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ORIGINAL ARTICLE

Evaluation of Fat and Cartilage Implant for Cases of Empty Nose Syndrome

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ABSTRACT

Background: A lot of materials have been used to reconstruct the Empty Nose Syndrome (ENS) patient's deficient anatomy including autografts (cartilage, bone, and fat), and allograft (alloderm). This work aimed for comparing the clinical outcomes, and the safety of using fat and cartilage implant in the treatment of ENS. **Patients and methods:** We performed this randomized clinical trial on 24 patients with ENS and they were divided into 2 equal groups based on management: Group (I): Twelve patients who undergone fat implant and Group (II): Twelve patients who undergone cartilage implant. Assessment of nasal obstruction improvement, nasal crust, nasal depression and nasal dryness, olfactory sensation, and saccharine test were done among the both studied groups. **Results:** There were significantly higher percent improvements of nasal obstruction, nasal crust, nasal depression, nasal dryness, olfactory sensation, mucociliary clearance improvement "Saccharine test" and endoscopic assessment, and Computed Tomography (CT) to nasal cavity in cartilage implant group compared to fat implant group within six months post operative (p=0.027, 0.005, 0.009, 0.009, 0.009, 0.004, <0.001, and 0.006 respectively). **Conclusion:** Autologous cartilage can be used as an effective implant material for the treatment of Empty Nose Syndrome. Results from treatments including cartilage implants were more favorable. Endonasal microplastic implants for the treatment of ENS patients may benefit more from cartilage implants than fat implants.

Key Words: Fat implant, Cartilage Implant, Empty Nose syndrome.

INTRODUCTION

Despite having an objectively large patent nasal cavity, the most common symptom of empty nose syndrome, which is an iatrogenic condition, is a paradoxical nasal obstruction. People who have normal turbinates and intranasal volume can be affected by ENS even though it typically occurs after the removal of the inferior and/or middle turbinates. Even though its cause has not been pinpointed, it is thought to be triggered by breathing in moist air and having wide nasal canals, both of which have the potential to affect neurosensitive receptors. There may also be involvement on the neuropsychological front. The symptoms of ENS are not always present in patients who have their radical turbinates removed. The natural breathing process that occurs in the nasal cavity may be disturbed by ENS, which may result in a decrease in the quality of life for those who are afflicted with the condition [1].

Empty nose syndrome, also known as ENS, is a condition that can occur in persons who have turbinates that appear to be normal; however, it is more common in people who have had their inferior and/or middle turbinates removed. It is best practice for rhinologists not to remove the middle and inferior turbinates on a regular basis. It is not known why some patients receive ENS while others do not get it. Given the high rate of correlation with mental diseases and, maybe, psychosomatic pathologies, it is reasonable to hypothesise that psychological stress may be a contributing factor in the conditions of some patients [2,3].

Although the severity of symptoms might vary, patients with ENS often experience the following: mucosal dryness, paradoxical nasal obstruction, headache on inspiration, rhinorrhea, , crusting, or postnasal drip (PND). The surgical procedure aims to restore the nasal architecture and airway narrowing so that the nose can resist passage of air, normal mucosa can regenerate, nasal tissue can retain more moisture due to decreased airflow, and the nasal cavity can receive better blood flow [4,5]. Stem cells are undifferentiated cells that have the ability to self-renew and differentiate into progenitor or precursor cells of one or more unique cell types. Stem cells can also differentiate into more than one type of cell [6].

It seems as though adipose tissue is a remarkable source of mesenchymal stem cells. To obtain these cells, a less intrusive and unpleasant process is required. Adult stem cells are able to be isolated from virtually every tissue in the body [7]. Due to the absence of side effects sometimes linked with synthetic materials, cartilage looks promising as a successful transplant material [2].

We aimed this study for comparing the clinical outcomes, and the safety of using fat and cartilage implant in the treatment of ENS.

PATIENTS AND METHODS

We performed this randomized clinical trial 24 patients Empty nose syndrome (ENS) in the period from January 2023 to July 2023 in the Otorhinolaryngology Department, Zagazig University Hospitals. The approval for the study was obtained from the Institutional Review Board (#10570/14-3-2023) and the research was conducted in accordance with the Helsinki Declaration.

