

Does Rhino-genic Headache Improve after Endoscopic Concha Bullosa Surgery in the Adult Patients?

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Abstract

Background: Pneumatization of Middle Turbinate (MT) is one of the common anatomical variations of the Nasal cavity named Concha Bullosa. It may be presented with facial pain or headache. There are several surgical techniques to treat Concha Bullosa.

Aim of the study: This is to evaluate the improvement of Rhino-genic headache after endoscopic Concha Bullosa surgery in adult patients.

Patients and methods: A prospective comparative study was designed in the Department of Otolaryngology at Al-Jerahat Teaching Hospital in Medical City and private hospital, Baghdad, Iraq, from March 2019 to August 2020. Forty patients suffering from headaches of Rhino-genic origin of more than six months duration were enrolled in the current study. Nasal examination by zero-degree endoscope revealed unilateral or bilateral MT enlargement with mucosal contact points to the Osteo-Meatal Complex or the Nasal Septum. All the patients had Nasal and Para-Nasal sinuses CT scan and xylocaine-xylometazoline test. The Forty patients were allocated into two groups, group A patients treated by Partial Lateral Middle Turbinectomy (PLMT). The 20 patients in group B had been subjected to Middle Turbinate Transverse Excision (MTTE). Patients followed-up every week in the first month and then every two weeks for the next two months. The headache assessment was achieved preoperatively using the Visual Analogue Scale (VAS) and at the third postoperative month. Statistical analysis was done using the Chi-square test to compare the VAS scores in group A patients at the third postoperative month to group B patients, and P-value was calculated.

Results: Fifty percent of the patients treated by PLMT became free of headache, 35% had a mild headache, and 15% moderate. In contrast, 85% of the patients subjected to MTTE became headache-free, and 15% still with mild headache (P value= 0.031).

Conclusions: MTTE is a better option than PLMT in relieving headaches due to contact between Concha Bullosa and Osteo-Meatal Complex or Nasal Septum.

Keywords: Concha Bullosa, Middle Turbinate Transverse Excision, Partial Lateral Middle Turbinectomy, Visual Analogue Scale.

Introduction

Rhino-genic headache is due to contact between mucosal surfaces inside the Nasal cavity in the absence of inflammatory Nasal diseases, Nasal polyp, or Nasal mass. Middle Turbinate (MT) pneumatization is the Concha Bullosa (CB) definition with an incidence of 5-25% in the average population. CB may cause a Nasal obstruction which can adversely affect the ventilation and mucociliary clearance of the Para-Nasal sinuses. ⁽¹⁾

CB is divided into three types depending on the extension of pneumatization itself: extensive, bulbous, and lamellar. ⁽²⁾

CB can be evaluated during endoscopic examination about their size and their relationship with neighboring structures. ⁽³⁾ Table (1) shows the endoscopic classification of CB.

Table 1: Endoscopic classification of CB. ⁽⁴⁾

Grade	Description
1	The sphenothmoid recess and uncinat process are both visible.
2	The sphenothmoid recess is invisible; the uncinat process is visible.
3	The sphenothmoid recess and uncinat process are both invisible.
4	Giant concha bullosa occupies the entire middle meatal area, extending to the inferior meatus.

One of the indications for endoscopic CB surgery is to remove any contact points between the MT and the Nasal Septum and/or the lateral Nasal wall; such contact enhances infection and may result in neuralgic pain or pressure sensation. ⁽⁵⁾

CB had several surgical techniques for its management, including lateral marsupialization, medial marsupialization, crushing, transverse excision, and finally, Conchoplasty. ^(6,7,8)

This study aims to evaluate the improvement of Rhino-genic headache following endoscopic CB surgery in adult patients.

Patients and Methods

This prospective comparative study was designed in the Department of Otolaryngology at Al- Jerahat Teaching Hospital in Medical City and private hospital, Baghdad, Iraq, from March 2019 to August 2020.

All the patients enrolled in the current study suffered from the headache of Rhino-genic origin for more than six months. Routine Otolaryngological history and examination were achieved, including Nasal endoscopic examination by zero degrees, 4mm rigid endoscope under local anesthesia, which reveal unilateral or bilateral enlargement of the MT with mucosal contact points to the Osteo-Meatal Complex, and/ or, to the Nasal Septum. All the patients were sent to Nose and Para-Nasal sinuses CT scan (axial & coronal views) to ensure the unilateral or bilateral CB. Figure (1) shows the pre-operative Nasal endoscopic examination.

