

Multimodal Analgesia in the Aesthetic Plastic Surgery: Concepts and Strategies

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Background: Postoperative pain management is crucial for aesthetic plastic surgery procedures. Poorly controlled postoperative pain results in negative physiologic effects and can affect length of stay and patient satisfaction. In light of the growing opioid epidemic, plastic surgeons must be keenly familiar with opioid-sparing multimodal analgesia regimens to optimize postoperative pain control.

Methods: A review study based on multimodal analgesia was conducted.

Results: We present an overview of pain management strategies pertaining to aesthetic plastic surgery and offer a multimodal analgesia model for outpatient aesthetic surgery practices.

Conclusion: This review article presents an evidence-based approach to multimodal pain management for aesthetic plastic surgery. (*Plast Reconstr Surg Glob Open* 2022;10:e4310; doi: 10.1097/GOX.0000000000004310; Published online 11 May 2022.)

INTRODUCTION

Postoperative pain management in aesthetic plastic surgery remains a topic of increasing interest amidst heightened awareness of the opioid epidemic. Poorly controlled postoperative pain has been associated with worse surgical outcomes. In patients undergoing thoracic and abdominal surgery, poorly controlled pain has a risk of poor pulmonary function, myocardial ischemia, ileus, thromboembolism, and impaired immune function.^{1,2} Poor pain control in noncosmetic surgeries has been associated with longer postanesthesia care unit (PACU) stays and higher readmission rates; this may cause an undue financial burden on the patient and poor patient satisfaction.³⁻⁹ Uncontrolled postsurgical pain has been implicated in the development of persistent postsurgical pain due to maladaptive neuronal plasticity and has been implicated in long-term opiate use.^{10,11} This article will review multimodal pain management strategies available to plastic surgeons based on therapeutic classes of medications, and provide a framework for pain management specifically in elective, aesthetic surgery.

OPIOIDS

This class of medications primarily act on mu (μ), kappa (κ), and delta (δ) opioid receptors in the central nervous system.^{12,13} These three opiate receptors are affected differently by various opiates; this may explain the varying effects of this class of medications.¹⁴ Opioids affect afferent pain signals by binding to opiate receptors, thus decreasing the perception of pain. The opiate receptors not only have analgesic properties but also leads to euphoria, sedation, anorexia, and respiratory depression.¹⁵ The addictive potential of opioids has been well established and cannot be overstated with estimates of new persistent opiate use after surgery ranging from 5%–13%.¹⁶⁻¹⁸

Opioids are administered parenterally or orally. Intravenous administration has predictable peak plasma concentration with rapid time of onset and offset. Intravenous opioids are typically given intraoperatively or in the PACU for aesthetic plastic surgery patients.^{19,20} Oral administration of opioids can offer longer duration of action due to the enteral absorption of the medication, but has slower onset, whereas intravenous administration has a faster and more predictable onset, as intravenous administration avoids first pass metabolism.²¹

Opioids should be used with caution in geriatric patients and patients with morbid obesity, obstructive sleep apnea, and those with abuse history or potential. Plastic surgeons should practice caution in prescribing this class of medication to patients who use other sedative medications such as benzodiazepines, antihistamines, barbiturates, or sleep aids or in patients with excess alcohol

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use, as these can have additive effects and cause respiratory depression.²¹

We recommend minimizing opiate use postoperatively by employing a multimodal analgesic (MMA) approach to ambulatory and inpatient surgery patients.²² For patients in whom the surgeon chooses to prescribe opioids for postsurgical pain, we recommend a judicious number of low dose, short-acting opioids that are not combined with acetaminophen. This will allow optimal dosing of acetaminophen without the concerns of overdosing.

ACETAMINOPHEN

Acetaminophen's mechanism of action has yet to be fully elucidated, but it is believed to act in the central nervous system.^{23,24} This accounts for its analgesic and antipyretic effects.^{25,26} Acetaminophen does not have the same gastric ulceration and bleeding complications associated with nonsteroidal antiinflammatory drugs (NSAIDs). A Cochran review found that a single postoperative dose of acetaminophen achieves a 50% reduction in pain over 4–6 hours.²⁷ The maximum dose of acetaminophen is 4000 mg in a 24-hour period in healthy patients who are not taking acetaminophen for extended periods of time (<7 days).^{28,29} In healthy patients taking prolonged acetaminophen (>7 days), dosage should be limited to 3000 mg in a 24-hour period.³⁰ In patients with liver disease, malnutrition, low body weight, geriatric age, or febrile illness, a maximum of 2000 mg in a 24-hour period or total avoidance is recommended.³¹

We recommend utilizing acetaminophen in all postoperative patients who do not have contraindications to its use as discussed above.^{9,32,33} It should be scheduled around the clock in the first 72 hours after surgery. Plastic surgeons must exercise caution and educate their patients who take at home medications containing acetaminophen such as certain opioid combinations or cold medications.