The present study was done 24 patients, who were randomly assigned into two equal groups: Group (I): Twelve patients who undergone fat implant and Group (II): Twelve patients who undergone cartilage implant.

Inclusion criteria: We included patients from both sexes aged from 18 to 60 years, with a clinical and radiological diagnosis of ENS based on the following characteristics: past turbinoplasty or turbinectomy as a means of reducing the size of the turbinates, On the endoscopic examination, excessively wide nasal canals and partially or completely removed inferior turbinates were observed and the manifestation of classic symptoms such as stuffy nose, blocked nose, runny nose, pain in the nose or face upon inspiration, and headache.

Exclusion criteria: We excluded all cases who had the following conditions: Patients with comorbidities (chronic diseases as heart diseases, liver or renal impairment, diabetes mellitus, sepsis, and malignancy), Patients with severe septal deviation or septal perforation, patients who had primary atrophic rhinitis, nasal infection or allergy as well as cases who were younger than 18 years, pregnant, lactating, or who were unable to tolerate surgery with general anesthesia.

Methods: Complete history taking including: Age, sex, occupation, history of whether they have certain characteristic symptoms such as an evidence of previous nasal turbinate surgery, improvement of their symptoms with cotton test, experiencing symptoms such as dry mucosa, stuffy nose, face aches, headaches upon inspiration, and crusty discharge.

Clinical evaluation: Local examination of nose for assessment of wide nasal cavities, who have had prior surgery that resulted in diminished or absent inferior and/or middle turbinates.

Laboratory tests: (complete blood count, prothrombin time, and bleeding and coagulation time; biochemical tests for fasting and postprandial blood glucose, liver function tests, and renal function tests.

Saccharine test: One easy way to check the nasal mucociliary clearance was to put a small particle of saccharin particle about 1 cm beyond the front of the inferior turbinate. A sweet taste was detected when normal mucociliary activity swept the saccharin

rearward to the nasopharynx. If the absence of sweetness was not noticed within 10–20 minutes, it indicated that the mucociliary clearance was delayed. Every step of the way, participants were told not to breathe in, out, chew, drink, talk, cough, scratch, or blow their nose. In such a case, the test was canceled, and the participants were rescheduled [8].

Endoscopic assessment to nasal cavity: Whenever possible, the examination was carried out using the 0–30 degree wide-angle 4 mm endoscope. To reach the nasopharynx, the endoscope was initially inserted along the floor in the first view. The septum, inferior turbinate, inferior meatus, and Eustachian tube opening might all be examined in this way. During the second examination, the endoscope was guided via the sphenoethmoid recess and into the middle turbinate and inferior turbinate. During the initial evaluation in the outpatient clinic, diagnostic nasal endoscopy was performed on all patients and the results were documented.

Radiological assessment: CT-Scan to nasal cavity: Computerized tomographic imaging of the nose and paranasal sinuses may still reveal variable, nonpathognomonic signals, even after a bone window and contrast-free coronary CT scan.

Operation

General anesthesia was used for all surgical procedures. For 10 minutes, the middle meatus and nostril were infiltrated with nasal pledgets that contained 0.05 percent oxymetazoline.

Preparation of Conchal cartilage

The postauricular technique was used to extract conchal cartilage, which was subsequently sculpted and rolled into a spherical kidney-shaped structure mimicking a neoturbinate. After making an incision at the pyriform border, immediately in front of the anterior attachment of the inferior turbinate stump, 1% lidocaine with adrenaline (1:200,000) was injected into the nasal mucosa. Following the incision, a tunnel was created into the lateral nasal wall by elevating the mucoperiosteal flap posteriorly. Conchal cartilage was used to fill the pocket and generate a neoturbinate after the submucoperiosteal flap was elevated. The implant has been securely placed in the pocket using resorbable sutures (4-0 chromic sutures), and the patient was monitored overnight with terramycin ointment, and gauze packing (Fig. 1).

