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A Clinical Study to Compare the Efficacy of Partial Turbinectomy and Crushing of Middle Turbinate for Concha Bullosa

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Abstract

Concha Bullosa, a pneumatised middle turbinate is a normal variant and is one of the most common variation of sino-nasal anatomy. It is identified in ~35% (range 14-53%) of patients. A large Concha Bullosa may cause the middle turbinate to bulge into adjacent sinuses, obstruct osteomeatal complex leading to recurrent sinus infections and nasal obstruction. Endoscopic Lateral Partial Turbinectomy (Lateral Laminectomy) is standard procedure for the treatment of Concha Bullosa. However, recurrence of contact points and postoperative synechiae with subsequent frontal recess obstruction are common complications of this technique. Crushing of pneumatised turbinate preserve the mucosa and may carry less risk of complications. The aim of this study is to compare the efficacy of Crushing with Lateral Partial Turbinectomy in the treatment of Concha Bullosa. This is a prospective randomized comparative study with convenient sampling conducted during a period of one year between April 2023 to May 2024 at Department of ENT, Sree Mookambika Institute of Medical Sciences kulasekharam. Patients with pneumatisation of middle turbinate, 40 patients having unilateral and 10 patients having bilateral CB satisfying the inclusion and exclusion criteria were subjected to either crushing (group A) or lateral partial turbinectomy (group B). Success of both techniques was compared on the basis of relief of symptoms assessed by Visual Analogue Score. Nasal endoscopy was done at one and six months after surgery to assess the sequelae. Repeat CT scan was done after 6 months to look for re-pneumatisation in group 'A' cases. The overall success rate of outcome was equal. There was no statistical difference in the outcome. Most common complication noted in both the groups was synechiae with no difference in the frequency of occurrence in the two groups. Crushing the concha bullosa is as efficient as lateral partial turbinectomy for the treatment of pneumatised middle turbinate.

INTRODUCTION

Pneumatisation of nasal turbinates is called concha bullosa. Most often it involves middle turbinate. Nasal obstruction is most common presenting symptom encountered by otorhinolaryngologist^[1]. The common causes for this are anatomical variants, deviated nasal septum and hypertrophied inferior turbinate. With invention of computed tomography scan and nasal endoscopy, pneumatized middle turbinate-Concha Bullosa (CB) has been detected frequently as one of the cause for nasal obstruction. The severity of symptoms resulting from CB is closely associated with the degree of pneumatization^[2,3,4]. Numerous methods have been described to surgically address concha bullosa, most common being Endoscopic Lateral Partial Turbinectomy (Lateral Laminectomy), other are crushing with endoscopic instruments, resection via marsupialization using combinations of blunt and sharp dissection, powered microdebridors and laser treatment^[5]. However, recurrences of contact points, unstable middle turbinate and postoperative adhesions with subsequent osteomeatal complex and frontal recess obstruction are common complications noted with lateral partial turbinectomy. Crushing the pneumatized turbinate may carry less risk of these complications. To the best of our knowledge, there are scarcity of studies that have compared crushing of middle turbinate and Lateral Partial Turbinectomy. In this background, the study was selected to compare the efficacy of Crushing with Lateral Partial Turbinectomy for the treatment of concha bullosa^[6-9].

MATERIALS AND METHODS

The present study was a prospective, comparative study. It was conducted for a period of one year from April 2023-May 2024 at Department of ENT, Sree Mookambika Institute of Medical Sciences kulasekharam. The subjects were 50 adult patients attending ENT department for nasal symptoms with concha bullosa. All symptomatic patients with CB whose CT scan showed middle turbinate pneumatization >50% of its vertical length were included. Age below 1 years and those with allergic rhinitis and polypoidal middle turbinate were excluded. Patient's history was obtained and was investigated appropriately, nasal endoscopic findings and CT scan finding were noted. 40 patients having unilateral CB and 10 patients having bilateral CB satisfying the inclusion and exclusion criteria were subjected to either crushing or lateral partial turbinectomy.

