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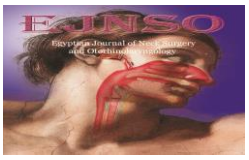

Evaluation of Metzenbaum's technique in correction of the caudal end of the nasal septum deviation

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Abstract:

Background: Caudal septal deviation is a significant reason for nasal obstruction. The first line of management is medical support to the nasal mucosa, if it fails, surgical treatment for a caudal septal deviation with Metzenbaum's "swinging door" method.

Objective: To evaluate the results of Metzenbaum's technique in correction of the Caudal end septal deviation on nasal airway obstruction and headache.

Patients and Methods: This observational study was done in the ENT department of Assiut University hospitals, included only patients with nasal airway obstruction due to caudal septum deviation, ages between 18 and 45y. Patients with other causes of airway obstruction e.g., nasal polyps hypertrophied inferior turbinate and patients having other external nose deformities other than caudal septal deviation were excluded.

Results: Pre-operative, out of 36 patients 18 had severe nose score between 60 and 90, and 18 had moderate nose score between 26 and 50. However post–operative; all the patients with severe nose score became mild with nose score less than 25 while 8 of the patients with moderate nose score became mild and 10 of them had no problem anymore. After 2-month follow up the symptoms were relieved in all the patients with no caudal septal deviation.

Conclusion: Caudal end deviation of the nasal septum can cause a serious breathing problem. Swinging door method is an effective surgical procedure for repairing caudal septum deviation.

Keywords: Nasal, obstruction, caudal, swinging door method.

Introduction

Caudal septal deviation can be a leading cause cosmetic and functional problem than other types of septal deviations. It is still difficult in its correction. [1] The first line of septal deviation management is medical therapy for the nasal mucosa with topical nasal steroids, antihistamines, and decongestants as tolerated. If it fails, then surgical intervention is needed to correct the underlying septal deformity. [2]

Surgical Procedures vary from simple techniques to more complex aggressive ones aiming to preserve the function and adequate shape of nasal septum. [3] The first surgical procedure for a caudal septal deviation was Metzenbaum's "swinging door" method, which was published in 1929 and we are using it in our study. [4]

This study Aimed to evaluate the results of Metzenbaum's technique in correction of the Caudal end septal deviation on nasal airway obstruction and headache.

Patients and methods:

The study was conducted as an observational study in the ENT department of Assiut University hospitals in the period from March of

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2021 to March of 2023 on thirty-six patients.

Only patients (ages between 18 and 45) with nasal airway obstruction due to caudal septum deviation presented to the clinic of the ENT department of Assiut University Hospitals were included in the study, But Patients with other causes of airway obstruction e.g., nasal polyps, hypertrophied inferior turbinates, having other external nose deformities other than caudal septal deviation or having contraindications for general anesthesia were excluded.

Pre-operative:

After fulfilling all inclusion and exclusion criteria all patients were subjected to full history taking and Photo documentation (Figure 1).

Each patient was photographed pre and post-operatively in the same view, patients were evaluated by The Nasal Obstruction Symptom Evaluation (NOSE) scale score. [5]

Results are recorded for each score on a scale from 0 to 4 and these scores were multiplied by 5 generating a balanced scale from 0 to 100, data was stratified according to NOSE scores and nasal obstruction was categorized as mild (0-25), moderate (26-50) and severe (> 50) both preoperatively and postoperatively (Figure 2).

Surgical technique and Preparation:

The Metzenbaum's procedure, as shown in (Figure 3) was used in the caudal septal deviation correction surgery, Patient was prepared by applying 0.05% of oxymetazoline hydrochloride to the nasal mucosa, Lidocaine and 1/100000 of adrenaline were infiltrated

Statistical analysis:

•Data were collected from the clinical interpretation of the patients at presentation and from the medical records.

•Computer software: SPSS Program, version 20 was used.

Results

The study included 36 patients; 20 of them were males (55.6%) and 16 were females (44.6%), their ages were from 18 to 35 years old, All the patients had unilateral caudal septum deviation; 20 of them had a right side (55.6%) defect and 16 had a left side (44.4%) defect, The main complaints were nasal obstruction and headache; with 16 patients having only nasal obstruction 44.4% and 20 patients having both nasal obstruction and headache 55.6%.

As regards the etiology of septal deviation; 20 patients had congenital caudal septal deviation and 16 patients had traumatic caudal septal deviation.

Comparison between NOSE SCORE severity preoperative and postoperative among the studied group as shown in table (1):

Pre-operative; out of 36 patients 18 had severe nose score between 60 and 90, and 18 had moderate nose score between 26 and 50.

