Surgical treatment of orbital lesions

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Introduction
Introduction
Introduction
Anatomy

- Mesenchymal cells
- 7 bones
- 30 ml volume
- 45 mm medial length
- 40 mm width
- 35 mm height
Anatomy

- Complex structure
  - globe
  - extraocular muscles
  - fat
  - vascular, nerve, glandular, and connective tissues
Anatomy

- Anterior compartment
  - lids
  - lacrimal apparatus
  - anterior soft tissues

- Posterior compartment
  - intraconal space
  - cone
  - extraconal space
Optic nerve gliomas

- Abnormal proliferation fibrillary astroglial cells
- Most common orbital tumor NF1, 2nd children, 5th adults
- Most are pilocytic astrocytomas
- 50% diagnosed < age 5 y
- Presentation: exophthalmos, ↓ visual acuity, blindness
II CN pilocytic astrocytoma
II CN ganglioglioma
Meningiomas

- Primary
- Secondary (medial sphenoid wing, tuberculum sellae, eg)

- Comprise 10% intraorbital tumours
- : = 3:1
- Presentation: exophthalmos, ↓ visual acuity, pallor optic disc, visual field deficits. Orbital pain or headache (uncommon)
Meningioma
Meningiomas

- Optic nerve sheath meningiomas
  - rare
  - 2% intraorbital tumours
  - 1-2% meningiomas
  - slow growing
  - untreated: progressive visual decline → color blindness → complete vision loss
  - good vision: FSR (improving/stabilizing vision)
  - surgery: intracranial tumour (prevent contralateral extension)
Tumours arising from neuronal structures and their coverings within the orbit

- Nerve sheaths tumours (15%)
  - neurofibromas
  - schwannomas
  - malignant peripheral nerve sheath tumours

- Do not involve II CN (lack schwann cells)
  - develop from peripheral motor nerves (extraocular muscles)
    - V1, V2, sympathetic/parasympathetic fibers
Tumours arising from neuronal structures and their coverings within the orbit

- **Neurofibromas**
  - **Solitary**
    - single, encapsulated, not associated NF
    - goal: complete resection
  - **Diffuse**
    - NF, multiple, may involve orbital tissues
- **Plexiform**
  - pathognomonic NF1, involve nerves, total resection difficult
  - subtotal resection (cosmetic deformity)
  - may coexist with II CN gliomas, meningiomas
Vascular lesions

- 12-15% orbital tumours
  - Capillary hemangiomas
  - Cavernous hemangiomas
  - Lymphangiomas
  - Hemangiopericytomas
  - AVMs
Capillary hemangiomas

- Benign
- Infiltrative
- Associated cutaneous manifestations (strawberry nevi)
- 6 months
- Spontaneous resolution over 3-5 y (cosmetic deformity, amblyopia)
- Tx: argon laser therapy or steroids (involution)
Cavernous hemangiomas

- Most common benign orbital tumour
- Young/middle-aged adults
- Low-flow, circumscribed, behind the globe, intraconic
- Tx: surgery
Cavernous hemangiomas
Lymphangiomas

- Slow-growing
- Children, young adults
- Slowly progressive exophthalmos
- Haemorrhage
- Difficult to manage surgically (involve critical structures)
- Laser therapy as adjuvant
Hemangiopericytommas

- Malignant
- Arise from undifferentiated mesenchimal cells with pericytic differentiation
- Young/middle-aged adults
- Invasive, metastasize (rare from orbit)
- Goal: total removal (prevent recurrence)
Tumours of mesenchimal origin

- Rhabdomyosarcoma
  - most common malignant tumour children
  - rapidly progressive
  - good response RT and CTH

- Fibrous histiocytyomas
  - most common orbital tumour adults
  - insidious, locally infiltrating
  - benign (high recurrence → resected wide margins)
  - malignant fibrous histiocytyomas: metastasize, death
Tumours arising from bone and cartilaginous structures

- Osteomas
- Ossifying fibromas
- Fibrous dysplasia
  - ↓ visual acuity, cosmetic deformity
- Aneurysmal bone cysts
Other tumours

- Dermoid and epidermoid
  - benign cystic lesions
  - dermoid: located anteriorly, childhood
  - frontozygomatic suture (+ frequent)

- Orbital pseudotumour
  - large spectrum non-specific idiopathic inflammations
  - common cause proptosis 2\textsuperscript{nd} to 7\textsuperscript{th} decade life
  - multifocal involvement
  - dull orbital pain worse with eye movement (++), proptosis (+++)
  - tx: steroids, surgery, RT, immunosuppressive agents
Lacrimal gland tumours

- 10% orbital tumours
- Superolateral, anterior orbit
- ½ malignant
- Radical surgery (skull bone and dura removal)
Adenoid cystic carcinoma
Metastatic lesions

- **Children**
  - neuroblastoma, Ewing tumour and Langerhans cell histiocytosis

- **Adults**
  - breast < lung < prostate < melanoma < G-I tract < kidney
Results

- April 2006 – January 2011 (n=8)
- 5-78 y (46,5)
Results

**Presentation**

- Lacrimation
- Orbital pain
- Chemosis
- Visual loss
- Proptosis

**Laterality**

- Right
- Left
# Results

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<th>Location</th>
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<tbody>
<tr>
<td>Extraconal</td>
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<tr>
<td>Intraconal</td>
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<td>Intra and extraconal</td>
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<table>
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<th>Approach</th>
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<tr>
<td>Lateral orbitotomy</td>
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<tr>
<td>Lateral supraorbital</td>
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<tr>
<td>Pterional (+ exenteration)</td>
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<td>Fronto-orbital</td>
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<td>Parcial</td>
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<td>Biopsy</td>
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<td>Meningioma</td>
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<td>Pilocytic astrocytoma</td>
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<td>Ganglioglioma</td>
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<td>Melanoma metastasis</td>
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<td>Cavernous hemangioma</td>
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<tr>
<td>Adenoid cystic carcinoma</td>
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Results

- Proptosis improved in all patients
- 2 FSR (meningiomas)
- 1 RT (adenoid cystic carcinoma)
- 2 deaths (melanoma metastasis, adenoid cystic carcinoma)

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<th>Complications</th>
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<td>CSF leak</td>
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<td>Superior rectus palsy</td>
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<th>Visual acuity</th>
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<td>Improved</td>
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<tr>
<td>Stable</td>
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<td>Worse</td>
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Conclusions

- Varied pathology
- Detailed anatomical knowledge
- Technically demanding
- Multidisciplinary approach