

Outcomes of Hydroxylated Polyvinyl Acetate and Medicated Ribbon Gauze Pack in Patients Undergoing Nasal Surgery: An Observational Study

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ABSTRACT

Nasal packs have been routinely used after nasal surgeries to prevent postoperative bleeding and synechiae formation. The aim of this study is to evaluate and compare the outcomes of hydroxylated polyvinyl acetate (PVA) and medicated ribbon gauze packs after performing nasal surgeries. A prospective observational study was conducted in a tertiary care hospital of South India from 2017 to 2019. A total of 100 patients satisfying the study criteria were included and divided equally into two groups. Group A underwent PVA packs and group B underwent medicated ribbon gauze packs. Visual analog scale for pain (0–3), hemostasis score (0–5) and postoperative mucosal scores were measured. The mean VAS scores in the postoperative period were 1.46 ± 0.3 and 1.92 ± 0.4 ($p = 0.000$), respectively. After pack removal, mean VAS scores were 1.84 ± 0.4 and 2.4 ± 0.6 , respectively ($p = 0.000$). The mean hemostasis scores of PVA and ribbon gauze group were 2.2 ± 0.95 and 1.64 ± 0.8 , respectively ($p = 0.119$). The postoperative mucosal scores were 2.75 ± 0.6 and 2.9 ± 0.7 on day 14 ($p = 0.35$) and 1.2 ± 0.4 and 1.9 ± 0.7 on day 28, respectively ($p = 0.001$). We conclude that PVA packs caused lesser pain and had better postoperative healing when compared with ribbon gauze. Though ribbon gauze packs had better hemostasis control, the difference was not statistically significant.

Keywords: Hydroxylated polyvinyl acetate, Nasal packing, Nasal surgery, Ribbon gauze, Synechiae.

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INTRODUCTION

Nasal packs have been routinely used in nasal surgeries and trauma to control epistaxis.¹ Nasal packing helps in good mucoperichondrial flap opposition, minimize risk of bleeding, reduce septal hematoma and synechia formation following nasal surgeries.² An ideal nasal pack should cause less damage to the nasal mucous membrane, provoke minimal tissue reaction, less discomfort to patients, and lesser incidences of rebleeding.³

Medicated ribbon gauze packs soaked with antibiotic or bismuth iodoform paraffin paste are commonly used for nasal packing. They provide adequate tamponade to nasal cavity resulting in lesser chances of bleeding in the postoperative period. However, ribbon gauze pack requires some training, postoperative antibiotic and steroid to reduce toxic shock syndrome and sinusitis.⁴ Proprietary types of nasal packs that are commonly used include Merocel (Medtronic Xomed, Jacksonville, Fla.), Rhino Rocket (Denver Splint Corp, Englewood, Colo.), Rapid Rhino (Applied Therapeutics, Tampa, Fla), and Epistat (Medtronic Xomed). Merocel and Rhino Rocket are made of hydroxylated polyvinyl acetate (PVA), which expands after contact with fluid.^{5,6} Though PVA pack causes less discomfort to patients, its tamponade effect especially following extensive nasal surgeries is still debated.

Nasal packs after surgeries not only help in hemostasis but also in stabilization of nasal flaps and septum. Hence, knowledge of nasal packs is important for obtaining desirable postoperative outcomes. This study was designed to analyze and compare the outcomes of PVA and medicated ribbon gauze packing in nasal surgeries.

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MATERIALS AND METHODS

A prospective single blinded observational study of patients who underwent nasal packing following nasal surgeries was conducted in a tertiary care hospital from 2017 to 2019.

The objective of this study was to compare the effectiveness and functional outcomes of PVA and medicated ribbon gauze packs

following nasal surgeries. Patients who satisfied the following study criteria were enrolled in the study.

Inclusion Criteria

Patients who underwent either PVA or medicated ribbon gauze pack after septoplasty and functional endoscopic sinus surgery.

Exclusion Criteria

Patients with history of traumatic epistaxis, bleeding disorders, nasal and nasopharyngeal tumors and aged below 18 years were excluded.