Preparation of septal cartilage

After local subperichonderial injection with 1% lidocaine containing adrenaline (1:200,000); hemitransfixation incision of septum and perichonderial flap elevation and cartilage implant.

Preparation of fat

After sterilization of the abdomen with Betadine and under complete aseptic condition under general anesthesia. Left peri umbilical incision about 5 “cm” and dissection with bulk of fat graft and this fat bulk divided into pieces, and these pieces were placed through sublabial incision and subperiosteal pocket to rebuild the inferior (Fig. 2).

Assessment of improvement

During follow-up appointments after surgery, patients underwent an endoscopic evaluation of the surgical site to detect any indications of implant infection, rejection, or allergic reactions. Radiological follow- up the patient (CT-Scan) to nasal cavity after (1 ,2,3,4) months. Anterior rhinoscopy and nasal mucociliary clearance (saccharine test) all was done preoperatively and postoperatively. The degree of improvement of symptoms of dryness, epistaxis ,nasal crusting.

STATISTICAL ANALYSIS

The information was analyzed using Stata (version 23.0), statistical software designed for the social sciences (SPSS Inc., Chicago, Illinois, USA). The chi-square test or Fischer's exact test was utilized for categorical variables with a frequency of less than 5, whereas the T test or Mann-Whitney test was utilized for normally distributed continuous variables. For paired categorical variables, the Mcnemar test was employed.

RESULTS

No significant differences were found between groups regarding gender, age, type of previous operation, medical history, or duration of operation of both surgical modalities (P>0.05) (Table 1).

There were significantly higher percent improvements of nasal obstruction, nasal crust, nasal depression, nasal dryness, olfactory sensation, in cartilage implant group compared to fat implant

group within six months post operative (p=0.027, 0.005, 0.009, 0.009, 0.009 respectively) (Table 2).

Six months post operative: There was significant higher percent of epistaxis improvement and a significant olfactory sensation improvement in cartilage implant group compared to fat implant group (p=0.009) (Table 3).

There was significant improvement in mucociliary clearance "Saccharine test" compared to pre-operative (p=0.004). Three- and six-months post-operative: There were significant differences in endoscopic assessment of nasal cavity in both groups (p<0.001). Also, there were significant differences in CT assessment of nasal cavity in both groups (p=0.006) (Table 4). There was no difference regarding occurrence of complication in both procedure (p>0.05) (Table 5).

Table (1): Patients' characters, Surgical history, Past medical, Duration of operation of studied groups.

Variables	**Group I (Fat implant) N=12**	**Group II (cartilage implant) N=12**	**Test of sig**	**p**
Gender n (%) Females Males	 7 (58.3) 5(41.7)	 8(66.7) 4(33.3)	F	0.99
Age per years Mean ±SD Range	 28.7± 8.2 20- 43	28.3±5.9 20-39	0.114t	0.911
Variables	**Group I (Fat implant) N=12**	**Group II (cartilage implant) N=12**	**χ 2**	**P**
	N(%)	**N(%)**		
Previous operation o Septoplasty and Cold surgery (inferior turbinectomy) o Septoplasty and Cauterization of inferior turbinectomy	6(50.0) 6(50.0)	5(41.7) 7(58.3)	0.168	0.682
Medical history o Iron deficiency anaemia	1(8.3)	2(16.7)	f	0.99
Variables	**Group I (Fat implant) N=12**	**Group II (cartilage implant) N=12**	**t**	**P**
	N(%)	**N(%)**		
Duration of operation(min) Mean ±SD (Range)	 132.3±26.2 (93-165)	 123±21.9 (82-146)	0.937	0.359

SD=standard deviation, f= fisher Exact test, t: student t test, p>0.05 was considered no significant

Table (2): Comparison of Nasal obstruction, Crust, depression and dryness pre, three month and six months Post-operative in Group (Fat implant) ,Group (cartilage implant) surgical procedure for empty nose

