

Comparison of Synechiae Formation in patients undergoing Endoscopic Sinus Surgery with and without using Silastic Splints

SAIFULLAH KHAN¹, SAIRA ZAMAN², ATHAR ADNAN UPPAL³, AYESHA SHAHBAZ⁴, SADIA IRAM⁵, SYED ABDULLAH HYDER⁶

¹Department of ENT, KRL Hospital, Islamabad

^{2,3}Department of ENT, Lahore Medical & Dental College, Ghurki Teaching Hospital, Lahore

⁴Department of ENT, Ghurki Trust and Teaching Hospital, Lahore

⁵Final Year MBBS Student, Lahore Medical & Dental College, Lahore

⁶University of College of Medicine & Dentistry, Lahore

Correspondence to: Dr. Saira Zaman, Email: sairaent@gmail.com, Cell: 0322-4943072

ABSTRACT

Background: Endoscopic sinus surgery (ESS) is a surgical procedure used to remove blockages in the sinuses. These blockages are caused by various nasal diseases like recalcitrant chronic rhinosinusitis, Nasal polyposis, and Concha bullosa. These problems can cause sinusitis, resulting in nasal blockage. Treatment of these conditions can either be medical or surgical. Synechiae are a frequent complication following endoscopic sinus surgery (ESS). Despite their prevalence, the actual clinical significance of synechiae formation after ESS remains understudied.

Objective: To observe the formation of synechiae formation in patients undergoing endoscopic sinus surgery with and without silastic splints.

Study Design: Comparative study.

Place and Duration of Study: Department of ENT Head and Neck Surgery, KRL Hospital, Islamabad from 1st May 2015 to 1st October 2015.

Methods: 60 patients were divided randomly into two groups, Group A and Group B. Endoscopic sinus surgery was performed on all these patients, and silastic splints were used in Group A after surgery. In Group B only meticulous care was done post-operatively. Adhesion formation was observed in these patients in 4 weeks post-operatively.

Results: The age bracket was 15 to 45 years. The mean age was 31.1±7.97 years in group A and 31.4±8.76 years in group B. The male patients were 16 (53.3%) in group A and 14(46.7%) patients were female. Eighteen (60%) patients in group B were male and 12 (40%) patients were female in group B. In the comparison of postoperative synechiae formation in both groups, there was no statistical difference between both groups after 4 weeks postoperatively.

Conclusion: Endoscopic sinus surgery substantially improves the symptoms of patients suffering from chronic rhinosinusitis, nasal polyps, and concha bullosa, and a definitive decrease in antibiotic and antihistamine requirement. However, no significant difference in synechiae formation between groups was found within 4 weeks postoperatively.

Keywords: Synechiae formation, Endoscopic sinus surgery, Silastic splints.

INTRODUCTION

Endoscopic sinus Surgery (ESS) includes removing of the polyps, small bone fragments and the debridement of tissue within the sinus cavities. The specific approach can vary depending on the disease and the preferences of the surgeon. Regardless of the procedure, significant postoperative inflammation and swelling are common, making postoperative care a critical component of ESS.¹⁻⁴

The surgical success rates are approximately reduced by 50-70% due to nasal polyposis, hence managing chronic rhinosinusitis with nasal polyps typically necessitates a multimodal approach.⁵ The primary treatment options include steroid therapy (both oral and topical) and surgery. Medical management often involves an initial course of systemic corticosteroids followed by long-term steroid therapy. Use of oral steroids has also been reported to improve both symptoms and findings in patients with polyposis.⁶ However, patients who remain symptomatic and have advancing diffuse polyposis often require surgical intervention. It is seen that intranasal steroids are effective in preventing polyp with recurrence following endoscopic sinus surgery.⁷

There are various postoperative treatment regimens like saline nasal washing, nasal packing, steroid therapy, topical decongestants, oral antibiotics, and/or sinus cavity debridement. Although different studies and trials have evaluated different treatment options, not all strategies have been rigorously assessed.^{8,9} The potential support was found for nasal saline irrigation, topical nasal steroid spray, and sinus cavity debridement. Additionally, postoperative care using an endoscope to perform minor procedures under local anaesthesia can significantly reduce the need for revision surgery.^{10,11}

