

The Benefit of Middle Turbinate Stabilization during Functional Endoscopic Sinus Surgery, A Comparative Study

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Abstract

Background: The laterlization of middle turbinate and adhesion to the lateral nasal wall is a common complication of functional endoscopic sinus surgery (FESS) result in failure of initial procedure and obstruction of osteomeatal complex. Current procedure for middle turbinate medialization, include creation of controlled synaechia between middle turbinate and nasal septum (bolgerization) and fixation of middle turbinate to nasal septum by suturing using absorbable vicryl suture (conchopexy). **Objective:** Is to compare between FESS with middle turbinate fixation to the septum by conchopexy or bolgerization technique to prevent laterlization of middle turbinate and thier impact on postoperative symptoms and signs and conventional FESS without fixation of the middle turbinate to the septum. **Patients and Methods:** The current study include 80 patients, they were divided into 3 groups, Group 1, include 30 patients underwent conventional FESS with medialization of middle turbinate only, using middle meatal pack, lest for 2 days. Group2, included 25 patients underwent FESS with Bolgerization method. Group3, included 25 patients underwent FESS with conchopexy by suturing the middle turbinate to the septum. Preoperative, postoperative, symptoms and endoscopy findings were compare among all the 3 groups. **Result:** Significant improvement is achieved in all groups and this improvement was found to be significant statically for nasa obstruction, nasal discharge, olfactory function, ($P > 0.001$) and for facial pain ($P = 0.009$). Bolgerization technique had better result in improving olfactory disturbance as compared to other methods. The postoperative endoscopic findings improvement score was statically significant for all groups with ($P = 0.002$) for the 1st group and ($P = 0.001$) for the 2nd and 3rd groups. Regarding synaechia and laterlization of middle turbinate, in group 3 one of the patient had laterlization and synaechia between the middle turbinate and the lateral nasal wall (4%), 4 patients in group 2 (16%), and 10 patients in group 1 (33.3%). **Conclusion:** Conchopexy and Bolgerization are effective method to stabilize middle turbinate and preventing middle turbinate laterlization and synaechia following FESS with highly significant improvement of postoperative symptoms and endoscopic findings.

Keywords: Bolgerization, conchopexy, middle turbinate lateralization

INTRODUCTION

The surgical interventions of the functional endoscopic sinus surgery (FESS) are designed for the blockage removal of interconnected passages in the osteomeatal complex that results in disease of the paranasal sinuses and to restore normal sinus ventilation and drainage.^[1]

The middle turbinate is an important structure in FESS that need adequate and precise management.^[2] Some advice that the middle turbinate should be resected partially or completely to prevent the postoperative adhesion that may obstruct the middle meatus ending with bad surgical outcomes. However, others preserve it to sustain the middle turbinate roll in conditioning and humidification of the inspired air

and to prevent the loss of crucial surgical landmark for the subsequent surgeries.^[3]

The lateralization of the middle turbinate and adhesion to the lateral nasal wall is a common complication of endoscopic sinus surgery resulting in the failure of the initial procedure and obstruction of osteomeatal complex.

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To maintain good ventilation and drainage at the middle meatus level, middle turbinate medialization should be considered as an alternative to turbinate resection.

Current procedures for middle turbinate medicalization, include procedure that use controlled synechiae between nasal septum and middle turbinate (Bolgerization) and fixation of middle turbinate to the nasal septum by suturing using absorbable vicryl suture (Conchopexy).^[4]

Conchopexy is the most definitive method to prevent lateralization and synechia to the lateral nasal wall with 90%–92% success rate and does not impair olfactory function as suggested by several authors.^[5]

Controlled synechia (Bolgerization) is documented to prevent lateralization and synechia in more than 88% of patients. This procedure was named after Pinilla UM *et al* (2016) and ValerieJL *et al* (2008).^[3,6]

Aims

The aim of this study was to compare FESS with fixation of middle turbinate to the septum by Conchopexy or Bolgerization techniques to prevent lateralization of middle turbinate and their impact on postoperative symptoms and signs and conventional FESS without fixation of the middle turbinate to the septum.

PATIENTS AND METHODS

Eighty patients with chronicrhinosinusitis (CRS) that did not respond to proper medical treatment were included in the study.

