A Case of Nasopharyngeal Carcinoma

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Agenda

- **Our Patient**
  - Clinical Presentation
  - Initial Impression of Imaging

- **Background on Nasopharyngeal Carcinoma**
  - Definition
  - Epidemiology
  - Classic and Common Presentations

- **Our Patient**
  - Attending evaluation of the imaging

- **Anatomy of the Nasopharynx**
  - Clinical-Anatomic Correlation
  - Rosenmuller Fossa
  - Intracranial Extension

- **Our patient**
  - MRI Images

- **Differential Diagnosis**

- **Staging**
Our Patient: Presentation

• 52 year old woman from Guangzhao, China

• She presented with headache, “hearing problems,” and dysphagia

• Physical exam was unremarkable

• Out of concern for chronic sinusitis the clinician ordered a CT sinus
Opacification of the Mastoid Air Cells

Incidental finding: Underdeveloped mastoid air cells

From BIDMC PACS
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Definition

• **Nasopharyngeal carcinoma:**
  – The most common primary malignancy of the nasopharynx
  – It is distinct from other squamous cell cancers arising in the head and neck in clinical behavior, epidemiology and histopathology
Epidemiology

- Generally a rare malignancy worldwide
- However, in specific populations it is significantly more common
  - Southern China
  - South East Asia
  - Most common pediatric malignancy in certain parts of Africa
- Etiology is unknown but thought to be a combination of genetic and environmental exposures including EBV infection, tobacco use and consumption of salt preserved foods

<table>
<thead>
<tr>
<th>Population</th>
<th>Incidence in Males (per 100,000 person-years)</th>
<th>Incidence in Females (per 100,000 person-years)</th>
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<tr>
<td>Hong Kong, Chinese</td>
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<td>8.3</td>
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<tr>
<td>Malaysia, Sarawak Bidayuh (native group)</td>
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<td>11.8</td>
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<tr>
<td>Hawaii, Chinese</td>
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<td>United States, White</td>
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<td>0.2</td>
</tr>
<tr>
<td>United States, Black</td>
<td>0.8</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Clinical

- Classically presents with Trotter’s triad
  - Hearing loss: Unilateral conductive hearing loss (secretory otitis media).
  - Pain: Ipsilateral ear ache and facial pain (involvement of CN V).
  - Paralysis: Ipsilateral paralysis of the soft palate

- However, typically clinical presentation is subtle leading to a delay in diagnosis, with an average of 10 months between symptom onset and diagnosis.

- Higher propensity for distant metastasis than other head and neck Squamous Cell Carcinomas (5-10% present with distant mets, most commonly bone)

- While biopsy is necessary for diagnosis, imaging is a vital part of evaluating tumor extent, nodal involvement and presence of metastasis
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Our Patient: head CT

Opacification of the Mastoid Air Cells

From BIDMC PACS
Our Patient: head CT

Destruction of the petrous apex and invasion into FO

Opacification of the Mastoid Air Cells

From BIDMC PACS
Our Patient: head CT

Soft tissue density in the area of the right Rosenmüller Fossa

From BIDMC PACS
Our Patient: head CT bone reconstruction

3-D Reconstructions made in OsiriX
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Anatomy and Situation

Clinical – Anatomic Correlation

Signs and symptoms are directly related to anatomy!

- Blood-tinged nasal discharge
- Nasal congestion
- Dysphagia
- CNIII, V, VI, and VII destruction
- Intracranial extension
- Cavernous sinus syndrome
- Jugular Vein involvement
- Destruction of anterior portions of C1 and C2
- Hearing loss
- Intracranial extension
- Chronic Otitis Media
- Mastoiditis
- Lymph Node Enlargement*
Rosenmüller Fossa I

Rosenmüller Fossa II

**Eustachian tube opening**

- Torus Tubarius
- Levator Veli Palatine

**Lateral Pharyngeal Recess (aka Fossa of Rosenmüller)**

**Pharyngobasilar fascia**

*Most commonly site of NPC*

How does the tumor get in the intracranial space?

**Trans-sphenoidal**

**Perineural Spread**

**Eustascian Tube (rare)**

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Follow up MRI recommended...

MRI with contrast is the imaging modality of choice for suspected NPC
Our Patient: mass on MRI Head

Heterogeneous isointense mass in the right nasopharynx

T2-hyperintense material in the mastoid air cells consistent with fluid

From BIDMC PACS
Our Patient: mass on MRI Head

Isointense mass in the right nasopharynx

From BIDMC PACS
Our Patient: mass on MRI Head

Heterogeneously enhancing mass in the right nasopharynx

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Differential Diagnosis

• Differential for a small mass that is confined to the mucosal space includes:
  – Prominent but normal adenoidal tissue
  – Nasopharyngeal lymphoma
  – Low grade or early other primary nasopharyngeal malignancies

• Given our patient’s background, the primary site of lesion, and extent of invasion, Nasopharyngeal Carcinoma is high on the differential
Nasopharyngeal Carcinoma Staging

(summarized)

Clinician
- Physical Exam
- Nasopharyngoscopy

Radiologist
- PET
- CT
- MRI*

**T**=extent of local invasion
- 1 = Confined no Nasopharynx
- 2 = into soft tissues
- 3 = into bone or paranasal sinues
- 4 = into intracranial / orbit / lower pharynx / CN

**N** = Nodal involvement
- 1 = Unilateral cervical nodes (<6cm)
- 2 = Bilateral cervical nodes (<6cm)
- 3 = Supracalvicular or >6cm

**M** = Mets
- 1 = Mets

*From NCI’s website*
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Nasopharyngeal Carcinoma Staging

(summaryized)

Stage groupings

Stage 1: T1, N0, M0
Stage 2: Either T2 or N1
Stage 3: T3 or N2
Stage 4: T4, N3, or M1

5 year survival rates

1 = 90% [RT alone]
2 = 84% [RT plus concurrent chemotherapy]
3 = 75% [RT with adjuvant, concurrent or neoadjuvant]
4 = 58%

From NCI’s website
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✔️ Differential Diagnosis

✔️ Staging
Our Patient: Outcome

• Our woman was alerted by her primary care physician about the concerning findings

• She is pending biopsy for definitive diagnosis

• Unfortunately, if her biopsy confirms the diagnosis of Nasopharyngeal Carcinoma she will have “advanced disease,” with an estimated 5-year survival ~50%
Three Nasopharyngeal Carcinoma take-away’s

• More common in people from Southern China, Southeast Asia and North Africa
• Identification of the Pharyngobasilar fascia on imaging can be an important guide to tumor extent
• MRI is the preferred imaging modality for evaluating for Nasopharyngeal Carcinoma
Thank you!
References

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