

Original Research Article

Study of the effect of balloon sinuplasty in patients with rhinosinusitis

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ABSTRACT

Background: A new technique which has revolutionized sinus surgery recently is balloon sinuplasty. The vast majority of patients with chronic rhinosinusitis improve with medical management, including antibiotics, saline irrigation, nasal steroids, antihistamines, allergy therapy, and asthma control. This study was conducted to study the effect of balloon sinuplasty in patients affected with rhinosinusitis.

Methods: This prospective study was conducted in all the patients visiting our hospital. Medical treatment included oral and sometimes intravenous antibiotics, nasal steroids, decongestants, systemic steroids, and allergy management. Those who had a positive biopsy were excluded from this study. The selected cohort of 20 patients, were prepared for balloon sinuplasty surgery in the same way as for conventional functional endoscopic sinus surgery (FESS) and were operated by our surgical team.

Results: 20 patients were included in the study, 70% men and aged 30±12 years. Sinuplasty was performed in 32 sinuses of 20 patients (22 maxillary, 4 sphenoid and 8 frontal sinuses).

Conclusions: Sinuplasty with balloon catheterization is effective in reducing symptoms and improving quality of life in selected patients with chronic rhinosinusitis. The results are beyond reported symptoms and confirm the benefit of balloon sinuplasty.

Keywords: Sinuplasty, Balloon catheterization, Rhinosinusitis, Balloon sinuplasty, Conventional FESS

INTRODUCTION

A new technique which has revolutionized sinus surgery recently is balloon sinuplasty. The vast majority of patients with chronic rhinosinusitis improve with medical management, including antibiotics, saline irrigation, nasal steroids, antihistamines, allergy therapy, and asthma control. Some people, however, have persistent symptoms despite maximal medical management, and surgical intervention may be indicated.^{1,2} Recent literature supports the efficacy and outcomes of balloon sinuplasty system, with large multi-centric studies proving it to be a very effective tool in the management of various sinus pathologies. Prospective study was conducted to study the effect of balloon sinuplasty in patients affected with rhinosinusitis.^{3,4}

The introduction of a new technological innovation called balloon sinuplasty in 2004, took the field of sinus surgery a step further. This cutting edge innovation was based on the principles of balloon angioplasty performed by cardio-thoracic and vascular surgeons.⁵ The balloon sinus dilatational system uses a series of intricate high pressure, low volume balloons similar to angioplasty balloon catheters, to effectively cannulate the natural ostia of the blocked sinuses under endoscopic and fluoroscopic guidance leading to microfractures in order to optimally dilate the occluded sinus ostium and restore sinus drainage.⁶⁻⁷

Since 2007, this technology has made its mark in India, with many centres successfully performing balloon sinuplasty surgery. Till date, an estimated 30,000 surgeries

have been performed worldwide, with around 200 surgeries having been done at various centers across India. Today, this system has added an efficient, minimally invasive tool in the field of the endoscopic rhinologist.⁸⁻¹²

Aim and objectives of the research was to study the effect of balloon sinuplasty in patients affected with rhinosinusitis.

METHODS

This prospective study was conducted over a period of 2 years from January 2017 to December 2018 after the approval from ethics committee. The study was conducted in Kapurthala hospital and nursing home. Balloon sinuplasty was performed in all the patients visiting our hospital in this time period.

Medical treatment included oral and sometimes intravenous antibiotics, nasal steroids, decongestants, systemic steroids, and allergy management. Those who had a positive biopsy were excluded from this study. The age group of participants ranged in age from 18 to 50 years. Those who met all of the following criteria were included in this study: age between 18 to 50 years; planned surgical intervention recommended by the primary investigator and consent was taken; and long-standing sinusitis (more than 3 months of symptoms or 6 episodes per year) and 2 failed courses of antibiotics followed by a positive computed tomography (CT) scan. Both male and female patients were eligible. Age group less than 18 years and more than 50 years were excluded from this analysis, also if they had extensive previous sinonasal surgery, cystic fibrosis, extensive sinonasal osteoneogenesis, sinonasal tumors or obstructive adenoid hypertrophy, allergic or fungal sinusitis, distorted the sinus anatomy and poor ciliary dysfunction.¹⁻³

At the pre-operative assessment, symptoms of these patients were graded, based on the Piccirillo’s sinonasal outcome test (SNOT-20 scoring system) and correlated with their diagnostic nasal endoscopic findings and CT scan pictures of the paranasal sinuses for categorizing the exact type and grade of sinus pathology.

The selected cohort of 20 patients, were prepared for balloon sinuplasty surgery in the same way as for conventional functional endoscopic sinus surgery (FESS) and were operated by our surgical team.

The nose was appropriately decongested with pledgets and local anesthetic. The sinus guide catheter was inserted behind the uncinate process by use of a rigid endoscope for visualization, and then the flexible guide wire was passed through the catheter. Confirmation that the guide wire was in the sinus was made with transillumination. Once the guide wire was in place, the sinus balloon catheter was passed over the guide wire into the sinus and placed across the ostium. After positioning was confirmed, the balloon was inflated. After inflation, the balloon dilating system

was removed. Sinus wash and culture were then performed as seemed necessary.⁵⁻⁷

20 cases were taken for balloon sinuplasty. The patient, surgical team and operating room staff wore appropriate radiological shields standardized as per international protocols.

