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Mubasher Ikram
Aga Khan University

Akbar Abbas

Anwar Suhail

Maisam Abbas Onali

Shabbir Akhtar

See next page for additional authors

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Authors

Mubasher Ikram, Akbar Abbas, Anwar Suhail, Maisam Abbas Onali, Shabbir Akhtar, and Moghira Iqbal

Management of allergic fungal sinusitis with postoperative oral and nasal steroids: A controlled study

By Mubasher Ikram, FCPS, Akbar Abbas, FCPS, Anwar Suhail, FRCS, Maisam Abbas Onali, MBBS, Shabbir Akhtar, FCPS, and Moghira Iqbal, FCPS

Introduction

Allergic fungal sinusitis was first described in the early 1980s by Millar et al¹ (<http://www.entjournal.com/#refs>) in the United Kingdom and by Katzenstein et al² (<http://www.entjournal.com/#refs>) in the United States. The organisms responsible for most cases of this disease are *Aspergillus* spp and members of the family of dematiaceous fungi.^{3,4} (<http://www.entjournal.com/#refs>) Typically, patients are young and immunocompetent, and they present with a history of atopic disease.

The onset of allergic fungal sinusitis occurs with the inhalation of fungal spores to which the patient is allergic. In response, the sinonasal mucosa produces a copious amount of secretions (mucin), but the process of mucociliary clearance fails to remove the spore. The fungal spore then germinates in the mucin and continues to provide an antigenic stimulus. Polyps and hyperplastic mucosa form as a result of the inflammatory stimulus.

The diagnostic criteria for allergic fungal sinusitis include the presence of nasal polyposis, atopy to fungi, characteristic findings on computed tomography (CT) and magnetic resonance imaging, and a characteristic histopathologic picture in which fungal hyphae are found in eosinophilic mucin without evidence of tissue invasion.^{5,6} (<http://www.entjournal.com/#refs>)

The management of allergic fungal sinusitis is difficult, and treatment failure is common. In fact, recurrence rates as high as 100% have been reported following surgical management.^{5,7} (<http://www.entjournal.com/#refs>) In an effort to lower the risk of recurrence, the use of postoperative medical treatment with corticosteroids has been tried in various centers worldwide, based on experience with the treatment of allergic bronchopulmonary aspergillosis.⁸ (<http://www.entjournal.com/#refs>)

We report our experience in managing patients with allergic fungal sinusitis who had endoscopic sinus surgery with and without adjunctive postoperative steroids.

Patients and methods

The purpose of this study was to determine if the addition of postoperative steroid therapy has any effect on preventing recurrences in patients who undergo endoscopic sinus surgery for the treatment of allergic fungal sinusitis. The study was conducted at the Department of Otolaryngology-Head and Neck Surgery at the Aga Khan University Hospital in Karachi, Pakistan. The study population was drawn from patients who had been diagnosed with allergic fungal sinusitis on the basis of characteristic clinical findings and confirmed by intraoperative findings (mucin and fungal debris) and histopathologic analysis. Exclusion criteria included invasive infection that extended beyond the nose and paranasal sinuses, immunocompromise, failure to participate in regular follow-up, and revision surgery.

This study was conducted in two parts—a prospective phase and a retrospective review. In the prospective phase, we studied 33 patients—21 men and 12 women (mean age: 31 yr)—whose sinusitis was treated with surgery plus steroid therapy (steroid group). For comparison purposes, we reviewed the records of 30 historical controls—16 men and 14 women (mean age: 29 yr)—who met the same inclusion and exclusion criteria and whose sinusitis had been treated with surgery only (no-steroid group). All patients in the no-steroid group had been treated prior to 2000, when it was not the policy of our institution to administer adjunctive postoperative steroid therapy. All patients in the steroid group were treated after June 2000. All 63 patients in this study were operated on in our department by a single surgeon (M. Ikram).

In the steroid group, patients were prescribed postoperative oral prednisone (0.5 mg/kg) for 1 month, followed by topical beclomethasone (2 sprays in each side twice daily) for 5 months. If the appearance of the nasal mucosa was greater than stage 0 as described by Kupferberg et al⁵ (<http://www.entjournal.com/#refs>) during nasal steroid therapy, a short course of oral steroids at 0.5 mg/kg/day for 1 to 2 weeks was given to restore the mucosa to stage 0.

