Endoscopic Sinus Surgery versus Conventional Method in Management of Naso-Ethmoidal polyps and Their Associated Intranasal Abnormalities

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Abstract

Background: This is a prospective and comparative clinical study, implemented in department of Otolaryngology – Sulaimani Teaching Hospital, from Aug. 1st 2006 to Nov. 1st 2007.

Objectives: This study was carried out to compare the influences and outcomes of endoscopic sinus surgery versus conventional intranasal method in management of patients with nasal polyps, which is the most common intranasal swelling.

Methods: The sample of the study includes 50 patients aged 12-75 years old that are managed for nasal polyp, thirty patients managed by conventional method and twenty patients were managed by endoscopic sinus surgery. Patients are observed postoperatively by symptomatic score and endoscopically.

Results: Endoscopic sinus surgery resulted in better improvement in symptoms, better treatment of other associated sinonasal pathologies, less complication rate, and less recurrence rate than conventional polypectomy. On the other hand endoscopic sinus surgery is more technically demanding and needs more operative time than the conventional way.

Conclusion: We concluded from the study that Endoscopic Sinus surgery is better than conventional intranasal polypectomy, as endoscopy provides approximate field of vision and illumination, good access, hidden pathology are revealed and managed, and complication, recurrent rate are less.

Keywords: nasal polyp, conventional polypectomy, endoscopic sinus surgery.

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Introduction

The introduction of endoscopes in sinus surgery has brought about a revolution in the approach to surgery of paranasal sinuses. This technical achievement has been critical in the evolution of a functional philosophy of sinus surgery which was introduced by Messerklinger (1978) and Wigand (1981) and further refined by Stammberger (1986) (1).

Endoscopic sinus surgery is a minimally invasive technique in which sinus air cells and sinus ostia are opened under direct visualization (2).

Endoscopy also used for therapeutic purposes for patients who are correctly documented disease have failed to respond to appropriate medical therapy like chronic rhinosinusitis and nasal polyp with preservation of mucosal and bony framework in critical areas of the nasal cavity (4).

CT scanning identifies the anatomic relationships of the key structures (orbital contents, optic nerve and carotid artery) to the diseased areas. A process that is vital for surgical planning. CT also defines the extent of disease in any individual sinus, as well as any underlying anatomic abnormalities that may predispose a patient to sinusitis and nasal polyp (2).

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Most rhinologists agree that Endoscopic Sinus Surgery should be a “disease-directed” and mucosal-sparing operation, recognizing the principle of the potential for re-establishing drainage and mucosal recovery of the dependent sinuses (3).
The reasons and concepts supporting the use of FESS have recently become widely accepted. The term "functional" was introduced to distinguish this type of endoscopic surgery from nonendoscopic, "conventional" procedures; the goal of FESS is to return the mucociliary drainage of the sinuses to normal function. The paranasal sinuses are maintained in a healthy state by ventilation through the individual ostia and by a mucociliary transport mechanism that keeps a continuous protective layer of mucus flowing out of the sinuses (1, 2, and 5).

Nasal Polyps are parts of an inflammatory reaction involving the mucosa of the nose and paranasal sinuses. Nasal polyps are evaginations of the nasal mucosa attached by a pedicle arising from the ethmoidal sinuses, middle turbinate, maxillary sinuses and sometimes from the septum (6).

Types:
- Simple.
- Neoplastic.
  - Benign.
  - Malignant.

There are 5 main theories of pathogenesis:
1. Bernoulli phenomenon.
2. Polysaccharide changes.
3. Vasomotor imbalance.
4. Infection.
5. Allergy (8).

No single predisposing disease can be implicated in the formation of polyps, though they may be associated with several other diseases, notably non-allergic (intrinsic) asthma and aspirin intolerance or sensitivity (9).

The association of asthma and nasal polyps has been noted by numerous authors. What is also recognized, but much less often cited, is that this association is strongest in women (10).

In advanced cases the external nose may be broadened, the condition is known as “frog-face”

On examining the interior of the nose, attention should first be directed to the region of the middle turbinate, though in obvious cases a view of this part will be obscured by the multiple grey polypoidal masses. They are insensitive to probing, mobile on their pedicles, and may totally fill the nose bilaterally.

