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Effects of different nasal packs on nasal functions after septoplasty

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Abstract

Background: Septoplasty is one of the most frequent surgical operations done in the area of otolaryngology. The purpose of this research was to examine the nasal function effects of various kinds of nasal packs after nasal surgery. Methods: Our research comprised 60 patients with general anaesthesia endonasal septoplasty. Group A: (20 patients) use Merocel, group B: (20 patients)use Merocel in glove-finger, group C: (20 patients)use of vaseline gauze, olfactory functions, mucociliary clearance and pre- and post-operative function of the Eustachian tube. Results: In 25, 15 and 15% of patients prior to surgery, impaired tympanometry was observed. This frequency reduced after two weeks to 10, 5 and 10 percent, followed by one month to 5, 0 and 5 percent. There was no significant difference between groups at all these periods ($p > 0.05$). There was no significant difference between the three groups in post-operative VAS score ($p>0.05$). However, a substantial difference in package removal was observed ($p<0.001$). The mean VAS was 4.35, 2.65 and 2.35 among patients in groups A, B and C correspondingly. The total number of complications across the three groups was not statistically different ($p > 0.05$). There were no significant differences between the three groups in patient satisfaction ($p = 1.0$). Conclusion: There was no significant difference in postoperative complication, saccharine testing, impaired tympanometry, patient satisfaction among the three kinds of nasal packing. The pain levels were greatest for Merocel and lowest with vaseline gauge during the removal of the nasal packings.

Keywords: packs, nasal functions, septoplasty.

1. Introduction

Nasal septal operation is one of the most frequent procedures done in the Department of Otorhinolaryngology. Sep teroplastic adjustments the nasal septum's structural abnormalities to alleviate nasal blockage [1].

After nasal surgery, the most frequent issue occurred with bleeding, as a nasal mucosa is one of the body's most vascular structures and is abundantly supplied via the internal and external carotid system, making it necessary to go on after surgery [2].

After numerous nasal operations, nasal packs have been widely utilised particularly in septoplasty. Nasals provide pressure, fill prepared gaps, support the cartilage or bone structure, maintain moist conditions to improve physiological processes and stimulate physiological hemostatic and repair procedures. Different items were produced with different materials for this purpose [3].

Different nasal tampons or different methods of suture have been used to avoid septal hematoma development, to control bleeding and to prevent adhesion of nasal cavities and to maintain the newer nasal septum following septoplastic treatment. After seven years after operation Merocelpacks, DoyleTM packages, Rapid RhinoTM tampons or vaseline gauze may be used as a nasal pack. Without the nasal packing following surgery, transeptal sutures and septal staplers may be used [4].

Ideal pack functions include preventing bleeding from the surgical sites, no abrasion when inserting, preventing recurrence of bleeding when removed and pain during removal [5].

Merocel packaging is the most often utilised material following nasal surgery, with famous benefits and problems and drawbacks such as discomfort and bleeding reported. Previous reporting was done to reduce the inconvenience of Merocel tampons using the glove fingers during ESS and post-septoplastic treatment [6].

The purpose of this research was to examine the nasal function effects of various kinds of nasal packs after nasal surgery.

2. Patients and methods

This prospective randomized study has been conducted over 60patients who selected among those attending the ORL outpatient clinic of Benha University hospitals from October 2019 to December 2020 and suffering from nasal diseases in the form of deviated nasal septum with or without hypertrophied inferior turbinate. These patients were selected as random sample by sealed envelope method. The average age ranged from 18 up to 50 years, (33) were males, (27) were females.

An informed consent was taken from all patients to participate in this study. In addition, approval from the ethical committee of ENT department, Benha University was obtained.

Patients were randomly assigned to 3 groups according to type of nasal pack in to:

Group A(20patients)will use Merocel.

Group B (20patient)useMerocel in aglove finger.

Group c(20patient)use vaselin gauze.

2.1. Inclusion criteria

- Patients with deviated septum with or without hypertrophied inferior turbinate
- Age between 18-50 years old.

2.2. Exclusion criteria

- Patients with pervious history of nasal surgery.
- Patients with other intranasal pathologies as nasal polyp or sinusitis.

- The patients in which there was intra operative complication as septal perforation will be excluded from the study.
- Patients with systemic illness such as:
- Coagulopathy.
- Immunodeficiency.
- Hepatic disorders.
- Hypertension.