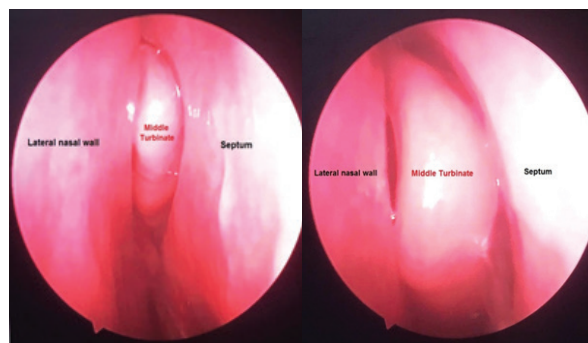


Figure 1: Nasal endoscopic examination showing enlarged MT with contact to the Nasal septum and lateral Nasal wall.

Xylocaine with xylometazoline test was performed for all patients. Under endoscopic guidance, gauzes soaked with a mixture of 10% xylocaine and 0.1 xylometazoline were placed inside the Nose at the contact areas. If the headache had been relieved within 10 minutes, the test was considered positive, and the patient was selected for endoscopic Concha Bullosa surgery.

Visual Analogue Scale (VAS) was used for subjective assessment of headache pre-operatively and at the end of the third postoperative month. VAS (10 cm line) scores were as follow: 0 = no headache, 1-3 = mild headache. 4-6 = moderate headache, 7-9= severe headache, and 10= worst pain.

Forty patients were included in this study that was suitable to the inclusion criteria, which were the presence of headache over the route of the Nose, Forehead, and/ or Peri-Orbital area of more than six months duration due to CB with clear contact areas to the Nasal Septum and/or the Osteo-Meatal Complex.

Exclusion criteria were revision Nasal and Para-Nasal sinuses surgery, a Nasal mass, Nasal

inflammatory diseases (Polyps or even mucosal hypertrophy with muco-purulent discharges), Inferior Turbinate hypertrophy, severe Nasal Septal deviation, Medical illnesses associated with headache presentation like Hypertension, Renal diseases, Vascular disorders, Migraine, Neuroglia, Cervical Spine disorders and Temporo-Mandibular disorder (that ensuring through Medical, Neurological, Ophthalmological, Maxillofacial and Psychological consultations). Bleeding tendency disorders, pregnancy, and high-risk patients from general anesthesia were also excluded.

Each patient was given a code number; patients with odd numbers (20 patients) were allocated in group A and had been subjected to Partial Lateral Middle Turbinectomy (PLMT), while the other 20 patients with double numbers in group B were treated by Middle Turbinate Transverse Excision (MTTE).

Surgical Procedures

Under general anesthesia with Oro-Tracheal intubation and Pharyngeal pack in Anti-Trendelenburg position and with Nasal endoscopic guidance (0-degree, 4 mm diameter, 180 mm length) and camera display system, 10% xylocaine with 0.1% xylometazoline soaked pledgets were inserted around the MT and over the area of the Middle Meatus.

In PLMT, a vertical incision in the CB was done by using a sickle knife with incision continuation to the lower margin of the MT reaching to the lateral insertion in the lateral Nasal wall. The superior incision continued by using a micro-scissor to the posterior end of the MT. Once the lateral part of the MT had been separated, it was resected with mucosa, as shown in figure (2).

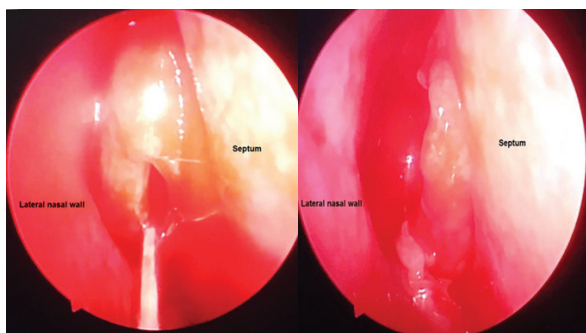


Figure 2: Partial Lateral Middle Turbinectomy.