Variable	Group (Fat implant) N=12	Group (cartilage implant) N=12	fP
	n (%)	n (%)	
Nasal obstruction			
Pre -operative	11(91.7)	11(91.7)	-
Post-operative three month	5(41.7)	3(25.0)	0.667
Post-operative six month	7(58.3)	1(8.3)	**0.027**
P1	**0.031**	**0.008**	
P2	0.125	**0.002**	
Nasal crust			
Pre -operative	10(83.3)	11(91.7)	0.99
Post-operative three month	4(33.3)	3(25.0)	0.667
Post-operative six month	7(58.3)	0(0.0)	**0.005**
P1	**0.031**	**0.008**	
P2	0. 25	**0.001**	
Nasal depression			
Pre -operative	11(91.7)	10(83.3)	0.99
Post-operative three month	5(41.7)	3(25.0)	0.667
Post-operative six month	8(66.7)	1(8.3)	**0.009**
P1	**0.031**	**0.016**	
P2	0. 375	**0.004**	
Nasal dryness			
Pre -operative	12(100.0)	12(100.0)	-
Post-operative three month	3(25.0)	1(8.3)	0.59
Post-operative six month	6(50.0)	0(0.0)	**0.009**
P1	**0.004**	**0.001**	
P2	**0. 031**	**0.0001**	

F:Fisher exact test, p>0.05:no significant, p<0.05 :significant, (p:compare between fat implant group& cartilage implant group), (p1:compare preoperative& Post-operative three month), (p2: compare preoperative & Post-operative six month).

Table (3):Comparison of epistaxis and olfactory sensation pre-operative, three month and six months Post-operative in Group (Fat implant), Group (cartilage implant) surgical procedure for empty nose

Variable	Group (Fat implant) N=12	Group (cartilage implant) N=12	fP
	n (%)	n (%)	
Epistaxis			
Pre -operative	10(83.3)	8(66.7)	0.64
Post-operative three month	3(25.0)	1(8.3)	0.59
Post-operative six month	6(50.0)	0(0.0)	**0.009**
P1	**0.039**	**0.016**	
P2	**0. 219**	**0.008**	
Olfactory sensation(present)			
Pre -operative	1(8.3)	2(16.7)	0.99

Variable	Group (Fat implant) N=12	Group (cartilage implant) N=12	fP
Post-operative three month	8(66.7)	9(75.0)	0.99
Post-operative six month	5(41.7)	11(91.7)	**0.009**
P1	**0.039**	**0.039**	
P2	0. 125	**0.004**	

F: Fisher exact test, p>0.05:no significant, p<0.05 :significant, (p: compare between fat implant group& cartilage implant group), (p1: compare preoperative& Post-operative three month),(p2: compare preoperative & Post-operative six month).

Table (4):Comparison of saccharine test, Endoscopic assessment, and CT assessment to nasal cavity pre-operative, three month and six months Post-operative in Group (Fat implant) ,Group (cartilage implant) surgical procedure for empty nose.

Variable	Group (Fat implant) N=12	Group (cartilage implant) N=12	Test of sig	P
Saccharine test time(minute)				
Pre-operative	38.2±5.8 32-49	34.6±4.4 31-46	1.71	0.102
Post-operative three month	14.9±4.9 9-27	12.7±3.08 9-18	1.35	0.19
Post-operative six month	16.4±4.9 10-29	11.3±2.6 8-15	**3.2**	**0.004***
P1	**0.0001**	**0.0001**		
P2	**0.0007**	**0.0001**		
Endoscopic assessment to nasal cavity	**Group I (Fat implant) N=12**	**Group II (cartilage implant) N=12**	**Test of sig**	**P**
	N(%)	**N(%)**		
pre ○ Patent nasal cavity, Bilaterally complete inferior turbinate resection ○ Patent nasal cavity, Unilateral complete inferior turbinate resection	5(41.7) 7(58.3)	9(75.0) 3(25.0)	2.74	0.098
Post-operative (3 months) ○ Present of narrowing ○ Mild increase narrowing	12(100.0)	12(100.0) 0.0	20.17	0.0001*
Post-operative (6 months) ○ Present of narrowing ○ Moderate increase narrowing	0 12(100.0)	12(100.0) 0.0	20.17	0.0001*
CT assessment to nasal cavity	**Group I (Fat implant) N=12**	**Group II (cartilage implant) N=12**	**Test of sig**	**P**
	N(%)	**N(%)**		
Pre-operative ○ Widely patent nasal cavity, evidence of prior turbinate surgery bilaterally	5(50.0)	9(75.0)	2.74	0.098

