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Original article

Role of Prelacrimal Recess Approach Assisted Middle Meatal Antrostomy in Primary Antrochoanal Polyp Management

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Abstract

Background: Primary antrochoanal polyp management is commonly done via middle meatal antrostomy which has a significant risk of recurrence. The prelacrimal recess approach is reported to minimize this risk. **Aim:** This study aims to compare the results of prelacrimal recess approach assisted middle meatal antrostomy with middle meatal antrostomy alone in the management of primary antrochoanal polyp. **Patients and methods:** A randomized prospective Comparative Study was performed on sixty patients with primary antrochoanal polyps in the period from October 2020 to June 2022. The patients were allocated randomly into two groups, group (A) 30 patients were surgically managed via only endoscopic middle meatal antrostomy, and group (B) 30 patients were subjected to endoscopic prelacrimal recess approach assisted middle meatal antrostomy. Postoperative follow-up was done subjectively and objectively over 6 months. **Results:** Age (p=0.4), sex (p=0.6), and lesion side (p=0.8) showed no statistically significant differences between the study groups, although mean operative duration was considerably shorter in Group A (25.2 ± 3.5) than Group B (37.7 ± 4.2) (p<0.001). Regarding the complications, there was no statistically significant difference between the two study groups regarding occurrence of Nasal obstruction(p=0.3) and Synechia(p=0.1), while recurrence rate was statistically significantly higher among group A than group B (p=0.03)**. Conclusion:** Prelacrimal recess approach assisted middle meatal antrostomy is a unique method for removing antrochoanal polyps to prevent its recurrence with reasonable operative time and few postoperative problems.

Keywords: Prelacrimal; Antrostomy; Antrochoanal

Introduction

The antrochoanal polyp (ACP) is a benign polypoid lesion that originates from the maxillary antrum and extends into the choana. ACP usually has two components, firm and cystic part [(1)]. It is a unilateral lesion that occurs in young ages **(Figure 1).** The etiopathogenesis of ACP is not clear. The most frequent symptoms are nasal obstruction and discharge. The main diagnostic techniques are nasal endoscopy and computed tomography (CT) scan [(2)]. Surgically treating ACP was performed previously by simple polypectomy and Caldwell Luc procedure that have been replaced recently by functional endoscopic sinus surgery (FESS) [(3)]. It is a minimally invasive technique that allows adequate removal with negligible complications [(4)]. Because of the difficulty in reaching the polyp's stalk in the maxillary sinus wall, endoscopic sinus surgery alone may not be effective. The recurrence rate via endoscopic sinus surgery is high. For prevention of ACP recurrence, removal of its stalk is a must[(5)].

The antral portion of the polyp can be removed via Caldwell-Luc method with multiple problems, including cheek anesthesia, swelling and injury of the infraorbital nerve. It risks damaging growing teeth in children [(2)].

Prelacrimal recess approach (PLRA) is a novel technique that makes maxillary sinus easily reached by the surgeon with wide and clear view [(6)].

Patients and methods

A randomized prospective comparative study of sixty individuals with primary antrochoanal polyps was performed in the period from October 2020 to June 2022. Patients were collected from Benha University Hospital Otorhinolaryngology outpatient clinic and randomization was done using sealed envelopes. The patients were allocated randomly into two groups, group (A) 30 patients were surgically managed via only endoscopic middle meatal antrostomy (MMA), and group (B) 30 patients were subjected to endoscopic prelacrimal recess approach assisted middle meatal antrostomy.

Inclusion criteria were patients with primary antrochoanal polyp whose ages ranged from 17 to 60 years, together with well-developed prelacrimal recess (Type II & Type III) [(7)]

and pneumatized maxillary sinus in CT scan.

Patients were excluded if they were younger than 17 years, older than 60 years, uncontrolled systemic diseases, fungal sinusitis, sinonasal tumors and recurrent antrochoanal polyp.

Preoperative diagnostic nasal endoscopy and multislice computed tomography scan were done.

Patients gave informed permission before participating in the research, and the Benha University ethical review board approved it. (MS 23-4-2021)

Surgical details: To avoid bias, same surgeon perfomed all surgical procedures under general hypotensive anesthesia.

