Nasal Septal Clips: An Alternative to Nasal Packing After Septal Surgery?

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Abstract Surgeons have debated since decades on the efficacy or inefficacy of nasal packing yet it is considered routine after septal surgery. Various types of septal splints have been tried as an alternative to nasal packs but most of them need to be sutured around the septum which requires a meticulous approach and expertise. Our aim is to assess and compare the immediate post-operative morbidity and the eventual outcome of septal surgery while using glove finger packs with that of septal clips with splints. This comparative study was done at MCV Memorial ENT Trust Hospital on 80 patients who were diagnosed to have DNS and underwent septal surgery. Patients were divided into two groups. Group A ($n = 40$) constituted of patients who had glove finger packs and Group B ($n = 40$) constituted of patients who had septal clips. In the immediate post-operative period patients were assessed for pain, headache, dysphagia, epiphora, dryness of mouth and post-operative bleed. On the first post-operative night, patients were assessed for oxygen saturation. Patients underwent tympanometry just before pack/splint removal and on reviews if the same was abnormal. Post-operative complications like septal perforation and synechiae were noted for both groups and compared. We found that the incidence of pain and various other signs and symptoms was significantly higher in Group A. The difference in the complication rates among the two groups was not statistically significant. We observed that nasal packing is a cause for significant morbidity and discomfort in the immediate post-operative period and does not give any added advantage over septal clips used in our study as far as the final outcome is

concerned. Nasal septal clips with splints are a useful alternative to existing techniques of flap approximation after septal surgery. The method is not expensive and needs no special expertise.

Keywords Septoplasty · DNS · Septal clips · Septal splints · Nasal packing

Introduction

Most descriptions of septoplasty techniques include some mention of the use of nasal packing. Several articles in the past have pointed out that nasal packing is not an innocuous procedure. Commonly used materials for packing include Ribbon gauze which consists of open-mesh cotton gauze as carrier material with or without paraffin or an antibiotic ointment. BIPP (Bismuth Iodoform Paraffin Pack) is impregnated with liquid paraffin and contains iodoform and bismuth in a ratio of 2:1. Telfa (The Kendall Company, Boston, MA) has been adopted for nasal packing from surgical wound care and consists of a layer of cotton fleece enclosed in a perforated inert water-repellent plastic film.

Fingerstall packs are made of latex rubber packed with foam, or occasionally with gauze.

Merocel (Medtronic Xomed, Jacksonville, FL) is a polymer made from esterified hyaluronic acid. First experiences with this product show a decrease in postoperative adhesions and crusting [1].

Complications related to pack insertion include pain, vasovagal attack, cardiovascular collapse, hypovolemic shock, nasovagal reflex and trauma to columella, nasal mucosa and soft palate. Complications related to maintaining pack include hypoxia and hypoxaemia which may

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lead to myocardial infarcts and cerebrovascular accidents, dysphagia, obstructive sleep apnoea (OSA), vestibulitis or sinusitis, toxic shock syndrome, Eustachian tube obstruction/Toynbee phenomenon which may lead to otitis media with effusion, acute otitis media and haemotympanum. Late complications include adhesions, septal perforations, velopharyngeal incompetence or stenosis and pack granuloma.

Intranasal (septal) splints have been used as an alternative to achieve good approximation of septal flaps and prevention of haematomas, bleeding and adhesions. The other alternatives include quilting sutures and fibrin glue. Intranasal splints were first described by Salinger and Cohen [2] in 1955. Initially splints were fashioned from any suitable material such as strips of X-ray film or polythene tops of coffee cans (Wright) [3] secured by septal suturing. Goode [4] introduced preformed splints which maintain pressure on the septum by using inbuilt magnets.

Various other types of septal splints are made of silastic sheets, silicon or dental utility wax plates [5]. They all need to be sutured around the septum which requires a meticulous approach and expertise.

This study is undertaken to assess and compare the immediate post-operative morbidity and the eventual outcome with the use of glove finger packing versus the septal clips.

