

Comparison between Different Types of Intranasal Packing after Endoscopic Sinus Surgery

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Abstract: Background: endoscopic sinus surgery (ESS) is the mainstay of surgical management for sinus pathology in the modern age. The most common reason for performing ESS is for chronic rhinosinusitis, with or without polyps. However, the extended applications of ESS include closure of CSF leaks, resection of sinonasal tumors, nasolacrimal duct surgery, orbital decompression, and a means of approach to the skull base and intracranial cavity. **Aim of the Work:** the aim of this study is to compare different types of nasal packing and non- packing after endoscopic sinus surgery. **Patients and Methods:** in this study, forty patients with sinus pathology presented to police hospital, Nasr city. Patients presented during the period from September 2016 to April 2018, seeking for management of their problem. (40) patients that had been diagnosed before as chronic rhino-sinusitis according to history, symptoms and examination (naked eye and endoscopic) were randomly divided into (4) equal groups: **Group (A):** 10 patients not packed (control group), **Group (B):** 10 patients packed with non absorbable tampon, **Group (C):** 10 patients packed with absorbable gel foam, **Group (D):** 10 patients packed with absorbable nasopore. Patients examined post-operatively for pain, bleeding, crustation, and synechia. **Results:** no significant difference in subjective assessment of pain and headache, crustations and nasal blockage between absorbable nasal pack group and the unpacked one. Also no significant difference between endoscopic assessment of postoperative edema, nasal secretions and presence of granulation tissue in the middle meatus. **Conclusion:** the use of absorbable nasal pack after functional endoscopic sinus surgery resulted in less bleeding, less crustations, decreasing the incidence of lateralization of middle turbinate and adhesions on long term and better mucosal healing.

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1. Introduction

Endoscopic sinus surgery (ESS) is the mainstay of surgical management for sinus pathology in the modern age. The most common reason for performing ESS is for chronic rhinosinusitis, with or without polyps. However, the extended applications of ESS include closure of CSF leaks, resection of sinonasal tumors, nasolacrimal duct surgery, orbital decompression, and a means of approach to the skull base and intracranial cavity [1].

However, despite numerous advances in surgical techniques and equipment, complications during the postoperative period remains obvious. Disappointing results can occur for a variety of reasons. Scarring can manifest in numerous ways, including stenosis of the sinus ostia or adhesions/synechia with subsequent middle turbinate lateralization [2].

The middle meatal packing post-ESS is common among sinus surgeons. A middle meatal pack promotes homeostasis and behaves as a stent to prevent middle turbinate lateralization and as a spacer to prevent blood or mucus accumulation in the cavity postoperatively. Packing may also prevent synechia development and reduce the risk of restenosis [3].

The use of removable nasal packing is highly uncomfortable and induces local pain and pressure [4].

The removal of nasal packing has been described as the most painful part of the whole treatment [5].

Therefore, there has been an increasing tendency to move away from removable nasal packing due to the discomfort and bleeding experienced on removal. The use of an absorbable packing material following ESS obviates some of the drawbacks of removable nasal packing. Due to their excellent haemostatic properties and superior patient comfort, a number of absorbable materials have been developed and are now routinely used after ESS [6].

These materials differ substantially in their mechanisms of action, composition, method of delivery, clearance profile, and cost [7].

Aim of the Work

The aim of this study is to compare different types of nasal packing and non-packing after endoscopic sinus surgery.

2. Patients and Methods

In this study, forty patients with sinus pathology presented to police hospital, Nasr city. Patients

presented during the period from September 2016 to April 2018, seeking for management for their problem. (40) patients that had been diagnosed before as chronic rhino-sinusitis according to history, symptoms and examination (naked eye and endoscopic) were randomly divided into (4) equal groups:

- **Group (A):** 10 patients will not be packed. (control group)
- **Group (B):** 10 patients will be packed with non absorbable tampon.
- **Group (C):** 10 patients will be packed with absorbable gel foam.
- **Group (D):** 10 patients will be packed with absorbable nasopore.

Patients will be examined post-operatively for pain, bleeding, crusting, and synechia.

Inclusion criteria:

1. Patients age between 18 and 55 years old
2. Chronic or recurrent acute rhinosinusitis in patients candidate for surgery.
3. Sinonasal polyposis with radiologically preserved middle turbinate.

