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Postoperative Pain and Analgesic Requirements After Septoplasty and Rhinoplasty

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Objectives/Hypothesis: To assess and define the level of pain after rhinoplasty and septoplasty and to better define the strength and quantity of postoperative opioids needed.

Study Design: Prospective outcomes research.

Methods: Two groups of patients were enrolled. One group underwent septoplasty with/without turbinate reduction and the other group underwent functional and/or cosmetic rhinoplasty (with/without septoplasty). Patients completed a 15-day log (daily, beginning on the day of surgery) to record the analgesics used and the daily maximal level of pain using a visual analog scale. Level of pain, number of days of moderate or severe pain, total number of opioid pills used, and total morphine milligram equivalents (MMEs) of opioid used were assessed.

Results: Pain after septoplasty and rhinoplasty was generally mild. Average pain was moderate through postoperative day (POD) 2 after rhinoplasty and only on POD 0 after septoplasty. There was no statistically significant difference between the two groups in terms of number of opioid tablets consumed or total MMEs used. Patients undergoing rhinoplasty consumed more acetaminophen than septoplasty-only patients (7471 ± 1009 vs. 2781 ± 585, P = .0112). Ninety percent of patients would have received adequate analgesia with as few as 11 opioid tablets. All patients had excess opioid at the end of the study period.

Conclusions: Both septoplasty and rhinoplasty are associated with mostly mild pain, and postoperative opioid requirements are quite low. Surgeons can reliably reduce opioid prescription after septoplasty and rhinoplasty to as few as 11 tablets. Reducing opioid prescribing will not adversely affect the patient but will reduce the availability of opioids for misuse or diversion.

Key Words: Analgesia, pain, opioids, rhinoplasty, septoplasty.

Level of Evidence: 2c

INTRODUCTION

Patient comfort is an important consideration after surgery. Patients undergoing elective, ambulatory surgery require that sufficient postoperative analgesia be provided. Opioids are frequently prescribed after ambulatory surgery. Concurrent with a rise in ambulatory procedures, stronger and longer-acting opioids became widely available, and opioid abuse and opioid-related overdose deaths skyrocketed. A greater attention to opioid prescribing, state-mandated prescription drug monitoring programs, and greater access to opioid antagonists like naloxone have begun to reverse these trends, but opioid prescriptions and related deaths are still significantly higher than they were in 1999.

Little has been written about actual postoperative analgesic needs. This study addresses postoperative pain and analgesic requirements after septoplasty and rhinoplasty from the patient’s perspective and will serve as a basis upon which decisions can be made about optimal opioid prescribing after these surgeries.

MATERIALS AND METHODS

Patients undergoing septoplasty, with/without turbinate reduction surgery, and/or functional and/or cosmetic rhinoplasty at New York–Presbyterian/Weill Cornell Medical Center, New York, New York, were enrolled between December 2017 and October 2018. Patients completed a preoperative survey recording demographic information, presence of depression/anxiety, chronic pain, (known to increase postoperative pain complaints), age, education, and current opioid use. After undergoing septoplasty and/or rhinoplasty without nasal packing, patients were prescribed natural or semisynthetic opioid analgesics at their surgeon’s discretion. Subjects then rated their maximum level of pain once a day for 15 days beginning on the evening of surgery using a 10-point visual analog scale (VAS). They also recorded the type and number of prescription and over-the-counter pain medications used each day. After completing the log, the patients also recorded the number of prescription opioid tablets remaining.
before returning their reports by mail. Morphine milligram equivalents (MMEs) were calculated using appropriate conversion factors. Operative reports were reviewed for technique specifics; the New York State Prescription Monitoring Program Registry was also consulted to ensure patients received no other opioid prescriptions for 3 months before and during the 2-week postoperative period.

All responses were entered into an Excel spreadsheet (Microsoft Excel for Mac 2011 version 14.6.2; Microsoft Corp., Redmond, WA). Statistical analysis was performed using Prism 8 for macOS version 8.0.0 (GraphPad Software, Inc., San Diego, CA). Two-tailed unpaired t tests were performed to assess relationship. This study was approved by the Weill Cornell Medical College Institutional Review Board.

RESULTS

Forty-four patients were enrolled and completed initial questionnaires, and 36 completed and returned their postoperative logs. Fourteen patients who underwent septoplasty with or without inferior turbinate reduction surgery and 22 patients who underwent functional and/or cosmetic rhinoplasty, with or without septoplasty and turbinate reduction, were available for review. One of three surgeons performed the septoplasty, whereas all rhinoplasties were performed by one surgeon.

