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Evaluation of the Effect of Endoscopic Sinus Surgery with Medialization of Middle Turbinate

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Abstract

Background: The main goals and key points of endoscopic sinus surgery are providing a sufficient drainage and ventilation for the diseased paranasal sinus groups. Method: A total of 44 patients (males 22 & 22 females) were included in this study, all of them complaining of chronic rhinosinsitis with or without polyposis not responding to maximal medical treatment and were assigned for ESS. Patients were classified into three groups; Group A: ESS with bolgarization, Group B: ESS with suture medialization of middle turbinate, Group C: ESS without medialization Postoperatively, patients were followed up with subjective (nasal obstruction, nasal discharge, headache, fascial pressure and smell disturbance) and objective (endoscopic evaluation of middle meatal MM patency) parameters in 2 weeks, I month, 3 months, 6 months and 1 year. Result: There improvement in nasal obstruction was reported by patients in all the three groups. Improvement in other symptoms was significantly higher in group A as compared to other groups. MM patency was evaluated by endoscopy and showed improvement of 100% in group B.

Key words: *Endoscopy, Rhinosinusitis, Bolgerization, Suturing, ESS.*

Introduction

The main essential of endoscopic sinus surgery (ESS) is to open the passages of the sinuses allowing for proper drainage and ventilation to the nose. Through this technique new passages are created or existing ones are opened by removing thickened mucous, polyps and cysts, or membranes that's why endoscopic techniques are now routinely being applied to the management of many non- inflammatory sinonasal disorders. [1] Turbinate medialization techniques are often used for prevention of turbinate lateralization and middle turbinate (MT) medialization has no detectable adverse effect on olfaction.[4] Medialization of the middle turbinate (MT) is an effective technique to prevent recurrent rhinosinusitis; but, could reduce olfactory function by interfering the odorants to reach the olfactory mucosae.[5] Whereas, middle turbinate (MT) lateralization is a common complication of endoscopic sinus surgery (ESS) that occurs when opposing areas of denuded mucosa form a scar between them. This scar pulls the MT laterally to the lateral nasal wall and may cause obstruction of the middle meatus and the maxillary, ethmoid, or frontal sinuses, which can result in failure of the initial procedure and often necessitates revision surgery.[4] Bolgarization (Medialization) can also be achieved by creating a small scar band between the middle turbinate and the nasal septum. Packing in the middle meatus is necessary to keep the surfaces in contact long enough to heal together and create an adhesion (usually 5 to 7 days). The middle turbinate can also be suture fixated to the nasal septum using a dissolving suture (conchopexy). This technique can successfully secure a destabilized middle turbinate in most cases.[6] The ethmoidal infundibulum is considered as a main draining space at the ostiomeatal complex that is bounded posteriorly by bulla ethmoidalis, anteromedially by the middle turbinate, and anterolaterally by an uncinate process, that's why it is also necessary to interfere with the middle turbinate to achieve enough ethmoidal infundibulectomy at the anteromedial aspect along with the uncinectomy[8,9,10,11,12] when it comes to determine the recurrence incidence rate of sinusitis after middle meatal endoscopic surgery, the middle terbinate play a vital role.[13,14,15] In most patients the middle turbinate is preserved and therefore it's vital to make it preserved during the surgery and not to destabilize. Fracturing anterior vertical insertion of middle turbinate from the skull base destabilize the MT. For posterior stability to the middle turbinate, which

is also important during surgery, could be achieved by preserving the horizontal portion of the ground lamella. However, excessive manipulation of the MT could fracture the turbinate's insertion on skull base and result in it becoming floppy. The frontal recess get narrower lateral dimension, which, ultimately, makes surgery very difficult and increases the risk of damage to the lateral wall of the olfactory fossa.

Methodology

The clinical trial was conducted in the department of otolaryngology, Head and Neck Surgery during the period from October 2015 to October 2017 at Al-Sader medical city, Al-Najaf governate. . All patients signed the informed consents, and the study conformed to the ethical principles set forth by the Declaration of Helsinki. A total of 44 patients (males 22 & 22 females) were included in this study, all of them complaining of chronic rhinosinsitis with or without polyposis not responding to maximal medical treatment and were assigned for ESS.

