Effect Of Nasal Polyps On Spirometric Values Pre And Post Operative Comparison

Dr. Hameed D. Hussain
Dr. Sajad Y. Alhelo

Abstract:
Background: Nasal breathing can be crucial to the proper functioning of the lower airway. Nasal obstruction (N.O.) may play an important role in modulating lower airway and lung function.

Objective: the study was designed to assess the influence of nasal polyps on spirometric value and to evaluate the effect of surgical polypectomy on pulmonary function depend on spirometric test. Setting: otolaryngology, head and neck surgery center in Al-Sadder teaching hospital in Al Najaf governorate.

Patients: Forty four patients (29 men and 15 women) from 20-50 years old were enrolled in this study after taking their consent. All patients had nasal polyps for many years.

Methods: Prospective study of patients who had nasal polyps. All patients underwent spirometric test pre-operatively, only those with abnormal spirometric value were included in this study. Patients were divided into two groups according to the presence or absence of chest symptoms as group I and group II respectively. Patients then were treated surgically by different surgical methods and followed up for a period of 2-4 months and were assessed for the improvement of pulmonary function by spirometry.

Results: fourteen seven patients (39%) of 120 patients with nasal polyps had abnormal spirometry, 3 patients were lost in follow-up. Treatment of both groups improved nasal breathing function in 81% with improvement of pulmonary function in 11 patients (34.37%) of group I (32 patients) and 6 patients (50%) in group II (12 patients) with overall improvement of spirometry in 44 patients (38.6%).

Conclusion: this study presents an evidence for the existence of correlation between nasal polyps and lower airway disorders, and shows that effective surgical polypectomy may improve pulmonary function in lower airway disease patients with nasal polyps.
INTRODUCTION

Nasal polyp presents in the nasal cavity with a grape-like appearance, having a ‘body’ and a ‘stalk’. The surface is smooth and the colour is more yellow than the pink mucous membrane. The polyps protrude into the nasal cavity from the middle and superior meatus, resulting in nasal blockage and abolishing airflow to the olfactory region. Nasal polyposis, consisting of multiple, bilateral polyps, is part of an inflammatory reaction involving the mucous membrane of the nose, the paranasal sinuses and often the lower airways. The relationship between nasal polyposis and chronic rhinosinusitis is much debated but in its broadest sense nasal polyposis should probably be regarded as one form of chronic inflammation in the nose and sinuses, i.e. part of the spectrum of chronic rhinosinusitis. The prevalence rate of nasal polyposis is about 2 percent. The male:female ratio is about 2:1. Nasal polyposis occurs with a high frequency in groups of patients having specific airway diseases. It is noteworthy that nasal polyps are very rare in allergic children in contrast to children with cystic fibrosis and that the disease is more frequent in nonallergic than in allergic adult patients with rhinitis and asthma.(1) Recent evidence suggests an important role for pro inflammatory cytokines, chemokines and chemotactic factor in the pathogenesis of inflammatory polyps, along with variety of inveronment genetic &biochemical factors that have previously been proposed (12)

PATIENTS AND METHODS

This is prospective study was carried out on patients attended the department of otolaryngology in the out-patients clinic in Al-Sadder teaching hospital in Al-Najaf governorate over the period of one year from 1st of March 2010 to the outset of March 2011. A total of 44 patients included in this study (29 male and 15 female). Their ages ranged from 20-50 years.

Table (1) shows patients age distribution

<table>
<thead>
<tr>
<th>Age group</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>31-40</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>41-50</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>total</td>
<td>29</td>
<td>15</td>
</tr>
</tbody>
</table>

Assessment of the patients :
Assessment of the patients was done for :
1- Evaluation of nasal breathing function which depend on:
   a- Subjective assessment : depended on history taking.
   b- Objective assessment : depend on E.N.T examination.
2- Finding the causes of nasal obstruction through history taking, E.N.T examination and investigations.
3- Evaluation of patients with chest complaint through history taking, chest examination and investigations.

Spirometric test:
We consider the following readings as normal pulmonary function test (no spirometric abnormality) \(^{(4,5)}\)
- FVC \(\geq 70\%\) of predicted value.
- FEV\(_1\) \(\geq 70\%\) of predicted value.
- FEV/FVC \(\geq 70\%\) of predicted value.
Values less than 70% of predicted value were considered as abnormal spirometric finding\(^4\). An increase of 10% of predicted value was considered as an index of improvement in pulmonary function \(^5\).

According to the results of baseline spirometer patients were divided into two categories:

1. Those with normal spirometer were excluded from the study (73 patients).
2. Those with abnormal spirometer were studied (47 patients). All were treated by surgical polypectomy and encouraged to return on regular follow-up, but three patients were lost in follow up and were also excluded.

They were divided into two groups according to the presence or absence of associated chest symptoms with abnormal spirometric values:

- Group I: Those with nasal polyps and chest symptoms (32 patients).
- Group II: Those with nasal polyps without chest symptoms (12 patients).