In Group A, Patients were surgically managed via only endoscopic middle meatal antrostomy. After uncinectomy, we identified the maxillary sinus ostium and removed the posterior fontanelle to the palatine bone to get a large ostium and allow better control of origin of ACP. The following stage was utilizing an angled endoscope (45 degrees, 70 degrees, or 120 degrees) to debride the periosteum at the ACP attachment site. The middle turbinate has been medialized to eliminate the potential for synechiae between it and the lateral nasal wall. **(Figure 2)**

In Group B, Patients were subjected to endoscopic prelacrimal recess approach assisted middle meatal antrostomy. The same technique of a former study [8] was implemented. Injecting two ml of xylocaine and adrenaline 1:200,000 into the inferior turbinate and the lateral nasal wall adjacent and anterior to the inferior turbinate after MMA was shown to be effective in achieving local hemostasis.

In the lateral wall of the nasal cavity between the front of the inferior turbinate and the rim of the pyriform opening, a curved mucosal incision was performed. The mucosa from the subperiosteal level was elevated to the insertion site of inferior turbinate with separation of its bony attachment. Elevation of mucoperiosteum was performed to reach inferior bony orifice of nasolacrimal duct.

A chisel (supplemented by Kerrison forceps) was used to remove the anterior bony portion of the medial wall of the maxillary sinus. This exposed the nasolacrimal duct (NLD), and the inferior turbinate-nasolacrimal duct (IT-NLD) flap

was created as a result **(Figure 3).** The anteromedial wall of the maxillary sinus was uncovered by medially repositioning the IT-NLD flap. Polyp was removed from its stalk under direct visualization **(Figure 4).** IT-NLD mucosal flap was repositioned at the end of operation, and the incision was sutured with 3-0 absorbable vicryl sutures **(Figure 5).**

Postoperative treatment and monitoring: After a day, the nasal pack was removed. Every patient was given a course of oral antibiotics to take for a week after surgery and instructed to use Alkaline nasal wash for at least a month. All patients underwent nasal examination once a week for a month and then once a month for another six months.

Subjective assessment: Subjective patient data was acquired using rated symptoms compared between two groups. All patients were approached to rate their symptoms as facial pain (before removal of the pack, three days, one, two, four and six weeks after surgery), nasal obstruction (after six months) and epiphora (after six months).

Objective assessment: Patients were assessed by endoscopic examination and CT. The operative cavity was assessed for crusts (after one, three, and six months), Synechia (after six months), Inferior Turbinate-Nasolacrimal duct flap status (after six months) and recurrence (after six months). Postoperative Radiological evaluation included CT scan paranasal sinuses after six months.

Statistical analysis

An "Investigation report form" was used to document the collected information. Statistical Package for the Social Sciences (SPSS) version 26 was used to do the tabulation, coding, and analysis of this data. For quantitative data, we calculated means, medians, and ranges; for qualitative data, we calculated counts and percentages. We used Shapiro-Wilk test to examine the distribution of the numerical data. We used Student's t-test to compare the means of two sets of numerical (parametric) data to determine the statistical significance of the differences between the groups. We utilized Mann-Whitney U-test to compare two groups since it is appropriate for continuous, non-parametric data. Chi-square test (X2-value) or Fisher's exact test was applied to compare groups' categorical data. When doing statistical tests, p-value of less than .05 was deemed significant.

Results

Age, sex, and lesion side did not vary significantly (p = .4, .6, and .8, respectively) between the two research groups **(Table 1).**

Regarding the site of origin of antrochoanal polyp, there was no statistically significant difference between the two study group: the most common is the medial (36.7%), followed by the posterior (30 %) then lateral (16.7%) and anterior walls (16.7%). The mean Operative time was statistically significantly lower among Group A (25.2 minutes) than Group B (37.7 minutes(p < .001).