All patients were followed for a minimum of 2 years. Patients were seen for follow-up once a month for 6 months, then once every 3 months for at least 18 months. At the monthly follow-ups, all patients underwent nasal endoscopy and measurement of their IgE level. All patients were actively encouraged to perform daily nasal lavage with normal saline, which we believe helps clear crust and debris from the nose. All recurrences were treated with revision surgery.

Our data were statistically analyzed with the aid of the Statistical Package for the Social Sciences software (version 13; SPSS; Chicago), and recurrence data were subjected to Kaplan-Meier analysis.

Results

At presentation, most patients had bilateral disease, nasal polyps, nasal obstruction, and headache (table 1).

Table 1. Presenting symptoms in the two groups

	No steroid n (%)	Steroid n (%)
Unilateral/bilateral disease	11/19(36.7/63.3)	14/19(42.4/57.6)
Nasal polyps	30 (100)	33 (100)
Nasal obstruction	30 (100)	33 (100)
Headache	27 (90.0)	25 (75.8)
Anosmia	13 (43.3)	18 (54.5)

Allergic fungal sinusitis recurred in 15 of the 30 no-steroid patients (50.0%), compared with only 5 of the 33 steroid patients (15.2%). The difference was statistically significant ($p = 0.008$).

According to the Kaplan-Meier analysis, the probability of treatment response was 0.8 in the no-steroid group (table 2) and 0.9 in the steroid group (table 3). The cumulative probability of remaining disease-free was 0.4656 in the no-steroid group and 0.8156 in the steroid group (figure (<http://www.entjournal.com/#fig1>), table 2, and table 3).

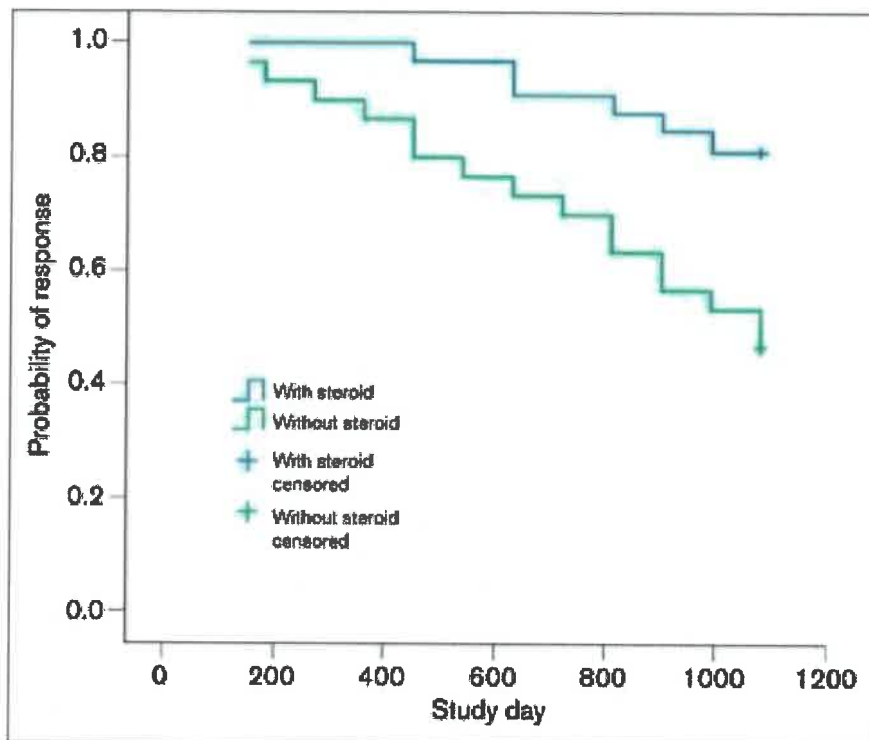
Table 2. Probability of treatment response and cumulative probability of remaining disease-free in the no-steroid group (Kaplan-Meier analysis)

Study day	Patients w/o recurrence n (%)	Probability of response	Cumulative probability
0	30 (100)	1.0	1.0000
150	30 (100)	0.9	0.9666
180	29 (96.7)	0.9	0.9326
270	28 (93.3)	0.9	0.8992
360	27 (90.0)	0.9	0.8658
450	26 (86.7)	0.9	0.7991
540	24 (80.0)	0.9	0.7657
630	23 (76.7)	0.9	0.7323
720	22 (73.3)	0.9	0.6989
810	21 (70.0)	0.9	0.6322
900	19 (63.3)	0.8	0.5656
990	17 (56.7)	0.9	0.5322
1,080	15 (50.0)	0.8	0.4656

