INTRANASAL SPLINTS IN REDUCING POST-OPERATIVE ADHESIONS AFTER ENDOSCOPIC SINUS SURGERY

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ABSTRACT

Objective: To compare the frequency of post-operative adhesions after endoscopic sinus surgery with and without intranasal silastic splint.

Study Design: Quasi experimental study.

Place and Duration of Study: Research was conducted at department of ENT, Combined Military Hospital Muzaffarabad, from Sep 2016 to Mar 2017.

Methodology: This study involved 62 patients of both genders aged between 15-60 years undergoing endoscopic sinus surgery who were randomly allocated into two treatment groups. Patients in groups-A received silastic splint in addition to anterior nasal packing while those in group-B received anterior nasal packing alone. Outcome variable was frequency of post-operative adhesions which was noted and compared between the groups.

Results: The mean age and SD of the patients was 33.58 ± 11.11 years. The mean duration of symptoms was 11.81 ± 3.20 months. Both the study groups were comparable in terms of mean age (p=0.910), mean duration of symptoms (p=0.876) and age (p=0.866), gender (p=1.000) and duration of symptoms (p=1.000) groups. Post-operative adhesions were observed in 5 (8.1%) cases and all of them belonged to study group-B. The frequency of post-operative adhesion formation was significantly higher in patients receiving anterior nasal packing alone (16.1% vs. 0.0%; p=0.020) as compared to those receiving silastic splint in addition to anterior nasal packing. Similar difference was observed across various age, gender and duration of symptoms groups.

Conclusion: The use of silastic splint was associated with significant reduction of post-operative adhesions in patients undergoing endoscopic sinus surgery regardless of patient's age, gender and duration of symptoms.

Keywords: Anterior nasal packing, Endoscopic sinus surgery, Post-operative adhesions, Silastic splint.

INTRODUCTION

Adhesion formation following endoscopic sinus surgery is a frequent complication which affects the course of treatment requiring further procedures and treatment increasing the cost and morbidity[1]. The reported incidence of adhesion formation is 6-11% and is even higher (36%) following turbinate resection[2]. Silastic intranasal splints have been claimed to reduce this complication and therefore they are commonly used in patients undergoing endoscopic sinus surgery[3]. However, their use is associated with increased discomfort, pain and bleeding during the post-operative period[2,3].

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A number of recent studies have failed to find any significant difference in the frequency of post-operative adhesions using intranasal silastic splints and have questioned their role in endoscopic sinus surgery. Amin *et al* reported that with use of silastic nasal splints in nasal surgery, no significant difference was found concerning post-operative adhesion (3.4% vs. 0%; p=0.30)[3]. Similar insignificant difference has also been reported in a number of other studies by Naik *et al* (3.06% vs. 3.45%; p>0.05) in India[4], Khayat *et al* (3.5% vs. 10.0%; p=0.6) in Iraq[5].

In the light of above evidence, the routine use of silastic nasal splints after endoscopic sinus surgery appears to be of no added benefit while it causes increased discomfort, pain and bleeding in the post-operative period[2,3]. But before concluding and discontinuing a routine practice, it's

worth mentioning that there are studies which have reported significantly decreased frequency of adhesions with silastic splints. Sarin *et al* (18% vs. 52%; p=0.0001) in India[2], Baguley *et al* (0% vs. 27%; p=0.0014) in USA[6], and Iqbal *et al* (0% vs. 12%; p=0.012) in Pakistan[7], observed significantly decreased frequency of adhesions among patients operated with and without silastic splints respectively.

This study was therefore conducted to support or discontinue the usage of splints after endoscopic sinus surgery if results showed significant reduction in adhesion formation or vice versa.

METHODOLOGY

We carried out quasi experimental study research was conducted at Department of ENT, CMH Muzaffarabad, from September 2016 to March 2017 after taking permission from hospital ethical committee. Sample size of 62 cases (31 in each group) was calculated with 80% power of test and 95% significance level while taking expected frequency of adhesion formation to be 18% in splint and 52% in non-splint groups in patients undergoing endoscopic sinus surgery[2]. All the Patients were selected by non-probability, consecutive sampling. Patients of both genders, aged between 15-60 years suffering from allergic rhinitis with nasal polyposis, symptomatic concha bullosa, chronic rhino sinusitis who failed to benefit from medical treatment for ≥6 months that consented were included in the study.