Methodology

A total of 100 patients were included in the study and were divided into two groups through randomization as group A and group B.

Group A was packed with 8 cm long hydroxylated polyvinyl acetal nasal pack (Merocel, Medtronic Xomed, Jacksonville, Fla.) smeared with 1 gm of metronidazole gel and group B was packed with 1 m long and ½ inch width ribbon gauze pack smeared with 1 gm of metronidazole gel.

The following parameters were assessed:

Visual Analog Scale

Pain was subjectively measured using visual analog scale. The scores ranged between 0 and 3. Pain scores were measured 6 hours after nasal packing and immediately after pack removal. The packs were removed 24 hours after surgery.^{6,7}

Hemostasis Score

The hemostasis score was computed using a grading system described by Badran Ket al.⁶ Hemostasis scores were measured and assigned scores ranging from 0 (no bleeding) to 5 (massive requiring re-packing). The scores were measured 6 hours after nasal packing and immediately after pack removal.

Postoperative Nasal Endoscopy

Postoperative nasal endoscopy was done and scored using the system proposed by Lund and Kennedy.⁸ Nasal endoscopies were done at the end of 14th and 28th postoperative day.

Statistical Analysis

Data were collected, tabulated, and analyzed using SPSS (version 16) software. Statistical analysis was carried out using the χ^2 test and Fisher’s Exact test for groups’ comparisons, and Mann–Whitney test for comparison of functional results, except percentage values, for which the χ^2 test was used. The *p*-value below 0.05 was considered statistically significant.

RESULTS

A total of 100 patients were included in the study. A total of 50 patients were enrolled in each group, respectively. The mean age of study sample in group A was 35.6 ± 12.4 years while group B was 37.1 ± 15.3 years (*p* = 0.32). Male: Female ratio of overall study sample was 63:37.

VAS

The VAS scores after 6 hours of nasal packing were as follows (PVA group: 3–0: 24–1: 20–2; 3–3. Ribbon gauze: 0–0: 12–1: 36–2: 2–3)

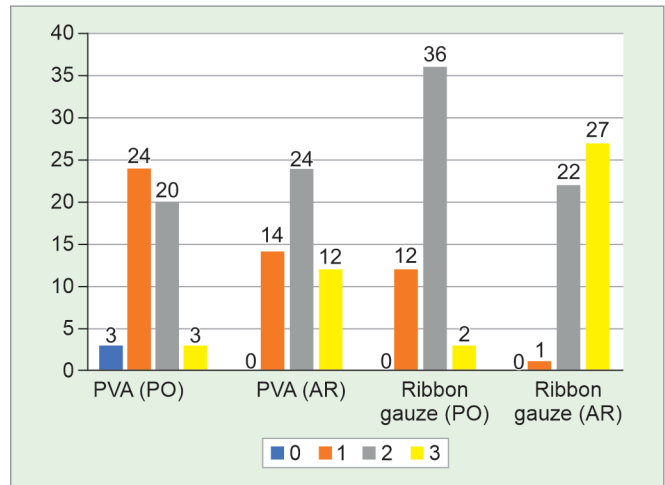


Fig. 1: The VAS scores after 6 hours of nasal packing

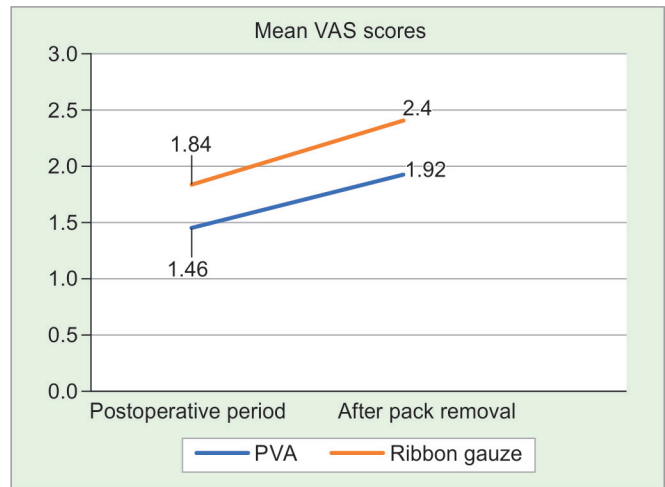


Fig. 2: The mean VAS scores in PVA and ribbon gauze groups

(Fig. 1). The mean VAS scores in PVA and ribbon gauze groups were 1.46 ± 0.3 and 1.92 ± 0.4 (*p* = 0.000), respectively (Fig. 2). When compared, pain scores in PVA group was significantly lower than ribbon gauze group (*p* = 0.008).