Some of sinus packing is generally done post surgery. Simple saline dressing can be manually inserted after surgery. Foam dressings, which are polysaccharide substances that result in formation of a hydrated gel can also be used as nasal packs for various indications. Synechiae are a standout amongst the most well-known undesirable results after ESS, with a rate extending from 10% to 40%.¹² Various researches have utilised the presence of synechiae after FESS as a conclusion measure for different medications during surgery, including surgical techniques and middle meatal spacers/stents.^{13,14}

Different tools have been used to avoid adhesion formation and to stabilize the middle turbinate. A study concluded that middle turbinate medialization by inducing a control synechiae between the caudal end of middle turbinate and the septum by creating mucosal abrasion.¹⁵ However, later this procedure comprised the sense of smell and synechiae might fail to occur leading to lateralization of middle turbinate. Thornton induced the suture stabilisation technique of the middle turbinate, it is hard to perform in a narrow posterior nasal cavity. Platelet gel packing and sodium hyaluronate-carboxymethylcellulose (HA-CMC), which prevent adhesions, have been used in different studies, but their efficacy remains unclear.

Synechiae was seen in 35% as compared to the control group which was 22.5%.¹⁶ Middle meatal silastic splints reduce adhesions after ESS. This study showed synechiae formation in only 6% of cases as compared to the control group with 44%. Various procedures have been tried in order to avoid adhesion formation after ESS, each procedure has certain difficulties or disadvantages, and no standardization has been done.¹⁷ This study is to see the effect of Silastic splints on synechiae formation as these synechiae are common complications post surgery and reduces the morbidity associated with this.

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MATERIALS AND METHODS

The study is a comparative study done in the Department of ENT Head and Neck Surgery, KRL Hospital, Islamabad from 1st May 2015 to 1st October 2015 after the approval of Ethical Review Committee No.ERC-15/04/02 dated 18-04-2015. Thereafter, the process was initiated by registering the ENT patients both from outpatient and indoor departments of the Hospital. Patients between the ages of 15 to 45 years and of both genders, falling in any of the following criteria were included: (a) allergic patients with bilateral nasal polyps seen on anterior rhinoscopy, (b) suffering from chronic rhinosinusitis (headache, nasal obstruction or post-nasal drip) for more than 3 months not resolved by medical treatment, (c) symptomatic concha bullosa diagnosed on computerized tomography as a Pneumatized enlarged Middle Turbinate, obstructing the nasal cavity. Patients who were found to be unfit for surgery or general anaesthesia, patients with coagulation abnormalities and patients with cystic fibrosis diagnosed by sweat test were excluded. The sample size was 60 patients with the level of significance set to 5% and power of the test to 80%. Anticipated population proportion 1 was 6% and population proportion 2 was 44%.⁸ Two groups of patients were made using randomization technique. Group A consisted of 30 patients in which silastic splint was used to prevent synechia and Group B had 30 patients in which no particular procedure was performed except for meticulous post-op care to prevent synechia. These patients were educated about the procedure, risks and benefits of surgery. Then the patient was asked about their consent to undergo the surgery. The patients for ESS were randomly divided into two groups (A & B) for the surgery which was performed by an experienced surgeon. In group A, ESS with silastic splints as a spacer was done while in group B, no particular procedure was performed except for meticulous post-op care to prevent synechia. In ESS standard instruments including sickle knife, Blakesley forceps, back biting forceps, non-cutting Blakesley forceps and micro-debrider were used. Antibiotics, nasal decongestants, saline douches, maintenance dose of oral corticosteroids and antihistamine were given postoperatively for up to two weeks. Postoperative follow-up of the patients, having undergone ESS, was carried out in the ENT OPD. During those checkups, presence of any synechia formation was ascertained by anterior rhinoscopy at 4 weeks post-operatively. The data was entered and analyzed in SPSS-27. Chi-square test was used to compare the synechia formation in both groups. P value of <0.05 was considered statistically significant.

