Endoscopic Assisted resection for congenital Midline Nasal Mass

Ahmed Aly Ibrahim  
A.prof ORL Department  
Alexandria University

Emad. A Magdy  
prof ORL Department  
Alexandria University

Haytham Morsi,MD  
Mohammad Fawzy,MD

Embryology

• During formation of skull base and nose, mesenchymal structures are formed from several centers which will eventually fuse and ossify.

• Before their fusion, there are recognized spaces which are important in the development of congenital midline nasal masses
  – Fonticulus frontalis
  – Prenasal space
  – Foramen cecum
Embyrology

- Fonticulus frontalis – space between the frontal and nasal bones
  - Eventually fuses with foramen cecum to create a separation between intracranial and extracranial structures
- Prenasal space is between the nasal bones and the nasal capsule (precursor of the septum and nasal cartilages)

Congenital Midline Nasal Masses

- Encephalocele
- Glioma
- Nasal dermoid
Encephalocele

• Extracranial herniations of cranial contents through a defect in the skull.

• May include meninges only (meningocele), or both brain and meninges (meningoencephalocele).

• 40% have other associated anomalies.

Encephalocele

• Divided into three categories:
  – Occipital 75%
  – Sincipital 15%
  – Basal 10%

• Sincipital encephaloceles:
  – A bony defect between the frontal and ethmoid bones anterior to the crista galli
  – Nasofrontal, nasoethmoidal, nasoorbital.

• Basal encephaloceles:
  – A bony defect between the cribriform plate and the superior orbital or posterior clinoid fissure, presenting as an intranasal mass.
  – Trans-ethmoidal, Spheno-ethmoidal, Trans-sphenoidal, sphenoorbital.
Encephalocele Imaging

• The diagnosis is radiologically confirmed by CT and/or MRI

• CT evaluation should include high-resolution which help delineate the infant’s cartilaginous skull base.

• MRI provides complementary information regarding the fluid and soft tissue characteristics of the mass and is valuable in identifying an intracranial connection. It is also useful in helping to differentiate a meningocele from a meningoencephalocele.

Encephalocele Treatment

• Early intervention in the first few months of life:
  – minimize the risk of meningitis and cosmetic deformities.

• Small lesions with minimal skull base defects may be managed endoscopically. Larger lesions require craniotomy / combined approach.
Glioma

• Gliomas are unencapsulated collections of glial cells situated outside the CNS.

• Possible theories of development include:
  (1) sequestration of glial tissue of the olfactory bulb entrapped during cribriform plate fusion
  (2) ectopic neural tissue cells
  (3) pinched encephalocele
  (4) inappropriate closure of the anterior neuropore (fonticulus frontalis), with failure of mesoderm to enter the region, resulting in inadequate bone formation.

• 15–20% of nasal gliomas have a fibrous stalk connection to the intracranial space.

Glioma

• Types:
  – extranasal (60%)
  – intranasal (30%)
  – combined (10%)

• Firm, noncompressible purple or gray mass.

• Site:
  – Extranasal: glabella or nasomaxillary suture
  – Intranasal: lateral nasal wall near MT or nasal septum

sometimes difficult to differentiate between gliomas and encephaloceles; however, the presence of ependymal tissue is consistent with an encephalocele.
Glioma

- Nasal gliomas appear hypo- or isointense on T1-weighted images and hyperintense on T2-weighted images.

- Management of nasal glioma consists of surgical excision.

- Intranasal gliomas can be excised with endoscopic techniques.
Intranasal Glioma
Nasal Dermoid

• Most common congenital nasal abnormality.

• 1–3% of all dermoids and 10–12% of head and neck dermoids.

• Congenital dermoids contain only **ectodermal and mesodermal** embryonic elements. Mesodermal elements, which include hair follicles, sebaceous glands, and sweat glands are found in the wall of the cyst and thus differentiate these masses from simple **epidermoid cysts**

• **Teratomas**, contain all three embryonal germ layers.

Nasal Dermoid

• Aetiology of these lesions is controversial.

• Prenasal space theory, is based on the abnormal development of the fonticulus frontalis.

• The retracting dura may drag the surface epithelium inward, causing formation of a sinus tract.

• In some patients, the sinus tract extends into the intracranial cavity or prenasal space.

• the dermal sinus or cyst may persist anywhere from the foramen cecum to the nasal tip.
Nasal Dermoids

- Manifest as a simple cyst, a cyst with a sinus tract, or a sinus tract alone. May be intermittent discharge or infection. Protruding hair is seen in a minority of patients, but is pathognomonic.

- Firm, lobulated, noncompressible midline mass over the nasal dorsum +/- sinus opening. Negative Furstenberg test and do not transilluminate.

- Intracranial extension 4–45%.

Nasal Dermoids

- CT and MRI provide complementary information.

- Common findings include a bifid crista galli and an enlarged foramen cecum. A normal crista galli and foramen cecum may be used to exclude intracranial extension.

- The neonatal crista galli does not contain marrow fat and hence a high intensity signal on T1-weighted images is suggestive of an intracranial dermoid.
Nasal Dermoid

Approaches to nasal dermoid should fulfill four criteria:
1. Provide excellent access to the midline
2. Allow access to the base of the skull
3. Provide adequate exposure for reconstruction of the nasal dorsum
4. Result in an acceptable scar

• Several extracranial approaches have been described:
  – lateral rhinotomy, external rhinoplasty, midline vertical incisions, medial paracanthal incisions

• The external rhinoplasty incision
  – best cosmetic result approach
  – gives access to the skull base and allows for exposure of the nasal dorsum
  – limited access to lesions in the glabellar region.
<table>
<thead>
<tr>
<th>Gliomas</th>
<th>Encephaloceles</th>
<th>Dermoids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contents</td>
<td>Glial cells</td>
<td>Meninges +/- brain tissue</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Reddish, firm, nonpulsatile</td>
<td>Bluish, soft, pulsatile</td>
</tr>
<tr>
<td>Furstenberg test</td>
<td>-ve</td>
<td>+ve</td>
</tr>
<tr>
<td>Intracranial extension</td>
<td>~15%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Take Home Message**

_A Multi-modality team should be considered in managing these type of congenital lesions_

**Approaches to midline congenital nasal mass should fulfill four criteria:**
1. Provide excellent access to the midline
2. Allow access to the base of the skull
3. Provide adequate exposure for reconstruction of the nasal dorsum
4. Result in an acceptable scar

**Endoscopic and Several extracranial approaches have been described:**
- lateral rhinotomy, external rhinoplasty, midline vertical incisions, medial paracanthal incisions and bicronal external approaches.
Thank You for your Attention