2.3. Preoperative preparation

- Evaluation of all patients has been done through;
- Detailed medical history has been taken from all patients.
- Physical examination: The doctor conducts a physical examination, including any relevant testing.
- Laboratory investigations done before the surgeries
- Complete blood count (CBC).
- Bleeding Profile (PT, PTT, INR, BT and CT).
- Renal function tests (serum urea and serum creatinine).
- Liver function tests (SGPT, SGOT and viral marker).
- Random blood sugar (R.B.S).
- X-Ray Chest (very important if patient over 45 years, smoker, or history of heart/lung disease).
- ECG
- Radiological investigation done before surgeries is CT scan of the nose and paranasal sinuses mainly coronal view.
- A discussion of expectations: patient and doctor should talk about what is this surgery and what are possible results.

Olfactory function, mucociliar clearance and eustachian tube function are assessed as follows:

Test sniff stick for olfactory function assessment.

Sniffin' Sticks are odor-filled felt-tip styles. Removal of the cap releases the smell.

The pen is about 2 cm in front of the nose.

The patient is prompted to take a whiff with a verbal instruction (e.g. stating the pen number).

During the examination, the patient is blinded, e.g. by a mask; one of the nares is plugged with a tape to test laterally.

Testing should always be carried out with little or no odour in a well-ventilated environment.

The patient should not have eaten or drank anything but water 15 minutes before the measurements. This regulation also applies to smoking and the usage of drops or gum.

Patients get information on the findings of the test only at the conclusion of the inquiry. (The University of Erlangen-Nürnberg, Germany, 1997) (Hummel T, Sekinger B, Wolf SR, Pauli E, Kobal G)

Saccharine mucociliary clearance testing.

Insertion of a sodium saccharin particle on the top surface of the subject's lower nasal turbinate.

The participants were then instructed to swallow and inform the examiner once per minute when they detected a sweet flavour.

The distance from the beginning of the mucociliar membrane to the far wall of the pharynx was measured with one probe and the mean velocity was calculated from this measurement.

3.4. Tympanometry For Testing Eustachian Tube Function

Intraoperative

Nose operations including submucosal resection (SMR), turbinate-reducing SMR, partial lower turbinectomy were performed in patients. The operation was done under general anaesthesia and endotracheal intubation and by top personnel. SMR was performed with cartilage resection and ossic septum with or without inferior turbinectomy. Local haemostasis was accomplished in the submucoperichondrial plane by injecting xylocaine and epinephrine 1:200,000 2 ml into the caudal septum. Hemitransfixion was made, mucopericondrial flap was raised, sevenfold incision was elevated, mucopericondrial flap elevation was elevated on the other side and the mucoperiod was also increased according to the pathological locations if required. The elevator between seven cartilages and the maxillary crest was done as a lower chondrotomy. Septal cartilage has been separated, and perpendicular ethmoid plate and spur and knotty deviations of vomer and perpendicular ethmoid plate have been removed. Hemitransfixion incision with 3-0 absorbable vicryl sutures were sutured after correction of the bone and cartilage distortion. Internal nasal splint placed and fixed by the 3-0 absorbable Vicryl sutures into the both nasal canals. Operating methods of the lower turbinectomy include lateralizing the lower turbinate and then resecting the posterior portion of the turbinate through direct or endoscopic viewing to expand the size of the nasal airway

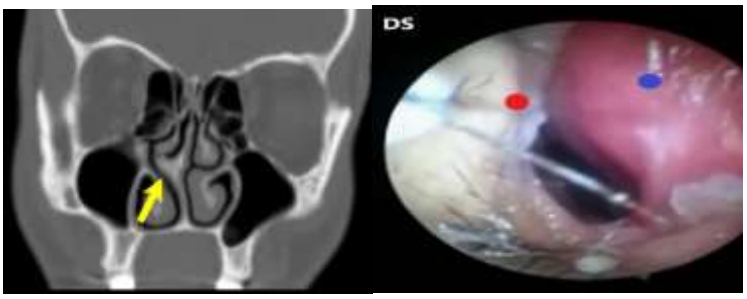

Fig. (1) On right side ct showing DS-on the left endoscopic view of the same pt.