RESULTS

In group A, 8 (26.7%) patients were between 15-25 years, 4 (13.3%) males and 4 (13.3%) females, 13 (46.6%) patients between 26-35 years, 6 (20%) males and 7 (23.3%) females, and here were 9 (30%) patients between 36-45 years of age, 6 (20%) male and 3 (10%) female with mean age was 31.1±7.97 years. While in group B, 9 (30%) patients between 15-25 years, 5 (16.7%) males and 4 (13.3%) females, 12 (40%) patients between 26-25 years, 7 (23.3%) males and 5 (16.7%) females and 9 (30%) patients between 36-45 years, 6 (20%) males and 3s (10%) female with mean age was 31.4±8.76 years. The difference was statistically not significant between the two groups (Table 1). Sixteen (53.3%) patients were males in group A and 18 (60%) in group B. Similarly, 14 (46.7%) patients were female in group A and 12 (40%) patients were female in group B. Male to female ratio was 1.14:1 in group A and 1:1.14 in group B (Table 2).

Table1: Frequency of age in both groups

Age (years)	Group A (n=30)		Group B (n=30)	
	No.	%	No.	%
15-25	8	26.7	9	30.0
26-35	13	43.3	12	40.0
36-45	9	30.0	9	30.0
Mean±SD	31.1±7.97		31.4±8.76	
P value	P>0.05			

Sixteen (53.3%) patients were male in group A and 18 (60%) in group B. Similarly, 14 (46.7%) patients were female in group A and 12 (40%) patients were female in group B. Male to female ratio was 1:1.14 in group A and 1:1.5 in group B. Adhesion formation was seen in 3 (5%) patients postoperatively. One (3.3%) patient was from Group A and 2 (6.7%) patients were from Group B, after four weeks postoperatively. Statistically, there was no difference between the two groups (Table 3).

Table 2: Frequency of genders in both groups

Gender	Group A (n=30)		Group B (n=30)	
	No.	%	No.	%
Male	16	53.7	14	46.7
Female	14	46.7	16	53.7
Male to female ratio	1.14:1		1:1.14	

Table 3: Comparison of synechia formation in group A and B at 4 weeks post-operatively

Nasal synechia	Group A (n=30)		Group B (n=30)	
	No.	%	No.	%
Yes	1	3.3	2	6.7
No	29	96.7	28	93.3
P value	0.55			

DISCUSSION

Endoscopic sinus surgery (ESS) is the preferred modality for treating sinus diseases as it is a safer option with improved outcomes. Conventional polypectomy does not surpass nasal polypectomy performed with ESS and is less effective for patients having Samter's triad. After complete pre-op evaluation, ESS is typically performed in an outpatient setting to minimize patient discomfort.¹⁸ Sinus surgery can be done both under general or local anesthesia and meticulous care must be taken to avoid any sort of complications. A pre-op CT scan is essentially done to evaluate potential anomalies due to the disease processes or anatomic variations. The procedure involves the risk of CSF leakage after surgery, orbital complications, bleeding from surrounding sinus vessels, and recurrence of polyps even after surgical resection. Patients should undergo close postoperative monitoring and receive appropriate medical management for allergies, asthma, and related comorbidities. Consistent postoperative treatment for allergic rhinitis and chronic nasal conditions is essential for long-term outcomes and to prevent polyp recurrence.¹⁹

Appropriate instrumentation along with a methodical approach in sinus surgery contributes to reduced complications and favourable surgical outcomes. The recent introduction of computerized tomography (CT) tracking systems has been beneficial in real-time surgical navigation, particularly in complex cases involving previous sinus surgery, potential CNS or orbital involvement, and other structural variations. Comprehensive surgical training and expertise are essential for ensuring patient safety in all sinus procedures. While new technologies can enhance surgical precision, they should complement meticulous surgical planning and the thoughtful implementation of treatment decisions.²⁰

Skilful operative technique and careful handling during surgery to minimize mucosal damage significantly reduce the risk of postoperative adhesion formation. If nasal packing is applied at the end of the surgery it can worsen mucosal trauma and contribute to the development of postoperative adhesions. A multimodal postoperative regimen is essential to prevent adhesions in the nasal cavity. This regimen typically includes saline douching performed by the patient and regular nasal cavity clearance by the surgeon at appropriate intervals, often using an endoscope under local anesthesia. Effective postoperative care plays a crucial role in preventing synechia (adhesions) formation in these patients. Saline douching is usually initiated 48 hours after surgery to avoid disrupting the initial healing process. Many surgeons use Silastic splints and other materials to prevent adhesion formation postoperatively. While effective, these splints

can cause discomfort to patients and obstruct nasal cavities until they are removed. Alternatively, Meroceal packs are utilized in cases of bleeding and are typically removed after 24 hours. A limited anterior wedge resection of the middle turbinate is another technique employed to prevent turbinate lateralization and facilitate effective postoperative cavity care. This approach helps in preventing adhesion formation and allows for thorough management of the surgical site after sinus surgery.