In MTTE, cutting the inferior half of the MT with its mucosa was done by using a micro-scissor, as shown in figure (3).

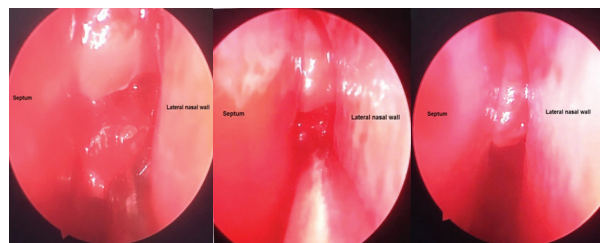


Figure 3: Middle Turbinate Transverse Excision.

At the end of the operation, Merocel packs were inserted for two days. Then, the patients were discharged to home with ten days course of Oral antibiotics and sodium bicarbonate Nasal wash.

The patient's follow-up was achieved every week for the first month & then every two weeks for the next two months. At the third postoperative month, the patients were assessed for headache improvement subjectively by VAS scores. All the patients were asked to phone or return at any time if there was any problem related to their conditions for further assessment and follow-up.

Statistics

The data had been managed and analyzed with computer software SPSS version 24.

- Frequency tables and graphs (pie charts).
- The Chi-square test was used to define the association between the categorical variable.
- A confidence level of 95% with a P-value equal to or less than 0.05 was considered significant.

Results

The patient's ages were ranged (from 18 to 45) years, mean age was (24.6) years, and standard deviation was (± 8.4) years.

The total number of patients was (40) patients which included 22 (55%) females (12 in group A and 10 in group B) and 18 (45%) males (8 in group A & 10 in group B).

The 40 patients included in the current study presented with headache as a chief complaint; other associated symptoms are shown in table (2).

Table 2: Associated Symptoms

Symptoms	Number of patients and %		Total
	Group A	Group B	
Nasal obstruction	11 (27.5%)	14 (35%)	25 (62.5%)
Snoring	10 (25%)	11 (27.5%)	21 (52.5%)
Rhinorrhoea	7 (17.5%)	5 (12.5%)	12 (17.5%)
Anosmia	2 (5%)	1 (2.5%)	3 (7.5%)

The sites of Rhino-genic headache were Frontal in 29 patients (72.5%), Nasal in 15 patients (37.5%), and Peri-Orbital in 13 patients (32.5%).

The CB of the patients who presented with Rhino-genic headache mainly was in grades 3 and 4. Fifty-five percent of the CB were in grade 3, 40% were in

grade 4, and only 5% were in grade 2.

The Distribution of CB according to the side is shown in table (3).

Table 3: Distribution of Concha Bullosa according to side

Group	Bilateral	Right	Left	Total
A	10 (25%)	6 (15%)	4 (10%)	20 (50%)
B	12 (30%)	3 (7.5%)	5 (12.5%)	20 (50%)
Total	22 (55%)	9 (22.5%)	9 (22.5%)	40 (100%)

Intergroup comparison had shown that the relief of headache after three months of the operation was statistically more significant in group B patients who MITTE treated than the patients in group A who were subjected to PLMT (P-value = 0.031), as shown in table (4).

Table 4: Headache VAS scores preoperatively and at the third postoperative month in both groups

			Visual analogue scale scores					Total
			0	1-3	4-6	7-9	10	
group	A	Pre-operative	0	0	11 (55%)	6 (30%)	3 (15%)	20 (100%)
		Post-operative	10 (50%)	7 (35%)	3 (15%)	0	0	20 (100%)
	B	Pre-operative	0	0	8 (40%)	8 (40%)	4 (20%)	20 (100%)
		Post-operative	17 (85%)	3 (15%)	0	0	0	20 (100%)
Statistics			Chi square = 7.222 Degree of freedom = 2 P value = 0.031*					

Discussion

Headache is one of the most commonly presenting symptoms in clinical practice. It could be due to various diseases, so an accurate diagnosis of Rhino-genic headache is essential before starting treatment to get good results. The current study depended on Nasal endoscopy, CT scan of Nose and Para-Nasal sinuses, and xylocaine-xylometazoline test to reach a correct diagnosis of Rhino-genic headache. Morgenstein and Krieger⁽⁹⁾ stated that the confirmation of the diagnosis of Rhino-genic headache is achieved by Nasal endoscopy and CT scan. An anesthetic test that can be performed with various anesthetic solutions, including xylocaine, cocaine, and tetracaine, is also a useful confirming test.^(10,11,12)