The scores after pack removal were as follows (PVA: 0-0: 14–1; 24–2; 12–3, ribbon gauze: 0–0; 1–0; 22–2; 27–3). The mean VAS scores in PVA and ribbon gauze groups were 1.84 ± 0.4 and 2.4 ± 0.6 , respectively. The scores were again significantly different (*p* = 0.000).

Hemostasis Score

The mean hemostasis scores of PVA group and ribbon gauze group were 2.2 ± 0.95 and 1.64 ± 0.8 , respectively. Hemostasis score was better with ribbon gauze pack clinically, when compared with that of PVA pack, but statistically there was no difference between the two packing materials (*p* = 0.119) (Fig. 3).

Endoscopic Mucosal Scoring

The mucosal injury was more with ribbon gauze packing than PVA, the difference was not statistically significant ($p = 0.3570$). However, on day 28, a statistically significant difference was observed between the two groups ($p = 0.001$) (Table 1).

Types of Nasal Surgery

The types of nasal surgery performed in the study were as follows, (PVA group: septoplasty – 18, FESS – 12, FESS + septoplasty – 20: Ribbon gauze group: septoplasty – 13, FESS – 15, FESS + septoplasty – 22).

The types of surgeries were comparable in both the groups and not significantly different ($p = 0.79$).

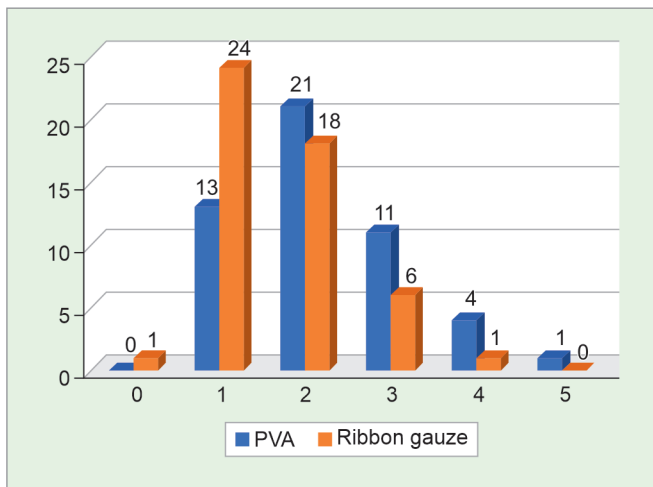


Fig. 3: The mean hemostasis scores of PVA group and ribbon gauze group

Table 1: Table showing the mean mucosal scores in postoperative period

Mucosal score (mean ± SD)	PVA	Ribbon gauze	p-value
Day 14	2.75 ± 0.6	2.9 ± 0.7	0.35
Day 28	1.2 ± 0.4	1.9 ± 0.7	0.001

Table 2: Table summarizing the results of various studies in literature

Studies	Indication	Material	Time	N	Result
Garth and Brightwell ⁴	Septal/turbinate surgery	Telfa, paraffin gauze, Merocel, BIPP, and silastic splints	16–23 hours	48	Patient comfort: no difference. Ease of removal: Telfa > Gauze > Bipp > Merocel Bleeding: Merocel > Gauze > BIPP > Telfa
Illum et al.	Septal/turbinate surgery	Fingerstalls, gauze with ventilation tubes, merocel	3 days	82	Ease of removal: Fingerstalls > Gauze > Merocel Nasal patency after 3 months: no difference Postoperative fever: Fingerstalls > Gauze/ Merocel Merocel: 3 septal perforations: Ventilation tubes: no advantage

(Contd...)

