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Efficacy of Surgical Outcome Between Absorbable and Nonabsorbable Nasal Packing in Endoscopic Sinus Surgery

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Abstract

Prospective, comparative, interventional and randomized study was conducted to compare the postoperative outcome after nasal packing with nonabsorbable (Merocel) and absorbable (Nasopore) materials after functional endoscopic sinus surgery. 60 study participants were divided into two equal groups by randomization. All patients underwent FESS under local anaesthesia and postoperatively nasal packing was done using nonabsorbable (Merocel) or absorbable (Nasopore) materials depending upon randomization. All patients were followed up on day 1, 2, 10 and 30 on the parameters pain, nasal blockage, mouth breathing and headache. Nasal endoscopy was done 10 and 30 and were assessed for synechiae, infection and re-epithelialization. Pain at day 1, 2,10 in non-absorbable nasal packing was significantly higher as compared to absorbable nasal packing (p value <0.05). Synechiae formation at day 2 was higher among non-absorbable group than that of absorbable group (p value=0.007). Overall patient discomfort is low and does not cause any serious complication. The absorbable nasal pack (nasopore) can be used safely in postoperative nasal packing after endoscopic sinus surgery irrespective of age and sex. It is safe and cost effective.

Keywords: Chronic Rhinosinusitis, FESS, Haemostasis, Oedema, Synechiae

Introduction

Chronic rhinosinusitis (CRS) is a widespread, long-lasting condition that affects a large population. It is caused by inflammation of the nose and paranasal sinuses and is characterized by symptoms that last for more than 12 weeks, such as obstruction, congestion, facial pain, decreased smell, polyps, mucopurulent discharge, oedema, and mucosal abnormalities.[1] Chronic rhinosinusitis is a multifactorial disease influenced by anatomic variations, mechanical barrier defects, and exogenous inflammatory events. It can lead to

obstruction in drainage, bacterial overgrowth, and stasis of secretions, affecting the body's immune system. The primary line of management for CRS is medical treatment, which involves topical and oral steroids as well as antibiotics. Functional endoscopic sinus surgery (FESS) has become the standard of care, particularly for some benign and malignant pathologies. The basic objective is to restore ventilation and drainage without scarring, synechiae, or blockage.[2]

FESS is a minimally invasive procedure for treating chronic and acute sinus disorders through the removal of obstruction caused by the anterior ethmoid cells in the middle meatus region. The major goals of FESS are optimum re-epithelialization, middle turbinate stabilization, and middle meatus patency. There is debate regarding whether or not to employ packing after FESS.[3]

Conventional nasal packings, such as gauze, cotton, and sponge, are affordable and easy to manipulate. However, they face criticism for issues like nasal airway obstruction, headaches, pressure, pain, mouth and pharynx dryness, infection, and discomfort during removal. This has led to the development of biodegradable/absorbable biomaterials that do not require subsequent removal. Absorbable materials, such as foams, gels, meshes, flowable matrices, films, and powders, have varied performance in haemostasis and wound healing outcomes. Some collagen-containing materials are effective haemostatic agents, but concerns about proinflammatory risks and mixed evidence support their wound healing abilities.[4,5] Hence, this study was conducted to compare efficacy of absorbable and nonabsorbable nasal packing in endoscopic sinus surgery.

Methods

Prospective, comparative, interventional and randomized study was conducted in the Department of Otorhinolaryngology, Deen Dayal Upadhyay Hospital, New Delhi from January 2020 to January 2021. The study comprised patients with a clinical diagnosis of chronic rhinosinusitis, with or without nasal polyposis, who were between the ages of 18 and 50. Sample size was calculated based upon the pain score obtained from study by Burduk PK et al.[6] The formula used for sample size calculation is as follows,

$N = 2\ (\text{standard deviation})^2 * (Z\alpha + Z\beta)^2 / (\text{mean difference})^2$.

The minimum required sample size for each study group was 26 patients. As a result, 30 patients were assigned to each group. All patients who were willing to participate in the study were randomized into 2 groups with an allocation ratio of 1:1.

Group A: Patients with nonabsorbable nasal packing after FESS.

Group B: Patients with absorbable nasal packing after FESS.

Block randomization was done with sealed envelope system. 10 treatment allocations within sealed opaque envelopes, assigning A and B in 5 envelopes each was randomly generated. Once a patient gave consent to enter a trial, an envelope was opened and patient was then offered the allocated group. Randomization, interventions and data collection were done by the principal investigator.

All patients who met the inclusion criteria were admitted and underwent endoscopic sinus surgery while under local anesthesia. The Messerklinger method was used for the surgery. Uncinectomy was performed first, followed by a middle meatal antrostomy. The bulla ethmoidalis was opened, and anterior and posterior ethmoidectomy were performed.

Following surgery, patients in group A were packed with merocel (nonabsorbable nasal pack) while patients in group B were packed with nasopore (absorbable nasal

pack). Patients with nonabsorbable nasal packs had their nasal packs removed after 48 hours. In contrast, patients' nasal packs made of absorbable material begin to absorb after three to five days.