Materials and Methods

This is a prospective, comparative and randomized study done on patients who were diagnosed to have Deviated nasal septum (DNS) and underwent septal surgery. All the operations were performed by the senior author. The study was conducted at MCV Memorial ENT Trust Hospital, Pollachi, Coimbatore Dt., between Aug. 2008 and Nov. 2009. The follow up period was 2–6 months. The data collected was analyzed using descriptive statistics with χ^2 and Student *t* test.

Patients underwent either submucosal resection (SMR) or septoplasty along with submucosal diathermy of inferior turbinate's with radio frequency (RFSMD). All the patients underwent the procedure under local anaesthesia. At the end of the operation, patients were randomly chosen using a sealed envelope system for either nasal packs (Group A = 40) or septal splints with clips (Group B = 40). Exclusion criteria included co-existing sinus disease necessitating endoscopic sinus surgery, septorhinoplasty, revision surgery, co-existing middle ear pathology. Patients diagnosed to have OSA were also excluded from the study as well patients below 18 years of age.

Thorough ENT examination was done, which included anterior rhinoscopy depicting the type and side of deviation,

the presence or absence of spurs and associated turbinate hypertrophy. The DNS was broadly classified as to the right or left. The objective confirmation was done using a cold spatula test and Diagnostic Nasal Endoscopy. All the patients underwent complete haematological and serological tests and a digital X-ray of PNS (Water's view) prior to the surgery. Patients with mid-septal and posterior deformities and more than 40 years of age underwent the standard SMR operation and patients with caudally dislocated cartilage and all below 40 years of age underwent septoplasty.

Description and Insertion Technique of Nasal Packs

A finger cut from the latex surgical glove is inserted into the nostril after lubricating with Neosporin ointment. It is then held open using a Killian's speculum and ribbon gauze is inserted using a Tille's forceps until the pack is fitting snugly. After packing the other nostril, the ends of the ribbon gauze are plastered on to the tip of the nose.

Description and Insertion Technique of Septal Clips with Splints (Nithya Medical Products, Coimbatore, India)

The spring clip made from medical grade stainless steel wires (Fig. 1). It is designed like a wire cage to distribute the approximating force thus avoiding the avascular necrosis of septal mucosa. The wire loop in the anterior aspect of the spring clip prevents contact with columella and soft triangle saving them from injury. The internal splints are made from polyethylene. The pliable and soft polymer plates with "memory" to attain the flat straight shape further distribute the force of the spring and effectively increase the area of septal flaps approximated. The splints have a retaining ridge on the lateral and inferior aspect which prevents the spring clip to slide down and press directly against the septum. The thickness of the

Fig. 1 Profile photo of septal clip and splints

plates is 1 mm and they are incompletely slit in a longitudinal direction to facilitate insertion by overlapping the borders along the slit. The anterior ends of the two splints are tied together with a silk thread to prevent posterior migration and to facilitate removal. The splints after lubricating with Neosporin ointment are inserted on either side of the septum. The spring clip is held open with a Pilchner nasal speculum and introduced into the nose to compress on the splints and in turn the mucosal flaps (Figs. 2 and 3).

All the patients were given intravenous Amoxycillin-clavulanic acid, oral analgesics and multi vitamins. Patients with septal clips were also given decongestant nasal drops. 6 to 10 h following surgery, patients was assessed for different parameters. Pain was assessed using a visual analogue scale (VAS) of one (minimal pain) to ten (unbearable). Patients were asked to rate the pain from 1 to 10. Headache, Epiphora, Dysphagia (with ear block sensation), dryness of mouth and post nasal drip (PND) were assessed as present or absent. Cold spatula test was done to assess the patency of nasal airway.

Fig. 2 Insertion of septal clip

Fig. 3 Septal clip in place

On the first post-operative night, patients were subjected to continuous oxygen saturation (SpO₂) monitoring which was recorded half hourly and the average of SpO₂ was finally calculated after 12 recordings.