Patients with history of previous sinus surgery, having coagulation abnormality, diabetes (fasting blood sugar ≥l10mg/dl), obesity (BMI ≥30kg/m^2), cystic fibrosis, or were unfit for general anesthesia were excluded from the study. Patients who acquired mucosal tear or septal perforation during surgery (assessed clinically) were also excluded.

The patients were randomly divided into 2 groups using lottery method. Group-A: Anterior nasal packing + silastic splint (31 cases). Group-B: Anterior nasal packing alone (31 cases). Following surgery, patients in group-A received silastic splint along with anterior nasal packing while those in group-B received anterior nasal packing alone. These antibiotic soaked packs were removed 48 hours after surgery. Patients in both the groups received antibiotics, antihistamine, nasal decongestant and analgesic for 7 days. Maintenance dose of oral corticosteroids was given for 2 weeks along with alkaline nasal washes with NaCl+$NaHCO_3$ in ratio of 2:1 in 250ml of water twice a day following the removal of anterior nasal packs. Silastic splint was removed in outpatient department (OPD) 14 days post-operatively. Patients were followed in OPD 4 weeks after surgery and occurrence of post-operative adhesion was noted as per operational definition. Patient's demographic details along with occurrence of post-operative adhesion were recorded. All the surgeries were performed by a single surgical team.

Data was analyzed by SPSS version 21. Mean and standard deviation (SD) were used to describe results of quantitative data like age and duration of symptoms. Categorical variables were presented as frequency and percentage. Frequency of post-operative adhesions has been compared between the groups using chi-square test taking $p\leq0.05$ as significant. Independent sample t-test was applied for the quantitative variable. Data has been stratified for age, gender and duration of symptoms to address effect modifiers. Post-stratification chi-square test and fisher's exact test have been applied taking $p\leq0.05$ as significant.

RESULTS

The age of the patients ranged from 16 years to 60 years with a mean of 33.58 ± 11.11 years. Most of the patients were aged between 15-30 years 30 (48.4%) followed by 31-45 years 23 (37.1%). There were 40 (64.5%) male and 22 (35.5%) female patients. The duration of symptoms ranged from 7 months to 18 months with a mean of 11.81 ± 3.20 months.

Both the study groups were comparable in terms of mean age (p=0.910), mean duration of

symptoms (p=0.876) and, gender (p=1.000)as shown in table-I.

Post-operative adhesions were observed in 5 (8.1%) cases and all of them belonged to study group-B as shown in table-II. The frequency of post-operative adhesion formation was significantly higher in patients receiving anterior nasal packing alone (16.1% vs. 0.0%; p=0.020) as compared to those receiving silastic splint in addition to anterior nasal packing as shown in table-III. Similar difference was observed across various age and gender groups, where were the results of duration of symptoms as shown in table-IV & V respectively.

Table-I: Baseline characteristics of study groups (n=62).

Characteristics	Silastic Splints (n=31)	Anterior Nasal Packing Alone (n=31)	*p*-value
Age	33.42 ± 10.45	33.74 ± 11.91	0.910
15-30 yrs	16 (51.6%)	14 (45.2%)	
31-45 yrs	11 (35.5%)	12 (38.7%)	
46-60 yrs	4 (12.9%)	5 (16.1%)	
Gender			
Male	20 (64.5%)	20 (64.5%)	1.000
Female	11 (35.5%)	11 (35.5%)	
Duration of Symptoms	11.74 ± 3.15	11.87 ± 3.30	0.875
7-12 months	18 (58.1%)	18 (58.1%)	
13-18 months	13 (41.9%)	13 (41.9%)	

Independent Sample t-test and Chi-square test, observed difference was statistically insignificant

Table-II: Frequency of post-operative adhesions (n=62).

Post-Operative Adhesions	Frequency (n)	Percentage (%)
Yes	5	8.1
No	57	91.9
Total	62	100

Table-III: Comparison of frequency of post-operative adhesions between groups (n=62).

Post-Operative Adhesions	Study Group		*p*-value
	Silastic Splint (n=31)	Anterior Nasal Packing Alone (n=31)	
Yes	-	5 (16.1%)	0.020*
No	31 (100%)	26 (83.9%)	

Fisher's exact test, *observed difference was statistically significant

Table-IV: Comparison of Frequency of post-operative adhesions between groups across age groups (n=62).