Follow-up was performed on the first, second, tenth, and thirtyth post-operative days. Pain, nasal obstruction, headache, and mouth breathing were evaluated during the follow-up. A visual analog scale with values ranging from 0 to 10 was used to measure pain; the rest of it was evaluated subjectively based on the presence or absence of symptoms. A nasal endoscopy was performed on both sides on days 10 and 30 following surgery to look for synechiae formation, infection, and re-epithelialization.

Data entry was done in the Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, ver 21.0

Results

A prospective, comparative, interventional and randomized study was conducted in the Department of Otorhinolaryngology, Deen Dayal Upadhyay Hospital, New Delhi from January 2020 – January 2021. 60 patients between 18-50 years of either sex clinically diagnosed Chronic rhino sinusitis with or without nasal polyposis were included in the study. Patients were divided into two groups by random selection by sealed envelope technique. (Fig 1)

Average age among patients with non-absorbable nasal packing and absorbable nasal packing was 27.93 ± 6.98 and 31.2 ± 8.48 respectively with no significant difference between these groups (p value=0.109). Distribution of gender was comparable between non absorbable and absorbable nasal packing groups. Proportion of females were 43.33% and 46.67% respectively in non absorbable and absorbable nasal pack groups. Whereas, male population were 56.67% and 53.33%.

Pain at day 1, 2,10 in non-absorbable nasal packing was significantly higher as compared to absorbable nasal packing (p value <0.05). But there was no significant difference seen in pain at day 30 (p value=0.426) between non absorbable and absorbable nasal packing. (Table 1) On comparing the proportion of nasal blockage on days 1,10 and 30, it was more for non-absorbable nasal pack group than absorbable nasal pack group. But the association was not statistically significant. Similarly, there was no statistically significant association was found on comparing the proportion of mouth breathing between the two groups. (Table 2 & 3) Headache was significantly higher in nonabsorbable nasal packing (100%) as compared to absorbable nasal packing (60%) at day 2. (Table 4) On comparing post-operative infection, synechiae formation and re-epithelialisation, it was found that synechiae formation at day 2 was higher among non-absorbable group than that of absorbable group (p value=0.007).

Table 1: Comparison of pain between non absorbable and absorbable nasal packing

	Non absorbable nasal packing(n=30)	Absorbable nasal packing(n=30)	P value
Day 1	5.87 ± 0.73	5.17 ± 1.29	0.006
Day 2	4.9 ± 1.4	3.33 ± 0.96	<0.0001
Day 10	1 ± 0.91	0.47 ± 0.57	0.012
Day 30	0.13 ± 0.35	0.1 ± 0.4	0.426

Figure 1: Comparison of trend of pain at different time intervals between non absorbable and absorbable nasal packing.

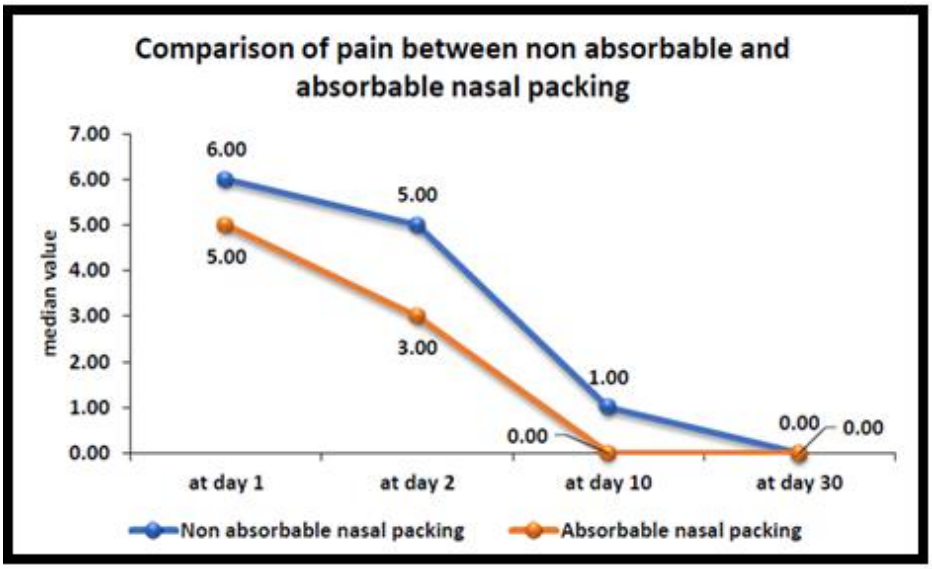

Table 2: Comparison of nasal blockage between non absorbable and absorbable nasal packing

	Non absorbable nasal packing(n=30)	Absorbable nasal packing(n=30)	P value
Day 1	30 (100%)	27 (90%)	0.237
Day 2	11 (36.67%)	13 (43.33%)	0.598
Day 10	13 (43.33%)	7 (23.33%)	0.1
Day 30	3 (10%)	2 (6.67%)	1