Exclusion criteria:

1. Patients with complicated chronic diseases e.g. DM, hypertension, liver disease.
2. Recurrent cases.
3. Patient complicated during surgery by flail middle turbinate.
4. Infants, children, uncooperative or neurotic patients.
5. Marked DNS.

Preoperative preparation:

Preoperative diagnosis was established by

- Clinical history, nasal endoscopy, and computed tomography (CT) of paranasal sinuses.
- A written informed consent for the surgery was obtained from all patients.
- Preoperatively, the 40 patients had their nasal cavities randomized by a closed envelope system to determine which type of pack related to the patient. Patients were under general anesthesia during the placement of the nasal pack and therefore blinded to the site where the spacer was inserted.

Operative Procedure:

Surgical procedures were performed under general anesthesia for all patients; nasal packs soaked with Adrenaline with concentration 1:10,000 were used for homeostasis. FESS was then performed with the sinuses addressed using conventional techniques.

At the end of the procedure, each group would be packed with its type of nasal packing which was cut according to the size of the middle meatus and placed between the middle turbinate and the lateral nasal wall. In the control group, the cavity was left with no pack according to a randomized assignment.

Postoperative

All patients were given the same medical treatment in the form of:

- Oral Amoxicillin-clavulanic acid for 10 days.
- Oral macrolides were used in cases of amoxicillin allergy.
- Oral Acetaminophen for 5 days.
- Local nasal decongestant; Xylometazoline 0.5 mg/ml for 5 days.
- Nasal packs were removed 48 hours after the operation.
- All the patients were discharged 2 days after surgery.
- Patients were instructed to perform a nasal irrigation using normal saline three times per day after removal of the packs.
 - All patients applied steroid nasal spray in each nostril twice daily following the nasal irrigation 1 week post-operatively.

• Post-operative assessment:

Clinical follow-up visits were performed 2, 4, 8, and 12 weeks after surgery, the assessment was focused on comparing groups with pack (absorbable and non absorbable) and the other group with no pack.

In the first visit, Patients were asked to complete a questionnaire in their first postoperative visit; this questionnaire was related to their subjective assessment of four criteria: pain, nasal blockage, nasal crustations and bleeding. For each of these criteria, and for each side, the patients were asked to give a score: 0 (no symptom), 1 (mild symptom), 2 (moderate symptom), 3 (maximal symptom). This questionnaire was repeated in the next visits.

Statistical methods

The collected data were coded, tabulated, and statistically analyzed using IBM SPSS statistics (Statistical Package for Social Sciences) software version 18.0, IBM Corp., Chicago, USA, 2009. The level of significance was taken at P value < 0.050 is significant, otherwise is non-significant.

3. Results

Table (1): Facial pain severity

Time	Measure	No packing	Gel foam	Nasopore	Tampon	^P
Day-2	Mean±SD	2.9±0.7	2.7±0.8	3.2±0.6	3.5±0.5	0.069
	Range	2.0–4.0	2.0–4.0	2.0–4.0	3.0–4.0	
Week-2	Mean±SD	0.6±0.5	0.3±0.5	0.9±0.7	1.1±1.0	0.083
	Range	0.0–1.0	0.0–1.0	0.0–2.0	0.0–3.0	

Table (1) show that: Regarding **facial pain severity**; gel foam has best findings, followed by no packing, then nasopore, while tampon has worst findings with no significant statistical difference between them.

Table (2): Nasal block severity

Time	Measure	No packing	Gel foam	Nasopore	Tampon	^P
Day-2	Mean±SD	2.7±0.7	2.6±0.7	3.1±0.6	3.2±0.4	0.084
	Range	2.0–4.0	2.0–4.0	2.0–4.0	3.0–4.0	
Week-2	Mean±SD	0.8±0.4	0.5±0.5	1.1±0.9	1.5±1.2	0.054
	Range	0.0–1.0	0.0–1.0	0.0–2.0	0.0–3.0	

Table (2) show that: Regarding **nasal block severity**; gel foam has best findings, followed by no packing, then nasopore, while tampon has worst findings with no significant statistical difference between them.

