clearly contraindicated, the recommendation of this consensus is to schedule acetaminophen and ibuprofen starting in PACU and continuing after discharge for a maximum duration of 72–96 h (Table 2). Lastly, it should be stressed that the postoperative nursing
The team plays a vital role in a successful ERAS by managing patients’ preconceived expectations regarding opioids, positively reinforcing the merits of a non-opioid pain strategy, and providing patients with a clear understanding of how they can communicate any postoperative pain concerns to the surgical team after discharge.

### 3.3 Prescribing opioids postoperatively

**Statement 2-A.** Head and neck endocrine surgeons should utilize opioid medications judiciously and only if first line non-opioid medications are insufficient or medically contraindicated (consensus).

**Statement 2-B.** For opioid-naive patients undergoing thyroidectomy or parathyroidectomy, relatively low total amounts of opioids (<75 MME) are required to adequately manage postoperative pain that is refractory to non-opioid medications (consensus).

**Statement 2-C.** Establishing perioperative processes that address patients’ pain management enhances and supports efforts to reduce postoperative opioid prescribing (consensus).

**Statement 2-D.** Evidence-based institutional process initiatives and protocols support surgeons in evaluating and improving their perioperative pain management practices (consensus).

Prior to 2016, postoperative opioid prescribing for most surgical procedures was demonstrably excessive. Furthermore, it has also been shown that patients undergoing thyroidectomy and parathyroidectomy have historically received high dosages of opioid of which they consumed only small proportions. Shindo and colleagues reported that, prior to 2016, the mean discharge dosage at their institution was 205 MME for total thyroidectomy, 112 MME for hemi-thyroidectomy and 176 MME for parathyroidectomy. Their study also identified significant variability in their opioid prescribing attributable to prescribing by surgical trainees. In addition to reducing opioid prescriptions at discharge, the study authors identified several process improvements including consistent preoperative patient education, postoperative nursing pain assessment based on functional status versus a traditional 1 to 10-point scale, and avoidance of unnecessary opioid administration in PACU. After instituting these changes, discharge doses for each procedure dramatically decreased by over 50%. In addition, the percentages of patients who were successfully discharged without opioids following parathyroidectomy, hemi-thyroidectomy and total thyroidectomy were improved to 58%, 38%, and 33%, respectively. Only 2% of patients requested additional opioids after discharge.

These results are further supported by additional evidence demonstrating that opioid requirements are minimal to nil following routine thyroid and parathyroid surgery. Tharakan et al. reported that 80% of their cohort used less than 10 pills of oxycodone (i.e., 75 MME) following routine thyroid and parathyroid surgery. Lou et al. described even lower analgesic requirements. Their study cohort was prescribed a median of 30 MME (range = 0–120 MME) at discharge and the actual amounts needed for adequate pain control were <20 MME. Based on recent reports, the consensus suggests that postoperative prescribing of opioids should not exceed 75 MME (i.e., ≤15 tablets of hydrocodone 5 mg or <10 tablets of oxycodone 5 mg). The majority of opioid-naive patients can be successfully managed either without opioids or with substantially lower amounts than have been used historically.

Effectively managing pain without opioids following outpatient thyroid and parathyroid surgery is a holistic, multifaceted endeavor. Health care organizations can focus on larger cultural changes and process improvements that are conducive to a comprehensive approach to perioperative pain management. Such efforts can be further enhanced by an electronic health record (EHR). Kaiser Permanente Northern California (KPNC) and Cancer Care Ontario (CCO)—two large, integrated health care systems—have incorporated several supportive EHR measures including: recommended dosing schedules of non-opioid medications, automatic

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose/route</th>
<th>Initial dose</th>
<th>Frequency</th>
<th>Regimen length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophena</td>
<td>650 mg PO</td>
<td>3 h after discharge from PACU</td>
<td>Every 6 h</td>
<td>72–96 h after surgery</td>
</tr>
<tr>
<td>Ibuprofena,b</td>
<td>600 mg PO</td>
<td>6 h after discharge from PACU</td>
<td>Every 6 h</td>
<td>72–96 h after surgery</td>
</tr>
<tr>
<td>Tramadol</td>
<td>50 mg PO</td>
<td>As needed (PRN) for breakthrough pain</td>
<td>Every 6 h PRN</td>
<td>Varies as needed</td>
</tr>
</tbody>
</table>

*Abbreviations: h, hours; PACU, postoperative care unit; PO, by mouth.

