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The effect of septoplasty on olfaction

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Abstract:
Objective: *To evaluate effects of septoplasty[SP] and nasal turbinectomy[NT] on olfaction.* ***Design:*** *A prospective randomized controlled study of olfaction in 40 patientsof Anatomic nasal obstruction [ANO] divided into 20 patients with Deviated septum[DS] where septoplasty has been performed and a control group of 20 patients with nasal hypertrophic turbinates where NT has been performed. All the patients underwent pre-operative and post-operative assessment with a questionnaire[Q] and UPSIT.* ***Results:****In20 patients with septoplasty, 7 patients showed worsened sensation of smell by Q and there was a decrease in the mean scores of smell test. The difference was significant (P < 0.01). In 20 patients with NT showed no change or improved in sensation of smell.The difference was insignificant (P=0.4)by objective analysis.****Conclusion:****septoplasty may lead to detectable adverse effect on olfaction.*
Key words: septoplasty,olfaction,turbinectomy.

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I. Introduction

The main functions of the nose are olfaction ,humidification and defence which require good interaction between the inspired air and the mucous membranes or the sensory cells of the olfactory system. this is achieved by the help of the septum which preserves the geometry of the internal nose. The success of functional and cosmetic nasal surgery depends on correction of the septum ,where nasal surgery involves both function and aesthetics as pointed out by Maurice cottle in 1960s .1 the appropriate management of the MT remains controversial ,and arguments for its resection and for its preservation have been proposed2-4. Patientshad better outcome after endoscopic surgery if DNS was corrected during theprocedure5, 53.5 % of patients who required revision surgery had un uncorrected DNS 6.

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II. Methods

This study was carried out as a prospective randomized controlled study of olfaction.Patients selected were having anatomic*nasal obstruction [ANO]* not previously treated surgically and were refractory to the ordinary treatment [including local decongestants and topical corticosteroid]. There were *40 patients, 28 Females and 12 Males ,their age range was 21-56 years(Y) , with a mean age of 33.2 Y and their range of duration of nasal obstruction (NO) was 1-20 Y, with a mean duration of NO was 6.2 Y* . Patients were then divided into 20 patients with Deviated septum *where the operation of septoplasty has been performed[* these 20 patients included 14 Females and 6 Males ,their age range was 21-56 years , with a mean age of 31.75Y and their range of duration of NO was 1-20 Y, with a mean duration of NO was 5.15 Y , according to the VAS, CNO was 8-10 with a mean 8.5and according to the UPSIT, the score was 14-40 with a mean score 30.65 and *a control group of* 20 patients with nasal hypertrophic turbinates*where the operation of nasal turbinectomy [NT] (total or partial removal of middle and/or inferior turbinate) has been performed[* These were 14 Females and 6 Males , their age range was 21-56 years, with a mean age of 33.1Y and their range of duration of NO was 1-20 Y, with a mean duration of NO was 7.1Y , according to the VAS, CNO was 8-10 , with a mean 8.5 and according to the UPSIT, the score was 15-40 with a mean score 29.9].No septic focus , polyp or mass was found pre-operatively in either the pharynx or the nose. The operation of *septoplasty &* NT (total or partial removal of middle and/or inferior turbinate) were performed under nasal endoscope 30 & 0 degree and local anaethesia (nasociliary, infraorbital blocks with topical anaesthesia of the pterygo- palatine nerves. The blocks were bilateral. Topical anaesthesia on each side, just posterior to the middle turbinate by a small piece of gauze soaked in 2 % lignocaine at the end of the nasal passage for at least 10 min . To block the infraorbital nerve, an oral or nasal approach, by 3 ml 2% lignocaine, a 3-cm, 25-gauge needle was injected in the vicinity of the foramen without entering the canal .To block the nasociliary nerve or its branches, needle as above was inserted 1 cm above the inner canthus and directed posterolaterally, keeping contact with bone7,8,9). [*septoplasty by*