Table 3. Probability of treatment response and cumulative probability of remaining disease-free in the steroid group (Kaplan-Meier analysis)

Study day	Patients w/o recurrence n (%)	Probability of response	Cumulative probability
0	33 (100)	1.0	1.0000
450	33 (100)	0.9	0.9696
630	32 (97.0)	0.9	0.9090
810	30 (90.9)	0.9	0.8786
900	29 (87.9)	0.9	0.8483
990	28 (87.9)	0.9	0.8156

Figure. Kaplan-Meier curve shows the cumulative probability of remaining disease-free in the two groups at study's end-0.8156 in the steroid group and 0.4656 in the no-steroid group



No patient in the steroid group reported any serious side effects of steroid therapy. Six patients (18.2%) experienced skin spots during the final week of their oral steroid regimen, but these lesions disappeared upon the conclusion of oral therapy.

Discussion

A number of contributing factors are associated with allergic fungal sinusitis. For example, atopy, continuous exposure to antigens, and inflammation all play key roles in the disease and its recurrence.⁹ (<http://www.entjournal.com/#refs>)

Historically, all forms of fungal sinusitis were treated with a combination of extensive surgical debridement and medical treatment.¹⁰ (<http://www.entjournal.com/#refs>) However, in most early reports, allergic fungal sinusitis was not adequately distinguished from other forms of fungal sinusitis, and this made it difficult to compare different treatments.¹¹ (<http://www.entjournal.com/#refs>)

Ever since allergic fungal sinusitis was first described,^{1,2} (<http://www.entjournal.com/#refs>) the primary mode of treatment has been surgical resection of allergic mucin and obstructing hypertrophic mucosal disease. More recently, conservative surgical procedures such as endoscopic debridement have been advocated.¹² (<http://www.entjournal.com/#refs>) Today, in addition to the surgical removal of allergic mucin and fungal debris, treatment includes the creation of patent sinus ostia that are large enough for adequate aeration and drainage of sinuses. But as mentioned, endoscopic sinus surgery is associated with high rates of recurrence.^{5,7} (<http://www.entjournal.com/#refs>) In an effort to reduce these recurrence rates, researchers have tried various medical therapies as adjunctive treatment, including antifungal agents, immunotherapy, and steroids.

Antifungal agents. The authors of some early reports recommended the use of antifungal drugs,^{13,14} (<http://www.entjournal.com/#refs>) but no prospective, controlled studies have been conducted to support their use. In fact, in noninvasive fungal disease, the risks associated with these medications may outweigh their benefits.¹⁵

(<http://www.entjournal.com/#refs>) Ricch-etti et al reported that the use of a topical antifungal (amphotericin B nasal lavage) prevented recurrences in nasal polyposis, but the patients in that study had not been diagnosed with classic allergic fungal sinusitis and the study had no control group.¹⁶ (<http://www.entjournal.com/#refs>) Therefore, further investigation is needed to confirm their findings.

Immunotherapy. The similarity between allergic fungal sinusitis and allergic bronchopulmonary aspergillosis led to an empiric and theoretical intimation that immunotherapy may be beneficial as a component of treatment of the former.⁸

(<http://www.entjournal.com/#refs>) Mabry et al conducted rigorous investigations and found that patients who had undergone immunotherapy in addition to surgery and postoperative steroid therapy experienced less crusting and less recurrence of nasal polyps.^{17,18} (<http://www.entjournal.com/#refs>) In a subsequent study of outcomes in 8 patients following the discontinuation of immunotherapy, Mabry et al reported no recurrences during 7 to 17 months of follow-up.¹⁹ (<http://www.entjournal.com/#refs>) In contrast, Ferguson found that patients on immunotherapy either did not improve or actually worsened.²⁰ (<http://www.entjournal.com/#refs>) As a result, more study is needed before immunotherapy can be widely accepted as the primary mode of treatment for allergic fungal sinusitis.

Steroids. The similarity between allergic fungal sinusitis and allergic bronchopulmonary aspergillosis also prompted the use of steroids, and many authors advocate their use. In one early report, Waxman et al outlined this relationship and suggested the use of systemic steroids postoperatively.²¹ (<http://www.entjournal.com/#refs>) Since then, both systemic and topical steroids have been recommended, although the optimal dosage and the duration of therapy remain unclear.^{5,10,22-25} (<http://www.entjournal.com/#refs>)

In a study of 26 patients with allergic fungal sinusitis, Kupferberg et al found that steroids were associated with greater improvements.⁵ (<http://www.entjournal.com/#refs>) Likewise, Schubert and Goetz retrospectively analyzed outcomes among 67 patients treated and followed over a period of 8 years.¹¹ (<http://www.entjournal.com/#refs>) All patients had been treated similarly with respect to sinus surgery, immunotherapy, anti-inflammatory nasal sprays, and antihistamines. Roughly half of these patients were treated with postoperative oral steroids and the other half were not. The use of oral steroids was associated with greater clinical improvement and a significantly lower incidence of revision sinus surgery.