Posterior rhinoscopy should also be done; the nose can be looked perfectly normal anteriorly in the presence of a large choanal polyp, the narrow pedicle of which cannot be seen in the middle meatus (12).

- There is no specific hematological, biochemical or immunological investigations that are required apart from those involved in the general work up of cases prior to surgery.
- Radiology
  Plain radiographs of the paranasal sinuses demonstrated by the conventional three views will show the extent of the disease in the nose and paranasal sinuses to some extent. A CT scan will give more information, particularly the anatomical detail (8).

Management:
The treatment of nasal polyposis is a debatable subject. Surgical or medical treatment or both have been recommended as the treatment of choice.

A. Medical treatment:
According to the “Position statement on nasal polyps,” medical treatment should be used for at least 1 month before surgery is contemplated in patients with typical nasal polyposis because some studies have indicated that in those patients who respond to medical treatment, no additional treatment is necessary (13).

Steroids are the cornerstone for treating NP. This can range from topical steroid sprays or drops in mild to moderate polyposis, to a short course of systemic steroids in severely affected patients (14).

Both oral corticosteroids and topical nasal corticosteroids are effective in shrinking polyps and controlling their...
recurrence. Topical corticosteroids are first-line therapy that should be employed prior to considering surgical intervention. Unless there is a contraindication, a trial of a tapering course of oral corticosteroids is also frequently used prior to surgical resection. Should surgery eventually become necessary, topical corticosteroids and occasionally oral corticosteroids may be needed for long-term maintenance (15).

B. Surgical treatment: Anaesthesia

Surgical treatment is performed under either local or general anesthesia. If the operation is performed under local anesthesia, the polyps themselves often shrink, which makes removal difficult. However, recurrence is common as there are large parts of the polyps which shrink into the ethmoidal cells.

General anesthesia on the other hand allows the surgeon an excellent access to the ethmoidal polyps (16).

Conventional polypectomy

A snare is passed around each polyp in turn and gradually tightened as high up around the pedicle as possible. It is important that the pedicle should be avulsed and not cut or torn through, otherwise early recurrence is inevitable (12). Or forceps are used to remove the polyps.

Endoscopic sinus surgery

Polyps are removed using endoscopy; and associated pathologies in the nose and paranasal sinuses are corrected through endoscopic sinus surgery. Endoscopy provides excellent illumination through endoscope, good access and better visualization without magnification that can be transmitted by optical camera to a monitor.

The whole nasal cavity can be visualized in approximate view by three passes of endoscope along the floor of nasal cavity, between middle and inferior turbinate and between the middle turbinate and septum of the nose. Each area of nasal cavity is examined in a systematic fashion [4, 5]. The specific features that must be identified and assessed during the examination are the middle turbinate and the middle meatus (ostiomeatal complex), anatomic obstruction like septal deviation near ostiomeatal complex and the presence of mucopus and nasal polyps (4).

All patients were given medical treatment for two weeks in the form of broad-spectrum antibiotics, antihistaminics and local or systemic steroids and decongestants. The patients were then subjected to computer tomography scan of
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paranasal sinuses- both axial and coronal views.

B. Definate treatment: The patients are divided into two groups:

1. Twenty patients underwent endoscopic sinus surgery for nasal polyps.

   The extent of surgery was decided based on the findings in pre-operative endoscopy and CT scan of paranasal sinuses. Uncinectomy, removal of lateral wall of concha bullosa, anterior ethmoidectomy, posterior ethmoidectomy, middle meatus antrostomy and/or clearance of frontal recess were performed in the second group of patients. Sphenoid sinus ostium was widened only if CT scan showed evidence of its involvement. Along with this any significant anatomical abnormality was also noted and taken in consideration during surgery.

2. Thirty patients underwent conventional intranasal polypectomy. A snare is passed around each polyp in turn and gradually tightened as high up around the pedicle and avulsed; or forceps are used to remove polyps.