The sites of Rhino-genic headache in the current study were Frontal in 72.5%, Nasal in 37.5% and Peri-Orbital in 32.5%. Perhaps, these multiple pain

sites may be explained because the Rhino-genic headache is a referred pain through the Ophthalmic and Maxillary divisions of the fifth Cranial nerve; the different contact sites between mucosal surfaces inside the Nasal cavity may also be referred to play a role. Behin et al.⁽¹³⁾ reported Frontal and Peri-Orbital pain. Clerico et al.⁽¹⁴⁾ described pain in the Supra-Orbital region (74%), Peri-Orbital region (37%), and Maxillary region (26%). Rai et al.⁽¹²⁾ reported sites of pain in the Frontal area in (82%), Peri-Orbital (34%), Nasal (32%), Malar (4%), all over the head (4%), and Occipital in (2%).

This study had evaluated the outcomes of 2 types of endoscopic CB surgeries in adult patients who presented with Rhino-genic headache.

In the current study, it was observed that the CB of the patients who presented with Rhino-genic headache mainly was in grades 3 and 4. Fifty-five percent of the CB were in grade 3, 40% were in grade

4, and only 5% were in grade 2. This observation can be explained because the more significant the CB's size, the greater the chance to contact other mucosal surfaces inside the Nasal cavity, leading to a Rhinogenic headache.

The present study showed that 85% of the patients managed by MTTE became free of headache, and 15% still complained of a mild headache at the third postoperative month. The complete relief of headache was found in 50% of the patients treated by PLMT, 35% still complaining of a mild headache, and 15% with moderate headache (P value= 0.031).

Perhaps, this result of headache improvement may be due to the elimination of the mucosal contact points on both sides of the MT in MTTE (medial side to the Nasal Septum and lateral side to the Osteo-Meatal Complex). In contrast, in PLMT, the elimination of mucosal contact area was achieved over the lateral side of the MT only.

Many studies have been carried out and shown different success rates of endoscopic surgical management of CB. Parsons and Batra ⁽¹⁵⁾ found improvement in 91%, while Morganstein and Kreiger ⁽⁹⁾ reported an 89% success rate, and Cho et al. ⁽¹⁶⁾ showed a success rate in 82% of patients. Likewise, Ramadan ⁽¹⁷⁾ showed improvement of pain in 60% of patients, Clerico et al. ⁽¹⁴⁾ study had shown that there was a 50% improvement of pain in 76% of the patients.

In their study, Mokbel et al. ⁽¹⁸⁾ mentioned that endoscopic CB surgery gives a more precise complete excision with exceedingly significant improvement in headache and facial pain (98%). Cantone et al. ⁽¹⁹⁾ found that endoscopic CB surgical intervention may rapidly resolve CB-related headaches (decreasing health care costs with improving the headache).

Yarmohammadi et al. ⁽²⁰⁾ stated that the effect of surgical management of the CB was highly significant on severity, frequency, and duration of headache (P-value less than 0.001). Ankit et al. ⁽²¹⁾ found that the severity of the complaints was achieved in 76.3% at the third postoperative month of PLMT. In comparison, postoperative improvement was found in 86.6% of the patients in a study done by Hammad and Gomaa. ⁽²²⁾ Bektas et al. ⁽²³⁾ found that (52.7%) of the patients had total relief of pain after endoscopic surgery while (47.3%) reported occasionally having minimal pain, which they considered insignificant; this result due to surgical removal of the mucosal contact point, which may relieve the headache.

Conclusion

The outcome of the endoscopic CB surgery in adult patients suffering from Rhinogenic headache is better in patients who had Transverse Excision of the lower half of the MT than patients treated by PLMT after three months follow-up.

Ethical clearance - The consent was taken from the patients and their family, the details & type of the operation and complications of surgery and the risk general anesthesia explained to them & they signed the form which was authorized in hospital by Ethics committee.

Source of funding - Self funding.

Conflict of Interest - It as nil.

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