Inclusion criteria

All patients of all ages with CRS with or without nasal polyps who had failed to respond to proper medical treatment were included in the study.

Exclusion criteria

Previous surgical treatment for (CRS), patients in need for septoplasty and patients with medical comorbidities. Informed consent was obtained from all the involved patients after approval of the study by the ethical committee were excluded from the study.

The surgeries were performed at the ENT department of Al-Yarmouk Teaching Hospital from January 2016 to January 2018.

Study design

A prospective randomized–controlled study. The patients are divided into three groups.

Surgical procedures

All operations were performed under general anesthesia. A standard FESS was used on both sides. Patients were sequentially arranged to have one of the following surgical procedures:

1. Group 1: 30 patients underwent conventional FESS with medialization of middle turbinate using a middle meatal pack only, placed for 2 days
2. Group 2: 25 patients underwent Bolgerization method, by which scratching of both medial surface of the middle turbinate and its opposing septal mucosa with sickle knife and middle meatal pack placed for 2 days. This technique results in controlled synechiae formation between the septum and middle turbinate
3. Group 3: 25 patients underwent Conchopexy, by which suturing the middle turbinates to the septum using Vicryl 4-0 on straight needle. Middle meatal pack placed for 2 days.

Preoperative assessment parameters

To evaluate the treatment efficacy and improvement, 2 parameters were followed, symptoms and endoscopic findings.

The subjective outcomes of preoperative and postoperative symptoms according to Lund-Mackay system score (facial pain, nasal obstruction, headache, discharge, and olfactory disturbance) were quantified on 1–10 points basis that assessed using the Visual Analog Score (VAS).

Engaging each patient in their recovery can be facilitated by the VAS.^[4,7]

Objective assessments of preoperative and postoperative were performed utilizing the endoscope in terms of Lund-Mackay system score (edema of osteomeatal complex, discharge in the middle meatus, crustation, and scarring) was quantified, on 0–2 basis (0 = absent, 1 = mild, and 2 = severe). Symptom score, endoscopic score, synaechia, and lateralization of middle turbinate were recorded 1 month, 3 months, and 6 months after the surgery.

SPSS V.20 (IBM, Armonk, New York, USA) was followed for statistical analysis; all findings and results were illustrated in

Table 1: Comparison of complaints pre-op, after 1month, after 3 months and after 6 months post-operative

Parameters	Average marginal scores				P	Effect
	Baseline	1.Month	3 months	6 months		
Obstruction	7.5	5.3	2	1	<0.001*	92%
Discharge	5.7	3.2	1.8	0.8	<0.001*	80%
Olfactory Disturbance	5.2	2.2	1	0.5	<0.001*	76%
Headache	3.2	1.6	0.8	0.4	<0.001*	46%
Facial pain	2.3	1	0.8	0.3	0.009*	31%

tables with explanation, respectively. $P \leq 0.05$ was labeled statistically significant and a $P \leq 0.001$ was labeled as highly significant.

RESULTS

The age of the patients ranged between 19 and 59 years with a mean age of 36.6 (36.6 ± 10.3). There were no statistically differences in age and gender among all groups, 50 patients (62.5%) were males and 30 patients (37.5%) were females.

The most common presenting symptom was nasal obstruction, complained off in 64 patients (80%), followed by nasal discharge which was observed in (50%), then headache (25%). Olfactory disturbance was observed in 35% and facial pain was observed in 10% of the patients.

No relation between the chief complaint and type of intervention performed to the patient. The improvement in patient's symptoms following FESS following any of the 3 procedures is demonstrated in Table 1 and the symptoms improvement was significant.

Preoperative nasal obstruction evaluation by the VAS for Groups 1, 2, and 3 mean was 6.3, 6, and 4.4, respectively, and the 6 months' postoperative evaluation mean was 1.2, 0.7, and 0.6, respectively. These findings were significant statistically ($P < 0.001$).

Preoperative evaluation of nasal discharge by VAS in Groups 1, 2, and 3 means were 6.5 ± 1.2 , 5.5 ± 1.4 , and 7.7 ± 1.1 , respectively, and 6 months postoperatively were 1.2 ± 1.1 , 0.7 ± 1.02 , 1.1 ± 1.3 , respectively. These findings were also significant statistically ($P < 0.001$).