NSAIDS AND CYCLO-OXYGENASE (COX)-2 SPECIFIC INHIBITORS

Traditional NSAIDs, also termed nonselective NSAIDs, act through peripheral inhibition of COX-1 and COX-2 enzymes, inhibiting the synthesis of prostaglandins, mediators of inflammation and vasodilation, and thromboxane, a mediator of vasoconstriction and platelet aggregation.³⁴ In contrast, COX-2 specific inhibitors do not have any effects on COX-1 enzymes and thus do not influence platelet function.³⁵

Nonselective NSAIDs can cause gastric ulceration (particularly in postbariatric surgery patients) and gastrointestinal (GI) bleeding. The COX-2 specific inhibitors, a class of NSAIDs, theoretically reduce the risk of GI bleeding but have many of the same contraindications as NSAIDs. Several studies investigating the GI benefits of COX-2 specific inhibitors found they have decreased risk of GI bleeding compared with NSAIDs; however, they are still associated with higher bleeding risk compared with placebo.^{36–38} Other potential concerns with this group of drugs include platelet dysfunction, asthma exacerbation, and renal impairment. Plastic surgeons must be aware of

Takeaways

Question(s): What is the optimal pain management strategy for aesthetic plastic surgery procedures?

Findings: Based on a review study, we present a multimodal analgesia overview for pain management in aesthetic plastic surgery.

Meaning: Given the concerns related to the opioid epidemic, plastic surgeons should employ a multi-modal pain management strategy.

the cardiovascular risks associated with NSAIDs. These include myocardial infarction, stroke, heart failure, hypertension, atrial fibrillation, and venous thromboembolism. NSAIDs should be used with caution in patients with cardiovascular disease.³⁹

Ketorolac tromethamine (Toradol; F. Hoffmann-La Roche AG, Basel, Switzerland) is a nonselective NSAID that is available in intravenous and oral formulation and is widely used due to its rapid onset of action.^{40,41} Intravenous ketorolac could be transitioned to any oral NSAID. Plastic surgeons have traditionally been hesitant to use this medication due to concerns for increased bleeding risk. However, a 2015 meta-analysis found that ketorolac does not statistically significantly increase hematoma rates amongst patients undergoing aesthetic surgery (2.5% in patients receiving ketorolac versus 2.4% in patients not receiving ketorolac; $P = 0.79$).⁴² All six studies included in the meta-analysis found a significant reduction in postoperative pain and narcotic use amongst patients who received ketorolac. A recent multisurgeon single-site retrospective cohort study did not find a significant increase in hematoma rates amongst patients undergoing breast reduction (4.0% in patients who received ketorolac versus 3.2% in patients who did not receive ketorolac; $P = 0.711$) and breast reconstruction (3.2% in patients who received ketorolac versus 1.9% in patients who did not receive ketorolac; $P = 0.475$).⁴³

A 2021 systematic review and meta-analysis of 229 articles including 151,031 patients undergoing a wide variety of surgical procedures (including plastic surgery) concluded that NSAIDs are unlikely to be the cause of postoperative bleeding complications, which is consistent across all types of NSAIDs and surgical procedures.⁴⁴ A 2021 Cochrane review comparing nonselective NSAIDs (including ketorolac) with placebo, other pain medications, and no medications in breast surgery found little evidence to suggest that NSAIDs affect postoperative bleeding in breast surgery. The authors note that large, high-quality randomized control trials are needed for further clarification on this question.⁴⁵

A study investigating the effects of COX-2 specific inhibitors on platelet function found these drugs to have undetectable effects on platelet function similar to placebo, whereas nonselective NSAIDs decreased platelet aggregation and increased bleeding time.⁴⁶ Importantly, they carry the same FDA warnings in regard to cardiovascular risks as nonselective NSAIDs.^{47,48}

In summary, we recommend nonselective NSAIDs or COX-2 specific inhibitors administered intraoperatively and continued postoperatively, unless there are contraindications.^{32,33} At equipotent doses there are no differences in the analgesic effects of nonselective NSAIDs and COX-2 specific inhibitors. We prefer meloxicam because it is administered once a day, which improves patient compliance. Furthermore, meloxicam has greater affinity to COX-2 inhibition compared with COX-1 inhibition, similar to celecoxib. These medications should not be used in patients with active cardiovascular disease, renal impairment, or GI bleeding risk factors. Duration should be minimized to the acute postoperative setting and the lowest effective dosage should be used. Plastic surgeons should consider the use of ketorolac intraoperatively or in the PACU as a powerful adjunct to decrease need for opiates.