2.5. Postoperative

- The patients of all groups given systemic antibiotics, alkaline nasal wash to have nasal douche 3-4 times daily after removal of the pack and pain medication will be prescribed only If necessary.
- The postoperative evaluation has been done in the following sequence:
- In the presence of nasal pack.
- At the time of pack removal.
- Weekly for the first month.
- Monthly for three months.
- Patients were evaluated in the presence of nasal pack

For

- Discomfort / pain due to nasal pack: assessed using visual analogue scale (VAS).
- Other complication of the pack as (Epiphora, lid edema and sleep disorders including snoring and OSA).
- After removal of the pack, patients were evaluated for following complications:
- Pain during removal of the pack: assessed using visual analogue scale (VAS).
- Nose bleeding: evaluated with how it is controlled (No bleeding, bleeding controlled spontaneously, bleeding controlled by ephedrine pack or bleeding controlled by anterior nasal Vaseline pack).
- Hematoma formation.
- Postoperative infection.
- Adhesions.
- Crustation formation.
- Smell disorders: as anosmia, hyposmia or cacosmia.
- Sniff stick test saccharine test Tympanometry were repeated 2week and 1 monthes postoperative

2.6. Statistical methods

Data management and statistical analysis were done using SPSS vs.25. Numerical data was summarized using means and standard deviations or medians and ranges. Categorical data was summarized as numbers and percentages. Comparisons between three groups were done using Kruskal Wallis test for numerical variables. Categorical data was compared using Chi-square test or Fisher's exact test if appropriate. Within groups comparisons were done using Friedman's test for visual analogue score and Cochran's Q test for other categorical variables. All P values were two sided. Post hoc comparisons were adjusted using Bonferroni correction. P values less than 0.05 were considered significant

3. Results

There were no significant differences between three groups as regard age and gender. P values were 0.88 and 0.934 respectively. Table (1).

Mann Whitney U test was used for age & Chi-square test was used for gender

At time of splint removal: Pain score showed overall significance between three groups. Pairwise analysis revealed that: Median pain score was significantly higher in group C [7] than group A [6], P value = 0.031, Median pain score was significantly higher in group C [7] than group B [6], P value = 0.045, There was no significant difference in pain score between group A and group B, P value = 1.0.

At 10 days: Pain score showed overall significance between three groups. Pairwise analysis revealed that;

Median pain score was significantly higher in group C [3] than group A [2], P value = 0.039, There were no significant differences in pain score between group A and B & group B and C. P values were 0.533 and 0.766 respectively.

At 4 weeks; Pain score showed overall non statistical significance between three groups.

Within each group; Within each group, pain score showed significant improvement at 10 days and 4 weeks. Table (2).

Table (1) Demographic characteristics in different study groups

		Group A (n = 20)	Group B (n =20)	Group C (n = 20)	P value
Age (years)	**Mean ±SD**	27 ±7	27 ±7	26 ±5	0.88
Gender	**Males**	11 (55.0)	12 (60.0)	12 (60.0)	0.934
	Females	9 (45.0)	8 (40.0)	8 (40.0)	

Table (2) Pain score in different study groups at different follow up times

	Group A (n =20)		Group B (n = 20)		Group C (n = 20)					
	Median	Range	Median	Range	Median	Range	P1	P2	P3	P4
Pain at time of splint removal	6	(3 - 8)	6	(3 - 8)	7	(4 - 9)	0.016*	1.0	0.031*	0.045*
pain at 10 days	2	(0 - 4)	3	(0 - 5)	3	(1 - 4)	0.045*	0.533	0.039*	0.766
pain at 4 weeks	0	(0 - 1)	0	(0 - 3)	0	(0 - 2)	0.316	-	-	-
P5	<0.001*		<0.001*		<0.001*					

P6	0.004*	0.003*	0.005*
P7	<0.001*	<0.001*	<0.001*
P8	0.008*	0.013*	0.005*

Mann Whitney U test was used for comparisons between groups. Within groups comparisons were done using Friedman's test. **P1** = Overall comparison between three groups, **P2** =Comparisons between group A & group B, **P3**= comparison between group A & group C, **P4**= comparison between group B & group C, **P5**= Overall comparison between 3 days, 10 days & 4 weeks within each group, **P6** = comparison between 3 & 10 days, **P7**= comparison between 3 days & 4 weeks, **P8**= comparison between 10 days & 4 weeks. All pairwise comparisons were Bonferroni adjusted