C. Post operative follow up: At the time of discharge from the hospital, the patients were given systemic antibiotic for 10 days along with decongestant drops. Steroid nasal spray was advised in all cases. Alkaline nasal douching was also advised. Patients were advised follow-up one week later, six weeks and three months. Subjective assessment for symptomatic improvement was done and objective results were assessed by check endoscopy. The results were then compiled.

Statistical analysis

The data are analysed by using StatCalc, version 5.3.4, by chi square analysis, P value less than 0.05 regarded as significant.

Results

The first operative group is composed of 13 males and 7 females and the second operative group consists of 20 males and 10 females.

The mean age of first operative group is 34.3 years while the mean age of second operative group is 37.9 years. There is no significant difference between the two groups regarding the age and sex, p value 0.38 (see table 1).

<table>
<thead>
<tr>
<th>characteristics</th>
<th>group I</th>
<th>group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Mean age (years) ± SD*</td>
<td>34.3±13.09</td>
<td>37.9±14.78</td>
</tr>
<tr>
<td>Sex (M: F) ratio</td>
<td>1.85:1</td>
<td>2:1</td>
</tr>
<tr>
<td>Residence (urban/Rural)</td>
<td>1.5:1</td>
<td>1.5:1</td>
</tr>
</tbody>
</table>

Group I: endoscopic sinus surgery group.
Group II: conventional intranasal polypectomy group.
SD = Standard deviation
* = p value = 0.38
The occupations of the patients are shown in the (Figure 1).

![Bar chart showing distribution of occupations](image)

**Figure 1:** shows the occupation distribution in the study group

Regarding the preoperative symptoms, both groups had nearly similar complaints, all they had nasal polyps with exclusion of antrochoanal polyp, nasal and antral tumor.

**Table 2: preoperative symptoms.**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>group I n=20</th>
<th>group II n=30</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-nasal obstruction</td>
<td>20 (100%)</td>
<td>22 (73.3%)</td>
</tr>
<tr>
<td>2-running and sneezing</td>
<td>18 (90%)</td>
<td>29 (96.6%)</td>
</tr>
<tr>
<td>3- hyposmea</td>
<td>20 (100%)</td>
<td>22 (73.3%)</td>
</tr>
<tr>
<td>4-pain</td>
<td>18 (90%)</td>
<td>29 (96.6%)</td>
</tr>
<tr>
<td>5-postnasal drip</td>
<td>5 (25%)</td>
<td>8 (26.6%)</td>
</tr>
<tr>
<td>6-hyponasal speech</td>
<td>20 (100%)</td>
<td>26 (86.6%)</td>
</tr>
<tr>
<td>7-mouth breathing</td>
<td>16 (80%)</td>
<td>18 (60%)</td>
</tr>
</tbody>
</table>

n= number

Regarding the preoperative examination by anterior/posterior rhinoscopy and nasal endoscope as a diagnostic tool for the two groups, gross finding such as deviated nasal septum, and hypertrophied turbinate are noted by either techniques while a hidden pathologies such as tiny middle meatal polypi and deformities of the middle turbinate are clearly visible by nasal endoscope (Figure2).
Figure 2: comparison of nasal pathology on clinical examination.

Regarding the operative procedures, Group I underwent Endoscopic sinus surgery for management of nasal polyps and associated finding preoperatively and intraoperatively while all group II patients underwent conventional intranasal polypectomy (table 3).

<table>
<thead>
<tr>
<th>Surgical Procedures</th>
<th>number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Septoplasty</td>
<td>10</td>
<td>50%</td>
</tr>
<tr>
<td>Uncinectomy</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>Anterior /posterior ethmoidectomy</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>Removal of lateral wall of choncha bullosa</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>Agger nasi exenteration</td>
<td>6</td>
<td>30%</td>
</tr>
<tr>
<td>Enlargement of maxillary sinus ostium</td>
<td>14</td>
<td>70%</td>
</tr>
<tr>
<td>Frontal recess clearance</td>
<td>1</td>
<td>50%</td>
</tr>
</tbody>
</table>

The duration of operation lasted longer in group I, the operation for 16 patients lasted 1.5-2 hours whereas 4 patients’ lasted 1-1.5 hours. While the duration for operation in group II lasted shorter, the operation for 25 patients’ lasted 0.5-1 hours, 4 patients lasted less than 0.5 hour and only one patient last 1-1.5 hours (figure 3), p value (0.000).
During follow up to six months postoperatively, patients in group I show great improvement symptomatically in comparison with symptomatic improvement in group 2, see table (4).