ADJUVANT MULTIMODAL MEDICATIONS

Steroids

Steroids have potent and well-known antiinflammatory, immunomodulatory, and antiemetic effects. A single intraoperative dose of dexamethasone has excellent prolonged antiemetic effects, and reduces postoperative pain scores and opioid requirements.^{49,50} Dexamethasone given intravenously has also been shown to prolong regional block, and has an added benefit of providing excellent long-lasting prophylaxis for postoperative nausea and vomiting.⁵¹⁻⁵⁴ In addition, recent studies have shown that IV dexamethasone reduces break through pain reported with single shot blocks.⁵⁵ In regard to aesthetic plastic surgery applications, prolonged steroid use causes delayed wound healing, increased surgical site infections, and hyperglycemia.⁵⁶ However, several meta-analyses have found that a single dose of dexamethasone does not influence wound healing complications or surgical site infections.⁵⁷⁻⁶² A single intraoperative dose of dexamethasone 8–10 mg is recommended for all patients except for those with uncontrolled diabetes, which is a contraindication for elective surgery. Of note, intravenous dexamethasone should be administered after the patient is asleep to avoid intense anal pruritus.⁶³

Gabapentinoids

Gabapentinoids (gabapentin and pregabalin) bind postsynaptically to dorsal horn neurons, blocking voltage-gated calcium channels and thereby decreasing neurotransmitter release.^{56,64} Gabapentin and pregabalin are not enterally metabolized and are renally excreted via first order kinetics; patients with renal impairment may require dose adjustments.^{65,66} The analgesic effects of gabapentin in the aesthetic surgery population are difficult to untangle from the effects of additional nonopioid medications as gabapentin is typically given as part of an MMA protocol. A comprehensive systematic review and meta-analysis questioned the analgesic efficacy of gabapentin.⁶⁷ A study comparing 1200 mg of preoperative gabapentin in addition to 1000 mg acetaminophen versus 1000 mg acetaminophen alone showed equivalent PACU and postoperative

pain scores.⁶⁸ The study concluded that both groups experienced moderate to severe pain postoperatively.

Gabapentin can cause somnolence, confusion, and dizziness.⁶⁹ However, a recent retrospective review of gabapentin use in abdominal wall reconstruction did not find postoperative gabapentin use associated with dizziness, presyncopal episodes, altered mental status, hypotension, or falls.⁷⁰ Nonetheless, gabapentin should be used cautiously in geriatric patients and those with obstructive sleep apnea or risk factors for obstructive sleep apnea.⁷¹ In addition, gabapentinoids should be avoided in patients who may require high opioid doses after surgery.

We recommend the use of gabapentin as an adjunctive multimodal medication for acute, postoperative pain only in patients who have a risk for nerve-related pain and in whom NSAIDs and COX-2 specific inhibitors are contraindicated.^{32,33} In this patient population we advocate for gabapentin 600 mg orally the evening before surgery as well as 600 mg before the operation. In patients less than 65 years old, we favor 300 mg orally every 8 hours, whereas for patients more than 65 years, we favor twice daily dosing. For those patients who may experience side effects, the dose can be reduced from 300 mg to 100 mg.

Muscle Relaxants

Muscle relaxants represent a broad category of medications. In our practice, cyclobenzaprine is most commonly prescribed. Despite its classification, cyclobenzaprine does not act on skeletal muscle. Rather, it is a centrally-acting medication believed to act at the brain stem level on the locus ceruleus, decreasing the activity of serotonergic descending neurons, thereby decreasing muscle tone.^{72,73} The effect on the locus ceruleus may help explain the sedating qualities of the medication. Cyclobenzaprine, and most other muscle relaxants, are renally metabolized and require dose adjustments for patients with renal impairment.