At time of splint removal and 10 days: No adhesions reported at time of splint removal or 10 days in all groups. **At 4 weeks:** Adhesions showed non statistical significant difference between three groups (P value = 0.766), **Within each group:** Adhesions showed non statistical significant difference between different follow up times within group A (P value = 0.135) and group B (P value = 0.368). Table (3)

Fisher's exact test was used between groups. Within groups analysis was done using Cochran's Q test. No pairwise analysis was done due to non-significant comparisons

At time of splint removal: Crustations showed non statistical significant difference between three groups (P value = 0.1), **At 10 days:** Crustations showed non statistical significant difference between three groups (P value = 0.863), **At 4 weeks:** No crustations reported at 4 weeks in all groups. **Within each group:** Crustations showed non statistical significant difference between different follow up times within group A (P value = 0.135), group B (P value = 0.368) and group C (P value = 0.05). Table (4).

Fisher's exact test was used between groups. Within groups analysis was done using Cochran's Q test. No pairwise analysis was done due to non-significant comparisons

At time of splint removal: Bleeding showed non statistical significant difference between three groups (P value = 0.863), **At 10 days and 4 weeks:** No bleeding reported at 10 days or 4 weeks in all groups. **Within each group:** Bleeding showed non statistical significant difference within group A (P value = 0.0.05), group B (P value = 0.135) and group C (P value = 0.368). Table (5)

Fisher's exact test was used between groups. Within groups analysis was done using Cochran's Q test. No pairwise analysis was done due to non-significant comparisons

At time of splint removal: Infection showed non statistical significant difference between three groups (P value = 0.766), **At 10 days:** Infection showed non statistical significant difference between three groups (P value = 1.0), **At 4 weeks:** No infection reported at 4 weeks in all groups. **Within each group;** Infection showed non statistical significant difference within group A (P value = 0.223), group B (P value = 0.368) and group C (P value = 0.368). Table (6)

Table (3) Frequency distribution of adhesions in different study groups at different follow up times

	Group A (n = 20)		Group B (n = 20)		Group C (n = 20)		
	N	%	N	%	N	%	P value
Adhesions at time of splint removal	0	0.0	0	0.0	0	0.0	-
Adhesions at 10 days	0	0.0	0	0.0	0	0.0	-
Adhesions at 4 weeks	2	10.0	1	5.0	0	0.0	0.766
P value	0.135		0.368		-		

Table (4) Frequency distribution of crustations in different study groups at different follow up times

	Group A (n = 20)		Group B (n = 20)		Group C (n = 20)		
	N	%	N	%	N	%	P value
Crustation at time of splint removal	0	0.0	0	0.0	3	15.0	0.1
Crustation at 10 days	2	10.0	1	5.0	3	15.0	0.863
Crustation at 4 weeks	0	0.0	0	0.0	0	0.0	-
P value	0.135		0.368		0.05		

Table (5) Frequency of bleeding in different study groups at different follow up times

	Group A (n = 20)	Group B (n = 20)	Group C (n = 20)				
	N	%	N	%	N	%	P value
Bleeding at time of splint removal	3	15.0	2	10.0	1	5.0	0.863
Bleeding at 10 days	0	0.0	0	0.0	0	0.0	-
Bleeding at 4 weeks	0	0.0	0	0.0	0	0.0	-
P value	0.05	0.135	0.368				

Table (6) Frequency distribution of infection in different study groups at different follow up times

	Group A (n = 20)		Group B (n = 20)		Group C (n = 20)		
	N	%	N	%	N	%	P value
Infection at time of splint removal	2	10.0	1	5.0	0	0.0	0.766
Infection at 10 days	1	5.0	0	0.0	0	0.0	1
Infection at 4 weeks	0	0.0	0	0.0	0	0.0	-
P value	0.223		0.368		-		

Fisher's exact test was used between groups. Within groups analysis was done using Cochran's Q test. No pairwise analysis was done due to non-significant comparisons

No septal perforation reported in all study groups at different follow up periods.

No hematoma reported in all study groups at different follow up periods.