○ Widely patent nasal cavity, evidence of prior turbinate surgery unilaterally	7(50.0)	3(25.0)		
Post-operative (3 months) ○ Decrease in size of nasal cavity	12(100.0)	12(100.0)	-	-
Post-operative (6 months) ○ Decrease in size of nasal cavity ○ Increase in size of nasal cavity	4(33.3) 8(66.7)	12(100.0) 0.0	f	0.006*

Saccharine test for efficacy of mucocilliary clearance time (minute), F:Fisher exact test, p>0.05:no significant, p<0.05 :significant, (p: compare between fat implant group& cartilage implant group), (p1: compare preoperative& Post-operative three month), (p2: compare preoperative & Post-operative six month)

Table (5): Complication in studied groups.

Variables	Group (Fat implant) N=12		Group (cartilage implant) N=12		[f]P
	n.	%	n.	%	
Intraoperative complications					
Bleeding	2	16.7	0	0.0	0.478
post-operative complications					
Incidence of post-operative complication	2	16.7	1	8.3	0.99
Perichondritis	0	0.0	1	8.3	0.99
Surgical Emphysema	1	8.3	0	0.0	0.99
Wound Infection	1	8.3	0	0.0	0.99

Data were expressed as number and percent, f= fisher Exact test, p>0.05 was considered no significant.