There were no significant differences between both groups regarding intraoperative bleeding (P = .2). Bleeding was minimal in amount (score 1) and confined to the nasal cavity. Suctioning was required with no affection on the surgical outcome. Intraoperative IT destabilization occurred in only one case of group B (3.3%)

Postoperatively, the pain score was statistically significantly higher among Group B than in group A before removal of the pack up to four weeks follow up (p = .006 and p = .02 respectively). But after six weeks, there was no statistically significant difference between the two study groups. (**Table 2)**

Three patients (10%) in group A and six patients (20%) in group B had postoperative nasal obstruction (P = .3). This showed no statistically significant difference between two groups. **(Table 3)**

To assess postoperative epiphora, A drop of sterile fluorescein solution (2% fluorescein) was placed in the conjunctival fornices of the eye and the patient's ability to see the drop vanish was evaluated to see whether epiphora was present. If sufficient dye remains on the tear meniscus after five minutes, or if the dye is not cleared off the tear meniscus completely, then there is a blockage. Just members of Group B had this problem. **Munk score** [(9)] determined that two patients (6.7%) experienced it at grade 1 (less than twice daily).

Regarding postoperative crustations, there was a statistically significant difference between two groups at one and three months follow up (p = .01, p = .04 respectively), while at six months follow up, no crustation in both groups. Crustations easily removed by suctioning under local anesthesia and by

regular use of an alkaline nasal wash (**Table 4)**

Postoperative Synechia occurred in one patient of group A (3.3%), while in five patients of group B (16.7%), adhesions were mild degree (score 1) and easily released under local anesthesia followed by nasal packing **(Figure 6).** This showed no significant difference between two study groups (P = .1). **(Table 3)**

One patient (3.3% of the total) in group B had a tiny bare region at the junction of the inferior turbinates and nasolacrimal ducts, but this area healed on its own after a month.

Among 30 cases of group A, five patients (16.7%) showed recurrence of antrochoanal polyp **(Figure 7)**, but no recurrence was detected in group B throughout six months after surgery **(Figure 8).** The Recurrence rate was statistically significantly higher among group A (P = .03) **(Table 3)**

Regarding recurrent polyps in Group A, this study reported three of five cases (60%) in the anterior wall, one of four cases (25%) in the lateral wall and one of 12 cases (8.3%) in the medial wall but no recurrence of polyp among nine cases of the posterior wall. There was a statistically significant difference between recurrence rates regarding site of origin, as the highest recurrence rate was in the anterior part (p = .03). **(Table 5)**

Table (1): Comparison between Group A and Group B regarding age, sex, Operative time and side of the lesion

Characteristics		**Group A (n=30)**	**Group B (n=30)**	**Test of sig.**	**p-value**
Age/months (mean ± SD)		32.03 ± 10.3	32.7 ± 9.8	0.3 **(T test)**	0.4
Sex	**Female**	14 (46.7%)	16 (53.3%)	0.3 **(X^2)**	0.6
No. (%)	**Male**	16 (53.3%)	14 (46.7%)		
Operative time (measured by minutes) (mean ± SD)		25.2 ± 3.5	37.7 ± 4.2	12.7 **(T test)**	**<0.001***
Side of lesion	**LT**	13 (43.3%)	14 (46.7%)	0.1 **(X^2)**	0.8
No. (%)	**RT**	17 (56.7%)	16 (53.3%)		

Table (2): Comparison between Group A and Group B regarding Pain score

	Group A (n=30)		Group B (n=30)		Test of sig. (Mann Whitney U test)	p-value
	median	range	median	range		
Before the removal of the pack	4	3-5	4.5	3-6	2.7	0.006*
3 days after the removal of the pack	1	0-5	3	0-6	2.8	0.005*
1 week	0	0-2	1.5	0-5	3.2	0.001*
2 weeks	0	0-0	0	0-2	3.4	<0.001*
4 weeks	0	0-0	0	0-1	2.3	0.02*
6 weeks	0	0-0	0	0-1	1	0.3

Table (3): Comparison between Group A and Group B regarding complications

	Group A (n=30)		Group B (n=30)		Test of sig. (X^2 - FET)	p-value
	No.	%	No.	%		
Nasal obstruction	3	10.0%	6	20.0%	1.2	0.3
Synechia	1	3.3%	5	16.7%	1.7	0.1
Recurrence	5	16.7%	0	0.0%	5.5	**0.03***