4. Discussion

In 25, 15 and 15% of patients prior to surgery, impaired tympanometry was observed. This frequency reduced after two weeks to 10, 5 and 10 percent, followed by one month to 5, 0 and 5 percent. Statistical analysis revealed the insignificant difference between three groups at all these periods (p>0.05). This suggests that deviation of the nasal septum leading to obstruction

Surgery, they observed substantial improvement in the kind of tympano-metric C to A (P<0.05).

Postoperative discomfort is considered the most frequent disease linked with septoplastic packing. Other morbidities include postoperative infections and worsening of respiratory problems during sleep[10].

In our research, there was no significant difference in the postoperative VAS score among the three groups (p >.05). However, a substantial difference in package removal was observed (p<0.001). Patients reported mean VAS of 4.35, 2.65, and 2.35 correspondingly in groups A, B and C. In opposition to any other pain rating scales, the use of a visual analogue value to quantify pain was predicated on the following advantages: I simplicity, high sensitivity and longitudinal reproducability, (ii) a direct quantifiable numerical pain score; and (iii) excellent correlations are found between pain ratings achieved by the analogue visual score methods, and verbal response and numerical scales. [11].

Acıoğlu et al. [12] observed that Merocel and Merocel in glove finger had the greatest pain ratings reported by their patients during removal of the nasal packings. In the removal of the nasal pack, Merocel in the glove finger and Vaseline gauze all exhibited significantly lower VAS rates than Merocel.

In the Department of ENT, Rajindra Hospital, Patiala, Punjab, India Kaur et al., [13] performed an observational and comparative research. There were a total of sixty patients that met the inclusion criteria in the research. For the ungloved Group Merocel, the mean VAS score was greater for all three parameters: pain during pack insertion, in situ and during the removal. These results corroborate the notion that the of the eustachian tube impairs the central ear function. Septal deviation may lead to tubal dysfunction resulting to negative middle ear pressure has been documented in literature [7].

Nanda et al., [8] individuals under examination who had deviated nasal septum needing surgery were evaluated by a thorough history, pure tone audiometry and tympanometry for ear complaints, hearing and middle ear pressure. They subsequently received septoplastic treatment and were evaluated again after operation. Abnormal Tymapanogram type C indicating an ineffective middle ear function, which was first detected in 36% of patient ears after 12 weeks after surgery, was decreased to 12%.

El-bary et al., [9] 59 individuals with various nasal diseases have been studied. In both ears following

usage of Merocel leads to discomfort during removal because of its propensity to stick to mucosal surfaces. The findings of their research suggest that the use of a glove finger to apply the Merocel packaging decreases discomfort considerably during removal.

The total number of complications across the three groups was not statistically different (p > 0.05). It had frequencies of 30, 15 and 30 percent correspondingly in groups A, B and C. Headaches were reported in 20, 15, and 25 percent of patients in the same groups, whereas in 10, 0 and 5 percent of cases in the same groups, bleeding occurred without significant differences.

Duan et al. [14] merocel produced the highest level of bleeding in nasal packing with a significant difference from the rest of the three groups (P<0.05), produced the highest pain during the nasal packing and removal from the packing of vaseline gauze, with a significant difference in other three groups (P <0.05).

Acıoğlu et al. [12] failed to experience any post-operative infections or other packing complications.

Eşki et al. [15] carried out a research on 38 patients (21 men and 17 women; average age 36.6 years; range of 18-61 years) undergoing septoplasticism at Baskent University. All patients have been randomised into two groups. Group 1 comprised of 16 (42.10 percent) and group 2 consisted of 22 (67.90 percent), complications were not statistically significant (p>0.05) between the groups.

No significant difference between the three groups in terms of patient satisfaction (p = 1.0). Satisfaction in the three groups was rated by 55, 85, and 75 percent. Even after hoc analysis the non-significant differences between the two groups were also found.

Illum et al., [16] have out a future-oriented trial to assess three different kinds of nasal packs following septoplasty with or without further turbinectomy in relation to the packing and short-term outcomes 3 months after surgery In the patient assessment, there were no significant variations in the pain produced by the packs assessed at the time of removal.

This variance in the findings of these research may be attributable to sample size, design and the many environmental and risk variables taken into account.

5. Conclusion

No significant difference was found as regard postoperative complication, saccharine test, impaired tympanometry, and patient satisfaction between the three types of nasal packing. The pain scores during the removal of the nasal packings were highest for Merocel and lowest for Vaseline gauge.

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