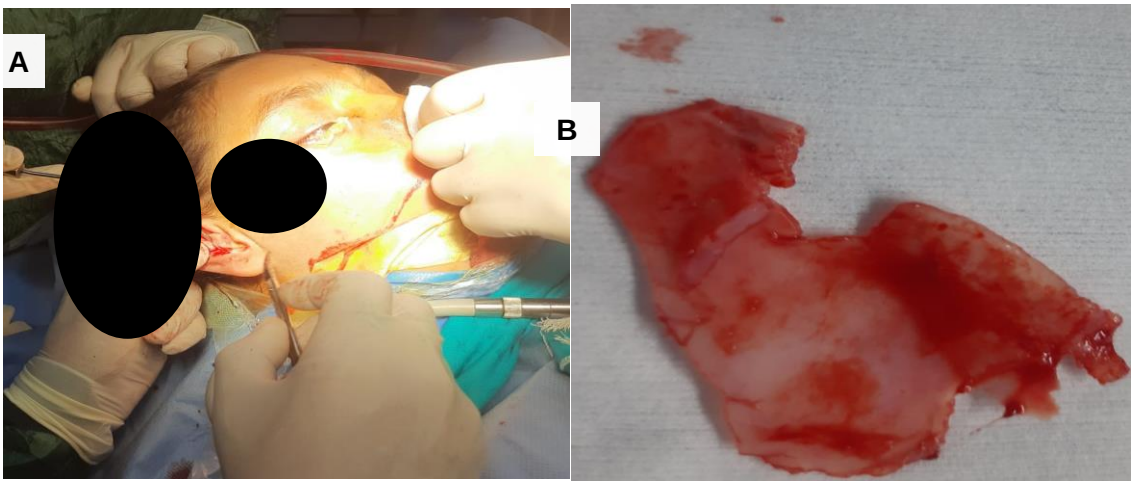

Fig. 1: (A) Auricular incision for conchal graft (B)conchal cartilage graft

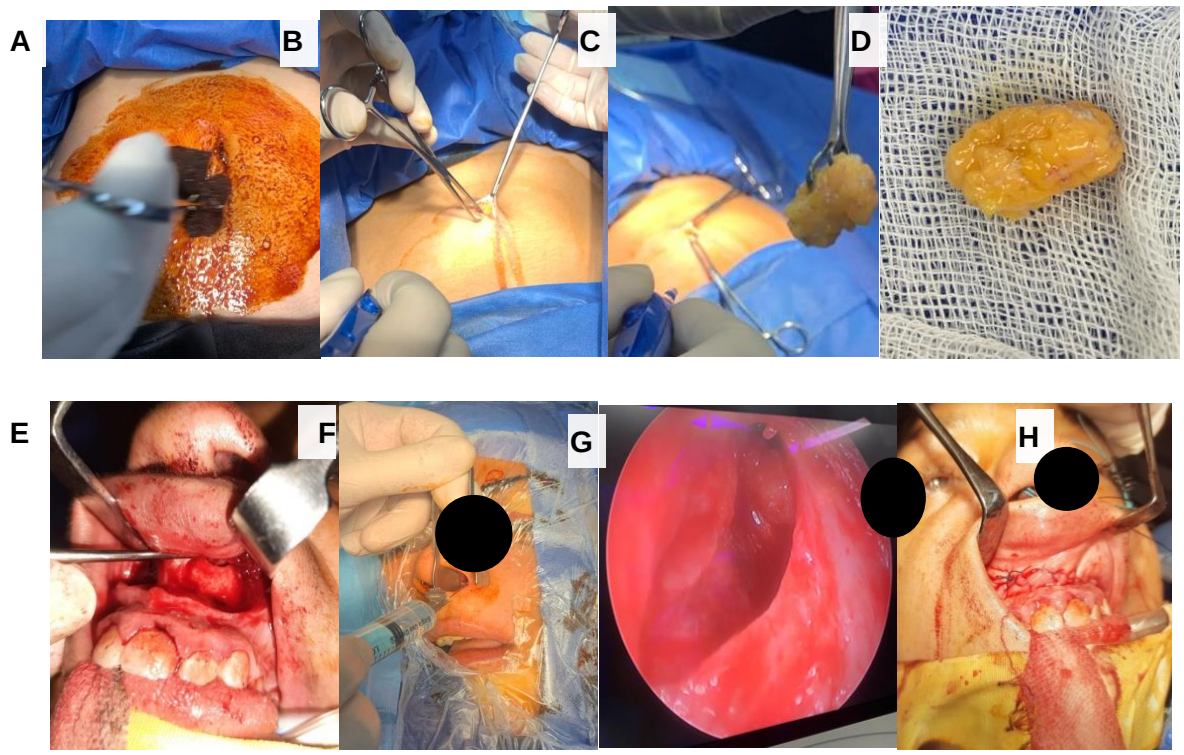

Fig. 2. (a) exposure and sterilization of periumbilical area (b) incision of periumbilical area (c) exposure of subcutaneous fat in the periumbilical area (d) enbulk fat graft (e) Sublabial incision (f) local hemostatic solution for injection (g) subperiosteal pocket of the floor of the nose for fat implant (h) closure of the sublabial wound

DISCUSSION

A lot of materials have been used to reconstruct the ENS patient's deficient anatomy including autografts (cartilage, bone, and fat), allograft (alloderm), and biomaterials such as plastipore and silastic. Moreover, some injectable materials like collagen, PRP, and fat have been tried but none of them have proved to be ideal in restoring anatomy and function of the nose. These grafts could be able to restore the shape of the turbinate but failed to restore the advanced function of the nasal epithelium including humidification and warming the inspired nasal airflow. With the recent advances in stem cell therapy, the hope has been renewed to use this technique for restoring the functioning nasal epithelium in those miserable patients [9].

In the present study we found that there was a significantly higher percent of nasal obstruction improvement in cartilage implant group compared to fat implant group within six months post operative. In agreement with our findings, Jang et al. [10] showed that patients got a marked improvement on the visual analogue score (VAS) for nose or facial pain, excessive airflow, and blockage after submucosal cartilage implantations at the inferolateral nasal walls. In three individuals, surgical complications were found (under correction).