**Table 4: postoperative finding**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Group I n=20</th>
<th>Group II n=30</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>nasal obstruction</td>
<td>2 (10%)</td>
<td>13 (43.3%)</td>
<td>0.001</td>
</tr>
<tr>
<td>running and sneezing</td>
<td>4 (20%)</td>
<td>15 (50%)</td>
<td>0.03</td>
</tr>
<tr>
<td>hyposmea</td>
<td>2 (10%)</td>
<td>13 (43.3%)</td>
<td>0.001</td>
</tr>
<tr>
<td>pain</td>
<td>2 (10%)</td>
<td>10 (33.3%)</td>
<td>0.07</td>
</tr>
<tr>
<td>postnasal</td>
<td>4(20%)</td>
<td>12 (40%)</td>
<td>0.13</td>
</tr>
<tr>
<td>hyponasal speech</td>
<td>10 (0.0%)</td>
<td>2 (10%)</td>
<td>0.23</td>
</tr>
<tr>
<td>mouth breathing</td>
<td>10 (0.0%)</td>
<td>2 (10%)</td>
<td>0.23</td>
</tr>
</tbody>
</table>

n=number

From 20 patients, only 2 patients remain with nasal obstruction postoperatively in group I which represent 10% of patients (see figure 4). While from 30 patients, 8 patients remain with nasal obstruction which represents 26.6% of patients (see figure 5).
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From 20 patients, only 2 patients remain with hyposmea postoperatively in group I which represent 10% of patients (Figure 6). While from 22 patients, 13 patients remain with hyposmea postoperatively in group II which represent 59% of patients; (Figure 7).

Regarding complications, minor complications like crusting present in 60% of patients in group I while 26.6% complain of crusting postoperatively. Because of associated pathology that had been corrected in group I; one patient developed septal haematoma (Table 5).
Table 5: complications of operations

<table>
<thead>
<tr>
<th>Complications</th>
<th>Group I (n=20)</th>
<th>Group II (n=30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intranasal Crusting</td>
<td>12 (60%)</td>
<td>8 (26.6%)</td>
<td>0.018</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>3 (15%)</td>
<td>7 (23.3%)</td>
<td>0.47</td>
</tr>
<tr>
<td>Septal hematoma</td>
<td>1 (5%)</td>
<td>0</td>
<td>0.21</td>
</tr>
<tr>
<td>Periorbital chymosis</td>
<td>1 (5%)</td>
<td>1 (3.3%)</td>
<td>0.76</td>
</tr>
<tr>
<td>Rhinitis/sinusitis</td>
<td>1 (5%)</td>
<td>5 (16.6%)</td>
<td>0.21</td>
</tr>
<tr>
<td>Surgical emphysema</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Orbital cellulitis</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Orbital hematoma</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Meningitis</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

During follow up postoperatively, recurrence of polyps in group I found in only 1 patient which represent (5%) of the patients, while the recurrence group II found in 9 patients which represents (30%) of the patients.

In group I, synchial found in only two patients (10%), while in group II, it is found in 5 patients (16.6%) during follow up examination. (Table6)

Table 6: Endoscopic finding on follow up.

<table>
<thead>
<tr>
<th>Finding</th>
<th>Group I n=20</th>
<th>Group II n=30</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrence of polyps</td>
<td>1 (5%)</td>
<td>9 (30%)</td>
<td>0.03</td>
</tr>
<tr>
<td>Synechiae</td>
<td>2 (10%)</td>
<td>5 (16.6%)</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Discussion
The results of 50 patients with ethmoidal polyps undergoing Endoscopic Sinus Surgery (ESS) or conventional intranasal polypectomy are analyzed.

Thirty patients are undergoing conventional intranasal polypectomy and twenty patients undergoing endoscopic sinus surgery.

There are no significant differences between the two groups regarding the age and sex. The urban/rural ratios are the same between the two groups P value (0.38), (see table1).