Within plastic surgery, muscle relaxant use has poor evidence for improvement in pain control and postoperative opioid use. A recent retrospective review study of scheduled cyclobenzaprine use after implant-based subpectoral breast reconstruction found muscle relaxant use did not significantly decrease pain scores nor opioid consumption.⁷⁴

Due to the lack of evidence of muscle relaxant use within an MMA protocol and given the risks of sedation in combination with opiates, we do not recommend the routine use of muscle relaxants as adjuncts in an MMA regimen. We recommend special caution in elderly patients as this class of medication can worsen fall risk and delirium.

Topical Local Anesthetics

Topical local anesthetics inactivate voltage-gated sodium channels, raising the threshold required to generate an action potential, rendering the area temporarily insensate.⁷⁵ These medications preferentially affect type C nerve fibers (pain fibers) over type A nerve fibers (proprioception and pressure fibers); patients may therefore continue to feel pressure sensation without feeling pain during the procedure.⁷⁶

Table 1. Local Anesthetic Dosing Recommendations

Anesthetic	Onset	Duration of Analgesia	Maximum Dose without Epinephrine	Maximum Dose with Epinephrine
Lidocaine	10–20 min	3–8 h	4.5 mg/kg	7 mg/kg
Mepivacaine	10–20 min	3–10 h	5 mg/kg	7 mg/kg
Ropivacaine	15–30 min	5–24 h	3 mg/kg	3.5 mg/kg
Bupivacaine	15–30 min	5–30 h	2.5 mg/kg	3 mg/kg

The most commonly used topical anesthetics include lidocaine patches, eutectic mixture of local anesthetics consisting of lidocaine and prilocaine, as well as a mixture of lidocaine, epinephrine, and tetracaine. The concentrations of each local anesthetic vary and must be carefully calculated to avoid local anesthetic systemic toxicity (Table 1).^{77,78} Surgeons must be well versed in the management of local anesthetic systemic toxicity; guidelines are available from the American Society of Regional Anesthesia and Pain Medicine.⁷⁹ Topical anesthetics may be of special benefit in aesthetic patients undergoing filler injection for preprocedure numbing.

Local Infiltration Anesthesia/Analgesia

Local infiltration anesthesia/analgesia commonly includes lidocaine, bupivacaine, and ropivacaine administered at the surgical site. These anesthetics are often combined with epinephrine to decrease intraoperative blood loss. Lalonde has revolutionized wide awake, in-office surgery with injection techniques that minimize discomfort and maximize efficacy.^{80–86} Local infiltration analgesia not only allow for painless awake office procedures, but also minimize postoperative pain.⁸⁷ A meta-analysis found that local anesthetic injected before incision decreases pain and decreases postoperative analgesic consumption and time to first rescue pain medication dose.⁸⁸

Liposomal bupivacaine (Exparel; Pacira Biosciences Inc; Parsippany, N.J.) contains bupivacaine within a lipid-based vehicle that results in diffusion of the drug over time with an initial peak at 0.25–2 hours and a second peak 12–24 hours after injection. Of note, lidocaine should not be injected within 20 minutes of liposomal bupivacaine as this can result in immediate release of bupivacaine from the product.⁸⁹ Liposomal bupivacaine has been shown to provide pain relief over 48–72 hours.⁹⁰ Liposomal bupivacaine remains under patent and thus costs more than standard bupivacaine. A study by Little et al found decreased postoperative narcotic consumption, length of stay, direct and total costs, and 30-day readmission rate with liposomal bupivacaine compared with control patients undergoing abdominal wall, implant-based, and autologous breast reconstruction.⁹¹

We recommend the use of short-acting local anesthetics for bedside procedures and long-acting local anesthetics for postprocedure pain control. In aesthetic plastic surgery patients undergoing ambulatory surgery, liposomal bupivacaine may provide significant pain relief in the acute postoperative period warranting the increased cost.