The present study findings regarding nasal crust clearly revealed that there was a significantly higher percent of nasal crust improvement in cartilage implant group compared to fat implant group within six months post operative.

This was in accordance with Ibrahim et al. [11] who reported the primary preoperative findings were broad nasal cavities, nasal crusting, and absence of turbinate tissue, as revealed by objective evaluation using anterior rhinoscopy and endoscopic inspection. Nasal crusting, which practically vanishes after implantation, shows significant objective improvement. In both groups, postoperative endoscopic nasal examination and anterior rhinoscopy revealed quick healing without indications of implant rejection, allergic reaction, infection, or slow healing. Patients' nasal canals

showed higher redness, increased mucus secretion, and decreased scab formation.

In consistent with our findings, Jung et al. [12] found that when comparing the mean difference between the pre- and post-operative SNOT-25 scores, the costal cartilage group showed statistically more significant improvement compared to the conchal cartilage group. Functional issues (such as a runny nose, postnasal discharge, nighttime waking, dryness, difficulty breathing through the nose, an overly open nose, and crusting on the inside of the nose) as well as three depression-related items (low productivity, decreased concentration, and frustration/irritability) showed improvement in the costal cartilage group.

Concerning nasal depression, the present study findings revealed that there was statistically significantly higher percent of depression improvement in cartilage implant group compared to fat implant group within six months post operative.

Kim et al. [13] showed that At1,3, and 6 months following intervention, as well as at any point beyond 12 months for patients with ENS, the sinonasal outcome test, the empty nose syndrome 6-item questionnaire (ENS6Q), and depression ratings were assessed. Significant improvement in symptoms was shown by all scores. According to the ENS6Q's minimal clinically meaningful difference (6.25), augmentation of the inferior turbinate or meatus alleviated the long-term nasal symptoms of ENS. Anxiety levels improved at 3 months, 6 months, and more than 12 months, but at 1 week, the changes were not statistically significant.

In the present study we found that there was statistically significant higher percent of nasal dryness improvement in cartilage implant group compared to fat implant group within six months post operative.

These results were compatible with Hosokawa et al. [14] illustrated that although all ENS6Q measures showed considerable improvement after surgery, the mean ENS6Q total score improved the most; nevertheless, dryness improved at a little slower rate than the other parameters. It is possible that the inferior meatus may get more airflow when the nasal cavity is narrowed with the IMAP, leading to a more accurate impression of nasal airflow. This could explain why the ENS6Q reports less nasal airflow and "nose feels too open" as improvements.

In the present study we found that preoperative there was no significant differences in percent of epistaxis in both groups which turned into significant higher percent of epistaxis improvement in cartilage implant group compared to fat implant group within six months post operative.

In agreement with our findings, Zhang et al. [15] showed that one location that can develop epistaxis is the anteroinferior portion of the nasal septum, which is also called Little's area. Because the vortex and greatest shear stress were located at the perforation's side, more physical and chemical particles and pathogens were deposited there, leading to more mucosal injury. Shear stress on the mucosal wall and vortexes at the septal margins were both decreased by the cavity-narrowing procedure.

The present study findings clearly revealed that there was significant olfactory sensation improvement in cartilage implant group compared to fat implant group within six months post operative.

Matching our findings, Zhang et al. [15] stated showed the amount of airflow that could enter the nasal cavity before to surgery was quite low. Also affecting the ability to smell were issues with pathological dryness of the nasal cavity and the development of a dry crust in the olfactory region. There was an increase in the deposition of odorants in the olfactory area after surgery because of the enhanced vortexing and airflow that reached the area. This probably made the sense of smell better. Since the olfactory area is a stream, the improvement in nasal olfactory function following cavity-narrowing surgery was more pronounced than that following nasoseptal perforation repair.

In the present study we found that there was statistically significant improvement concerning efficacy of mucociliary clearance time “Saccharine test” in cartilage implant group compared to fat implant group within six months post operative.