After 24 h, patients underwent tympanometry (Zodiac 901 Madsen) to objectively assess the middle ear status. After the removal of packs/splints, nasal suctioning was done and douche was given with normal saline and amikacin solution.

Patients were discharged on the second post-operative day with oral antibiotics for 5–7 days. Patients were asked to do nasal douching with normal saline and amikacin solution three times a day. On the seventh post-operative day, anterior rhinoscopy was performed to assess the status of the septum, formation of adhesions and the presence of any raw surface. Tympanometry was performed only on the patients who had abnormal tympanogram post-operatively. At 6 weeks post-operatively all the patients underwent nasal endoscopy to look for complications. Tympanometry was performed only on the patients who had abnormal tympanogram on seventh post-operative day. Patients were asked to rate the symptomatic improvement on the scale of 1 to 4. Resolved (1), Better (2), Unchanged (3) and Worse (4).

Observations and Results

Our study constituted of 80 patients. We had 55 male and 25 female patients and the male to female ratio was 2.2. Overall, 28 (35%) had nose block on the right side, 15 (18.8%) had on the left side, 7 (8.8%) had bilateral and 30 (37.5%) had alternating block. Patients were broadly classified to have DNS to right (54) or left (26) side. 65 (81.2%) underwent septoplasty and 15 (18.8%) underwent SMR.

Six to 10 h after the procedure, 28 (70%) patients in Group A had pain score six or above, 10 (25%) had score of ten and the mean pain score (MPS) was 7.23. Only three of the patients in Group B had score more than 5, the most common score was one (50%) and the MPS was 2.57 (Table 1). We also found that 29 (72.5%) patients in Group A experienced headache compared to just 6 (15%) in Group B ($P < .001$). 38 (95%) patients in Group A experienced difficulty in swallowing compared to only 2 (5%) in Group B ($P < .001$). All the patients in Group A had

Table 1 Pain scores (VAS)

Pain (VAS)	1	2	3	4	5	6	7	8	9	10
Group A (pack)	0	0	2	2	8	4	4	5	5	10
Group B (clip)	20	8	2	3	4	0	0	0	1	2

intermittent watering from the eyes while in Group B, only 3 (7.5%) patients complained of the same ($P < .0001$). Three patients in Group A had bleeding immediately after pack removal and none of the patients in Group B had bleeding on clip removal (Table 2). In Group B, 38 (95%) patients had nasal breathing with 29 (72.5%) having bilateral airway patent as assessed by cold spatula test (Table 3). Oxygen saturation was assessed during sleep on first post-operative night. In Group A, 28 (70%) patients had an average SpO₂ less than 95% while in Group B, only 5 (12.5%) had SpO₂ less than 95%. None of the patients in our study had average SpO₂ less than 90% (Table 4). At 24 h post-op tympanometry was done. In Group A, 21 (52.5%) patients had Type C tympanogram at least in one ear with 13 (32.5%) having bilateral Type C. In Group B, only one patient had unilateral Type C tympanogram (Table 5).

We reviewed the patients 1 week after the surgery and looked for the presence of complications such as

haematoma, residual deviation, focal ulceration, early synechiae formation or septal perforation. None of the patients in our study had septal haematoma or perforation. 3 patients in both the groups had residual deviation (Table 6). Five patients in Group A and only one patient in Group B had early synechiae formation ($P < .05$). These synechiae were released in the OPD. 10 (25%) patients in Group A and 7 (17.5%) in Group B ($P < .05$) had focal ulcerations on either the septum or the turbinate and were treated with local antibiotic. All the patients who had Type C tympanograms underwent repeat tympanometry. All the patients who had unilateral Type C and all but two patients who had bilateral Type C reverted back to normal.

On second post-op review (6 weeks post-op) one patient from Group A developed repeat synechiae formation. Patients were asked to rate the symptomatic improvement on the scale of 1 to 4. In Group A, 34 (85%) patients and in Group B, 30 (75%) had total resolution of nose block.