*a Acetaminophen and ibuprofen can be staggered every 3 hours for optimal pain management.*

*b Ibuprofen should be taken with food to avoid gastritis.*
suggestions of adjunctive pain management strategies (e.g., physical therapy), and well-defined protocols and order sets which provide surgeons guidance on prescribing the lowest effective doses of immediate-release opioids for the shortest duration. Lowering default pill counts in EHR order sets effectively reduces the total prescribed MMEs after common surgical procedures—including thyroidectomy and parathyroidectomy.\(^{55}\)

Furthermore, incorporating the PACU nursing staff is key to success. PACU nurses are a valuable link between the patients and surgical team by educating patients at discharge on safe opioid use and storage, calling discharged patients to assess pain, reinforcing the primary facets of a non-opioid pain control regimen such as cold compresses and scheduled NSAIDs/acetaminophen, and escalating new or persistent pain concerns to the surgical team. Lastly, surgeons’ clinical office staff can maintain these lines of communication in the days following discharge with scheduled phone calls and/or EMR messages assessing pain, surgical site appearance, sleep quality, and other important data.

Evolving institutional perioperative pain management beyond an overreliance on opioids requires a team effort that is well-versed in evidenced-based pharmacologic\(^ {56}\) as well as complementary strategies\(^ {57}\) and promotes accountability via performance monitoring and feedback. Health care organizations can identify the magnitude of opportunities and track improvement by identifying appropriate metrics and standardizing their use.\(^ {58}\) As an example, between 2017 and 2019, both KPNC and CCO incorporated standardized metrics to track proportions of patients receiving opioids in the perioperative period. They provided surgeons objective, comparative feedback on pain management and opioid-prescribing performance. These institutional and system-wide efforts translated into significant decreases in the proportion of patients receiving opioids (upwards of 20%–30%) over a short time. Head and neck endocrine surgeons are well-advised to work proactively within their respective health care systems to implement similar process improvements designed to promote satisfactory postoperative pain outcomes and sustainably reduce the use of opioids.

3.4 Chronic pain and postoperative pain management

**Statement 3.** Successful postoperative pain management in patients with underlying chronic pain conditions may be enhanced through collaboration with pain medicine specialists and the judicious use of opioid medications after thyroid and parathyroid surgery (consensus).

Chronic pain is defined by The International Classification of Diseases (ICD) as persistent or recurrent pain lasting longer than 3 months. Chronic pain persists past normal postoperative healing time and lacks the acute warning function of physiological nociception.\(^ {59-61}\) Chronic pain is further classified into several subcategories\(^ {61}\) and affects an estimated 20% of people worldwide.\(^ {59,62}\) The detrimental impact of chronic pain on quality of life can be substantial.\(^ {63}\) While management strategies for chronic pain can vary, long-term use of high-dosage opioids is common.\(^ {64}\) In the perioperative setting, chronic pain presents a unique challenge as it is characterized by increased central pain sensitization and perceived nociception as well as opioid-induced hyperalgesia which can render these patients more sensitive to acute postoperative pain. These effects can be further compounded by opioid tolerance. For these reasons, perioperative pain management in the setting of chronic pain is inherently complex and should be a collaborative effort between the surgical team and a patient’s chronic pain/supportive care specialist.

For head and neck endocrine surgeons, there are additional perioperative considerations associated with long-term opioid use. First, preoperative opioid use creates a higher overall risk of potential drug interactions. Additionally, long-standing opioid use is a strong predictor of poorly-controlled pain after surgery,\(^ {64-66}\) can increase postoperative complications,\(^ {67}\) and can increase risk of awareness during general anesthesia.\(^ {68}\) These issues highlight the need for surgeons to proactively identify patients with chronic pain conditions in the preoperative period, collaborate closely with the treating pain management physician, and clearly define perioperative pain management expectations up front.