One septoplasty patient reported using short-acting opioids preoperatively and was excluded from the analysis. All 13 septoplasties were performed endonasally. Eleven were male and two were female; the average age was 44.3 ± 15.7 years (range, 18–75 years). Three patients were prescribed codeine/acetaminophen 30/300, whereas the remaining 10 patients were given oxycodone/acetaminophen 5/325. The pain reported by septoplasty patients ranged from 0 to 78 on the VAS scale. The mean number of opioid tablets used was 4.1 ± 0.8 (range, 0–15), with a mean total MMEs used of 28.7 ± 34.1 (Fig. 2). These patients averaged 2,781 ± 585 milligrams of acetaminophen through postoperative day (POD) 14; they reported a VAS score of at least 40 for 0.9 ± 1.1 days and at least 30 for 1.4 ± 1.1 days.

Of the 22 patients who had rhinoplasty, 19 also had a septoplasty, including concurrent endoscopic sinus surgery in one. Twelve patients were female, and 10 were male, and their average age was 38.2 ± 14.8 years (range, 24–68 years). Endonasal approaches were used in 13 cases, whereas an external approach was used in the remaining nine cases. Two patients were prescribed codeine/acetaminophen 30/300, whereas 19 patients were given oxycodone/acetaminophen 5/325; one patient refused any opioid prescription. The pain reported by rhinoplasty patients ranged from 0 to 88 on the VAS scale (Fig. 1). The mean number of opioid tablets used was 4.4 ± 4.0 (range, 0–14), with a mean total MMEs used of 28.7 ± 34.1 (Fig. 2). These patients averaged 7,471 ± 1,009 mg of acetaminophen through POD 14 (Fig. 3). Rhinoplasty patients reported a VAS score at least 40 for 1.9 ± 1.9 days and at least 30 for 2.9 ± 2.7 days. All patients in both groups had excess opioids at the end of the follow-up period.

Statistical analysis showed no differences in total MMEs, number of opioid tablets consumed, or in overall VAS pain scores between septoplasty and rhinoplasty patients. Furthermore, there was no difference in these measurements between patients undergoing external versus endonasal approaches, between patients treated or not treated with nasal bone osteotomies, or based on weight or body mass index. There was a weak trend toward statistical difference in the number of days with a VAS score of at least 30 (P = .07). There was a statistically significant difference between the septoplasty and rhinoplasty groups in the amount of postoperative acetaminophen used (P = .0112). There was no difference in acetaminophen use in rhinoplasty patients based on external versus endonasal approach or whether or not patients were treated with osteotomies.

DISCUSSION

The Centers for Disease Control and Prevention has estimated that 116 Americans died every day in 2016 in...
the United States from an opioid overdose. ³ The National Institute of Drug Addiction has stated that 45.8% of these involved the use of legally available natural or semisynthetic opioids. ³ Whereas the death rate from synthetic narcotics such as fentanyl continued to skyrocket, the death rate associated with natural or semisynthetic opioids began to rise more slowly after 2010 and has declined since 2012, when a number of states enacted opioid-specific legislation by requiring prescription drug monitoring programs to reign in the use of prescription opioids and increasing the availability of opioid antagonists like naloxone. ⁵ Nevertheless, 37.8% of all American adults used prescription opioids in 2015 ⁶ and the opioids prescribed per person, measured in MMEs, is triple what it was in 1999. ⁷ Unlike the 1960s, when heroin was the initial opioid in more than 80% of abusers, in the 2000s, prescription opioids were the gateway opioid in 75% of abusers. ⁸ Seventy percent of intravenous heroin users in New York City reported nonmedical use of prescription opioids prior to first use of heroin, ⁹ and 41% to 54% of people who misused opioids in 2014 and 2015 obtained prescription opioids free from friends or family. ⁶, ¹⁰ Hwang et al. ¹¹ found that 92% of medical opioid users between 2002 and 2014 were given short-term (<90 days) prescriptions. Any opioids prescribed in excess of actual acute need were thus subject to the risk of diversion. Bicket et al. ¹⁰ in a systematic review of postsurgical opioid use, found that more than 80% of patients reported surplus opioid tablets. Bates et al. ¹² found that 67% had excess prescription opioids after genitourinary surgery, with greater than 50% of the prescribed opioids unused. Bartels et al. ¹³ found that 83% of patients used half or less of the prescribed number of opioids after cesarean delivery, and 71% of patients undergoing thoracic surgery took half or less of the prescribed amount. Three-quarters of both groups reported storing unused opioids in an unlocked location after they were no longer needed for analgesia.

The required doses and quantities of opioids given to patients is procedure-specific and only recently have guidelines been promulgated to assist the prescriber. The Veterans Health Administration embrasure of pain as “the fifth vital sign” in the care of patients in 2001 led to confusion as to the appropriate degree of emphasis to be placed on patient pain. ¹⁴ The Joint Commission did emphasize the need to monitor and quantify patient pain and avoid vague as-needed pain medication orders. Studies relating numerical pain score to physical pain have been slowly integrated into clinical practice.