Table 2 Symptoms and signs

Symptoms and signs	Group A (pack)	Group B (clip)
Headache	29 (72.5%)	6 (15%)
Dysphagia	38 (95%)	2 (5%)
Epiphora	40 (100%)	3 (7.5%)
Dryness of mouth	40 (100%)	4 (10%)
Bleeding	3 (7.5%)	0
PND	10 (4%)	18 (45%)

Table 3 Fogging in cold spatula test

	Group A (pack)	Group B (clip)
B/L fogging	0	29 (72.5%)
U/L fogging	0	9 (22.5%)
No fogging	40 (100%)	2 (5%)

Table 4 Oxygen saturation and snoring

	Group A (pack)	Group B (clip)
<95%	28 (70%)	5 (12.5%)
>95%	12 (30%)	35 (87.5%)
Snoring	37 (92.5%)	3 (7.5%)

Table 5 Tympanometry (24 h post-op)

Curve	Group A (pack)	Group B (clip)
Type A (B/L)	19 (47.5%)	39 (97.5%)
Type C (U/L)	8 (20%)	1 (2.5%)
Type C (B/L)	13 (32.5%)	0

Discussion

Considering pain as one of the major concerns for the patient in the post-operative period, routine use of packing is difficult to justify. In a study done by Schoenberg et al. [6], the MPS in packed group was 4.2 and in unpacked group 2.8. In another study done by Nunez et al. [7], they also found a significantly greater extent of post-operative pain in the packed group.

Dysphagia attributed to the Toynbee phenomenon was also significantly high in packed patients ($P < 0.001$). If the patient swallows when nasal passages are blocked, air cannot pass anteriorly and it is insufflated to the middle ear. This unpleasant feeling results in poor oral intake while the packs are in place.

In a study done by Nayak et al. [5], patients in packed group had significantly higher incidence of headache, discomfort in swallowing, dryness of mouth, disturbed sleep and oozing of nasal secretions than in splinted group. Similarly, Awan et al. [8] also found the incidence of these symptoms significantly higher in packed group. Although, dysphagia, intermittent watering from the eyes and dryness of mouth almost exclusively seen in patients with packs are not the causes of real concern, they do add to the patients woes.

Table 6 Complications

Complication	Group A (pack)	Group B (clip)
Residual deviation	3 (7.5%)	3 (7.5%)
Adhesion	5 (12.5%)	1 (2.5%)
Raw surface	10 (25%)	7 (17.5%)

The mechanisms by which nasal obstruction causes sleep-disordered breathing may be due to a combination of factors. There is a direct mechanical effect, in that the pressure in an obstructed upper airway becomes negative if there is no gas flow and results in tendency to airway closure. Also, there is evidence of a reflex mechanism, by which interruption of normal sensory input can cause abnormal breathing patterns and a decrease in genioglossus and diaphragm muscle activity which normally act to preserve airway patency. Zwillich et al. [9] and Suratt et al. [10] demonstrated an increase in the frequency and duration of apnoeic episodes when the nose is occluded. Hady et al. [11] also suggested that nasal packing for 24 h may cause arterial oxygen desaturation. 70% of the patients in our study had average SpO₂ less than 95%. Although, this temporary drop in oxygen saturation in packed group may not be clinically relevant in many patients but the nasal packing can induce or worsen OSA particularly in older patients with cardiac or pulmonary problems.

We used tympanometry as a tool to assess the effect of nasal packing on middle ear function and our results were similar to Thomson et al. [12] and Egelund et al. [13]. Although, there is no permanent influence of nasal packing on Eustachian tube function, it is still a cause of discomfort. The immediate complications such as bleeding on removal of pack/clip and late ones such as synechiae were encountered more in packing group but were not statistically significant and the resolution of nose block was also comparable in both the groups.