Preoperative evaluation of olfactory disturbance by VAS in Groups 1, 2, and 3 means were 5.6 ± 2.25 , 4.2 ± 2.12 , 5.5 ± 1.45 respectively and 6 months postoperatively were 1.5 ± 1.01 , 0.1 ± 0.4 , 0.5 ± 0.6 respectively. These findings were also statistically significant ($P < 0.001$). Bolgerization had the best improvement rate of olfactory functions.

Preoperative evaluation of facial pain by VAS in group 1, 2, 3 mean was 3 ± 1.12 , 2 ± 1.12 , 1.1 ± 1.01 respectively and 6 months postoperatively was 0.5 ± 0.6 , 0.4 ± 0.3 , and 0.5 ± 0.45 , respectively. This improvement was significant statistically ($P = 0.009$).

Table 1 shows the comparison of the symptoms preoperatively, after operation by 1 month, 3 months and 6th months.

Endoscopic scoring of the middle turbinate stabilization both preoperatively and postoperatively was as follows:

1. Group 1: The score of preoperative ranged from 3 to 5 with mean of (3.75 ± 1.32), and the score of postoperative ranged from 0 to 3 with mean of (1.75 ± 1.85). These results were significant statistically ($P = 0.002$)
2. Group 2: The score of preoperative ranged from 3 to 5 with mean of (3.35 ± 1.3), and the score of postoperative

ranged from 0 to 2 with mean of (1.12 ± 1.2). These results were significant statistically ($P = 0.001$)

3. Group 3: The score of preoperative range from 3 to 5 with mean of (4 ± 1.4) and the score of postoperative ranged from 0 to 1 with mean of (0.65 ± 0.7). Significant statistically results ($P = 0.001$).

The postoperative endoscopic findings in Conchopexy group, one of the patient had lateralization and synaechia of the middle turbinate to the lateral nasal wall (4%), and while in the Bolgerization group, 4 patients had postoperative lateralization and synaechia (16%) and in the conventional FESS group, 10 patients had postoperative lateralization and synaechia of the middle turbinate (33.3%).

DISCUSSION

The stabilization of middle turbinate after endoscopic sinus surgery accounts for the prevention of postoperative middle turbinate lateralization, with synaechia and middle meatus obstruction. Conchopexy and Bolgerization techniques have gained popularity as techniques used to achieve these aims.

Significant improvement is achieved in nasal presenting symptoms in all groups ($P < 0.001$) for nasal obstruction, nasal discharge, olfactory function, and ($P = 0.009$) for facial pain. Bolgerization technique had better result in improving olfactory disturbance as compared to other methods.

The postoperative endoscopic findings score improvement was statistically significant for all groups with $P = 0.002$ for the 1st group and $P = 0.001$ for the 2nd and 3rd groups. Hence, conchopexy and bolgerization are more effective to prevent middle turbinate lateralization and adhesion after FESS, with improvement of postoperative endoscopic findings scores with complete resolution and disappearance of mucopus and mucosal edema than FESS without middle turbinate fixation to septum.

The results of the current study are somehow comparable to results found by others with minimum variations probably related to surgeon preference and experience, the racial differences among populations and the sample size. KhammasAH *et al.*^[8] reported synechia in 45% of patients underwent FESS without middle turbinate fixation and 0% for those with fixation of middle turbinate by either Bolgerization or Conchopexy. Mohammad *et al.*^[9] reported synaechia in 38% for patients without middle turbinate fixation and 7% for those patients with middle turbinate fixation. Dutton and Hinton^[5] reported that lateralization of middle turbinate can be prevented in 88% of cases by using Bolgerization and in 90% by using Conchopexy. Samuel *et al.*,^[10,11] lateralization was observed as a complication of silastic removal after septoplasty. Thornton,^[12] Kim *et al.*,^[13] and Chen *et al.*,^[14] concluded that turbinate medialization by suturing after FESS is very effective to prevent postoperative lateralization.

CONCLUSIONS

1. Conchopexy and Bolgerization are effective methods to stabilize middle turbinate and preventing lateralization and synaechia following FESS with highly improvement of preoperative symptoms scores and endoscopic nasal findings scores
2. Conchopexy or Bolgerization does not interfere with olfactory function or cause olfactory disturbance as thought previously.

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Conflicts of interest

There are no conflicts of interest.

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