**ABSTRACT**

**Background:** Chronic rhinosinusitis is a clinical syndrome defined by persistent symptomatic inflammation of the mucosa of the nasal cavities and paranasal sinuses. Usually, it responds to conservative medical treatment. Cases that resist medical treatment usually need functional endoscopic sinus surgery. Uncinectomy is the first step in functional endoscopic sinus surgery.

**Objective:** to compare between partial and total uncinectomy results in terms of patient symptoms improvement, operative data (operative time and complications), and postoperative complications in management of localized maxillary sinusitis.

**Methodology:** the present study included 40 cases with chronic maxillary sinusitis allocated for functional endoscopic sinus surgery after failure of medical treatment. The 40 cases were divided into groups (20 cases each). Partial uncinectomy was done in group A and total uncinectomy was done in group B.

**Results:** both partial and total uncinectomy were compared in terms of safety and effectiveness. Total uncinectomy had significantly longer operative time and had more complications when compared to partial uncinectomy. In addition, total uncinectomy was more effective in relieving headache, anterior nasal discharge and nasal obstruction, while partial uncinectomy was more effective in relieving postnasal discharge. None of these results reached a statistically significant value.

**Conclusion:** compared to total uncinectomy operative time, healing time and complications were less in partial uncinectomy. Despite that both are effective in resolving the symptoms, partial uncinectomy is preferred in patients with localized maxillary sinusitis.

**Keywords:** Total uncinectomy, partial uncinectomy, localized maxillary sinusitis, functional endoscopic sinus surgery.

**INTRODUCTION**

When the nose and its surrounding nasal sinuses become inflamed for at least twelve weeks, despite of taking medical treatment, the chronic rhinosinusitis (CRS) is considered [1, 2]. Medical treatment options for CRS include topical intranasal steroid, oral antibiotics, topical antibiotics, nasal saline irrigation, oral steroids or combination of oral antibiotics and steroids [3]. Medical treatment aims to decrease sinus edema, help drainage of the sinuses and help in eradication of the infection. Cases not responding to medical treatment need functional endoscopic sinus surgery [4]. When surgical intervention (Functional endoscopic sinus surgery) is required in cases of chronic rhinosinusitis, diagnostic nasal endoscopy is done in addition to CT scan of the nasal sinuses [1, 2]. The concept of functional endoscopic sinus surgery is based on the publication of Messerklinger in which mucociliary defects and narrowing of osteomeatal complex are considered as the main cause of recurrent chronic rhinosinusitis [5, 6, 7]. Functional endoscopic sinus surgery (FESS) helps to clean and ventilate the natural ostia. The most common area in pathogenesis of chronic and recurrent rhinosinusitis is maxillary sinus ostium [8]. Functional endoscopic sinus surgery (FESS) consists of many steps the first step is uncinectomy [9, 10]. The uncinate process is a thin bone like leaflet that can be attached to the lateral nasal wall, the lamina papyracea, on the ethmoidal proof, or the middle concha [11, 12]. The space between the upper part of the uncinate process and ethmoidal bulla is the...
hiatus semilunaris which opens into ethmoidal infundulum which houses the maxillary sinus ostium [13]. The most important step in FESS is uncinectomy [14]. Partial excision of uncinate process helps to improve patients with pathological conditions localized to the maxillary sinus [15]. Total excision of uncinectomy is not essential because it delays the healing, can cause injury to important structures as lamina papyracea or nasolacrimal duct [16]. There are documented complications of the endoscopic sinus surgery such as lamina papyracea injury (because it is very thin and, in some patients, may be touching the uncinate process). This leads to injury of the orbital cavity which may lead to blindness [17]. This work evaluates the outcome of partial uncinectomy in comparison to total uncinectomy as regard curative rate, operative data, operative complications and postoperative complications.