DISCUSSION

Nasal packs are routinely used to pack the nasal cavities after sinonasal surgeries and uncontrolled epistaxis. Nasal packs help in hemostasis, prevent middle turbinate lateralization, synechia formation, and restenosis after FESS and have been reported to stabilize the remaining cartilaginous septum internally, prevent complications such as septal hematoma and formation of synechia, and to minimize the persistence or recurrence of septal deviation after septoplasty. Nasal packing has disadvantages like mucosal injury, septal perforation, pain, discomfort, allergic reaction, and sleep disturbances. Many nasal pack materials are available in the market, in both removable- and absorbable-pack forms. Though comparison of removable- and absorbable packs is an ongoing debate, each one has its own advantages and disadvantages.⁹ Many surgeons still believe that packing after nasal surgeries are important to reduce the postoperative bleeding and overall outcomes.¹⁰

Medicated ribbon gauze pack has been the traditionally used removable pack, which is readily available, cheaper and offers excellent hemostatic control, especially in cases of extensive nasal surgeries. The PVA is one of the most popular nasal dressings used nowadays and possesses many advantages, such as low price, ease of manipulation, excellent wet-state elasticity, and sufficient support.¹¹ Though most studies have analyzed the pain and bleeding following nasal packing, there are only few studies available that have analyzed the postoperative outcomes of nasal surgeries. This study was designed to evaluate the immediate and short-term postoperative outcomes of using these nasal packs.

Udaipurwala et al. conducted a study to compare glove finger covered Merocel with ribbon gauze nasal packing in septal surgeries. He concluded that glove finger pack group had better pain and bleeding control in septal surgeries.¹² Titiz et al. conducted a study to analyze the histopathological changes following packing with various materials. He concluded that glove finger covered Merocel caused significantly lesser damage to mucosa and lamina propria.¹³ Naik et al. conducted a study to compare the outcomes of nasal tampon and framycetin soaked ribbon gauze. They concluded that nasal tampon packs caused lesser pain when compared with ribbon gauze packs. However, no difference was observed in postoperative crusting and adhesions.¹⁴ Table 2 shows the results of various studies available in literature.¹⁵

Table 2: (Contd...)

Studies	Indication	Material	Time	N	Result
Von Schoenberg et al. ³	Septal/turbinate surgery	Telfa, BIPP, No packing, silastic splints (N = 46)	24 hours	95	Pain on removal: BIPP > Telfa, adhesion rate: no difference: Pain: packing > no packing: BIPP + splints: 2 septal perforations
Watson et al.	Septal/turbinate surgery, polypectomy	Pneumatic balloon, gauze (jelonet), fingerstalls, silastic splints	24 hours	106	Bleeding: no difference; nasal obstruction, fibrin accumulation, adhesion rate: balloon > Gauze > fingerstalls
Saab and Randell	Epistaxis	Merocel, BIPP		30	Effectiveness: no difference; Ease of insertion and removal: BIPP > Merocel
El-Silimy	Turbinate surgery	Gauze, no packing	24 vs 48 hours	180	Bleeding rate: 11.7%/8.3%/0% 948 h/24 h: adhesion rate: no difference
Sirimanna et al.	Turbinate surgery	Alginate, gauze, fingerstalls	24 vs 48 hours	92	Bleeding rate: Gauze > fingerstalls > alginate: 48 hours < 24 hours

Limitation and Recommendations

The obvious limitations of this study are shorter follow-up, smaller sample size, and lack of standardization in the extent of FESS. Patients with sinonasal polyposis underwent opening of all sinus ostia resulting in more mucosal damage. We recommend standardization in surgical procedures for better analysis of results.

CONCLUSION

In this study, PVA was associated with significantly lesser pain when compared with ribbon gauze packs.

There was no significant difference between the two nasal packs with respect to hemostasis control and 2nd week postoperative mucosal healing. However, 4th week mucosal healing was better in PVA group.

We conclude that PVA is a safe, effective, and better tolerated nasal pack with improved postoperative outcomes.

Ethical Approval

The institutional ethical committee approval was obtained.

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