Given the limited evidence to support post-operative packing and splints, many have come to favour alternative methods of preventing complications of septoplasty. Malki et al. [14] randomized patients undergoing septal and inferior turbinate surgery to splints or no splints. They found increased pain at 1 week post-operatively in splinted group and no difference in adhesions at 6 weeks.

A septal quilting suture [15, 16] appears to be an effective means of preventing post-operative bleeding and haematoma while avoiding the morbidity of packing or splints. Lemmens et al. [17] evaluated post-operative stability using this technique. Out of 226 subjects, only a single persistent septal deviation was noted.

This technique is not only meticulous and time consuming; it also carries a rare risk of late stitch abscess observed by the senior author in two of our patients in the past. Alternatively, some authors have had success with intraseptal application of fibrin glue [18].

Among all the comparative studies published in literature, authors have compared packs with no packs or splints with no splints or compared different types of packs or splints. To our knowledge, ours is the first study to compare packs with septal clips. We observed that nasal packing is a cause for significant morbidity and discomfort

in the immediate post-operative period until its removal as compared to septal clips and does not give any added advantage over the latter as far as the final outcome is concerned which appears to be operator and technique dependent.

Conclusion

The patient's comfort, ease of application and removal, the purposefulness and the availability make the Indian made septal clips a useful and economical alternative which is possible to apply in day to day practice.

References

1. Weber R, Keerl Rainer, Hochapfel F, Draf Wolfgang, Toffel PH (2001) Packing in endonasal surgery. *Am J Otolaryngol* 22:306–320
2. Salinger S, Cohen DM (1955) Surgery of the difficult septum. *Arch Otolaryngol* 419–421
3. Wright W (1969) Principles of nasal septum reconstruction. *Trans Am Acad Ophthalmol* 78:252–255
4. Goode RL (1982) Magnetic intranasal splints. *Arch Otolaryngol* 108:319
5. Nayak DR, Murty KD, Balakrishna R (1995) Septal splint with wax plates. *J Postgrad Med* 41(3):70–71
6. Von Schoenberg M, Robinson P, Ryan R (1993) Nasal packing after routine nasal surgery—Is it justified? *J Laryngol Otol* 107:902–905
7. Nunez DA et al (1991) An evaluation of post-operative packing in nasal septal surgery. *Clin Otolaryngol* 16:549–550
8. Awan MS, Iqbal M (2008) Nasal packing after septoplasty: a randomized comparison of packing versus no packing in 88 patients. *Ear Nose Throat J* 87:624
9. Zwillich CW, Pickett G, Hanson FN et al (1985) Disturbed sleep and prolonged apnoea during nasal obstruction in normal men. *Ann Rev Respir Dis* 124:158–160
10. Suratt PM, Turner BL, Wilhoit Sc (1986) Effect of intranasal obstruction on breathing during sleep. *Chest* 90:324–329
11. Hady MR, Nodeira KZ, Abdel Hady N (1983) The effect of nasal packing on arterial blood gases and the acid-base balance and its clinical importance. *J Laryngol Otol* 97:599–604
12. Thompson AC, Crowther JA (1991) Effect of nasal packing on eustachian tube function. *J Laryngol Otol* 105:539–540
13. Egelund E, Jeppesen F (1992) Respiratory tubes with nasal packing following septorhinoplasty. *Rhinology* 30:193–204
14. Malki D, Quine SM, Pfeleiderer AG (1999) Nasal splints, revisited. *J Laryngol Otol* 113:725–727
15. Norman EJ (1971) Revision surgery of nasal septum. *N Y State J Med* 2300–2302
16. Stucker FJ, Ansel DJ (1978) A case against nasal packing. *The Laryngoscope* 88:1314–1317
17. Lemmens W, Lemkens (2001) Septal suturing following nasal septoplasty, a valid alternative for nasal packing? *Acta Otorhinolaryngol Belg* 55:215–221
18. Daneshmand P, Chin GY, Rice DH (2003) Fibrin glue prevents complications of septal surgery: findings in a series of 100 patients. *Ear Nose Throat J* 82:1967