SUBJECTS AND METHODS
This study included 40 cases that showed symptoms and signs suggestive of chronic sinusitis and they failed to respond to medical treatment. The age ranged from 19 years to 51 years; 24 of them were males and 16 were females. Uncinectomy was done as a part of FESS surgery. Cases were selected from Al-Zahraa Hospital, from March 2015 to December 2017. The study protocol was approved by local ethical committee of the Otorhinolaryngology department. Consents of the patients were obtained. The 40 cases were divided randomly into two groups (20 cases each).

Group A were electively assigned to partial uncinectomy and group B were electively assigned to total uncinectomy.

Preoperative assessment was done including personal history, history of present illness, rhinorrhea (mucopurulent, purulent or watery), Nasal obstruction (partial or total, permanent or alternating), sneezing, smell disorders, postnasal discharge, headache. Past medical and surgical histories were conducted. General examination, nose examination including anterior rhinoscopy and Nasal endoscopic examination were done. Investigations were done in the form of fasting blood sugar, complete blood picture, liver and kidney function. Preoperative CT scan (nose and paranasal sinuses). Inclusion criteria: Cases with chronic sinusitis that failed to respond to medical treatment. Exclusion criteria: patients with any contraindication for nasal operation, with previous endoscopic sinus surgery, with nasal polyposis, suffering from either benign or malignant nasal masses and/or with fungal sinusitis were excluded.

Surgical technique
Anaesthesia: under general anaesthesia and hypotensive blood pressure done by anaesthetist.

Position: patients lay in a semi-sitting position.

Group A, with partial uncinectomy in which half of the uncinate was removed using Sickle knife and Backbiter to identify the maxillary sinus ostium [15].

Group B, with total uncinectomy; same surgical technique of group A was applied, in addition removal of the entire uncinate process was done [15].

Postoperative care: Medical treatment was given to the patients. Nasal packing was removed 2 days after the operation.

Postoperative follow up: We followed the patients on the third day, after one week, weekly for one month and monthly for six months [18]. Clearing the nasal cavity and removing any blood clot or crustation were done in the visits.

The following parameters were evaluated: operation time, healing time and incidence of postoperative complications.

Statistical analysis
We analysed our data by using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. When comparing between two means independent-samples t-test of significance was used. The confidence interval was set to 95% and the margin of error accepted was set to 5%. P-value <0.05 was considered significant.

RESULTS
Our study was designed to evaluate if partial uncinectomy is effective as much as total uncinectomy in management of patients with isolated chronic maxillary sinusitis.

Age ranged from 19 to 51 years; males represented 60% of all studied cases and females represented 40% with male to female ratio of 1.5:1. Presenting symptoms were in the form of post-nasal discharge in 82.5% of cases; headache in 65% of cases; anterior nasal discharge in 27.5% of cases and nasal obstruction in 27.5% of cases. There was no statistically significant difference between group A and group B as regard to age, sex.

Operative time ranged from 1-3 minutes in group A and 4-5 minutes in group B and there was statistically significant shortening of operative time in partial uncinectomy group when compared to total uncinectomy group. [Table 1] Healing time [weeks] was ranged from1- 3 weeks in group A and 2-3 weeks in group B, with significant difference between groups A and group B. [Table 1]. There were no complications in group A, but in group B complications were in the form of synchia formation 3 cases [15%], Lamina papyracea injury in 1 case [5%] and NLD injury in 1 case [5%] [Figure 1]. As regard postoperative symptoms; postnasal discharge was reported in 9 cases [22.5%] of cases, headache in 3 cases [7.5%], anterior nasal discharge in 6 cases [15%] and nasal obstruction in 4 cases [10%]. In terms of effectiveness in relieving symptoms, the two groups were effective nearly the same. However, group B had better effectiveness in terms of relieving headache, while group A had better effect on postnasal discharge.
Table (1): Comparison between groups according to operation duration and healing period

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A (PU) (N=20)</th>
<th>Group B (TU) (N=20)</th>
<th>t-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation duration (min)</td>
<td>Mean ±SD</td>
<td>Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.04±0.58</td>
<td>1-3</td>
<td>4.59±1.31</td>
<td>4-5</td>
</tr>
<tr>
<td>Healing period (week)</td>
<td>Mean ±SD</td>
<td>Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.30±0.66</td>
<td>1-3</td>
<td>2.81±0.80</td>
<td>2-3</td>
</tr>
</tbody>
</table>