Tumescent Analgesia

Tumescent analgesia involves the use of dilute lidocaine or bupivacaine in large volumes of carrier fluid with

or without epinephrine. This technique was popularized by Klein in the late 1980s for use during liposuction and its use has since been widely expanded.^{92,93} Due to the lipid solubility and distributive properties of local anesthetics, tumescent analgesia allows for higher maximum concentrations of local anesthetics than traditional field blocks.⁷⁶ Studies measuring the maximum safe dosage of lidocaine in wetting solution have been found to be 35 mg per kg, with more recent reports showing safety profiles up to 55 mg per kg.^{94,95} The American Society of Plastic Surgeons Practice Advisory on Liposuction recommends limiting lidocaine to a maximum dose of 35 mg per kg (only when used as part of wetting solution).⁹⁶

Tumescent analgesia is frequently used in abdominoplasty procedures with reports of the technique being used with deep sedation and conscious sedation for in-office procedures.⁹⁷ Tumescent techniques are frequently combined with liposuction during abdominoplasty, a technique known as lipoabdominoplasty. This procedure carries with it an inherent risk of vascular compromise due to the theoretical risk of disrupting blood supply to the abdominal skin flaps. This complication can be minimized by performing only selective undermining of the skin flaps to the portion of the abdomen requiring rectus muscle plication, thereby preserving the lateral row of rectus muscle perforators.^{98–100} A 2019 systematic review of 17 lipoabdominoplasty studies encompassing 14,061 patients found fewer complications in the lipoabdominoplasty group compared with the traditional abdominoplasty group (RR 0.85; CI 0.71–0.97; $P = 0.017$) with the lipoabdominoplasty group having a lower incidence of hematoma (RR = 0.56; 95% CI 0.36–0.86; $P = 0.009$) and seroma (RR = 0.69; 95% CI 0.57–0.85; $P = 0.000$) compared with the traditional abdominoplasty group.¹⁰¹

Tumescent analgesia can also be used for breast surgery. Breast reductions have been carried out under intravenous sedation and tumescent analgesia with reports of 516–2948 g resection specimens, thus avoiding the need for general anesthesia.¹⁰² A 2012 meta-analysis of 13 articles of tumescent analgesia used during breast reduction found that patients who underwent tumescent analgesia had an average of 202 cm³ less blood loss compared with patients without tumescent analgesia ($P < 0.001$).¹⁰³ There was also a significant reduction in the need for postoperative blood transfusion amongst patients who received tumescent analgesia (OR 0.05). Tumescent analgesia has also been reported for use in breast augmentation under intravenous sedation, including submuscular implant placement, with a higher than average mixture of tumescent analgesia (100 cm³ of 1% lidocaine with 1:100,000 epinephrine mixed with 250 cm³ of normal saline).¹⁰⁴ Tumescent analgesia has also been reported as an adjunct

Table 2. Multimodal Analgesia Options

Medication/ Technique	Timing	Dosage	Duration	Contraindications/Caution
Local and/or regional analgesia	Preoperatively or intraoperatively	Local anesthetic maximum dosage	Depends on local anesthetic used	Local anesthetic systemic toxicity
Acetaminophen	Preoperative dose or intraoperatively continued postoperatively	1000 mg preoperative// 1000 mg q6 hours postoperative	Continue until healing	Liver disease
NSAID	Intraoperatively continued postoperatively	Ketorolac 15–30 mg IV// Meloxicam 15 mg	Continue until healing	Cardiac or renal disease; caution in patients at risk for GI bleeding
Gabapentin	Preoperative and continued postoperatively	600 mg preoperative dose// 100–300 mg TID	Continue 5 days after surgery	Avoid in elderly, morbidly obese, obstructive sleep apnea, and patients requiring high opioid doses after surgery; caution in patients with renal impairment
Cyclobenzaprine	Postoperatively	5–10 mg TID PRN	Discontinue as soon as able	Caution in geriatric patients and in those requiring higher doses of opiates
Oxycodone	Postoperatively	5 mg q3–4h PRN	Discontinue as soon as able	Use only as rescue (breakthrough pain)

PRN: as needed; TID: three times daily.

to implant capsulectomy in technique papers to facilitate dissection through hydrodissection and to minimize intraoperative blood loss.^{105,106}

Tumescent analgesia is routinely used for rhytidectomy to facilitate dissection and minimize intraoperative blood loss. Tumescent analgesia can also allow for rhytidectomy to be performed under oral or intravenous sedation in the office.⁹³ The precise composition of the wetting solution varies widely between surgeons based on the total amount of wetting solution injected; standard guidelines for local anesthetic dosages should be respected. We recommend the routine use of wetting solution in a superwet manner with lidocaine or bupivacaine, as described by Fodor, within the safety profile of each respective local anesthetic for liposuction.^{107,108}