Table (4): Comparison of Group A and Group B regarding crustation score

	Group A (n=30)		Group B (n=30)		Test of sig. (Mann Whitney U test)	p-value
	median	range	median	range		
1 month	1	1-2	1	1-2	2.5	**0.01***
3 months	0	0-0	0	0-1	2.1	**0.04***
6 months	0	0-0	0	0-0	---	---

Table (5): Comparison of the recurrence rate regarding the site of origin in cases of MMA (Group A)

	Non recurrent (n=25)		Recurrent (n=5)		X^2	p-value
	No.	%	No.	%		
Anterior	2	8.0%	3	60.0%	9.4	**0.03***
Lateral	3	12.0%	1	20.0%		
Medial	11	44.0%	1	20.0%		
Posterior	9	36.0%	0	0.0%		

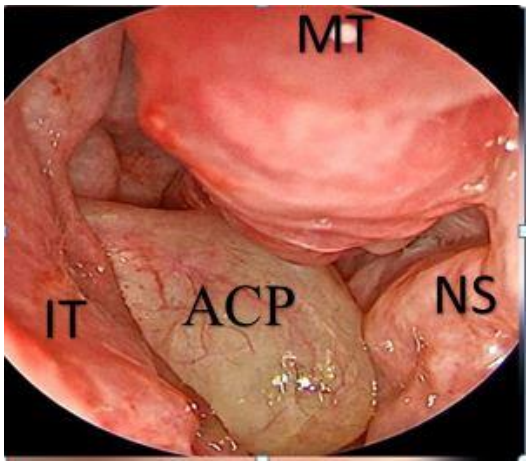

Fig. (1): right acp protruding from middle meatus into nasal cavity. **Mt:** middle turbinate. **It:** anterior part of inferior turbinate. **Ns:** nasal septum. **Acp:** antrochoanal polyp.

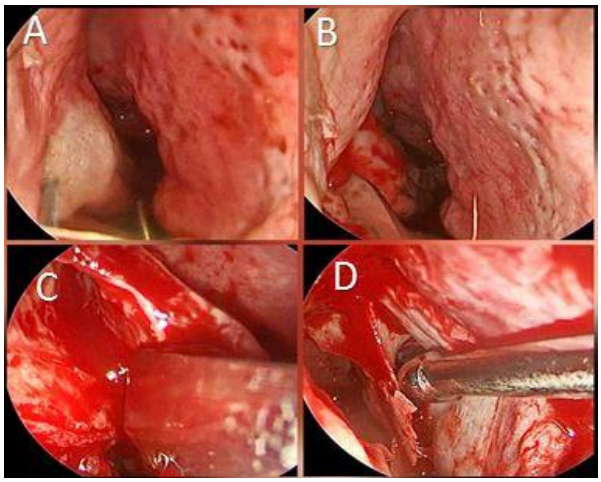

Fig. (2): A: Injection of xylocaine and adrenaline into anterior end of inferior turbinate. **B:** curved incision in lateral nasal wall. **C:** elevation of mucosal flap of inferior turbinate. **D:** Chieseling of the anterior bony portion of medial wall of maxillary sinus.

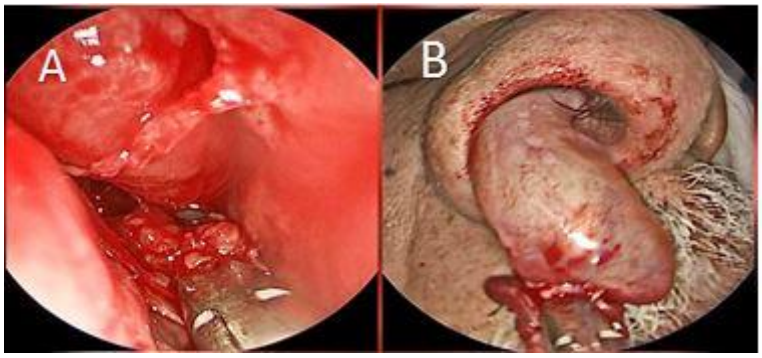

Fig. (3): Removal of the polyp from its stalk out of maxillary sinus **(A)** and nasal cavity **(B)**.