freer incision5 m.m from anterior edge of septum&NT by a microdebridor]. All were followed up until complete healing was confirmed by endoscopic visualization at the final office examination. Smell assessment: This prospective controlled study involved 40 patients undergoing septoplasty and nasal turbinectomy mentioned above. Before surgery ,each patient completed a questionnaire to elicit information on medications, medical history and the patient,s subjective assessment of olfaction . 40 patients then took the smell test by UPSET10. the test was presented to both nostrils simultaneously,the nostrils were not tested separately. The test scoring is based on the number of correct answers that can range from 0 to 40 in which 0 represents complete anosmia and 40 represents a perfect score . All patients underwent pre-operative nasal endoscope and coronal computed tomography of the nose &paranasal sinuses.8 Patients who stated that they had complete anosmia or patients who scored less than 10 on this smell test were excluded from the study. Patients were examined at regular intervals according to standard protocol,approximately 5 weeks after surgery. The patients who had complete recovery with no signs of scabbing and crust formation completed a post-operative questionnaire and repeated Smell test .Patients who were incompletely healed at 5 weeks after surgery were asked to return at 8 weeks after surgery .the remainder of the patients completed the questionnaire and the smell test at that time . The questionnaire by asking if the sense of smell had improved ,worsened or remained unchanged since the surgery . All patients completed smell test by the end of 8 th post-operative week . Statistical analysis: Descriptive and statistical analysis was performed to obtain the Means and Variance as well as the Standard deviation for all variables . The Student,s t test was used to correlate the statistical significance. All patients had a performed consent to participate in this study and the procedures were performed by the same author in the same period between January 2022 and June 2022.

III. Results

The details of the patients with septoplasty and turbinate resection and post-operative resultsare shown in tables1&2.There were 20 patients with septoplasty and according to the UPSIT, the score was 0-40 with a mean score 20.55]where 7 patients showed worsened sensation of smell by questionnaire (subjective analysis) and there was a decrease in the mean scores of smell test.(objective analysis).The difference was significant (P <0.01) .The other patients underwent turbinate resection [middle and/or inferior turbinate] and according to the UPSIT, the score was 15-40 with a mean score 30.4] where these 20 patients showed no change or improved in sensation of smell by subjective analysis. The difference was insignificant (P=0.4)by objective analysis.

Data concerning Septoplasty in CNO patients Table 1

tient no	Age(Y)	Sex	Duration (Y) of NO		endoscopic examination	CT findings	Septoplasty			Last follow up Result Post-operative
1	56	f	3		DS	CB	+			CC& *
2	28	f	3		DSHI	DSHI	+			CC&*
3	44	f	10		DS	CB	+			CC &**
4	54	f	12		DSHI	DSHI	+			CC &*
5	34	f	10		DS	DS	+			CC&*
6	21	f	5		DS	DS	+			CC &**
7	43	f	8		DS	DS	+			CC&*
8	30	f	8		DS	DS	+			CC &**
9	26	f	4		DS	DS	+			CC &*
10	33	f	4		DS	CB	+			CC &*
11	45	f	6		DSHM	DSHM	+			CC &*
12	32	f	5		HMDS	HMDS	+			CC &**
13	23	f	2		DSHI	DSHI	+			CC&*
14	31	f	6		DS	CB	+			CC&**
15	46	m	9		HMDS	HMDS	+			TiNO&*
16	34	m	3		DS	DS	+			CC &**
17	30	m	2		HMDS	DS	+			CC &*
18	26	m	2		DSHI	DSHI	+			CC &*
19	30	m	5		DS	DS	+			CC&*
20	25	m	4		DS	CB	+			CC &**

CT computerized tomography, CC complete cure of nasal obstruction , , f female, m Male,HM hypertrophic middle turbinate, HI hypertrophic inferior turbinate, DS deviated septum, CB concha bullosa of middle turbinate.* unchanged or improved sensation of smell,**worsened sensation of smell[adverse].