Post –operative; all the patients with severe nose score became mild with nose score less than 25 while 8 of the patients with moderate nose score became mild and 10 of them had no problem anymore

Follow-up symptoms and Patient photo score among the studied group as shown in table (2):

After 2-month follow up the symptoms as Nasal blockage, trouble breathing through nose, trouble sleep, obstruction during exertion and headache, some symptoms relieved totally in all the patients as nasal blockage, trouble breathing through nose and headache but others still presented with difference percentages,

and as regards caudal septal deviation it was completely relieved in all patients.

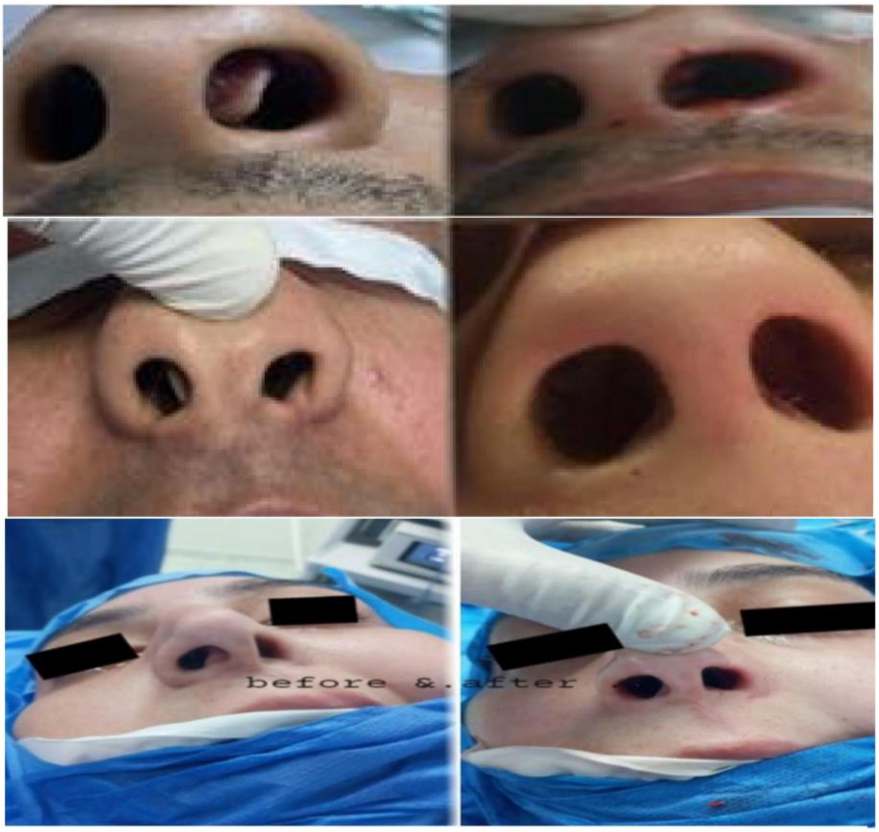

Figure (1): some photo documentation before and after surgery

	Not a problem	Mild problem	Moderate problem	Fairly bad problem	Severe problem
Nasal congestion	0	1	2	3	4
Nasal blockage	0	1	2	3	4
Trouble breathing through nose	0	1	2	3	4
Trouble sleep	0	1	2	3	4
Obstruction during exertion	0	1	2	3	4