In general, patients on long-term chronic pain regimens should take their normal doses on the morning of surgery.\(^ {69}\) While many chronic opioid patients will be able to be maintained on their preoperative pain regimens, a smaller subset of these patients may require increased dosages (i.e., 30%–100%) to effectively manage the acute surgical pain.\(^ {70}\) The surgical team should consult with a patient’s pain specialist or an available pain management specialist if significant changes to the preoperative pain regimen are needed. Certain long-term analgesic medications warrant additional consideration. For instance, methadone has many, potentially fatal pharmacologic interactions as well cardiovascular sequela, and as such, its dosing should generally not be increased in the immediate preoperative period.\(^ {71}\) Continuation of buprenorphine throughout the perioperative period is generally recommended and can be supplemented as needed.\(^ {72,73}\) Transdermal opioid preparations should be continued during surgery but must be
shielded from intraoperative warming devices which can accelerate medication release. Postoperatively, multimodal analgesia is especially efficacious for patients with chronic pain in reducing additional opioid requirements and opioid-related adverse effects. The anesthesia team should also be notified in advance to enable forward planning and creation of appropriately targeted postoperative pain management regimens. For discharge planning, if additional or increased opioid dosages are deemed necessary, communicating clear expectations with the patient regarding the expected duration is essential. A clear discharge plan that outlines any changes to the patient’s routine pain regimen and facilitates timely transition back to the pain management specialist is crucial to ensuring seamless management. Lastly, any prolonged or atypical postoperative pain concerns should be addressed expeditiously to evaluate for both potential surgical complications (e.g., hematoma, surgical site infection) and postoperative hyperalgesia.

3.5 Preoperative pain risk assessment and patient education

Statement 4-A. Surgeons should proactively assess for patient specific factors and underlying conditions which could impact pain experiences and portend higher pain management requirements (consensus).

Statement 4-B. Preoperative education that clearly defines pain expectations and the benefits of multimodality pain management reinforces efforts to curtail postoperative opioid prescribing (consensus).

Statement 4-C. Surgeon performed pain management education should be strongly encouraged and, whenever possible, integrated into the preoperative workflow (consensus).

Excessive postoperative prescriptions have been clearly identified as a major contributing factor to the opioid epidemic, and it has been estimated that 20% of people with opioid addiction obtain opioids via a prescription. A recent large-scale study of opioid-naïve patients found that those prescribed an opioid postoperatively carried a 44% risk of developing long-term opioid use with upwards of 10% of those patients continuing to take an opioid beyond 12 months after surgery. It is imperative that surgeons be purposeful and conscientious in their perioperative pain management practices.

Independent factors which are demonstrably associated with higher narcotic requirements (i.e., >10 MME) include age less than 45 years and history of previous narcotic use. Other factors include lower median household income, chronic medical, history of tobacco or alcohol abuse, and preoperative use of other non-opioid medications (e.g., benzodiazepines, selective serotonin reuptake inhibitors, angiotensin converting enzyme inhibitors). As part of the preoperative assessment, surgeons should actively screen for patient-specific factors and counsel patients on postoperative pain expectations and developing a pain management plan.

A recent study demonstrated that preoperative education—emphasizing the benefits, risks, and rationale of opioid and non-opioid pain control options—resulted in 90% of patients declining a postoperative opioid prescription in favor of non-opioid alternatives. The patients who received pain control education also had lower average pain scores and shorter duration of pain. Thus, surgeon-led pain education can have a significant, positive impact on postoperative pain management outcomes, and it should be considered an integral component of the preoperative consent process. Resources are becoming more widely available to assist surgeons in these efforts such as the “Safe and Effective Pain Control After Surgery” patient handout created by the American College of Surgeons (Accessible at: https://www.facs.org/safepaincontrol).