Patients were randomly divided by lot method into two groups-Group A and Group B. In group A, 27 cases underwent Crushing and group B, 33 cases underwent Lateral Partial Turbinectomy. Patients were followed up at 1week, 1month and 6 months intervals. Success of both techniques were compared on the basis of

relief of symptoms assessed by Visual Analogue Score. Incidence of complications like synechiae, CSF leak and unstable turbinate was assessed by nasal endoscopy at one month and six months after surgery. Repeat CT scan was done after 6 months to look for re-pneumatization in group A cases.

Surgical Technique:

Crushing: Here, William Watson's forceps was modified by smoothening the serrated surface of the forceps to crush the turbinate without injuring the mucosa. After local infiltration, the middle turbinate was held with the forceps and crushed from anterior to posterior direction. Gel foam soaked in mupirocin ointment was placed medial and lateral to the middle turbinate. Bleeding was negligible.

Lateral Partial Turbinectomy: After local infiltration a vertical incision was made at the center of the anterior surface of MT and was extended inferiorly and superiorly. Lateral lamella was elevated and separated using Freer's elevator, its attachments excised using scissor and removed by Blekesley forceps. Gel foam was placed medial and lateral to the middle turbinate. Bleeding was approximately 5ml in each case.

These procedures were done according to the standard description in literature.

Follow up: Regular follow up was done at 1 week, 1month and 6 months following the date of surgery. Detailed account of the symptoms were noted. Nasal endoscopy was done after 1 week, 1 month and 6 months to note if any crusting, discharge, synechiae or other complications.

Outcome was Assessed at the end of 6 Months in Terms of:

- Subjective relief of symptoms assessed by visual analogue score
- Assessment of nasal airway by cold spatula test
- Appearance of the middle turbinate, crusting, synechiae, unstable turbinate and CSF leak were checked by diagnostic nasal endoscopy
- Repeat CT scan was done after 6 months to assess re-pneumatization in group A cases.

RESULTS AND DISCUSSIONS

Among the 50 patients who underwent surgery 10 were having bilateral concha bullosa. So a total of 60 concha bullosa were operated. Among them, 20 were females (40%) of which 10 underwent crushing and 14 underwent Lateral partial turbinectomy. 30 cases were males (60%), of which 17 underwent crushing and 19 underwent Lateral partial turbinectomy. In the present study, majority of the patients were in the age group of 21-30 years. 8 patients were in the age group 10-20

years (16%), 32 patients were in the age group 21-30 years (64%). 9 patients were in the age group 31-40 years (18%). 41-50 years only 1 patient.

The most common presenting symptom was nasal obstruction 42 (84%). The next common symptom was headache associated with nasal obstruction.

The status of relief of symptoms assessed after 6 months among Group A and Group B (Table 3) showed no statistically significant difference

There were no major intra operative complications in any of the 60 procedures. Post operatively, the following complications were observed and there was no statistical difference in the frequency of complications between the two groups. Synechia was the most common complication among both the groups (Table 4). Total 7 cases (26%) had synechia in Group A(crushing) and 4 cases (12%) in Group B(lateral partial turbinectomy). Group A, 5 patients had synechia between the lateral nasal wall and MT and 2 patients had synechia between the septum and MT. Group B, 2 patients had synechia between the MT and lateral nasal wall and 2 patient had synechia between the septum and MT. O No surgical intervention was required. Among 31 cases, 2 (6.45%) cases had re-pneumatisation after 6 months of Crushing (Figure 8). The two cases were 27 years old male and 38 years old female.

The aim of this study was mainly to know the efficacy of crushing CB and compare it with standard technique, LPT. There are 3 types of CB depending on the extent and site of pneumatization. The exact mechanism of concha bullosa formation has been unclear. However, it is considered that the airflow pattern of the nasal cavity plays an important role. This theory is named as e vacue. Nasal obstruction is the one of the common symptom addressed in the patients attending ENT outpatient department. Various reasons lead to nasal obstruction, most common being deviated nasal septum. With the use of CT scan in evaluating these patients, CB is one of the most common anatomical variant encountered causing significant nasal airway narrowing. There are various surgical techniques designed to treat concha bullosa. These include partial to total resection and crushing of the turbinate. Many studies were done to assess the outcome of crushing and to know the incidence of re-pneumatization of crushed CB.