Patients aged above 12 years and Patients complaining of chronic rhinosinsitis with or without polyposis not responding to maximal medical treatment were included in this study while patients with sinonasal malignancy and middle turbinate resection and disturbed anatomy from previous surgery or trauma were excluded from the study.

The questionnaire survey methodology was used to collect the information from patients before operation for physical examination, anterior rhinoscopy, and nasal endoscopic examination and after survey all selected patients were subjected to detailed history, general examination, systemic examination and full head and neck examination and nasal endoscopic examination and divided into three respective groups, Group - A, B and C; details are given here under.

All patients were given a course of proper systemic oral antibiotic (patients with CRS) with local and systemic steroid and nasal douching for 2 weeks and then assigned for native computed tomography in axial, sagittal & coronal plane 1-2 mm thickness slices at level of the nose and paranasal sinuses was taken and the follow-up subjective (nasal obstruction, nasal discharge, headache, fascial pressure and smell disturbance) and objective (endoscopic evaluation of middle meatal MM patency) was performed after 2 weeks, 1 month, 3 months, 6 months and 1 year, respectively.

All cases were operated under general anaesthesia. The mucosa of the nasal cavity was decongested using nasal pledges with 1:80000 adrenaline and 2% xylocaine 15 – 20 minutes before surgery. After drapping, endoscopic examination with 0° rigid scope in the standard three passes to assess extent of the disease. Septoplasty was performed when necessary, removing the lateral part of concha bullosa when present. Classical steps of ESS including: unilateral or bilateral uncinectomy with MMA, anterior and posterior ethmoidectomy. sphennoidotomy and frontal recess interventions were done accordingly with the aid of microdebrider.

Patient Groups

Group A: the mucosa of medial surface of MT and the opposing septal mucosal surface were abraded with aid of sickle knife or rosen knife just posterior to the caudal end of MT (care must be taken that abrasion not extending through the whole length of MT otherwise postoperative anosmia and nasal obstruction ensure) with merocel meatal pack for 24-48 hrs to create iatrogenic synechia between MT and the septum (Fig 1).

Group B: 4-0 vicryl suture and tonsilar pillar needle were used to suture the MT to the septum. The needle passed through MT from lateral to medial through the septum to the other side and then passed in opposite direction just anterior to MT through the septum to be tied in the first side.

Group C: ESS without medicalization.

Endoscopic scoring depends on endoscopic evaluation of MM for presence of scarring or adhesion and it was graded as: 0 = 4 mm hopkin rigid 0 scope can pass freely at any point of MM. 1 = 4 mm hopkin rigid 0 scope can pass with freer used to medialize MT. 2 = 4 mm hopkin rigid scope can't pass at all.

Statistical Analysis

All collected data was then analyzed and compared on SPSS version 22.

Results

There were about three groups of patients i.e, Group A (Bolgarization group) which consisted of 13 patients, Group B (suturing group) which consisted of 9 patients, Group C (without medialization) which consisted of 22 patients. with no statistically significant differences had