*Significant p-value < 0.05

Figure (1): Post-operative complications among group B assigned to total uncinectomy

DISCUSSION

When the medical treatment fails in cases of chronic rhinosinusitis surgical intervention is needed in the form of functional endoscopic sinus surgery [19]. Functional endoscopic sinus surgery (FESS) was done when medical treatment failed. Partial uncinectomy provides the same result as total uncinectomy without complications of total uncinectomy [9]. However, partial uncinectomy had significantly shorter operative time. Total uncinectomy had higher complications when compared to partial uncinectomy. As regard relieving of the symptoms total uncinectomy was more effective in relieving headache but partial uncinectomy was more effective in relieving postnasal discharge. On the other hand, anterior nasal discharge and nasal obstruction are of equal results in both groups.

Regarding age it was ranging from 20 – 51 in (Partial uncinectomy) and 19 – 46 in Group B (Total uncinectomy); by Buyn and Lee [15] age was ranging from 11 – 65 in (Partial uncinectomy) and 10 – 59 in Group B (Total uncinectomy); while by Kamel [18] the ages were between 13 and 61 years.

Regarding gender 24 of them were males and 16 were females distributed males represented 60% of all studied cases and females represented 40% with male to female ratio of 1.5:1. Also, Buyn and Lee [15] reported 15 of their patients were males and 10 were females distributed males represented 60% of all studied cases and females represented 40% with male to female ratio of 1.5:1. Meanwhile, Kamel [18] reported there were 34 males (51.5 %) and 32 females (48.5%) with male: female ratio of 1.06:1.

Regarding to surgical indication of uncinectomy, it was reported that partial uncinectomy is more useful in cases of localized maxillary sinusitis [15, 20]. These data agree to our surgical indications in the present study. Regarding number of cases with chronic sinusitis the number was 40 cases, 20 cases were PU and 20 cases were TU. Regarding to operation duration (min). In our study it ranges from 1- 3 minutes in group A (PU) and 4- 5 minutes in group B (TU). While by Buyn and Lee [15] it ranges from 1.95 - 3.17 minutes in group A (PU) and 2.37 – 4.51 minutes in group B (TU). Regarding to healing period (week). In our study it ranges from 1- 3 weeks in group A (PU) and 2-3 weeks in group B (TU). Also, Byun and Lee [15] reported healing period ranges from 1.18 - 2.36 weeks in group A (PU) and 1.63 – 3.21 weeks in group B (TU). This agrees with the results reported by Byun and Lee [15] who reported that, operation and healing time of partial uncinectomy were statistically significantly shorter than total uncinectomy. Regarding post-operative improvement in our study postnasal discharge was improved in (77.5%), headache was improved in [92.5%] of cases, anterior nasal discharge was improved in [85%] and nasal obstruction was improved in [90%]. By Kamel [18] study postnasal discharge was improved in (89%), headache was improved in [96%] of cases, anterior nasal discharge was improved in [90%] and nasal obstruction was improved in [65%]. Regarding to operative and post-operative complications it was as follow; In our study complications were in group B in the form of Lamina papyracea injury in 1 case [5%], NLD injury in 1 case [5%], synechie formation 3 cases [15%] and there was no significant difference between the two groups as regarding complications. This agrees with results reported by Byun and Lee [15].
who reported occurrence of lamina papyracea injury in one case of total uncinectomy group. Partial synechia formations were reported in two cases in group B. In our study 3 cases (15% from 20 patients) reported partial synechia formations. Friedman et al. [21] reported uncommon side effect as nasolacrimal duct obstruction or stenosis of the frontal recess. This agrees with results reported by Kamel [18] who reported one case of lamina papyracea injury and three cases of post-operative synechia out of 94 total uncinectomy operation cases.