Data concerning Nasal turbinectomy in CNO patients Table 2

Patient no	Age(Y)	Sex	Duration (Y) of NO	BMI Of Ob	endoscopic examination	CT findings	NT MT total	NT MT partial	NT IT partial	Last follow up Result Post-operative
1	25	f	1	25	HM	CB	+	-	-	CC & *
2	22	f	2	30	HMHI	HMHI	-	+	+	CC &*
3	56	f	20	35	HM	CB	-	+	-	CC &*
4	50	f	15	28	DSHI	HI	-	+	+	CC &*
5	45	f	10	32	DS	-	+	-	-	CC &*
6	40	f	7	34	DSHI	HI	+	-	+	CC &*
7	50	f	5	30	HI	HI	-	+	+	CC &*
8	46	f	12	34	HI	HI	+	-	+	CC &*
9	24	f	2	27	DS	DSHI	+	-	+	CC &*
10	23	f	3	28	HM	CB	+	-	-	CC &*
11	25	f	5	30	HI	HI	-	-	+	CC &*
12	45	f	9	38	HMHI	HMHI	+	-	-	CC &*
13	38	f	4	32	DSHI	DSHI	-	+	+	CC &*
14	21	f	2	25	HM	CB	+	-	-	CC &*
15	24	m	3	35	HMHI	HMHI	+	-	+	CC &*
16	30	m	5	32	DS	-	+	-	+	CC &*
17	40	m	9	36	HMDS	DS	+	-	+	CC &*
18	26	m	4	40	HI	HI	-	+	+	CC &*
19	21	m	3	32	HI	HI	+	-	+	CC &*
20	24	m	2	25	HM	HM	+	-	-	CC &*

CT computerized tomography ,CC complete cure of nasal obstruction , , f female, m Male,HM hypertrophic middle turbinate, HI hypertrophic inferior turbinate, DS deviated septum, CB concha bullosa of middle turbinate.* unchanged or improved sensation of smell.

IV. Discussion

The olfactory receptor cells are present in the mucosa of the superior nasalturbinate and the opposite part of the nasal septum.11,12 Kimmelman examined 93 patients undergoing various types of nasal surgery including ESS, rhinoplasty, septoplasty ,and fracture reduction .he reported no statistically significant effect of the type of operation on olfaction as measured with UPSIT.13Davis et al. reported that middle turbinectomy was the most important variable in predicting patency of the middle meatus antrostomy.14 Eichel considered absence of the MT an absolute contraindication for ESS.15 Pratt concluded that neither the MT nor the medial wall the ethmoid should be removed,as they present a pathway for infection and meningitis.16 Leopold determined that the volume of the space between the midportion of the middle turbinate and the septum correlated strongly with olfaction.17 M.Friedman described the creation of an adhesion between the medial aspect of the MT and the nasal septum by abrading these surfaces using the microdebrider and there was not adverse effect on olfaction by this type of MT medialization.18 Our study presents good solutions for most dilemma mentioned.

V. Conclusion

1-Septoplasty may lead to adverse effect on olfaction & nasal turbinectomyhas not adverse effect on olfaction.2-In patients with CNOand DNS, partial turbinectomy (inferior and/or middle) may be instead of some septoplasty to preserve olfaction and prevent other complication of septoplasty.

VI. Summary

Prospective study was to analyse the results of septoplasty on olfaction and nasal obstruction (NO) in20 patients of Anatomic *nasal obstruction [ANO]* with Deviated septum,after pre-operative and post-operative assessment with a questionnaire and UPSIT whereseptoplasty impacted olfaction in 7 patients by questionnaire and there was a decrease in the mean scores of smell test,the difference was significant ($P < 0.01$) in comparing with a control group of *nasal turbinectomy*in which the difference was insignificant (P=0.4)by objective analysis.

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