Alam et al. ¹⁵ noted that patients who received postoperative opioid prescriptions were 44% more likely than those who did not receive opioids to become chronic opioid users. Brummett et al. ¹⁶ reviewed insurance data from 2013 to 2014 and examined adult patients who had not used an opioid for at least the previous 12 months. Only 0.4% of patients who did not have surgery filled an opioid prescription during a follow-up period 90 to 180 days later. By contrast, 5.9% of patients who underwent minor surgery and 6.5% of patients who underwent major surgery filled an opioid prescription 90 to 180 days postoperatively, suggesting new opioid dependence was related to even brief courses of opioids. Tobacco and alcohol use, substance

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**Fig. 2.** Mean daily morphine milligram equivalents (MMEs) opioid usage for patients undergoing septoplasty and rhinoplasty. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

**Fig. 3.** Mean daily acetaminophen usage for patients undergoing septoplasty and rhinoplasty. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]
abuse, preoperative chronic pain disorders, anxiety, and depression were all risk factors for persistent opioid use, independent of the surgical procedure.\textsuperscript{15}

There were approximately 50 million ambulatory surgical procedures performed in the United States between 2010 and 2018.\textsuperscript{15} As ambulatory medicine, including outpatient surgery, assumes a greater role in medical care, the goal of rapid resumption of everyday activities requires both adequate analgesia and avoidance of opioid overmedication. Few studies have looked at the actual opioid requirements of patients undergoing outpatient surgical procedures. Rodgers et al.\textsuperscript{17} reported that the majority of patients used prescribed opioids for 2 days or fewer after elective upper extremity surgery, and two-thirds of the prescribed opioids were unused. Recent studies have suggested that patients are being overprescribed opioids after rhinoplasty. Schwartz et al.\textsuperscript{18} conducted an online survey and found that respondents prescribed rhinoplasty patients $22 \pm 10$ opioid tablets postoperatively. Over 45% of respondents prescribed 20 to 30 tablets, with less than 10% prescribing 10 or fewer tablets.

Patel et al.\textsuperscript{19} surveyed patients at the POD 5 visit after nasal surgery, and found that patients on average reported using 8.7 tablets of hydrocodone/acetaminophen

Fig. 4. Cumulative percentage of septoplasty and rhinoplasty patients with adequate pain control as a function of the number of postoperative opioid doses. Dotted line indicates 90%. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

Fig. 5. Cumulative percentage of septoplasty and rhinoplasty patients with adequate pain control as a function of the total postoperative morphine milligram equivalents (MMEs). Dotted line indicates 90%. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]
Parents recorded pain scores using a VAS instrument after septal surgery or septrhinoplasty in a study by Szychta et al. Patients who underwent septal surgery only in this study reported minimal pain, with VAS scores less than 10 at all times after surgery. This differs significantly from the results of our study, in which average VAS pain scores, although mild, exceeded a VAS score of 10 until POD 3. In our study, VAS scores were not significantly higher for patients undergoing rhinoplasty at any time after surgery. The appropriate VAS cutoff for mild and moderate pain, and the need for opioid analgesics, is debatable, with Bodian et al.22 and Sethi et al.20 noted an average of 28 opioid tablets (range, 5–40) prescribed to 173 patients undergoing rhinoplasty, suggesting significant routine overprescribing.

Our study firmly establishes the relatively low levels of pain experienced by the average septoplasty and rhinoplasty patient. Whereas some patients experienced more severe pain or for a longer duration, the patients in this study experienced, on average, 2 to 3 days of mild pain. Even patients who reported VAS scores in the high 80s in our study experienced, on average, 2 to 3 days of mild pain. It seems reasonable that opioids may be required for patient comfort during these time periods in many patients, and some patients may feel the need to use opioids later in the first 14 postoperative days. In our study, septoplasty patients averaged 4.1 ± 4.4 (maximum of 15) tablets, whereas rhinoplasty patients used 4.4 ± 4.0 (maximum of 14) tablets. These groups averaged 32.0 and 28.7 MMEs. Patel et al.19 documented an average use of 8.7 hydrocodone (5 mg)/acetaminophen (325 mg) tablets (43.5 MMEs); 26% of their patients used more than 15 tablets (80 MMEs or more). However, our results agree in the lack of relationship between total MMEs and the performance of an external approach or osteotomies.

This study did not assess the effect of a comprehensive multimodality analgesia (MMA) regimen but rather assessed the patients’ pain control needs in the current setting. Militsakh et al.23 and Shindo et al.26 found that opioid prescribing after thyroid and parathyroid surgery declined with the use of a MMA regimen. Addition of such a regimen may further reduce the need for opioids.

CONCLUSION

Despite the backlash against the characterization of pain as the fifth vital sign, disproportionate postoperative pain can be an important sign of an atypical postoperative course; excessive opioid prescription should be avoided for this reason, as well as the risk of opioid addiction. However, as noted by Zgierska et al.,27 the current environment in which hospitals and physicians are reviewed by patients, including questions about pain control, establishes a potential conflict between the need to provide adequate postoperative analgesia and conservative and reasoned opioid prescribing. This study establishes a patient-derived benchmark against which prescription patterns can be judged, and represents part of a larger departmental initiative examining other ambulatory otolaryngology procedures.

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BIBLIOGRAPHY