**Criteria For Improvement In The Pulmonary Function Were Classified As**

1. Subjective: the opinion of the patient regarding improvement of chest symptoms.
2. Objective: by spirometric testing. An increase of 10% of the predicted value in \( \text{FEV}_1, \ FVC, \ FEV_1/FVC\% \) was considered as an index of improvement in spirometric value.

**RESULTS**

The results of baseline spirometric values:

Table (2) shows the improvement in spirometry in group I patients

<table>
<thead>
<tr>
<th>No.of Patient</th>
<th>Males</th>
<th>Females</th>
<th>Improved</th>
<th>Not improved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>32</td>
<td>21</td>
<td>11</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>
Table (3) shows the results of improvement in SMV in group II patients

<table>
<thead>
<tr>
<th>No. of Patient</th>
<th>Males</th>
<th>Females</th>
<th>Improved</th>
<th>Not improved</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>12</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

**Results of spirometric value following surgical polypectomy:**

The effect of treatment of nasal polyps on lower airway disorders was assessed by:

1. Subjective assessment: the opinion of the patient regarding improvement in chest symptoms.
2. Objective assessment: by spirometric value done pre-operatively and during follow up period on 2-4 months following surgical treatment for all patients who had nasal polyps.

2.1. Eleven patients of group I (32 patients) were significantly improved after surgery (p value 0.0001). The mean±SD pre-operatively was 60.31±5.72 and the mean±SD post-operatively was 64.66±8.38.

2.2. Six patients of group II (12 patients) were significantly improved after surgery (p value 0.0140). The mean±SD were (55092±5.26 and 62.67±7.00) pre and post-operatively respectively.

2.3. The overall improvement in spirometric value (Group I + Group II) had occurred in 17 patients out of 44 patients who received treatment of nasal polypectomy (38.6%).

**DISCUSSION**

Strong evidence exists in the literature to support a link between the nasal polyps and lower airways. In this study, an attempt was made to assess the correlation between the nasal polyps and lower airway disorders, and to evaluate the effect of surgical polypectomy on spirometric value. Lung function can be altered by nasal airway obstruction. It has been demonstrated that there is a decrease in FEV₁ when one nostril is blocked.[6]

*In this study, we found that out of 120 patients with nasal polyps, 32 of them (group I) had abnormal spirometric value whom divided by the physician into those with chest symptoms and the result was improved in spirometric value in (11) of them when assessed by spirometry. Out of 12 patients (group II) who had nasal polyps and abnormal spirometric value but without chest symptoms, (6) patients had improved lung function after surgery depending on spirometric value. Two patient had deterioration in his disease after surgery.

*Our results support the evidence in the literature concerning the existence of link between nasal polyps and lower airway disorders and the surgical treatment may improve lung function depending on spirometry.

We found that the overall improvement in spirometry had occurred in (38.6%) of 44 patients received treatment, while the overall improvement in spirometry among 35 patients who had got relief of nasal obstruction following treatment had occurred in (56.8%) of the patients. The majority of patients who had improvement in their lung function were those in group II who did not have lower airway dysfunction and concomitant chest symptoms (50%) versus (34.37%) of group I in whom pulmonary function was improved.

*Richard Voegel, Fabrizio R., Romano et al. (2000) they carried out retrospective study
of 40 patients who had asthma with polyps and underwent ESS. 74.2% of the patients experienced improvement of their asthmatic condition after surgery depending on (FEV1,PEFR and FEF50). No worsening of pulmonary symptom. They recommend that patient with severe asthma must be carefully searched for nasal disease.\(^{(7)}\).

*Catherine lamblin,Anne Britchet et al (2000) in hospital A.calmette (France) found that in 46 asthmatic and BHR patients with nasal polyps, 28 of them treated by intra-nasal polypectomy and the result was significant increase in FEV1,FEV1/FCV ratio (p less than 0.05) in 4 years follow up.\(^{(8)}\)

*Ebrahim Razmpa,Amin Safavi et al (2010) in Tehran university depart.of ENT found that in 56 patients with nasal polyps &asthma , 69.6% of them were improved. This improvement was demonstrated by decreased visit to the hospital, use of combination of drugs and increase in FEV1 (3.49 pre op. to 3.67 post op) and no deterioration in all those patients.\(^{(9)}\)

*Nechama Uri MD,Raanan cohen-Kerem M.D et al (2006) found that in 34 patients, there was no difference in their pre&post operative asthma condition except for the combination of steroid and bronchodilator, no worsening of their asthma but improve quality of life and nasal breathing,\(^{(10)}\),which was in disagreement with our study.

*Ceylan E, Gencer M department of chest disease Harran university turkey (2007) in 3000 patients,63.2% of them had NP with asthma,64% of them improve in decreasing visit to the hospital, increase in FEV1 ,FVC. 2 patients in the study became worse.\(^{(11)}\)

**CONCLUSIONS:**
Successful treatment of nasal polyps may improve lung function.

**RECOMMENDATION:**
1. Children should be included in the future studies.
2. Additional studies were needed to reveal improvement in spirometric test according to severity of asthma.
3. Any patient with nasal polyp should have preliminary function test before treatment to have an idea about lower airway and lung function.

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