Regarding the preoperative symptoms, both groups have nearly similar complaints. They have nasal polyps with exclusion of antrochoanal polyp, nasal and antral tumor.

Concerning the preoperative examination by anterior/posterior rhinoscopy and nasal endoscope as a diagnostic tool for the two groups, gross finding such as deviated nasal septum, and hypertrophied turbinates are noted by either techniques while hidden pathologies such as tiny middle meatal polypi and deformities of the ostiomeatal complex are clearly visible by nasal endoscope (Figure2). This concludes that nasal endoscopies is much more superior to
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anterior/posterior rhinoscopy to examine and diagnose intranasal pathologies. This coincide with the study of MATTOX, D.E (17) and LEVINE, H.L (18) who stressed on the importance of endoscopy in the diagnosis of sinonasal diseases.

The diagnosis of recurrent ethmoiditis due to a small polyp obstructing the ostiomeatal complex can be difficult and often unrecognized during anterior rhinoscope examination and can be diagnosed by nasal endoscope (19).

Regarding the operative procedures, all patients in group II underwent just conventional intranasal polypectomy while apart from polypectomy other pathologies were treated in group I like septoplasty (50%), uncinctomy (90%), anterior/posterior ethmoidectomy (90%), removal of lateral wall of concha bullosa (40%), Agger nasi exenteration (30%), Enlargement of maxillary sinus ostium (70%) and Frontal recess clearance (5%), (Table 3). This may explain that with endoscopic surgeries we can treat other pathologies which can not be treated by conventional way.

This validates the result of Ms Kim Dalziel, Research Fellow (LEAD), who states that ESS aims not only to remove the polyp but also to improve sinus drainage and ventilation, which may decrease recurrence rates. Advantages are claimed over conventional surgery: permitting a better view of the surgical field, fewer complications and lower recurrence rates. ENT specialists, aside from removal of polyps, use endoscopes for a variety of procedures (20).

The duration of operation lasts longer in group I, the operation for 16 patients lasts 1.5-2 hours whereas 4 patients’ last 1-1.5 hours. While the duration for operation in group II lasts shorter, the operation for 25 patients’ lasts 0.5-1 hours, 4 patients last less than 0.5 hour and only one patient lasts 1-1.5 hours (Figure 3), p value (0.000).

The final follow up was done after six months of surgery. There is satisfactory relief of symptoms postoperatively in all the subjects of the study with significant difference regarding nasal obstruction, running and sneezing and hyposmia (p value 0.001, 0.03, 0.001 respectively). These could be attributed to the removal of polyps and partly to the practice of doing anterior/ posterior ethmoidectomy and other associated procedures of the middle turbinate, which bears the brunt of inspiratory airflow (See table 4). Stammberger (1991) reports that 85% very good overall improvement and facial pain and headache were assessed as better as 93.4% (21).

The most common complication encountered involving intranasal crustation in 12 patients (60%), epistaxis in 3 patients (15%) and intranasal adhesions in 2 patients (10%).

Close outpatient postoperative care with meticulous cleaning of the nasal cavity under endoscopic guidance can easily prevent most of these adhesions.

The patients are advised to use nasal saline irrigation two to three time’s daily and nasal ointment to prevent dryness and crusting for at least two months postoperatively. The use of gel film has been reported to be effective in preventing synechiae formation between the middle turbinate and the lateral nasal wall.

The recurrence rate after six month period of follow up shows significant differences in recurrence rate, in group II, 9 patients (30%) while in group I shows only 1 patient (5%), p value 0.03.

We strongly recommend using endoscopic examination even in those departments which do not routinely
perform endoscopic sinus surgery, as it often reveals hidden pathologies.

Endoscopic sinus surgery is better than conventional intranasal polypectomy because of other pathologies can be treated like high septal deviation, tiny polyp obstructing the ostiomeatal complex and better ventilation and drainage of nose and paranasal sinuses.

The recurrence rate and complication are less if compared with conventional intranasal polypectomy.

It’s a minimally invasive surgery, has approximate field of vision and illumination and good access if compared with conventional intranasal polypoectomy, but it needs well trained and expert surgeon.

References