Table (3): Nasal discharge severity

Time	Measure	No packing	Gel foam	Nasopore	Tampon	^P
Day-2	Mean±SD	1.9±0.7	1.7±0.8	2.2±0.6	2.5±0.5	0.069
	Range	1.0–3.0	1.0–3.0	1.0–3.0	2.0–3.0	
Week-2	Mean±SD	0.4±0.5	0.1±0.3	0.7±0.8	1.0±1.1	0.055
	Range	0	0.0–1.0	0.0–2.0	0.0–3.0	

Table (3) show that: Regarding **nasal discharge severity**; gel foam has best findings, followed by no packing, then nasopore, while tampon has worst findings with no significant statistical difference between them.

Table (4): Postnasal discharge severity

Time	Measure	No packing	Gel foam	Nasopore	Tampon	^P
Day-2	Mean±SD	2.1±0.6	1.9±0.7	2.3±0.7	2.6±0.5	0.100
	Range	1.0–3.0	1.0–3.0	1.0–3.0	2.0–3.0	
Week-2	Mean±SD	0.5±0.5	0.2±0.4	0.8±0.8	1.0±0.9	0.076
	Range	0.0–1.0	0.0–1.0	0.0–2.0	0.0–3.0	

ANOVA test

Table (4) show that: Regarding **postnasal discharge severity**; gel foam has best findings, followed by no packing, then nasopore, while tampon has worst findings with no significant statistical difference between them.

Table (5): Olfactory disturbances severity

Time	Measure	No packing	Gel foam	Nasopore	Tampon	^P
Day-2	Mean±SD	1.8±0.8	1.6±0.8	2.1±0.7	2.5±0.7	0.69
	Range	1.0–3.0	1.0–3.0	1.0–3.0	1.0–3.0	
Week-2	Mean±SD	0.5±0.5	0.1±0.3	0.8±0.8	0.8±0.8	0.059
	Range	0.0–1.0	0.0–1.0	0.0–2.0	0.0–2.0	

ANOVA test.

Table (5) show that: Regarding olfactory disturbances severity; gel foam has best findings, followed by no packing, then nasopore, while tampon has worst findings with no significant statistical difference between them.

4. Discussion

Lateralization of the MT seems to be the most common complication encountered after ESS and can result in occlusion of the sinus drainage pathway. In addition, adhesion can result in recurrent symptoms and subsequent surgical failure. Studies have shown

that up to 25% of patients who experience adhesion formation will require revision surgery in the future.

Patency of the middle meatus with a well-healed mucosa in addition to good surgical technique is the mainstays of optimal surgical outcomes. Given the fragile attachment of the middle turbinate and the potential for granulation tissue formation during the healing, nasal packing and postoperative care play crucial roles in overcoming disease recurrence.

There are ongoing debates about the ideal material that should be used for packing. Basic criteria that a product should meet to be eligible to be used as nasal pack include: good haemostatic property, middle

turbinate stabilizer effect, promotion of wound healing, resistance to bacterial colonization, and easy removal with minimal discomfort to the patient. Pack removal should not impede the patient's psychological status.

This study is designed to evaluate the effect of nasal pack on the patient's comfort (pain, headache, nasal blockage), bleeding, crustation (healing) and synechia formation. Forty patients underwent ESS, packing was placed at the end of the surgery in the middle meatus of the nasal cavity of 3 groups while the middle meatus of the last group was left with no packing. The non-packed group represents the control one. Assessment of bleeding on pack removal was performed at day 2 before discharging the patient. Endoscopic assessment of both middle meati was performed at 2, 4, 8, 12, weeks after the surgery.

In This study, evaluation of the middle meatus showed no difference in synechia formation and lateralization of middle turbinate between groups in the early visit at 2 weeks, synechia formation was less with better results in the groups with nasal pack in the late visits at 4, 8, 12 weeks but the difference was statically significant in the third and fourth visits only, **which agree with (Kimmelman et al., 2001) [8] who studied that** safety and efficacy of Seprigel Sinus® (absorbable nasal dressing), when used as a postoperative dressing after endoscopic sinus surgery as a facilitator of healing and a preventative for scarring and stenosis in ten patients undergoing bilateral endoscopic ethmoidectomy. Seprigel Sinus® significantly improved all outcome measures by week 2 and remained statistically significant for reduction of synechia and stenosis.

Also agree with (Catalano and Roffman 2003) [9]. who compared postoperative synechia rates between two self-absorbing stents (Gelfilm® and MeroGel®) in 100 patients undergoing bilateral minimally invasive sinus techniques. Follow-up consisted of three postoperative visits the first was at week 1 and the last at week 12. Compared with Gelfilm, MeroGel® stents produced significantly less synechia.