Figure (2): NOSE scale score

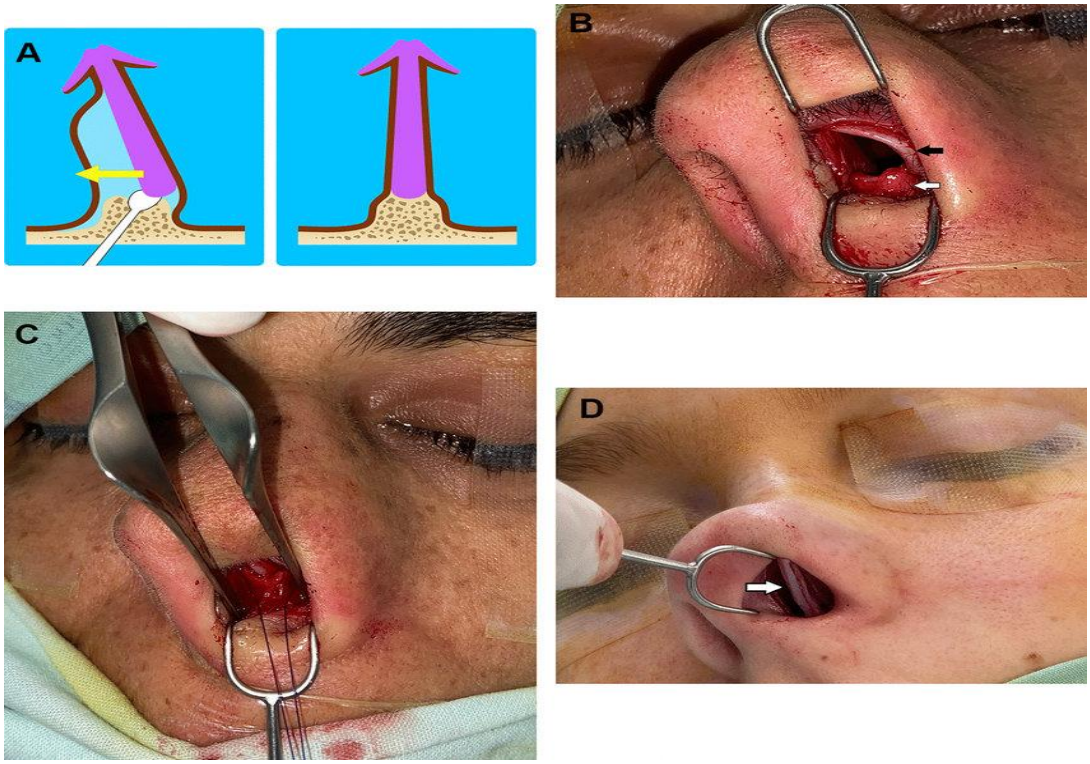

Figure (3): Metzenbaum's technique (swinging door method) in caudal septal end correction.

Table (1): comparison between NOSE SCORE severity preoperative and postoperative among the studied group

NOSE SCORE	
Preoperative	
Moderate (n=18)	
Min.-Max.	26 - 50
Mean ±SD	36.61±9.31
Median(Q1-Q3)	32.5(28-47.25)
Severe (n=18)	
Min.-Max.	60 - 90
Mean ±SD	72.22±11.66
Median(Q1-Q3)	80(60-80)
Postoperative	
Mild (n=36)	
Min.-Max.	0 - 24
Mean ±SD	7.39±6.31
Median(Q1-Q3)	7.5(0-10)

*Preoperative scores indicating severity (Moderate: Min.-Max. 26-50, Mean ± Standard Deviation (SD) 36.61±9.31, Median (Q1-Q3) 32.5(28-47.25); Severe: Min.-Max. 60-90, Mean ± SD 72.22±11.66, Median (Q1-Q3) 80(60-80)) and postoperative scores showing improvement (Mild: Min.-Max. 0-24, Mean ± SD 7.39±6.31, Median (Q1-Q3) 7.5(0-10)).

Table (2): Follow-up symptoms and Patient photo score among the studied group

Follow up after 2 months	N =36	%
Nasal congestion	12	33.3
Nasal blockage	0	0
Trouble breathing through nose	0	0
Trouble sleep	8	22.2
Obstruction during exertion	4	11.11
Headache	0	0
Residual deviation by photo	0	0

***N = 36 (Number of participants in the study/sample)**

Discussion:

Caudal septal deviation is a leading to cosmetic and functional problems more than do other types of septal deviations. The first descriptive surgical procedure for a caudal septal deviation was Metzenbaum's ''swinging door "method in 1929. [6] The swinging door technique was created by Metzenbaum to maintain closer opposition between the cartilaginous elements in which a wedge of cartilage was excised from the inferior edge of the caudal septal deformity followed by the repositioning of the caudal septum and fixation to the anterior nasal spine. Metzenbaum's procedure is aiming to cartilage preservation of the nasal septum. [7]

Our study was done aiming to evaluate the effectiveness of Metzenbaum's original technique in correction of the deviation of the caudal end of nasal septum. The study included thirty-six patients; twenty males by percentage of 55.6 and sixteen females by the percentage of 44.4 ages from eighteen to thirty-five years old. The study was done in the time between March 2021 and March 2023. All our patients had Photo Documentations pre and postoperatively in the same views. In the present study, 36 patients out of 36 patients had no residual caudal septum deviation with a percentage of 100%.

Comparing our technique to other techniques, in the Nose scale questionnaire: Using the Batten Graft technique on 29 patients **Kim and Jang** found that over a period of 2 months follow up the mean preoperative NOSE score was 62.1; it decreased to 9.2 at 2 months after the surgery and the difference was statistically significant (P < .001). Among the 19 responders, subjective patient satisfaction was "much improved" in 8 (42.1%) patients, "improved" in 9 (47.4%), "no change" in 1 (5.3%), and "worse" in 1 (5.3%). Mean long-term NOSE score was 32.1; subjective satisfaction was "much improved" in 3 (25.0%) patients, "improved" in 7 (58.3%) patients, 1 (8.3%) "No change," and 1 (8.3%) "Worse". [8]