Table 3: Comparison of mouth breathing between non absorbable and absorbable nasal packing

	Non absorbable nasal packing(n=30)	Absorbable nasal packing(n=30)	P value
Day 1	30 (100%)	27 (90%)	0.237
Day 2	17 (56.67%)	13 (43.33%)	0.302
Day 10	13 (43.33%)	7 (23.33%)	0.1
Day 30	3 (10%)	2 (6.67%)	1

Table 4: Comparison of headache between non absorbable and absorbable nasal packing

	Non absorbable nasal packing(n=30)	Absorbable nasal packing(n=30)	P value
Day 1	30 (100%)	30 (100%)	NA
Day 2	30 (100%)	18 (60%)	0.0001
Day 10	5 (16.67%)	7 (23.33%)	0.519
Day 30	2 (6.67%)	3 (10%)	1

Table 5: Comparison of headache between non absorbable and absorbable nasal packing

Characteristic	Day	Non absorbable nasal packing(n=30)	Absorbable nasal packing(n=30)	P value
Infection	Day 10	12 (40%)	10 (33.33%)	0.592
	Day 30	3 (10%)	2 (6.67%)	1
Synechiae formation	Day 1	9 (30%)	3 (10%)	0.104

	Day 2	16 (53.33%)	6 (20%)	0.007
Re-epithelialisation	Day 1	5 (16.67%)	7 (23.33%)	0.519
	Day 2	12 (40%)	7 (23.33%)	0.165

Discussion

In this study which compare the efficacy of absorbable and nonabsorbable nasal packing in endoscopic sinus surgery, there was no significant difference between the age or sex among both the groups. The study found that individuals with absorbable nasal packing had less pain and headache than those with non-absorbable material, but there was no significant difference in mouth breathing or nasal blockage. Synechiae formation was reduced with absorbable nasal packing, although infection and re-epithelization did not differ significantly across groups.

Another study by Burduk PK et al.[6] showed that slightly lower scores for pain for the absorbable nasal packing group during the follow-up visits. Similar findings were also showed by studies by Arya AK et al.[7] and Hesham et. al.[8] Study by Bugten et al.[9] stated that there were no differences in nasal blockage, nasal pain, and headache between the groups. Accordingly, the packing did not appear to cause blockage in addition to that caused by the postoperative edema and crusts.

Study conducted by Burduk P K[6] et al showed statistically significant reduction of nose blockage in the absorbable group was observed. This was caused by resorption of the packing with less debridement in the middle meatus compared to high secretion and edema mediated by the gauze packing on the other side. Another study was conducted by Saedi B et al.[4] comparing merocele packing and no packing after endoscopic sinus surgery. There were no significant differences between cases and controls as regards nasal obstruction, nasal pain or headache, when assessed pre-operatively, at three to four weeks post-operatively and at 12 to 14 weeks post-operatively.

In the study conducted by Berlucchi et al.[10] stated that nasal secretions were seromucous in 83.8% and 90.5% of the absorbable nasal pack groups and control groups respectively. There were no purulent secretions at any visit in the absorbable nasal pack group, while there were two cavities with purulent secretions at 2 weeks and 12 weeks in the control group.

The study had numerous strengths, such as an appropriate and comparable number of patients in both groups. The shorter study term of 30 days made it easier to follow up with the patients, and none dropped out. Some of the outcomes, such as synechiae, infection, and re-epithelialization, were assessed endoscopically, which contributed to the study's strength.

The study's limitations include subjective assessment of outcomes such as mouth breathing and nasal blockage, which has led to disparities at times. It was not possible to do a long-term follow-up for later-onset synechiae or disease recurrence. Many outcome indicators were difficult to elaborate, thus only those that could be described better were included in the study.

Conclusion

The success of endoscopic sinus surgery relies on the postoperative care which includes nasal packing that is important for haemostasis, middle turbinate stabilising, promoting healing and decreasing discomfort. Only nonabsorbable nasal packs were used and were popular until recently. But these packs were also responsible to cause pain, headache, mouth breathing and increased bleeding and discomfort while pack removal. It was also responsible for causing serious complications like

obstructive sleep apnoea, eustachian tube dysfunction, posterior dislodgement and aspiration and toxic shock syndrome.

Nasal packs made of absorbable materials are less expensive, safer, and did not result in any serious problems. Pain and headache symptoms are lessened while using absorbable nasal packing as opposed to nonabsorbable packing. With an absorbable nasal pack, synechiae formation is also reduced. For this reason, regular use is highly advised regardless of the patient's age or gender. More studies need to be conducted on this topic mainly emphasising on patient comfort, postoperative bleeding and safety of absorbable nasal packs in day care surgeries. Apart from endoscopic sinus surgeries, the use of absorbable nasal packs in epistaxis should be studied.

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