Regional Anesthesia

Regional anesthesia involves injecting long-acting local anesthetic into a targeted area surrounding peripheral

nerves (either perineurally or in the fascial planes).¹⁰⁹ Regional anesthesia is a key component of MMA technique as it has been shown to decrease postoperative pain scores and postoperative opioid use, as well as opioid-related adverse events.^{110–114} The most commonly used regional anesthetic techniques within aesthetic plastic surgery include the interfascial plane blocks such as pectoralis (PECS) I and II block and the erector spinae plane blocks in breast surgery, as well as the transversus abdominis plane block and rectus abdominis muscle block for abdominal surgery.¹⁰⁹

The PECS I block is performed by injecting 20 cm³ of long-acting local anesthetic into the fascial plane between the pectoralis major and minor muscle to blunt burning sensation from the pectoral and intercostobrachial nerves.^{115–118} The PECS II block is performed by injecting 10–20 cm³ of local anesthetic between the pectoralis minor and serratus anterior muscle at the level of the third rib to blunt intercostal nerves 3–6 and the long thoracic

Table 3. Alternative MMA Options

Medication/ Technique	Alternatives	Dosage	Duration	Contraindications/Caution
Acetaminophen Celecoxib	None Ibuprofen	1000 mg q6h 600–800 mg q8h	Up to 7 days after surgery Up to 7 days after surgery	Severe liver disease Cardiac or renal disease; caution in patients at risk for GI bleeding
Ketorolac (IV) Gabapentin	Meloxicam (PO) Pregabalin	15–30 mg, intraoperatively 300–600 mg, q8h Pregabalin: 75 mg q12h	Intraoperative Up to 5–7 days after surgery	Same as celecoxib Can cause somnolence; respiratory depression when combined with high dose opioids; requires dose adjustment in renal impairment
Cyclobenzaprine	Tizanidine	2 mg q8h; increase by 2–4 mg to max dose 36 mg in 24 hours	Up to 5–7 days after surgery	Requires dose adjustment in renal impairment
Oxycodone	Methocarbamol (PO) Hydrocodone Morphine (PO)	1000 mg q6h 5 mg q3–4h, PRN for breakthrough pain 15–30 mg q3–4h PRN immediate release	Continue 5 days after discharge if initiated inpatient Discontinue as soon as able Discontinue as soon as able	Requires dose adjustment in renal impairment Contains acetaminophen—decrease other sources of acetaminophen
IV hydromorphone	Morphine (IV) Fentanyl (IV)	2.5–5 mg q3–4h, PRN 50–100 mcg q1–2h PRN	Discontinue as soon as able Discontinue as soon as able	

CLD: clear liquid diet; PRN: as needed; TID: three times daily.

nerve.^{115–118} The PECS blocks are traditionally performed under ultrasound guidance but can also be performed under direct visualization intraoperatively. The erector spinae plane block is performed under ultrasound guidance by injecting 20 cm³ of local anesthetic between the rhomboid major and erector spinae muscle; this provides anesthesia from the T2 to T9 level from the midclavicular line to 3 cm lateral of midline from the thoracic spine.¹¹⁹

The transversus abdominis plane block is performed by injecting local anesthetic between the internal oblique and transversus abdominis fascial planes, blunting the afferent sensory pain fibers of the terminal branches of T10-L1 sensory fibers.^{118,120} This is traditionally performed under ultrasound guidance; however, the transversus abdominis plane block can also be performed under direct visualization during abdominoplasty. The rectus abdominis muscle block is similarly performed; however, the rectus abdominis muscle block is more limited to the rectus abdominis muscles in the distribution of T7-L1.¹²¹ The rectus abdominis muscle block is best used for vertical midline incisions.^{122,123}

We recommend the use of regional anesthesia whenever possible. Because regional anesthesia utilizes local anesthetics, the same caution in regard to local anesthetic toxicity must be employed.

Putting It All Together: MMA Regimen

In a time when the United States struggles to confront a growing opiate epidemic, surgeons must be ever mindful of their postoperative analgesic approach. We have adapted the lessons learned from our own institutional experience to develop an MMA regimen to treat postsurgical pain in aesthetic plastic surgery patients.^{124–126} Table 2 summarizes our recommendations for MMA options that can be customized based on the unique surgical procedure and patient characteristics. Table 3 provides alternative medication options for an MMA regimen. Patients with allergies to the medications listed in Table 2 should either not be given these medications or be given alternative medications within the same drug class depending on the severity of their allergy. Treatment with these multimodal regimens should be limited to the shortest duration of time possible to minimize risk of complications from medication overuse.

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