been found neither in age nor gender among the three groups, (P>0.05). Nasal obstruction was the main chief complaint in all patients, and polyposis was the main finding in anterior rhinoscopy, with no statistically significant differences amongst the three groups neither in chief complaints nor the anterior rhinoscopy findings, (P>0.05) as given in Table- 1. As it shown in table 2 , there was a significant change (improvement) in nasal obstruction reported by patients in all the three groups, however, the change was significantly larger in suturing group, where the mean nasal obstruction score reduced from 5.89 at 2 weeks to reach 1.44 at the 12 month, with a mean difference of 4.45 and percentage change (improved) by of 75.5%, in bolgarization group the mean difference was (3.15) and in controls it was (3.0), by comparing the mean differences amongst the three groups it was statistically significant (P<0.05). In table 3 ,The changes in nasal discharge was insignificant in bolgarization group , the mean score for nasal discharge was 2.23 at 2 weeks relatively reduced at one month, three month and 6 month but return to its level at one year, (P>0.05). in suturing group the mean score was 2.22 reduced in the subsequent visits to reach 1.33 at the one year with a statistically significant difference of 0.89 and percentage change of 40.1% (improved), which was larger than the mean difference in control group, (-0.41) that increased at one year by 16.7% (worsening), (P<0.05), hence, the change (improvement) was in suturing group rather than Bolgarization and controls, . For the facial pressure, it was relatively and insignificantly reduced in bolgarization group, (P>0.05), but it was significant in suturing group where it reduced from 2.24 at two week to reach 1.33 at one year, with a mean difference of 0.91 and 40.6% improvement, conversely, facial pressure get worse in controls; its score elevated from 2.5 at two weeks and to 2.81 at the one year, however it was statistically insignificant, i.e. it is the same, (P>0.05).

Smell was improved in both Bolgarization and suturing groups by an improvement rate of 23.7% and 50%, respectively,(P<0.05), compared to significant worsening in control group, (P<0.05). However, the larger difference and improvement rate was among suturing group , as shown in table 4.

Headache was improved significantly in both bolgarization and suturing group, (P<0.05) and the larger mean difference was 1.21 in suturing group with a percentage change of 52.4%, compared to 1.08 and 41.2%, respectively, in bolgarization group. While headache was relatively and insignificantly get worse in control group, (P>0.05) .

In figure (1)The mean MM score at two weeks was 2, 1.22 and 2.0 in bolgarization, suturing and control groups, respectively, at the one year it was improved by 57.7% in bolgarization group, reach zero (100% improved) in suturing group, also it was better in control group with improvement of 34.1, (P<0.05) . Middle turbinate plays an important role in ESS, extensive disease process or surgical resection may render the middle turbinate floppy and unstable with subsequent scarring and synechiae formation that result in middle turbinate lateralization and hence obstruction of OMC that impede drainage pathway and impair ventilation of the sinuses.[22]

Table 1. Chief complaints and endoscopic assessment findings of patients in the studied groups

Variable		**Bolgarization (n = 13)**		**Suturing (n = 9)**		**Control (n = 22)**		**P. value**
		No. %		No. %		No. %		
Chief Complaint	Nasal obstruction	12	92.3	8	88.9	20	90.9	0.69
	Headache /orbital pain	1	7.7	1	11.1	2	9.1	
Endoscopic assessment	Polyposis	12	92.3	8	88.9	17	77.3	0.37
	CRS	0	0.0	0	0.0	3	13.6	
	ACP	0	0.0	0	0.0	2	9.1	
	Other	1	7.7	1	11.1	0	0.0	

Table 2. Changes in nasal obstruction reported by patients in the studied groups at different follow up time with the mean difference and percentage change

Nasal obstruction	Bolgarization (n = 13)	Suturing (n = 9)	Control (n = 22)	P. value between groups
2wk	7.15	5.89	7.41	0.016
1m	6.15	4.78	6.59	0.005
3m	4.92	3.33	5.82	< 0.001
6m	4.31	1.78	5.14	< 0.002
12m	4.00	1.44	4.41	< 0.003
Mean difference	-3.15	-4.45	-3.00	0.008
Percentage change	44.1%	75.5%	40.5%	
P. value within group	< 0.001	< 0.001	< 0.001	

Table 3. Changes in nasal discharge reported by patients in the studied groups at different follow up time with the mean difference and percentage change

Nasal discharge	Bolgarization (n = 13)	Suturing (n = 9)	Control (n = 22)	P. value between groups
2wk	2.23	2.22	2.45	0.474
1m	2.15	2.11	2.45	0.161
3m	2.08	1.78	2.32	0.021
6m	2.15	1.78	2.77	< 0.001
12m	2.23	1.33	2.86	< 0.001
Mean difference	0.00	0.89	-0.41	0.001
Percentage change	0.0%	40.1%	16.7%	
P.value within group	1.000	0.002	0.036	