Kuhn and Javer have advocated a postoperative steroid protocol that begins with oral prednisone at 0.4 mg/kg/day for 4 days.²² (<http://www.entjournal.com/#refs>) The dosage is decreased by 0.1 mg/kg/day every 4 days until it is lowered to either 20 mg/day or 0.2 mg/kg/day, whichever is greater. That low dose is continued for 1 month, at which point the dosage is adjusted so that all patients are given 0.2 mg/kg/day. That dose is maintained while patients are followed monthly with nasal endoscopy and measurements of their IgE level. Later, the steroid dosage is again adjusted to maintain the patient's nasal membrane appearance at stage 0. For patients who maintain a stage 0 appearance for 4 months, the dosage of oral steroid is decreased to 0.1 mg/kg/day and a topical steroid is added. If stage 0 continues for 2 more months, then the oral steroid is tapered off completely and the topical steroid is continued for 1 year.

The results of our study strongly support the use of oral and nasal steroids to control allergic fungal sinusitis and to prevent its recurrence. We recommend further study to identify the optimal dosage and duration of therapy.

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From the Department of Otolaryngology-Head and Neck Surgery, Aga Khan University Hospital, Karachi, Pakistan. Mubasher Ikram, FCPS, Department of Otolaryngology-Head and Neck Surgery, Aga Khan University Hospital, Stadium Rd., PO Box 3500, Karachi 74800, Pakistan. Phone: 92-21-486-4779 or -4770; fax 92-21-493-4294 or -2095; e-mail: mubasher.ikram@aku.edu (mailto:mubasher.ikram@aku.edu)

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Cervical esophagotomy for an impacted denture: A case report

By Sardar Zakariya Imam, MD, Mubasher Ikram, FCPS, Saulat Fatimi, MD, and Moghira Iqbal, FCPS

Introduction

Impaction of dentures in the esophagus is a distressing experience for a patient and can lead to serious consequences, such as esophageal perforation. Patients with an impacted denture often present with a history of accidental swallowing, frequently during trauma, seizures, or sleep or in association with some degree of psychological dysfunction.¹⁻³ (<http://www.entjournal.com/#refs>) The common signs and symptoms of an impacted denture are odynophagia, dysphagia, or simply pain and tenderness in the neck or chest.⁴⁻⁶ (<http://www.entjournal.com/#refs>) Impacted dentures, mostly broken or partial dentures, accounted for 11.5% of foreign bodies in the esophagus in a case series by Abdullah et al.¹ (<http://www.entjournal.com/#refs>)

Case report

A 46-year-old woman presented to our hospital with complaints of persistent odynophagia and intermittent pain in the neck and shoulders ever since she had swallowed her denture while drinking water 18 days earlier. She had visited a family physician, who ordered a plain radiograph of the neck. The physician could not see the denture on the neck x-ray and told her that the denture had probably passed farther into her alimentary canal.

Because her symptoms persisted, the patient returned to her physician, who restudied the radiograph. This time the physician was able to see the shadow of a metallic wire in the x-ray at the C8-T1 level (figure 1 (<http://www.entjournal.com/#fig1>)).



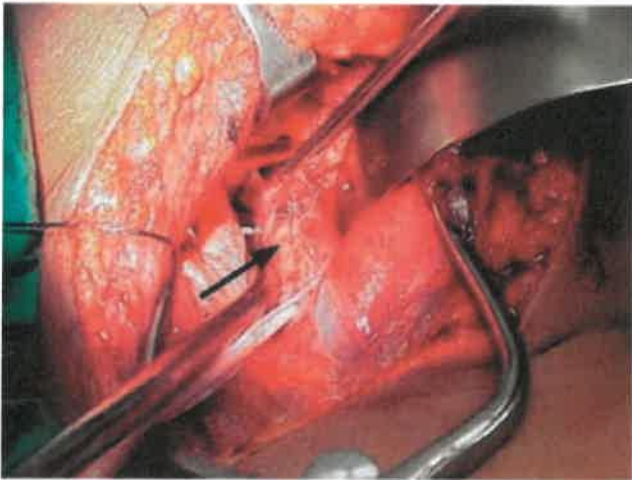
The shadow of the metallic wire (arrow) attached to the denture can be seen in this x-ray

The patient was then referred to a tertiary care hospital. Esophagoscopy performed there revealed that the denture was lodged in the esophagus, but the surgeon could not remove it. It appeared to be deeply impacted in the esophageal wall. The patient was therefore referred to our hospital.