CONCLUSION
In this study it was found that partial uncinectomy has shorter operative and healing time and less possibility of complications with comparison to total uncinectomy. Complete and partial uncinectomy are effective in relieving symptoms with slight better effectivness in complete uncinectomy. We recommend that in case of maxillary sinusitis unilateral or bilateral with normal other sinuses to perform partial uncinectomy because it has the same effect of total uncinectomy but less complication.

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Conflict of interest
The authors declared that there is no conflict of interest to be declared.

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الملخص العربي

الاستئصال الكلي مقابل الجزئي للناتوء الهلالي في جراحة المناظير الوظيفية للجبوب الأنفية

سيد محمود مخيمر 1، سيد موسى سعيد قدح 1، فاطمة سيد عبد الجابر 2، أحمد عبد الغفار 2

قسم الأنف و الأنف والحنجرة - كلية الطب، بنات، القاهرة، جامعة الأزهر، جمهورية مصر العربية
قسم الأنف و الأنف والحنجرة مستشفى المطرية التعليمي، القاهرة، جمهورية مصر العربية

ملخص البحث:

الخليفة: التهاب الجيوب الأنفية المزمن عرض يعترف بوجود اعراض ثابتة لالتهاب الغشاء المخاطي للأنف و الجيوب الأنفية. وعادة هي تستجيب للعلاج الدوائي ولكن الحالات التي لا تستجيب للعلاج الدوائي عادة تخضع لعملية جراحية بالمنظار الأنفي. أول خطوة في هذه العملية هي استئصال الناتوء الهلالي.

الهدف: من هذه الدراسة هو المقارنة بين نتائج الاستئصال الكلي مقابل الجزئي للناتوء الهلالي و دور كل منهم في مدى تحسين الاعراض المرضية و في نفس الوقت تجنب مضاعفات ما بعد العملية.

الطريق: وقد اشتملت الدراسة على 40 حالة ممن يعانون من اعراض التهاب الجيوب الأنفية المزمن و جميعهم لم يستجيبوا للعلاج الدوائي و تم إعدادهم للتدخل الجراحي. و تم تقسيم المرضى لمجموعتين كل مجموعة بها 20 حالة المجموعة الأولى اعتملت على حالات الاستئصال الجزئي للناتوء الهلالي و المجموعة الثانية اعتملت على حالات الاستئصال الكلي للناتوء الهلالي.

النتائج: وقد أقرت نتائج الدراسة عن كفاءة الاستئصال الجزئي للناتوء الهلالي بالنسبة للامان و الفاعليه مقارنة بالاستئصال الكلي للناتوء الهلالي بينما كانت الاستئصال الكلي تتم في وقت أقل من الاستئصال الكلي و لذا مساعدة أقل مقارنة بالاستئصال الكلي و لكن الفروق لم تكن ذات دلالة إحصائية. وكذلك كانت الاستئصال الجزئية أكثر فعالية في خفض اعراض النقص في تخفيف اعراض الرش الخفيف للفالون بينما كانت الاستئصال الكلية أكثر فعالية في تخفيف الصداع الناتج عن التهاب الجيوب الأنفية المزمن و الرش الامامي و إغلاق الأنف و كانت الفروق ليست ذات دلالة إحصائية.

الاستنتاجات: و خلصت نتائج الدراسة عن فعالية و آمن الاستئصال الجزئي للناتوء الهلالي مقابل الاستئصال الكلي للناتوء الهلالي.

الكلمات المفتاحية: الاستئصال الكلي للناتوء الهلالي - الاستئصال الجزئي للناتوء الهلالي - التهاب الجيوب الأنفية الفيكي الموضعي - جراحة المناظير الوظيفية للجيوب الأنفية

الباحث الرئيسي:

الاسم: فاطمة سيد عبد الجابر - قسم الأنف و الأنف و الحنجرة - كلية الطب، بنات، القاهرة، جامعة الأزهر، جمهورية مصر العربية

البريد الإلكتروني: fatmamohamed30@hotmail.com

هاتف: 01124454762