Age Groups (Years)	Post-Operative Adhesions	Study Group		*p*-value
		Silastic Splint (n=31)	Anterior Nasal Packing Alone (n=31)	
15-30 (n=30)	Yes	-	2 (14.3%)	0.209
	No	16 (100%)	12 (85.7%)	
31-45 (n=23)	Yes	-	2 (16.7%)	0.48
	No	11 (100%)	10 (83.3%)	
46-60 (n=9)	Yes	-	1 (20%)	0.10
	No	4 (100%)	4 (80%)	

Fisher's exact test, observed difference was statistically insignificant

Table-V: Comparison of frequency of post-operative adhesions between groups across gender groups (n=62).

Gender	Post-Operative Adhesions	Study Group		*p*-value
		Silastic Splint (n=31)	Anterior Nasal Packing Alone (n=31)	
Male (n=40)	Yes	-	3 (15%)	0.23
	No	20 (100%)	17 (85%)	
Female (n=22)	Yes	-	2 (18.2%)	0.48
	No	11 (100%)	9 (81.8%)	

Fisher's exact test, observed difference was statistically insignificant.

DISCUSSION

Adhesion formation following endoscopic sinus surgery is a frequent complication which affects the course of treatment requiring further procedures and treatment increasing the cost and morbidity in such patients[1,8]. Silastic intranasal splints have been claimed to reduce this complication and therefore they are commonly used in patients undergoing endoscopic sinus surgery[3,9]. However, their use is associated with increased discomfort, pain and bleeding during the post-operative period[2,10]. A number of recent studies have failed to find any significant difference in the frequency of post-operative adhesions using intranasal silastic splints and have questioned their role in endoscopic sinus surgery[4,11].

However, the existing evidence contained controversy which necessitated the present study.

In the present study, the mean age of the patients was 33.58 ± 11.11 years. Irshad-ul-Haq *et al* reported similar mean age of 31.56 ± 6.18 years among such patients presenting at department of ENT, Sheikh Zayed Hospital, Rahim Yar Khan[12]. Fazal-I-Wahid *et al* reported it to be 37.74 ± 16.46 years at Lady Reading Hospital (LRH), Peshawar[13]. A comparable mean age of 28.4 ± 8.56 years has been reported in Indian such patients by Kaur *et al*[14].

In the present study, the mean duration of symptoms was 11.81 ± 3.20 months which is comparable to the observation of Kaur *et al* who also reported similar mean duration of symptoms (12.6 months) at presentation among Indian patients[14].

Both the study groups were comparable in terms of mean age (p=0.910), mean duration of symptoms (p=0.876) and gender (p=1.000) groups. Thus the randomization of study sample was effective and there was no inherent bias among the study groups.

In the present study, we observed post-operative adhesions in 5 (8.1%) cases and all of them belonged to study group-B. The frequency of post -operative adhesion formation was significantly higher in patients receiving anterior nasal packing alone (16.1% vs. 0.0%; p=0.020) as compared to those receiving silastic splint in addition to anterior nasal packing. Similar difference was observed across various age, gender and duration of symptoms groups. Our observation is in line with previously published results of Iqbal *et al* who also reported similar significant difference in the frequency of post-operative adhesions with and without silastic splint (0% vs. 12%; p=0.012) in Pakistan[7]. Coelho *et al* also observed similar but insignificant difference (0% vs. 10.6%; p=0.056) in Brazil[15].

The results of the present study are in line with the previously published studies and establish the protective role of silastic splints against post-operative adhesions. In the light of results of the present study, the use of silastic splint was associated with significant reduction of post-operative adhesions in patients undergoing endoscopic sinus surgery[15-18].

A very strong limitation to the present study was that we didn't consider the complications of silastic splints which are equally important and should be considered before their routine use in future practice. Such a study is highly recommended in future research.

CONCLUSION

Intranasal adhesions formation was a troublesome complication following endoscopic sinus surgery. It can be advocated that silastic splints should be routinely used in endoscopic sinus surgery to reduce the occurrence of post-operative adhesions with their associated morbidity regardless of patient's age, gender and duration of symptoms.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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