Using The Novel Wedge technique on 17 patients 3 of them had hypertrophied turbinates' so only 14 of them had the nose scale questionnaire, **Lee and Jung** found that The NOSE scale was obtained in 14 patients. All 14 patients experienced statistically significant improvement in all areas except in the first query field. Total of 12 patients had both preoperative and postoperative acoustic rhinometry. Minimal cross-sectional area (MCA) in the convex side of the nasal cavity changed from 0.352 cm2 to 0.367 cm2 (P = 0.61) and nasal volume from 6.91 mL to 7.42 mL (P = 0.17) after surgery. MCA in the concave side of the nasal cavity changed from 0.335 cm2 to 0.330 cm2 (P = 0.91) and nasal volume from 6.20 mL to 7.12 mL (P = 0.34) after surgery. [9]

Using The Fishing Line technique on 63 patients **Yaniv and Hadar** found 24 to 70 months Fifty-three patients reported excellent nasal breathing eight reported only partial improvement in breathing, and 2 reported no improvement. The 10 patients who complained of residual nasal obstruction were found to have turbinate hypertrophy postoperatively although all of them had partial turbinectomy during surgery: 6 unilateral and 4 bilateral. In most of these patients' turbinate hypertrophy occurred at least 6 months postoperatively. The mean SNOT-16 questionnaire result before surgery was 27; after surgery the result changed to 10 ($p < 0.001$). All patients reported satisfaction with the aesthetic outcome regarding the asymmetry of the nostrils. In the rhinoplasty group (14 patients) the mean ROE questionnaire result before surgery was 6 and after surgery it was 17 ($p < 0.01$). [10]

Using Cutting and Suture Technique on 45 patients **Jang et al.,** stated that Evaluations of the postoperative subjective outcomes in the 41 patients with questionnaire data were much improved in 28 (68%), improved in 6 (15%), and no change in 7 (17%). [11]

Using Ethmoid Bone Sandwich Grafting on 10 patients **Metzinger and Boyce** stated that 83.3% at 6 months and 126.7% at 1 year. Even though this improvement in the nasal airway was dramatic, it was not perfect. We did not address the contribution of the inferior turbinates or the nasal valve to nasal obstruction. Many patients also had underlying allergic rhinitis, which limited their subjective nasal airway potential. [12]

Using The Goldman technique on 48 patients **Fine** found observing 20 patients for two years, that they showed gratifying results, and the other 28, were observed for a one-year period, have also been greatly benefited. The results in both cases were excellent. [13]

Using the "J septoplasty" technique on 16 patients **Iimura and Miyawaki** stated that all patients were asked to rate the severity of their symptoms on a 7-point scale preoperatively and postoperatively Nasal obstruction was significantly reduced or eliminated in all patients ($p < 0.001$). The mean nasal symptom score decreased from 4.56 preoperatively to 1.75 postoperatively. [14]

Using The L-septoplasty on 30 patients **Lee and Kim** found that The NOSE scale scores before and after the surgery were 47.2 and 13.6, respectively, which were statistically significant ($P < .001$). [15]

Dikici and Bayar did a comparative study using The Mattress Suture technique between open and endonasal septoplasty on 52 patients and they concluded that Postoperative modified NOSE survey scores were significantly lower than preoperative scores ($P < 0.05$) but there was no significant difference

between the open and the endonasal septoplasty patients. [16]

Using the septal cartilage traction suture technique on 67 patients **Seo and Na** concluded that Compared to a mean preoperative NOSE scale score of 52.9 +/- 26.5, postoperative NOSE scale scores were significantly decreased to 8.6+/- 13.0, 5.2+/- 6.9, and 5.8 +/- 7.2 at 1, 3, and 6 months follow up respectively (all P < .001). [17]

Using the transcutaneous Columellar Strut on 14 patients **Ghorbani and Ganjali** stated that The NOSE score preoperatively was between 50 and 90 with a median of 67.5. After the operation, this score ranged from 0 to 30 with a median of 10. Difference in the median of NOSE score before and after the operation was statistically significant (Wilcoxon signed rank test, P = 0.001). Nasal breathing improved in all patients after the operation compared to their preoperative state. [18]

Summary and conclusion

- Caudal end deviation of the nasal septum can cause a serious breathing problem.
- It may be caused by a trauma or congenital defect.
- It can cause variable degrees of nasal obstruction and headache, or it can be present with only cosmetic problems.
- In our study we only included patients with nasal obstruction, headache or both problems together.
- NOSE score questionnaire is an important method for evaluation of nasal obstruction preoperative and postoperative.
- Swinging door method is an effective surgical procedure for repairing caudal septum deviation.

Funding support: Our study did not receive any funding support.

Conflicts of interest: No

Ethical Considerations: This study was approved by the Ethical Committee of faculty of medicine at Assiut University (IRB number: 1710387) . Informed consent with surgery explanation was obtained from all the participating patients . The patients were allowed to ask any question about the study . The patients were allowed to refuse participation in the study without affecting the medical service or the clinical management.

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