From the patient’s perspective, the preoperative office visit is an ideal setting for a conversation given its privacy and personalized context. In general, the conversation should focus on assessing past experiences with medical procedures and pain control; understanding which analgesics have been used previously; accounting for any current pain medications and their indications; and clearly understanding any past opioid use, apprehensions about opioids, or previous sequelae. Ultimately, establishing open dialogue and rapport are important goals of these discussions. Clinicians are advised to be mindful of their presentation style and word choice (i.e., avoiding negative or prejudicial terms such as “abuse”). Once an understanding of the patient’s unique situation and pain management expectations has been established, the surgeon can better outline the anticipated perioperative pain management approach. It is important for the clinician to recognize the understandable consternation that can result from the anticipation of postoperative pain. In this context, the surgeon can highlight the proven efficacy of alternative pain management options while also clearly communicating that the proposed regimen can be appropriately tailored based on the postoperative pain experience. Lastly, some patients may benefit from additional, inventive approaches to preoperative education such as facilitating interactions with other established patients who can share their firsthand insights and experiences.
To successfully integrate preoperative pain education into the routine preoperative planning process, surgeons should consider incorporating a preoperative pain checklist into their standard surgical consent process. This will ensure that pain expectations are a routine focus in the preoperative setting and lessen the chance for the surgical procedure to be an unintended gateway to secondary opioid dependence. While there are no available randomized trials specifically evaluating surgeon-directed pain education, this strong recommendation is underscored by the high intuitive value in both strengthening the surgeon-patient relationship and preventing unnecessary opioid usage. An example of a recommended pain assessment checklist that can be readily integrated into the preoperative workflow is provided in Box 1.

### 3.6 Supportive pain management programs and technology

**Statement 5.** When available, participation in statewide prescription drug monitoring programs may curtail excessive or unnecessary prescribing of postoperative opioids (consensus).

Although prescription drug monitoring programs (PDMPs) have been available since the early 1990s, the ongoing response to the opioid epidemic has increased their visibility and refocused attention on and evaluation of their merits. In fact, as of 2019, 49 states and the District of Columbia have implemented PDMPs. According to the Centers for Disease Control, a PDMP should be an electronic databases that "tracks controlled substance prescriptions in a state [and] provides authorities timely information about prescribing and patient behaviors that contribute to the [opioid] epidemic and facilitate a targeted response." In practice, these programs are intended to increase clinician awareness of current opioid use; to identify patients at potentially high risk of opioid misuse or dependence; and to promote accountability and responsible prescribing practices among medical professionals.

While large-scale studies evaluating the utility and efficacy of PDMPs are relatively limited, a recent systematic review of 24 studies published between 1993 and 2014 suggested that these programs are efficacious in reducing the availability and unintended diversion of schedule II opioids into the community-at-large. Although not specifically focused on surgical patients, similar conclusions have been reported by other smaller, retrospective studies. PDMPs may also reduce the incidence of opioid-related morbidities and mortality, but the data on this contention is limited. Regarding effective use, surgical specialists have been shown to have lower rates of PDMP registration and participation. Several reasons may explain this underutilization including difficulty of use; perceptions that PDMPs are not helpful in accurately identifying “at-risk” patients; and potential time burdens.

These issues notwithstanding, active participation in PDMPs can enhance a comprehensive perioperative pain management strategy. There are currently no published studies specifically focused on PDMPs and head and neck endocrine surgery. However, in a recent single-institution study of over 500 urologic procedures, Myrga and colleagues found that mandated queries resulted in a significant and sustained reduction in the median MMEs prescribed at discharge for both opioid-naïve and chronic opioid patients. These results are encouraging, and it is reasonable to extrapolate similar potential benefits to head and neck endocrine surgery. Based on the preponderance of available evidence, head and neck endocrine surgeons are strongly encouraged to register and actively utilize PDMPs. They can provide important, up-to-date information on patients’ historical opioid requirements; prevent redundant or excessive opioid prescriptions; and encourage surgeons and other medical professionals to collaboratively approach pain management.

In addition to PDMPs, there have been several recently introduced technological innovations designed to reduce opioid prescribing. These include systems, which rely on heat, cold, or massage to minimize the patient’s nociception. There is currently limited available evidence. Additionally, a range of software applications designed to record and monitor the experience of patients have recently been made more widely available. While in theory some of these innovations may beneficially impact ongoing efforts at narcotic control, at this point no evidence is available to assess their utility in the perioperative setting. Physicians should maintain awareness of new tools or technologies—such as educational resources and patient-centered pain assessment tools such as the “Safe Pain Control Patient Evaluation,” by the American College of Surgeons’ Surgical Patient Education Program. The survey assesses patient’s understanding of their pain control options, when to use non-opioid versus opioid medications, and how to use opioids safely. It also collects information about the patient’s baseline preoperative pain and pain medication usage, operation, length of hospitalization, and pain severity during the acute postoperative period. This survey is publicly available for all surgeons and can be accessed at: https://redcap.facs.org/surveys/?s=XDKRD8A8EH. Well-designed, prospective studies focused on utilizing available and emerging
### Box 1  Example of AHNS-ES recommended preoperative pain assessment checklist