We performed a rigid endoscopy. The impacted denture was identified 22 cm from the patient's incisors. Multiple attempts to dislodge it failed; therefore, we enlisted a thoracic surgeon's help with its removal.

A vertical incision was made along the anterior border of the sternocleidomastoid muscle on the left side. The middle thyroid vein was ligated and the recurrent laryngeal nerve identified and preserved. The esophagus was found to be severely inflamed and already perforated. The denture, including its attachment, was visualized at a level just below the clavicle near the brachiocephalic vein.

The cervical esophagus was separated from the surrounding structures (figure 2 (<http://www.entjournal.com/#fig2>)). An incision was made at the perforation site to facilitate removal of the denture (figure 3 (<http://www.entjournal.com/#fig3>)). The edges of the perforation were freshened, and the 3-cm longitudinal opening thus created was closed by primary repair; a drain was left in the patient's neck.



Intraoperative photo shows the mobilization of the cervical esophagus (arrow)



The protruding wire (arrow) can be seen after the denture has been removed

A Gastrograffin swallow performed a week later showed no extravasation of the contrast medium. Subsequent follow-ups were unremarkable.

Discussion

Impacted dentures may lead to fistula formation or esophageal perforation,^{3,6} (<http://www.entjournal.com/#refs>) a serious complication. Beyond 24 hours after ingestion, the rate of complications multiplies several-fold, from 3.2% at 24 hours to as high as 23.5% after 48 hours.^{3,7} (<http://www.entjournal.com/#refs>)

Diagnosis and treatment are often delayed because of the radiolucent nature of modern dentures^{8,9} (<http://www.entjournal.com/#refs>) and the inability of the attending physician to appreciate subtle signs seen on a neck x-ray.^{3,10} (<http://www.entjournal.com/#refs>) Even though x-rays remain useful⁵ (<http://www.entjournal.com/#refs>) and are the most commonly performed initial investigation, their results need to be viewed with caution. One study showed that lateral radiographs of the neck changed the management approach in only 1.4% of cases.¹¹ (<http://www.entjournal.com/#refs>) In the series by Abdullah et al, only 33% of the dental prostheses impacted in the esophagus could be visualized on a lateral neck radiograph.¹ (<http://www.entjournal.com/#refs>) Those that could be visualized were only seen because they had metal wires attached to them, but since denture wires are so small, their shadows can be extremely difficult to see. Therefore, a high index of clinical suspicion needs to be maintained and esophagoscopy performed if a patient's clinical history suggests denture ingestion and impaction.⁷ (<http://www.entjournal.com/#refs>)

In a study by Weber et al, rigid endoscopy was found to be a safe procedure.¹² (<http://www.entjournal.com/#refs>) However, others suggest a higher risk of perforation with attempted endoscopic removal.⁶ (<http://www.entjournal.com/#refs>) If a denture is found via rigid esophagoscopy to be deeply embedded in the wall of the esophagus, then esophagotomy is the best option for removing the dental prosthesis.^{4,5,12} (<http://www.entjournal.com/#refs>) This surgery may be performed through a cervical or thoracic approach, depending on the level of impaction.

We conclude that cervical esophagotomy is a safe procedure for the removal of foreign bodies impacted in the cervical esophagus that are not amenable to endoscopic removal.

From the Department of Otolaryngology and Head and Neck Surgery (Dr. Imam, Dr. Ikram, and Dr. Iqbal) and the Department of Cardiothoracic Surgery (Dr. Fatimi), Aga Khan University Hospital, Karachi, Pakistan. Moghira Iqbal, Department of Otolaryngology and Head and Neck Surgery, Aga Khan University Hospital, Stadium Rd., Karachi, Pakistan. Fax: 92-21-4934294/4932095; e-mail: moghiras@hotmail.com (<mailto:moghiras@hotmail.com>)

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Nasal packing after septoplasty: A randomized comparison of packing versus no packing in 88 patients