Sample size was calculated in defined duration. 20 samples have undergone balloon sinuplasty in duration of 2 years. So sample size was 20 cases.

Statistical analysis

All the data were entered in Microsoft excel sheet and analyzed by using statistical package for the social sciences (SPSS). Mean and standard deviations were calculated for given samples.

Ethical approval was taken before the conduct of study.

RESULTS

20 patients were included in the study, 70% men and aged 30±12 years. Sinuplasty was performed in 32 sinuses of 20 patients (22 maxillary, 4 sphenoid and 8 frontal sinuses). All the patients underwent balloon sinuplasty.

Table 1: Demographic data.

Gender	Number	Percent
Male	14	70
Female	6	30
	Mean	SD
Age	30	12

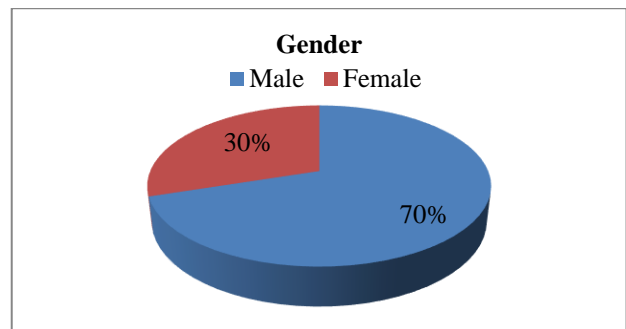


Figure 1: Gender distribution.

Table 2: Distribution according to SNOT 20 scoring system (mean values).

Mean values	Pre-operative	Post-operative
Need to blow nose	2.8	0.9
Sneezing	2.5	0.7
Cough	2.7	0.4
Runny nose	3.1	0.3

Mean values	Pre-operative	Post-operative
Post nasal discharge	4	0.3
Thick nasal discharge	0.8	0.2
Ear fullness	3.3	0.1
Dizziness	0.2	0.3
Ear pain	2.1	0.2
Fatigue	2	0.1
Facial pain	2.2	0.3

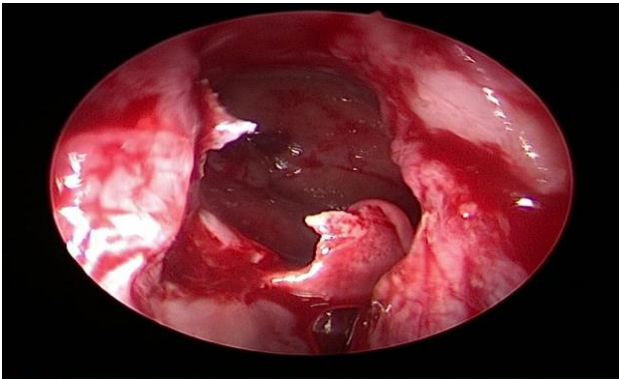


Figure 2: Pre-operative endoscopic view.

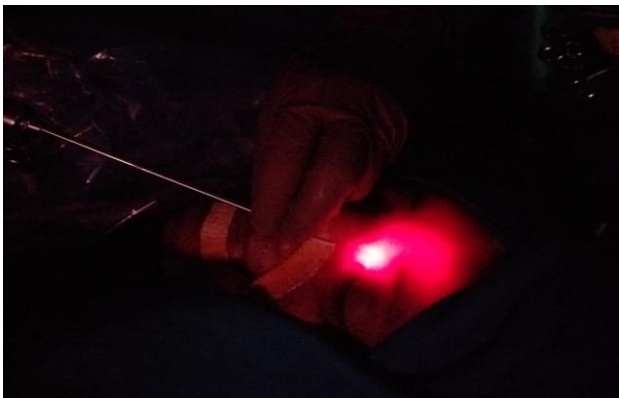


Figure 3: Imaging during balloon sinuplasty.

DISCUSSION

This study confirmed the safety and high success rate in ostial dilation of the procedure, which resulted in patency of the sinuses at the follow-up. There were no severe adverse events, such as cerebrospinal fluid (CSF) fistula, orbital injury, or major bleeding. This study confirmed the reduction of symptoms and the increase in quality of life in patients with chronic rhinosinusitis who underwent balloon catheterization.^{14,15} The effectiveness of sinuplasty had already been described and the present results confirmed the viability of this procedure in otolaryngology practice.^{5,10,14,15} The use of a standardized instrument, such as the SNOT-20 questionnaire, allowed to quantify the improvement on symptoms and quality of life after the procedure, and there were substantial benefits.^{14,15} Considering the patient's perspective, the results justify the therapeutic approach by balloon

catheterization. However, some considerations should be made regarding these patients, since they were selected in a reference center, according to the recommendations for sinuplasty.^{13,15} Therefore, the present study evaluated a subset of patients with chronic rhinosinusitis refractory to clinical treatment, for whom sinuplasty was effective. Specific indications for use of balloon sinuplasty in rhinosinusitis are not yet consensual, beyond those used in this study. They probably will emerge in subsequent studies, designed to establish further indications and their advantages.

Finally, a broader analysis of the benefits of the procedure should take into account a cost-effectiveness. A study comparing sinuplasty versus conventional FESS showed similar costs.⁸

CONCLUSION

Sinuplasty with balloon catheterization is effective in reducing symptoms and improving quality of life in selected patients with chronic rhinosinusitis. The results are beyond reported symptoms and confirm the benefit of balloon sinuplasty.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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