Do Preoperative Corticosteroids Benefit Patients With Chronic Rhinosinusitis With Nasal Polyposis?

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BACKGROUND
Optimizing the surgical field in patients with chronic rhinosinusitis with nasal polyposis (CRSwNP) increases the chances for a safe and efficient surgery. Preoperative medical management, anesthetic choice, patient positioning, and topical vasoconstrictors are methods currently used to mitigate cumbersome bleeding during surgery. Decreased bleeding improves the quality of the optical cavity, thereby enhancing visualization of nearby critical structures. Pretreatment with corticosteroids is a common practice with the theory that decreased preoperative mucosal inflammation and edema results in less blood loss and better surgical visualization. Several randomized trials have addressed the efficacy of CRSwNP pretreatment with corticosteroids with respect to bleeding loss and surgical field quality.

LITERATURE REVIEW
Sieskiewicz et al.\textsuperscript{1} first investigated the question in 2006 comparing pretreatment with 30 mg prednisone per day for 5 days prior to surgery to a control group that was steroid-naïve for a minimum of 6 months before surgery (level 1b). Thirty-six patients were enrolled and randomized into the treatment and control arm. The two groups did not differ with respect to disease severity as measured by endoscopic and radiologic grading systems, presence of allergy, asthma, aspirin triad, or American Society of Anesthesiologists' physical status classification. Blood pressure and heart rate were measured every 15 minutes, and there was no significant difference between the two groups. The mean total blood loss was 217 mL in the treatment arm and 245 mL in the control group. This difference did not reach statistical significance ($P = .066$). The quality of the surgical field was evaluated by the operating surgeon, who was blinded with respect to pretreatment with steroids, every 15 minutes according to the five-point Boezaart scale. The surgical field quality was significantly better in the treatment arm compared to the control arm (2.3 vs. 3.1, respectively, $P = .03$). Additionally, the operative time was significantly shorter in the treatment group by 11 minutes (78 minutes vs. 89 minutes, $P = .041$). The authors concluded that pretreatment with steroids improved the surgical field, but the difference in blood loss was not statistically significant, which may have been due to the small sample size.

A double-blinded, randomized controlled trial reached similar conclusions with respect to the technical ease of the surgery (level 1b).\textsuperscript{2} Twenty-six patients in this study were randomized to treatment with 30 mg of prednisone for 5 days leading up to surgery or a placebo. Technical difficulty was measured by the operating surgeon on a three-point scale, and the degree of difficulty in the placebo group was significantly greater compared to the treatment arm of the study (a 40% difference between treatment and control groups was deemed significant). The study also found a significantly higher rate of severely inflamed mucosa at the time of surgery in the placebo group. Notably though, there was no significant difference in operative time or bleeding volume between the two groups that the authors attributed to possible differences in external factors such as equipment, nursing, and trainee participation. Interestingly, fewer sinuses were opened in the placebo group than intended, and this was attributed to difficulty with visualization.

A 2015 double-blinded, randomized controlled trial provided further support for preoperative corticosteroids (level 1b).\textsuperscript{3} Ecevit et al. randomized 22 patients with CRSwNP to a placebo or a 2-week steroid taper beginning with 60 mg of prednisolone. Both the control group and treatment group were treated with topical fluticasone drops for 6 weeks prior to randomization. Blood loss, operative time, and Boezaart visual grading system were
analyzed. The treatment group had significantly less blood loss (141 ± 90 mL vs. 384.2 ± 237.5 mL, P = .022), shorter operative time (61 ± 10 minutes vs. 71.67 ± 13.5 minutes, P = .003), and a better operative field (2.4 ± 0.5 minutes vs. 3.42 ± 0.5 minutes). The authors concluded that preoperative corticosteroids improve the surgical field by decreasing blood loss, thereby shortening the operative time.

An additional nonrandomized controlled clinical trial (level 2b)\(^4\) found that preoperative corticosteroids decreased blood loss in patients with nasal polyposis. Twenty-seven patients with chronic rhinosinusitis (both with and without polyps) were allocated to the treatment arm, in which patients received 30 mg of meprednisone for 5 days, and 27 patients in the control group received no systemic steroids for a minimum of 2 months before the procedure. Both groups were not using inhaled corticosteroid sprays for the 3 weeks leading up to surgery. Blood loss was significantly reduced among patients with nasal polyposis (139.6 mL) compared to the control (171.1 mL, P = .03). This is in contrast to patients without polyps, in which there was no significant difference between the treatment and control groups (94.6 vs. 101.9, respectively, P = .09). The quality of the surgical field was improved in the CRSwNP group. The treatment group's Boezaart score was 2.21 compared to the control group's score of 3.59; however, this was not statistically significant (P = .06).

A meta-analysis published in 2016\(^5\) included five studies of 187 patients comparing pretreatment with corticosteroids to a control group and determined that operative bleeding, operative field visibility, and operative time were statistically improved in the treatment groups (level 1a). One of the five studies used topical mometasone furoate as the treatment arm, and there was significant inter-study heterogeneity for operative bleeding and operative field visibility but not operative time. Given the effect size >0.5 for each of the three parameters, the effect of preoperative corticosteroids was determined to be clinically significant. Notably, the adverse effects were not explicitly reported in four of the included studies.

There is currently a paucity of data on preoperative corticosteroid administration in patients with CRSsNP, and thus a best practice statement cannot be made for patients with CRSsNP undergoing endoscopic sinus surgery.

**BEST PRACTICE**

Preoperative treatment of patients with CRSwNP undergoing endoscopic sinus surgery with corticosteroids is indicated and beneficial. Pretreatment with corticosteroids shortens operative time, likely decreases bleeding, and improves the quality of the surgical field allowing for safe and efficient surgery. There are known risks of administration of systemic corticosteroids, and clinicians must take these into account when evaluating an individual patient. Additionally, future studies are needed to determine the optimal dose and duration of treatment.

**LEVEL OF EVIDENCE**

Three randomized controlled trials (level 1b), one nonrandomized controlled trial (level 2b), and a meta-analysis (level 1a) were evaluated.

**BIBLIOGRAPHY**