By Mohammad Sohail Awan, FCPS and Moghira Iqbal, MBBS

Introduction

For many decades, nasal packing was routinely performed following septoplasty. This practice was based on the assumption that packing would result in good flap apposition and minimize the risk of complications such as bleeding, septal hematoma, and adhesion formation, although there were no published studies at the time to support these assumptions.¹

(<http://www.entjournal.com/#refs>) However, many patients complained that the presence of nasal packing was quite distressing, and some said that its removal was the most painful experience of their life.² (<http://www.entjournal.com/#refs>) In addition, pack removal sometimes caused secondary bleeding that required repacking. Nasal packing has also been reported to cause edema of the nose and periorbital area, excessive lacrimation, sleeplessness, dry mouth, and even cardiopulmonary complications.² (<http://www.entjournal.com/#refs>)

In view of these concerns, Stucker and Ansel¹ (<http://www.entjournal.com/#refs>) questioned the benefits of nasal packing in 1978, and since then, several alternatives to traditional packing have been proposed. Various absorbable materials have been marketed to obviate the need for removal of packing. These products include modified hyaluronan, bovine gelatin mixed with thrombin, platelet-rich gels, and tissue adhesives. However, biocompatibility and cost issues have been raised.³ (<http://www.entjournal.com/#refs>)

Although the consensus in the world literature today is that packing should be avoided, to the best of our knowledge, no truly randomized study has been undertaken in Southwest Asia upon which to justify this recommendation here. Therefore, we conducted such a study to determine if a lack of nasal packing would result in any undesirable consequences. It was our opinion that if intraoperative bleeding was adequately controlled, postoperative bleeding would not be excessive and packing would not be necessary.

Patients and methods

This prospective, randomized, procedural study was conducted at the Aga Khan University Hospital in Karachi, Pakistan. Our objective was to compare the incidence of postoperative signs and symptoms in patients undergoing septoplasty with and without postoperative nasal packing. These variables included postoperative pain, headache, epiphora, dysphagia, sleep disturbance on the night of surgery, bleeding, septal hematoma, adhesion formation, and local infection. In addition, patients in the packing group were evaluated for pain during removal of the packing.

Patient characteristics. Our study population was drawn from among all patients aged 15 years and older who had undergone septoplasty at our institution from January 2003 through June 2004. Exclusion criteria included a history of cardiopulmonary disease, diabetes, anticoagulation or a bleeding disorder, and revision surgery on the nose.

To adequately compare a nasal packing group with a no-packing group, we chose a sample size of 88 patients. Randomization was accomplished in the operating room when the surgeon chose a sealed envelope that contained a slip of paper marked either packing or no packing. The envelopes were shuffled before each draw. A sample size of 44 patients in each group was determined by a statistical calculator to be sufficient to detect a difference of 50% between the two groups with a 95% confidence interval at an alpha level of 0.05.

Age and sex characteristics in the two groups were similar. The packing group was made up of 27 males and 17 females with a mean age of 27.63 ± 2.3 years, and the no-packing group was made up of 30 males and 14 females with a mean age of 25.34 ± 2.1 years.

Surgical procedure. All septoplasties were performed by a senior consultant with the assistance of a resident. Intravenous clavulanate/amoxicillin was administered preoperatively. Anesthesia with 2% lidocaine with 1:200,000 epinephrine was infiltrated submucosally 7 minutes before incision. Standard septoplasty was performed with the mucoperichondrial flap kept intact. A small incision was made in the flap on one side of the septum to facilitate the drainage of blood. Septal quilting sutures with 2-0 Vicryl were applied with a straight needle to approximate the subperichondrial flaps.

In the packing group, packing was performed uniformly by inserting glove-finger packs lubricated with petroleum-based antibiotic ointment. Packs were removed on the day after surgery.

Patients in both groups were discharged on postoperative day 1 with a 7-day course of oral antibiotics.

Data collection. Immediately following surgery, patients in both groups were given identical analgesic medications on demand. Before they were administered their medication, they were asked to rate their degree of pain on a visual analog scale (VAS) of 1 (minimal) to 10 (unbearable).

Just prior to discharge, patients filled out a questionnaire to indicate whether they had experienced any headache, epiphora, dysphagia, or sleep disturbance on the night of surgery. Also, the patients in the packing group used the same 10-point VAS to indicate the degree of pain they experienced during removal of the pack.

At 7 days postoperatively, all patients underwent a thorough examination of the mouth and nose, including rigid nasal endoscopy. During this examination, we looked for any postoperative bleeding, septal hematoma, and synechia formation, as well as signs of local infection.

Statistical analysis. For categorical variables, the chi-square test was applied, and a *p* value of less than 0.05 was considered significant.