In our study only those cases who had bulbous type of CB with extent of pneumatization of middle turbinate >50% of its vertical length were only included for the convenience of comparison.

In our study the range of age was 10 years-50 years. Most of our patients were in third decade (64%). A similar study comparing the age distribution is reported by Hatipoglu HG *et al*² and Singhani Ankit.

There were a total of 20 females (40%) and 30 males (60%) in the present study group. This is

contrary to other studies wherein a female preponderance was noted. In Subramanian's³ study there was a higher incidence of concha bullosa in females (58.9%) compared to males. This discrepancy could be due to small sample size.

In our study most common presenting symptom was nasal obstruction(84%), next being headache (25).similar reports was seen in studies conducted by Singhani Ankit⁴ and Koçak¹

In our study the relief of symptoms assessed after 6 months among Group A and Group B showed no statistically significant difference. similar pattern was reported in several other studies.

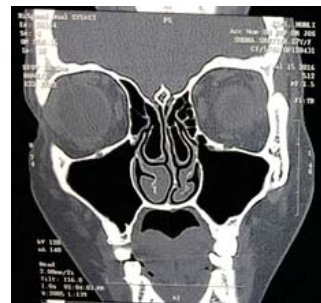


Fig. 1: PNS CT scan showing CB

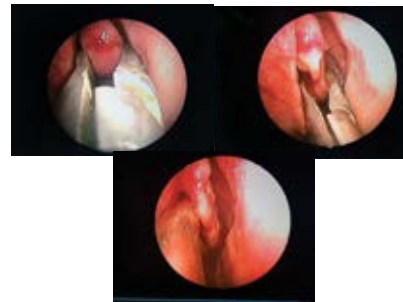


Fig. 2: Series of pictures showing the procedure of crushing



Fig. 3: DNE showing concha bullosa



Fig. 4: Right CB DNE and PNS CT scan showing CB

Table 1: Sex distribution in study group

Sex	Number	Percentage
Males	30	60 %
Females	20	40%
Total	50	100%

Table 2: Age distribution in study group.

Age	Males	Females	Total	Percentage
10-20	4	4	8	16%
21-30	20	12	32	64%
31-40	6	3	9	18%
41-50	-	1	1	2%
Total	30	20	50	100%

Table 3: Comparison of two groups (Crushing)(Group A) and lateral partial turbinectomy(Group B)) with status of symptoms at 6 months

Symptoms	(Group A) Crushing (No. of patients)	%	(Group B) Lateral partial turbinectomy (No. of patients)	%
Absent	23	85	29	87.87
Present	4	14.8	4	12.12
Total	27	100.00	33	100.00

Table 4. Comparison of two groups (Crushing and lateral partial turbinectomy) with status of synechia at 6 months

Synechia	(Group A) Crushing (No. of patients)	%	(Group B) Lateral partial turbinectomy (No. of patients)	%
Absent	20	74	29	88
Present	7	26	4	12
Total	27	100.00	33	100.00

Most common complication noted in both the groups of our study was synechia which was a similar finding noted in the other studies.⁴ (12%) patients developed synechia who underwent LPT and 7 (26%) patients developed synechia who underwent crushing. No surgical intervention was required. In the study conducted by Singhani Ankit⁴, in one group who underwent LPT, 3 (11.4%) patients developed synechia

CONCLUSION

The overall success rate of outcome for both the group was equal. There was no statistical difference in the outcome of the two groups. Efficacy of crushing the concha bullosa is as good as lateral partial turbinectomy. However, it is inconclusive whether these therapeutic effects are maintained beyond six months. Long term follow-up is needed to further evaluate the efficacy of this procedure.

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Declaration:

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Conflict of Interest: None declared.

Ethical Approval:

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