1. How satisfied have you been with your pain management experiences after prior medical, surgical, or dental procedures (such as tooth extractions, root canal, etc.)?
   - [ ] Very satisfied
   - [ ] Somewhat satisfied
   - [ ] Somewhat dissatisfied
   - [ ] Very dissatisfied
   - [ ] I have never had any prior medical, surgical, or dental procedures

2. Which of the following best describes any current conditions you are experiencing that require daily use of pain medication(s)? (May select more than one answer)
   - [ ] Back/spinal pain
   - [ ] Osteoarthritis
   - [ ] Rheumatoid arthritis
   - [ ] Chronic headaches
   - [ ] Multiple sclerosis
   - [ ] Fibromyalgia
   - [ ] Nerve damage (neuropathy)
   - [ ] Other (Please specify) __________________
   - [ ] I do not have any current pain condition

3. If you have any of the above pain conditions, what type(s) of prescription or over-the-counter medication(s) do you take? (May select more than one answer)
   - [ ] Opioids (hydrocodone, oxycodone, tramadol, Tylenol with codeine)
   - [ ] Tylenol (Acetaminophen)
   - [ ] NSAIDs (Advil, Aleve, Celebrex, ibuprofen, aspirin)
   - [ ] Nerve pain medication (Neurontin, Lyrica, gabapentin)
   - [ ] Other (Please specify) __________________

4. Have you ever had any side effects or other bad reactions to any of the following types of pain medications?
   - [ ] Opioids (hydrocodone, oxycodone, tramadol, Tylenol with codeine)
   - [ ] Tylenol (Acetaminophen)
   - [ ] NSAIDs (Advil, Aleve, Celebrex, ibuprofen, aspirin)
   - [ ] Nerve pain medication (Neurontin, Lyrica, gabapentin)
   - [ ] Other (Please specify) __________________
   - [ ] I have never had any side effects or bad reactions to a pain medication

5. If you have had any bad reaction(s) to a pain medication, which of the following best describes the reaction(s)? (May select more than one answer)
   - [ ] Nausea/vomiting
   - [ ] Constipation
   - [ ] Stomach pain
   - [ ] Drowsiness/decreased energy/mental cloudiness
   - [ ] Difficulty breathing
   - [ ] Rash/swelling
   - [ ] Other (Please specify) __________________

6. Do you take any of the following medications? (Select all that apply)
   - [ ] Benzodiazepines (Xanax, Valium, Ativan, Klonopin)
   - [ ] SSRIs (Prozac, Lexapro, Zoloft, Celexa, Paxil)
   - [ ] ACE inhibitors (Lisinopril, enalapril, benazepril)

7. Have you ever experienced issues with addiction to alcohol or medications (prescription or nonprescription)?
   - [ ] Yes
   - [ ] No

8. The patient and I have discussed postoperative pain expectations and our pain management plan.
   - [ ] Yes
   - [ ] No
technologies to better evaluate, track, and ultimately improve patients’ perioperative pain outcomes are clearly warranted.

4 | CONCLUSIONS

Promoting more conscientious opioid prescribing practices is an important first step yet this issue is best viewed within the larger framework of a comprehensive, multifaceted perioperative pain management strategy. Evidence-based recommendations to help guide surgeons on best practices regarding perioperative pain management remain limited. This expert panel consensus aimed to review and synthesize the available literature and provide clinicians with evidence-based recommendations with practical clinical applicability. As this review highlights, a successful pain management strategy spans the continuum of perioperative encounter. The process begins with assessing patients’ pain risk factors and expectations, effectively utilizes multimodality strategies, and upon discharge implements processes to readily address patients’ pain management concerns. Additionally, head and neck endocrine surgeons are well advised to approach pain management in a multidisciplinary fashion. Collaboration with primary care and pain specialists should be viewed as essential to successful perioperative pain management. Surgeons should seek out continuing educational opportunities and become adept with emerging technologies focused on improving patients’ perioperative pain management experiences and outcomes. By implementing a mindful and comprehensive approach to perioperative pain management, head and neck endocrine surgeons can provide tangible, positive impacts on patients’ postoperative outcomes and our National public health.

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