NASAL POLYPS

By Dr. Fahad AlObaid
NASAL POLYPS

- Hx & Definition
- Epidemiology
- Types and classification
- Etiology and predisposing factors
- Histopathology
- grading
NASAL POLYPS

- Polyps were first reported about 4000 years ago (old Egyptians and ancient Hindu).
- Nasal polyps represent edematous semitranslucent masses in the nasal and paranasal cavities, mostly originating from the mucosal linings of the sinuses and prolapsing into the nasal cavities.
- It represents an end stage of chronic inflammation.
NASAL POLYPS

- prevalence

- They are the most common mass lesions encountered in the nose.

- Prevalence: 0.2-4.3% (north America) 0.2–1% (UK) ; family history (14%); increases with age
CLASSIFICATION OF NASAL POLYPS

1. The antrochoanal polyp, mostly arising from the maxillary sinus and prolapsing into the choana, a commonly large isolated unilateral cyst-like non-eosinophilic formation
2. Idiopathic unilateral or bilateral, mostly eosinophilic polyps without involvement of the lower airways
3. Bilateral eosinophilic polyposis with concomitant asthma and/or aspirin sensitivity
4. Polyposis with underlying systemic disease such as cystic fibrosis, primary ciliary dyskinesia, Churg-Strauss syndrome, or Kartagener’s syndrome
<table>
<thead>
<tr>
<th>Disease</th>
<th>Percentage of people with disease who also have nasal polyps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin intolerance</td>
<td>36</td>
</tr>
<tr>
<td>Adult asthma</td>
<td>7</td>
</tr>
<tr>
<td>Non-allergic asthma</td>
<td>13</td>
</tr>
<tr>
<td>Allergic asthma</td>
<td>5</td>
</tr>
<tr>
<td>Chronic rhinosinusitis</td>
<td>2</td>
</tr>
<tr>
<td>Non-allergic rhinitis</td>
<td>5</td>
</tr>
<tr>
<td>Allergic rhinitis</td>
<td>1.5</td>
</tr>
<tr>
<td>Childhood asthma/rhinitis</td>
<td>0.1</td>
</tr>
<tr>
<td>Cystic fibrosis</td>
<td>20</td>
</tr>
<tr>
<td>Churg–Strauss syndrome</td>
<td>50</td>
</tr>
<tr>
<td>Allergic fungal sinusitis</td>
<td>85</td>
</tr>
</tbody>
</table>
Histopathology

- Normal sinonasal histology characterized by:
  1. Structural component
  2. Non structural component
Histopathology

- Structural component
  - (epithelium, basement membrane, submucosal tissue)
Histopathology

- Non structural component (resident and non residential cells from lymphoid and myeloid tissue)

- Single lymphocytes scattered among the epithelial cells and lamina propria and nasal associated lymphoid tissue NALT (resamples peyers patches in gut but but not well formed)

- NALT my become more pronounced in chronic inflammation
Histopathology

- Lymphocyte population composed of:
  - T cells
  - B cells
  - Plasma cells
  - Natural killer cells
Histopathology

- Myeloid components:
  - Monocytes
  - Macrophages
  - Dendritic cells
  - Granulocytes (neutrophiles and eosinophiles)
- Mast cells
Histopathology

- Histopathology of NP

- It is not a simple edema of the mucus membrane of lateral wall of nose

- It is a de novo inflammatory growth of mucosa of lateral wall of nose
Histopathology

- In the case of NP from CRS:
  - Features of structural component
  - Features of nonstructural component
Histopathology

- Features of structural component are:
  - 1- Basal cell hyperplasia
  - 2- Goblet cells hyperplasia
  - 3- Occasionally squamus metaplasia of epithelium

(Fibroblasts, epithelial cells, and endothelial cells which make up most of the structural cells of the NP)
Histopathology

- Features of nonstructural component are:
  - 1- Edema
  - 2- Extensive lymphocytosis
  - 3- Eosinophilia (and eosinophil breakdown products “charcot lydin crystals”)
  - 4- Degenerated cystic glands filled with mucus
  
  (And fungal component can be detected in cases of AFS when using silver stains)
A hallmark of bilateral nasal polyposis in adults is the abundant number of eosinophils within the tissue can be found in about 70–90% of polyps from European and US patients, but in few polyps from Asian patients.
Histopathology
Histopathology

- A range of mediators linked to eosinophil growth and activation, including GM-CSF, IL-3, IL-5, and IFN-γ.