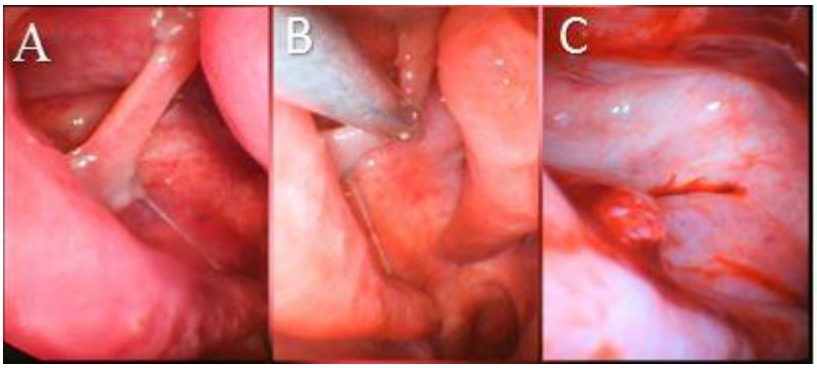

Fig.(4): Postoperative adhesions (Synechia) in case of PLRA. **A:** mild degree adhesion score 1 (Band between middle turbinate and lateral wall). **B:** release of the adhesive band under local anaesthesia. **C:** maxillary sinus cavity after release of the adhesive band.

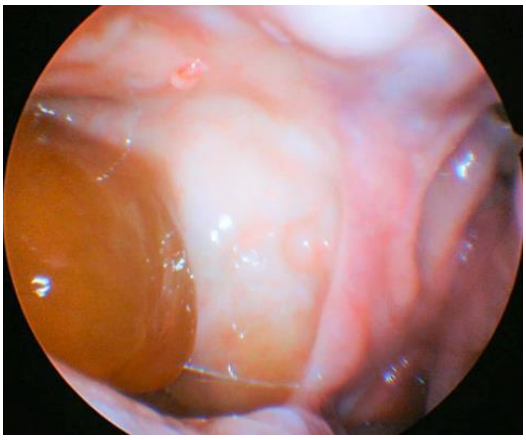

Fig. (5): Postoperative recurrent Polyp arising from Middle Meatus in case of MMA within 6 months after surgery

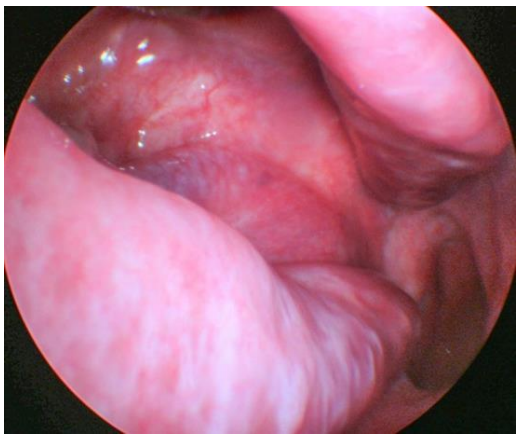

Fig.(6): Postoperative endoscopic examination of the nasal cavity in case of PLRA showing well-drained maxillary sinus with no recurrent polyps (6 months follow up)

Discussion

Antrochoanal polyp is a unilateral polyp that begins in the maxillary sinus and grows into the nasal cavity through the natural or accessory ostia and its first description by Killian in 1906 **[10].** Prelacrimal recess approach is a novel technique that makes maxillary sinus easily reached by the surgeon with wide and clear view **[11].**

This study was conducted on 60 patients who presented with primary antrochoanal polyps. 30 patients underwent endoscopic middle meatal antrostomy, and the other 30 patients underwent endoscopic prelacrimal recess approach assisted middle meatal antrostomy.

Similarly, a previous study **[12]** observed no statistically significant difference in age between the two groups (ten to 35 years with a mean of 22.03 years). There was no statistically significant difference between male (56.2% vs. 43.8%) and females (43.8%) in terms of gender and lesion location, as reported in another study **[13],** (left side 62.5% and right side 37.5%).

In our study, the mean operative time was statistically significantly lower among Group A (25.2 minutes) than Group B (37.7 minutes) ($p < .001$). This observation agreed with a former study **[14],** where the mean operative time for Middle meatal antrostomy group was 21.1 minutes, whereas it was 39.6 minutes for Prelacrimal recess approach.