Results

The patients in the packing group had significantly more postoperative pain (table 1) and a significantly higher incidence of headache, epiphora, dysphagia, and sleep disturbance on the night of surgery (table 2). No significant differences between the two groups were seen with respect to bleeding, septal hematoma, synechia, and infection (table 2).

Pain scores in the packing group (n = 44) and the no-packing group (n = 44) postoperatively and during pack removal

Group	Visual analog scale score*									
	1	2	3	4	5	6	7	8	9	10

* A score of 1 indicates "minimal" pain and a score of 10 indicates "unbearable" pain.

Group	Visual analog scale score*									
	1	2	3	4	5	6	7	8	9	10
Postoperatively Packing (n)	0	0	2	2	8	6	6	1	8	11
No packing (n)	25	4	4	6	5	0	0	0	0	0
During pack removal Packing (n)	0	0	0	0	1	7	8	8	9	11

* A score of 1 indicates “minimal” pain and a score of 10 indicates “unbearable” pain.

Postoperative signs and symptoms in the packing group (n = 44) and the no-packing group (n = 44)

Sign/symptom	Packing n (%)	No packing n (%)	p Value
Headache	40 (90.9)	9 (20.5)	<0.05
Epiphora	44 (100)	5 (11.4)	<0.001
Dysphagia	42 (95.5)	2 (4.5)	<0.001
Sleep disturbance*	36 (81.8)	7 (15.9)	<0.05
Bleeding	0 (0)	1 (2.3)	NS†
Septal hematoma	3 (6.8)	0 (0)	NS
Adhesions	8 (18.2)	0 (0)	NS
Local infection	0 (0)	0 (0)	

* Denotes sleep disturbance on the night of surgery only.

† Not statistically significant.

Pain. The most common pain scores were 10 in the packing group and 1 in the no-packing group (table 1).

Headache. Forty patients (90.9%) in the packing group experienced postoperative headache, compared with only 9 (20.5%) in the no-packing group ($p < 0.05$).

Epiphora. All 44 patients in the packing group complained of excessive lacrimation, compared with only 5 patients (11.4%) who did not receive packing ($p < 0.001$).

Dysphagia. All but 2 patients in the packing group (95.5%) said that they had difficulty swallowing because they felt discomfort in the ears, whereas only 2 patients in no-packing group (4.5%) expressed this complaint ($p < 0.001$).

Sleep disturbance. Thirty-six patients (81.8%) in the packing group had less than 6 hours of sleep on the night of surgery, compared with only 7 patients (15.9%) in the no-packing group ($p < 0.05$).

Bleeding. Only 1 patient in the entire study experienced postoperative bleeding that required a topical vasoconstrictor, and that episode was mild. The affected patient was in the no-packing group (0 vs. 2.3%; $p > 0.05$).

Septal hematoma. The only 3 patients who developed a septal hematoma and required incision and drainage were in the packing group (6.8 vs. 0%; $p > 0.05$).

Adhesion formation. Synechiae developed in 8 of the packing patients and none of the no-packing patients (18.2 vs. 0%; $p > 0.05$).

Infection. No patient in either group exhibited any signs of local infection, although the mucosa appeared to be raw on rigid nasal endoscopy in 25 of the packing group patients (56.8%).

Pain during packing removal. Twenty of the packing group patients (45.5%) rated their degree of pain during pack removal as a 9 or 10, and 23 others (52.3%) rated it as a 6, 7, or 8 (table 1).

Discussion

From a patient's perspective, the pain and distress caused by nasal packing brings into question whether there is a need to pack the nose at all. Various modifications in the design and type of nasal packing have been suggested to improve patient comfort. Among the products not mentioned earlier are devices that provide direct pressure via an inflatable balloon or a central lumen and products that have hemostatic properties, such as Gelfoam. However, the advantages of these modified nasal packings are counterbalanced by both real and potential drawbacks. First, the insertion of any type of nonabsorbable packing will necessitate its removal, and we have earlier noted that this painful experience is one of the worst aspects of nasal surgery.²

(<http://www.entjournal.com/#refs>) (Indeed, Yavuzer and Jackson quoted one patient as saying, "I have come to have surgery from you because I hear that you don't pack the nose."⁴ (<http://www.entjournal.com/#refs>)) Second, the newer modified nasal packings are expensive and add significantly to the cost of surgery.^{3,5} (<http://www.entjournal.com/#refs>) Third, packing increases the relative risk of toxic shock syndrome, although the absolute risk remains low.⁶ (<http://www.entjournal.com/#refs>) Finally, the most dangerous complication is what is known as the *nasopulmonary reflex*, which is mediated via the vagus nerve and results in an increase in parasympathetic activity that can lead to broncho-constriction and hypoxia.⁷ (<http://www.entjournal.com/#refs>)