- Interleukin-5 turned out to represent a key cytokine among those, independent of the atopic status of the patient.
Histopathology

- Newly

- The rate of nasal colonization of S. aureus is significantly increased in polyp patients versus controls, and increases with the severity of airway disease, with a colonization rate of 88% in aspirin-sensitive asthmatic polyp patients.
A detailed analysis showed that IgE antibodies to Staphylococcus aureus enterotoxins (SAEs) were present in polyp tissue and that these were associated with a more severe local eosinophilic inflammation suggesting that SAEs could have a potential role as disease modifiers.
A recent study demonstrated that the accumulation of plasma cells, macrophages, and activated IL-2 receptor-positive T cells are characteristic features of nasal polyps (along with the eosinophils but still eosinophil predominance)
Histopathology

- lymphocytes and neutrophils are the predominant cells in cystic fibrosis and in primary ciliary dyskinesia
Histopathology

- In case of anterochoanal polype:
- Stratified columnar epithelium usually intact
- Thin basement membrane
- Stroma may exhibit myxoid changes and some giant cells
- Usually lacks significant inflammatory response
- Sometimes degenerative changes (granuloma & angiomaticus changes)
"Nasal sprays are very harmful to your sinuses. From now on I want you to use this tiny plumber's helper."
Grading of NP

- (Hadley’s clinical scoring system)
- Grade 1: smallest size polyps within the middle meatus not reaching the inferior edge of the middle turbinate.
- Grade 2: polyps within the middle meatus reaching the inferior border of the middle turbinate.
- Grade 3: polyps extending into the nasal cavity below the edge of the middle turbinate but not below the inferior edge of the inferior turbinate.
- Grade 4: polyps filling up the nasal cavity
Fig. 9.8: Polyp size can be graded.

Grading
<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No polyps present</td>
</tr>
<tr>
<td>1</td>
<td>Polyps confined to the middle meatus</td>
</tr>
<tr>
<td>2</td>
<td>Polyps beyond the middle meatus (reaching the inferior turbinate or medial to the middle turbinate)</td>
</tr>
<tr>
<td>3</td>
<td>Polyps almost or completely obstructing the nasal cavity</td>
</tr>
</tbody>
</table>


Kennedy Grading
Table 56.2  -- A radiologic staging system for sinusitis

<table>
<thead>
<tr>
<th></th>
<th>Right</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxillary sinus</td>
<td>0, 1,</td>
<td>2</td>
</tr>
<tr>
<td>Anterior ethmoid</td>
<td>0, 1,</td>
<td>2</td>
</tr>
<tr>
<td>Posterior ethmoid</td>
<td>0, 1,</td>
<td>2</td>
</tr>
<tr>
<td>Sphenoid</td>
<td>0, 1,</td>
<td>2</td>
</tr>
<tr>
<td>Frontal sinus</td>
<td>0, 1,</td>
<td>2</td>
</tr>
<tr>
<td>Ostiomeatal complex</td>
<td>0, 2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


0, no abnormalities; 1, partial opacification; 2, total opacification.

Grading
Histological comparison of nasal polyposis in black African, Chinese and Caucasian patients*

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Stage I NP was present in 22% of the Caucasians and 30% of the Chinese. Stage II was found in 58% of the Caucasians, 56% of the Chinese and 8% of the Africans. Stage III was found in 92% of the Africans, while only 20% of the Caucasians and 14% of the Chinese
References

- Adkinson: Middleton's Allergy: Principles and Practice, 7th ed

- Nasal Polyposis: Pathogenesis, Medical and Surgical Treatment By T. Metin Önerci


Thank you