Also this study agree with (Berlucchi et al., 2009) [10] who performed a randomized, controlled, multicenter clinical study to assess efficacy of absorbable middle meatal packing in patients undergoing FESS. 66 patients were randomized to receive either MeroGel® (absorbable nasal dressing) or standard non absorbable nasal pack with antibiotic coating at the end of FESS. All were reassessed by rhinoscopy at 2, 4, and 12 weeks in blinded fashion. Follow-up endoscopy showed a lower proportion of nasal adhesions in MeroGel® group at both 4 and 12 weeks.

And Contrary to (Chandra et al., 2003) [11]. who evaluated the effects of Floseal® on mucosal healing in ESS. Twenty patients underwent bilateral ESS. For each patient, one ethmoid cavity was randomized to receive Floseal® and the other received thrombin-soaked gelatin foam. The extent of granulation tissue and synechia formation was evaluated at 6-8 weeks after surgery. The Floseal® group showed clear trends toward increased granulation tissue and synechia formation compared with thrombin soaked gelatin foam group, which may be due to different type of pack used.

In this study, subjective assessment showed better results in the nasal cavity with absorbable pack as regarding bleeding, patient comfort (pain, headache and nasal blockage), nasal crustations and healing.

However, there is no statically significant difference. Bleeding assessment on pack removal on day 2 also showed statically significant difference between the groups with better results in the groups with absorbable pack. This means that bleeding was less in the group with absorbable pack, **which agree with (Cho et al., 2013) [12]. who** conducted multicenter, prospective, randomized, double-blind and controlled study. 100 patients with chronic sinusitis requiring the same extent of ESS were included. Following surgery; one ethmoid cavity was packed with a Cutanplast® (absorbable nasal dressing) haemostatic sponge and the other with a Merocel® (non absorbable nasal pack) according to a randomized assignment. All nasal packs were removed the day after. Both packs were effective at preventing postoperative hemorrhage. However, Cutanplast® was significantly more comfortable while in situ and less painful on removal of the pack. The Merocel pack was associated with significantly more bleeding on removal; therefore much time was needed to control hemorrhage. Cutanplast pack results in significantly less pain and less bleeding compared to Merocel pack.

And Contrary to (Shoman et al., 2009) [13] who conducted a prospective, double-blind, randomized study of 30 patients undergoing bilateral FESS to compare NasoPore® (absorbable nasal dressing) and vinyl gloved Merocel® (non absorbable nasal pack). Patients were evaluated 1 week postoperatively for pack removal and debridement, and associated discomfort and bleeding with the removal, as well as overall preference for either pack. Postoperatively, there was no significant difference between both groups with regard to patients' pain, pressure, blockage, swelling, bleeding, or discomfort on packing removal. There was no statistical difference in the amount of bleeding associated with packing removal.

This non-matching may be due to type of non-absorbable pack used, or may be due to change in time of visits.

Also contrary to (Wang et al., 2011) [14] who evaluated the effects of three different nasal packing materials: Vaseline gauze strip, Merocel® (non absorbable nasal packs) and Nasopore® (absorbable nasal dressing). All patients were admitted to undergo the appropriate ESS, and at the end of the surgery, the chosen packing material was impregnated with antibiotics and introduced in the middle meatus. The Vaseline gauze strip and Merocel packing were removed 48-72 hours after surgery. In contrast, Nasopore was left in place until it was suctioned out 5-10 days after discharge. Nasopore showed a significantly greater association with bleeding related admission and additional nasal packing. Overall, the outcome measures in the patients who received Vaseline gauze were equivalent to those in the patients who received Merocel. However, Nasopore was not superior to the two nonabsorbable packing materials in this study. This difference may be due change in type of pack used or time of pack removal.

The previous studies showed that each absorbable middle meatal material has its own advantages and disadvantages. Some studies recommended the use of absorbable middle meatal pack at the end of endoscopic sinus surgery to decrease the incidence of postoperative lateralization of middle turbinate and bleeding while others didn't recommend it. However, this study recommends that using absorbable middle meatal pack is better than not using it at all.

5. Conclusion

The use of absorbable nasal pack after functional endoscopic sinus surgery resulted in less bleeding, less crustations, decreasing the incidence of lateralization of middle turbinate and adhesions on long term and better mucosal healing.

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