Regarding the site of origin, the medial wall was found to be the most prevalent place of origin for antrochoanal polyps (27.2%), followed by the posterior wall (18.1%) in a previous study **[15].** When comparing the middle meatal antrostomy and prelacrimal approaches, intraoperative hemorrhage was less in the former group **[16]**. Our research found that little bleeding (score 1) that was localized to the nasal cavity had no effect on the final surgical result.

As regards postoperative pain, facial pain was found to occur in 11.1% of patients: 14.29 % in the Endoscopic sinus surgery group and 9.09 % in the Prelacrimal recess approach group within the follow-up period = 22.5 months (range, 8-44 months) **[12]**. But our study declares that the pain score was statistically significantly higher among Group B than in group A before removal of the pack up to four weeks follow up ($p = .006$ and $p = .02$ respectively), while at 6 weeks follow up no statistically significant

difference between the two study groups regarding pain score.

Using an alkaline nasal wash, crustations disappeared in every patient after a month [(17)]. After one and three months of follow-up, our research found a statistically significant difference between Groups A and B (p = .01 and p = .04, respectively), but at six months of follow-up, no crustation was seen in either group.

Synechia formation between the middle meatus and the septum was just superior to the inferior turbinate; 6.25 % in the endoscopic sinus surgery group and 18.75 % in the Prelacrimal recess approach group and all were not complaining and needed no surgical interference [(14)]. This agrees with our study in which there was no statistically significant difference between the two study groups regarding the occurrence of Synechia. The percentage of cases exhibiting Synechia was 10% in total; 3.3% in Group A and 16.7% in Group B. Synechia formed in cases of both groups is of mild degree (score1) and released under local anesthesia followed by nasal packing using a strip of gauze soaked with antibiotic cream removed after 24 hours in order to prevent its recurrence.

In this study, intraoperative inferior turbinate destabilization occurred in 3.3 %, and postoperative inferior turbinate flap prolapse occurred in 3.3 % only in cases of group B, compared to 15% that was reported in a former study [(18)].

As regards postoperative epiphora, this study reported 6.7 % of cases with epiphora score (1) on the Munk scale, dabbing less than twice daily and not requiring surgical interference. And this percentage is lower than similar studies [(11),(12)] who reported temporary epiphora in 22.7% and 20% of patients, respectively.

The ACP recurrence rate with endoscopic large middle meatal antrostomy was 12% [(19)]. The recurrence is most likely because of residual polypoid parts in the maxillary sinus that were not previously removed. A combination method (FESS with Caldwell-Luc) is indicated to reduce the polyp if the whole polyp cannot be removed endoscopically. This agreed with our study in which patients in Group A who only underwent middle meatal antrostomy had a recurrence rate of 16.7 %.

A previous study [(20)] who also utilized the prelacrimal recess method, reported a 95% success rate and a follow-up of seven to 60

months without recurrence. Also, another study [(11)] had no recurrence for a one-year follow-up.

This significant difference is due to the advantage of the prelacrimal approach, as it allows wide access to the maxillary sinus and makes it easier to remove the polyp without leaving any remnants. This role is very important, especially with polyps that originate from walls which are not completely accessible by basic endoscopic sinus surgery. So, we had a relationship between site of origin of polyp and recurrence rate in patients who were operated by middle meatal antrostomy only. There was a statistically significant difference ($p = .03$) between recurrent rate regarding the site of origin, as the highest recurrence rate was in the anterior part (60%).

The findings of one study [(12)] were in contrast to ours; they claimed that in Endoscopic sinus surgery, antrochoanal polyps were removed entirely via MMA, with no further procedures being necessary. We ultimately had to use the PLRA . By combining PLRA with MMA, we were able to access all of the maxillary sinus's walls. The attachment site of ACP was located and removed completely. Selected cases were both primary and recurrent.

Conclusion

Prelacrimal recess approach assisted middle meatal antrostomy is a unique method for removing antrochoanal polyps to prevent its recurrence with reasonable operative time and few postoperative problems.

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