A study was carried out by Munoz et al that the mean age of the patients in group A was 48.2 years and in group B the mean age was 49.8 years. The same study reported by Munoz et al out of total 121 there were males 63.7% and females 36.3%.²¹ In a study done by Luciano, out of 192 patients there were 66.14% males and 33.85% females with the mean age of 49 years.²² In comparison with our study, out of a total 60 patients the mean age was 31.1±7.97 years in group A and 31.4±8.76 years in group B which is slightly low for some other studies. The present study showed that in group A, 16 (53.3%) patients were male while 14 (46.7%) were female, in group B, 18 (60%) patients were male and 12 (40%) were female which is comparable with other studies.

A study conducted by Kingdom underscores the critical importance of regular debridement of the sinuses and nasal cavity and close follow-up care after surgery. Recurrence can be prevented by continuing medical treatment and managing allergic rhinitis. It is not uncommon for patients to overlook the recurrence of polyps due to loss of medical follow-up. Therefore, educating patients by emphasizing on the long-term treatment plan and goals is crucial. Patients should be informed about the necessity of ongoing treatment to prevent the recurrence of nasal polyps. This ensures that they remain vigilant about their health and actively participate in managing their condition to achieve optimal outcomes.²³

In a study reported by Shrieme et al²⁴, synechia formation was seen in 16 patients (9.3%). Patients who underwent middle turbinate medialization with FloSeal demonstrated a higher incidence of synechia formation compared to those treated with medialization alone (18.9% versus 6.7%). Whereas in this study synechia occurred in 3 (5%) patients, 1 (3.3%) patients in which silastic splint was used (Group A) along with meticulous postoperative care and 2 (6.7%) patients in which meticulous care alone was taken to prevent adhesions (Group B).

The success of ESS in patients with chronic rhinosinusitis significantly relies on reducing postoperative scarring, crusting and edema which can impair ciliary function and sinus drainage. Many rhinologists recommend repeated saline irrigation and steroid nasal sprays postoperatively, combined with meticulous debridement of the ethmoid cavities and sinus outflow tracts. This approach can effectively reduce the incidence of synechia (adhesions) formation in the nasal cavity. In studies comparing control and experimental groups, synechia were rare in both. Although, lesser incidence of synechia formation was seen in the experimental group, the data did not achieve statistical significance ($P > 0.25$).⁸

Gosepath and Mann²⁰ suggested medializing the middle turbinate by inducing controlled adhesions between its caudal end and the septum using microdebrider-assisted mucosal abrasion. However, this approach seemingly hinder airflow and affect the sense of smell. Alternatively, Thornton introduced a technique involving suture stabilization of the middle turbinate to address its instability.²¹ While the suture stabilization technique introduced by Thornton may effectively prevent synechia, it poses challenges in practical implementation. It is difficult to perform this technique in the posterior parts of nasal cavity. Furthermore, penetrating the dense bone of the middle turbinates and ethmoid plate with a needle can be technically demanding, particularly in cases where septoplasty has not already been performed. These factors can complicate the application of the suture technique in clinical practice.¹⁷

CONCLUSION

Endoscopic sinus surgery results in substantial improvement in the symptoms and condition of patients suffering from chronic rhinosinusitis, nasal polyps and concha bullosa. The efficacy of a middle meatal silastic splints in reducing the chances of synechia formation after ESS is not statistically significant. Hence, it is important to not rely on just the use of splints for the prevention of formation of post-surgical nasal synechia. A good surgical technique and postoperative care including patient counselling are also essential to reduce the chances of adhesion formation after surgery.

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