Similar findings were obtained by Ibrahim et al. [11] who reported that the association of surgical fat implant and autologous adipose-derived stem cells (ADSCs) injection has resulted in significant improvement in the results of mucociliary clearance test where there was an improvement in the function of the mucosal surfaces of the turbinate after the reconstruction. The association of surgical fat implant and ADSC injection has resulted in being an effective management of ENS to recover the volume

and restore functionality of the damaged or amputated nasal mucosa.

In the present study we found that there was statistically significant difference regarding endoscopic assessment of nasal cavity in both groups. In consistent with our findings, Jung et al. [12] demonstrated that both groups showed no indications of implant infection, rejection, or allergic reaction during postoperative endoscopic examinations; furthermore, no patients showed misplaced implants on endoscopic examination or postoperative computed tomography (CT) throughout the follow-up period.

The present study findings clearly revealed that there was statistically significant difference in CT assessment of nasal cavity in both groups within six months post operative. This was in accordance with Hosokawa et al. [14] who demonstrated that prior to the procedure, the CT scan and endonasal endoscopy revealed that the inferior turbinate was largely absent, and that the nasal cavity had significantly increased. Three months after the procedure, CT and endonasal endoscopic scans revealed that the nasal cavity had been progressively narrowed from front to back due to the implantation of ADF in the nasal floor.

In the present study we found that there was statistically insignificant difference regarding occurrence of complication in both procedures. In agreement with our findings, Hosokawa et al. [14] reported that there were no surgical complications.

Jung et al. [12] studied the efficacy of costal and conchal cartilage implants in treating empty nose syndrome and found that both groups improved significantly after surgery on the SNOT-25. However, when looking at the mean difference between pre- and post-operative SNOT-25 scores, the costal cartilage implant group outperformed the conchal cartilage implant group.

Saafan et al. [16] stated that repairing damaged tissue, restoring normal airway resistance, and managing symptoms are the main goals of endotracheal shunt (ENS) treatment. Restoring the inadequate intranasal anatomy in ENS patients can be achieved through the practical procedure of implanting graft materials beneath the nasal mucosa. The effectiveness and safety of treatments including the implantation of acellular dermal grafts and silastic sheets were compared in his study. Both materials showed substantial outcomes in terms of SNOT-25 scores in that study, but there were no indications of major differences between them, and remarkable results were obtained.

Modrzyński et al. [17] reported that hyaluronic acid gel implants for less severe cases of ENS after his investigation found excellent results with these implants. Even though these synthetic implants might work, many doctors and scientists believe that the most biocompatible option is to employ autologous or homologous materials, such cartilage.

Thamboo et al. [9] demonstrated that ENS6Q results are the most appropriate for gauging the effect of IMAP. Positive and positive effects of IMAP on ENS patients are demonstrated by the 13.3% statistical and clinical drop in ENS6Q from baseline to 6 months post-IMAP. Many psychological problems associated with upper airway respiratory impairment can be significantly alleviated with the use of IMAP. Supporting the argument that the development of the onerous psychological profile associated with ENS is partially driven by chronic suffering from debilitating nasal and sleep concerns secondary to nasal tissue loss, there was a significant improvement in PHQ-9 (depression) and GAD-7 (anxiety) scores following IMAP.

Several limitations should be acknowledged in our study. Firstly, the relatively modest sample size of 24 participants may limit the generalizability of our findings. A larger and more diverse clinical trials could provide a more comprehensive understanding of the clinical outcomes, and the safety of using fat and cartilage implant for the treatment of ENS. The absence of long-term follow-up data is another limitation, preventing us from assessing the enduring effects of Fat and Cartilage Implant for Cases of Empty Nose Syndrome and monitoring late-onset complications.

CONCLUSION

Implants made of autologous cartilage have shown promising results in the treatment of Empty Nose Syndrome. Treatment outcomes were improved with the introduction of cartilage implants. Therefore, endonasal microplasty implants made of cartilage may be better suited to treat ENS patients than those made of fat. In addition to alleviating nasal symptoms, patients with ENS may find relief from related mental health issues like anxiety and sadness

after undergoing inferior turbinate/meatus augmentation.

CONFLICTS OF INTRESET

No conflicts of interest

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Citation

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