The only apparent advantage of packing the nose is perhaps that it helps achieve good flap apposition. Even so, this benefit can be achieved by other means—namely, by using quilting sutures to hold the septum and flaps together.^{6,8} (<http://www.entjournal.com/#refs>)

To the best of our knowledge, our study is the first ever conducted in our part of the world that addresses the issue of nasal packing in detail. We took into account all of the important ill effects of nasal packing, such as headache, epiphora, dysphagia, and pain. Our decision to use the 10-point VAS to subjectively quantify pain was based on the fact that it is simple and highly sensitive, and it generates a directly measurable numerical score.

We believe that the significantly high pain levels we observed in the packing group over the first 24 hours after surgery make the use of routine nasal packing difficult to justify. We also found that the patients in the packing group had a significantly greater incidence of headache; this can be attributed to the fact that packing stretches the nasal walls and causes pain that is perceived as headache. Nasal packing also blocks the nasolacrimal duct and causes epiphora; although this is a temporary problem, it was described as a nuisance by most of the patients in the packing group. Dysphagia was another common complaint in the packing group. If a patient swallows when the nasal passages are blocked (Toynbee maneuver), air cannot pass anteriorly and it is insufflated into the middle ear. This unpleasant feeling results in poor oral intake while the packing is in place.

Postoperative bleeding was not an issue in our study. An important factor in maintaining good hemostasis during septoplasty is the proper infiltration of lidocaine and epinephrine solution. If this is achieved and the mucosal flap is elevated in the right plane, there is virtually no bleeding.⁹ (<http://www.entjournal.com/#refs>)

Some surgeons might consider nasal packing as a means of preventing septal hematoma.¹⁰ (<http://www.entjournal.com/#refs>) However, in our study, the only septal hematomas that were observed occurred in patients in the packing group. One possible reason for this surprising finding might be that the surgeon handled the septum roughly knowing that the packing would take care of any consequent bleeding. Another possible reason is that the packing itself exerted a traumatic effect and caused the septum to buckle, resulting in the formation of a septal hematoma.

Another justification that has been cited in the past for placing postoperative nasal packing is that it might prevent adhesions from forming between the turbinates and the lateral nasal wall. But we found that packing makes the nasal mucosa raw and actually more susceptible to synechia formation. In our study, the rate of adhesion formation was actually higher in the packing group than in the no-packing group (18.2 vs. 0%). In the only published local study of the complications of septoplasty (N = 200), which was reported by Iqbal and Nabil in 2003, nasal packing was performed routinely; synechiae formed in 14 of these patients (7.0%).¹¹ (<http://www.entjournal.com/#refs>) Adhesions can be prevented without packing by careful handling of the septal mucosa, by avoiding manipulation of the turbinates, and by meticulous placement of instruments in the surgical site.^{12,13} (<http://www.entjournal.com/#refs>)

In this era of evidence-based medicine, it is difficult to justify providing any potentially harmful therapy to our patients without having a clearly documented rationale for doing so. For example, in 2004, Orlandi and Lanza advocated that packing be eschewed during endoscopic sinus surgery; they too emphasized meticulous technique.¹⁴ (<http://www.entjournal.com/#refs>) Nevertheless, in some cases nasal packing is unavoidable—for example, when the operative field is obscured by bleeding from vessels that are not accessible for diathermy or ligation. Such a situation is most likely to arise when there is accidental trauma and damage to the turbinates. The surgeon must individualize treatment in such circumstances.

In conclusion, we hope that the results of our study will act as a stimulus to change some aspects of surgical practice at the medical centers in our part of the world and that post-septoplasty nasal packing will for the most part be relegated to the history books.

From the Section of Otolaryngology-Head and Neck Surgery, Department of Surgery, Aga Khan University Hospital; Karachi, Pakistan. M. Sohail Awan, FCPS, Section of Otolaryngology-Head and Neck Surgery, Aga Khan University Hospital, Stadium Rd., P.O. Box 3500, Karachi 74800, Pakistan. Phone: 92-21-4859- 4769 or -4770; fax: 92-21-493-4294 or -2095; e-mail: sohail.awan@aku.edu (<mailto:sohail.awan@aku.edu>)

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