Table 4. Changes in smell disturbance reported by patients in the studied groups at different follow up time with the mean difference and percentage change

Smell disturbance	Bolgarization (n = 13)	Suturing (n = 9)	Control (n = 22)	P. value between groups
2wk	2.62	2.00	2.41	0.116
1m	2.69	2.00	2.45	0.086
3m	2.69	1.78	2.64	0.017
6m	2.31	1.22	2.91	< 0.001
12m	2.00	1.00	2.86	< 0.001
Mean difference	0.62	1.00	-0.45	< 0.001
Percentage change	23.7%	50.0%	18.7%	
P. value within Group	0.040	0.001	0.015	

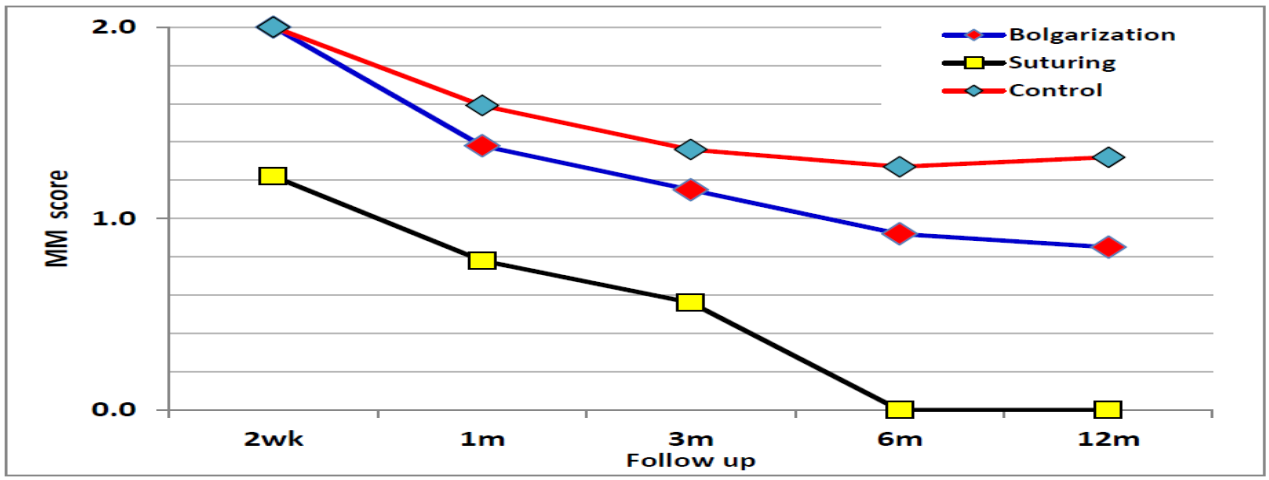

Figure 1. Comparisons between the studied groups in the changes in MM score

Conclusion

The present study was conducted to perform Medialization of middle turbinate following conventional endoscopic sinus surgery to ensure widely patent middle meatus and osteomeatal complex to facilitate drainage, ventilation, mucosal healing and follow up with better access of topical medications to the mucosa and concluded that Medialization with trans-septal suture technique is an effective method in preventing lateralization of middle turbinate and subsequent OMC obstruction. It was also clinically and statistically better that other technique of medialization namely bolgarization. The authors in present study recommended that Middle turbinate should be medialize and stabilize in FESS to ensure widely patent MM using 0-3 or 0-2 vicryl suture to avoid laceration of MT. There is a need for further studies with a broader population of patients and with longer periods of close endoscopic and symptomatic follow-up. Moreover, other techniques of medialization including using of Gelfilm, bovine serum albumin tissue adhesive (BioGlue), bioresorbable implant (L-lactide-co-glycolide) may also be performed to check their effectiveness.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Medicine, Kufa University, Najaf, Iraq and all experiments were carried out in accordance with approved guidelines.

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