

Surgical treatment of orbital lesions

Nuno Morais¹
José António Moreira da Costa²

¹Neurosurgery Department, Hospital de Braga, Braga, Portugal

²Private Practice, Clínica Neurológica e da Coluna Vertebral, Braga, Portugal

Disclosure

Funding for presenter to attend:

Institution (non-industry) funded

Portuguese Neurosurgical Society

Introduction

The screenshot shows a web browser window displaying the PubMed search results for the query "orbital tumors". The search bar at the top contains the text "orbital tumors" and a "Search" button. Below the search bar, the results are displayed in a list format. The first result is "Minimally invasive anterior orbitotomy biopsy: Finger's aspiration cutter technique (FACT)". The second result is "Endoscopic surgery for advanced malignant nasal and sinus tumors". The third result is "Clinicopathological analysis of 39 patients with corneal tumor". The fourth result is "Spontaneous intracranial extradural haematoma associated with frontal sinusitis and orbital involvement". The fifth result is "Head and Neck Rhabdomyosarcoma: A Critical Analysis of Population-Based Incidence and Survival Data".

Search results for "orbital tumors" (10719 results)

Results: 1 to 20 of 10719

1. [Minimally invasive anterior orbitotomy biopsy: Finger's aspiration cutter technique \(FACT\).](#)
Finger PT.
Eur J Ophthalmol. 2011 Sep 13. pii: 93CC603C-9A10-4F2D-BA04-1DA695B014F5. doi: 10.5301/ejo.5000045. [Epub ahead of print]
PMID: 21928271 [PubMed - as supplied by publisher]
[Related citations](#)

2. [Endoscopic surgery for advanced malignant nasal and sinus tumors.](#)
Ran Q, Chen L, Wang RG, Wang HT.
Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi. 2011 Jun;46(6):469-74. Chinese.
PMID: 21924097 [PubMed - in process]
[Related citations](#)

3. [Clinicopathological analysis of 39 patients with corneal tumor.](#)
Li Y, Yan J, Qiu H.
Yan Ke Xue Bao. 2011 Sep;26(3):148-53.
PMID: 21913346 [PubMed - in process]
[Related citations](#)

4. [Spontaneous intracranial extradural haematoma associated with frontal sinusitis and orbital involvement.](#)
Spennato P, De Paulis D, Bocchetti A, Michele Pipola A, Sica G, Galzio RJ.
Neuro Sci. 2011 Sep 9. [Epub ahead of print]
PMID: 21904864 [PubMed - as supplied by publisher]
[Related citations](#)

5. [Head and Neck Rhabdomyosarcoma: A Critical Analysis of Population-Based Incidence and Survival Data.](#)
Turner JH, Richmon JD.

Filter your results:
All (10719)
[Free Full Text \(1152\)](#)
[Review \(871\)](#)
[Manage Filters](#)

Titles with your search terms

Survey of orbital tumors at a comprehensive cancer center in the United State [Head Neck. 2011]
Magnetic resonance imaging in the analysis of pediatric orbital tumors: utility of [J AAPOS. 2010]
[Orbital tumors in children: clinical examination, imaging, specific progression [Neurochirurgie. 2010]
[See more...](#)

482 free full-text articles in PubMed Central

Review of orbital exenterations in korle-bu teaching hospital. [Ghana Med J. 2011]
A case of recurrent bloody tears. [Clin Ophthalmol. 2011]
NK/T-cell lymphoma in a renal transplant recipient and review of literature. [Indian J Nephrol. 2011]
[See all \(482\)...](#)

Introduction

The screenshot shows a web browser window displaying the PubMed search results for the query "orbital tumors and neurosurgery". The search bar at the top contains the query, and the results section shows a list of five articles. The search results are displayed in a list format, with each entry including a checkbox, a title, authors, journal information, and PMID. The search results are sorted by "Recently Added" and displayed in "Summary" view with 20 items per page. The first result is "Spontaneous intracranial extradural haematoma associated with frontal sinusitis and orbital involvement" by Spennato P, et al. The second result is "Selection of surgical approach to orbital tumors based on differential diagnosis" by Fukami T, Nozaki K. The third result is "Optic atrophy in thalassemia intermedia" by Pakdel F, et al. The fourth result is "Abnormalities of the optic disc" by Sadun AA, Wang MY. The fifth result is "Neuronavigation in craniorbital neurosurgery - do we really need it?" by Enchev Y, et al. The search results are displayed in a list format, with each entry including a checkbox, a title, authors, journal information, and PMID. The search results are displayed in a list format, with each entry including a checkbox, a title, authors, journal information, and PMID. The search results are displayed in a list format, with each entry including a checkbox, a title, authors, journal information, and PMID.

Search results for "orbital tumors and neurosurgery" (731 results):

- 1. Spontaneous intracranial extradural haematoma associated with frontal sinusitis and orbital involvement. Spennato P, De Paulis D, Bocchetti A, Michele Pipola A, Sica G, Galzio RJ. *Neurol Sci*. 2011 Sep 9. [Epub ahead of print] PMID: 21904864 [PubMed - as supplied by publisher] [Related citations](#)
- 2. Selection of surgical approach to orbital tumors based on differential diagnosis. Fukami T, Nozaki K. *No Shinkei Geka*. 2011 Jul;39(7):641-55. Japanese. No abstract available. PMID: 21719907 [PubMed - indexed for MEDLINE] [Related citations](#)
- 3. Optic atrophy in thalassemia intermedia. Pakdel F, Pirmarzashty N, Sanjari MS, Kashkouli MB, Sarhadi H. *J Neuroophthalmol*. 2011 Sep;31(3):252-4. PMID: 21610515 [PubMed - in process] [Related citations](#)
- 4. Abnormalities of the optic disc. Sadun AA, Wang MY. *Handb Clin Neurol*. 2011;102:117-57. Review. PMID: 21601065 [PubMed - indexed for MEDLINE] [Related citations](#)
- 5. Neuronavigation in craniorbital neurosurgery - do we really need it? Enchev Y, Tzekov C, Ferdinandov D, Cekov A, Spiriev T. *Turk Neurosurg*. 2011;21(2):119-26. doi: 10.5137/1019-5149.JTN.3212-10.2.

Filter your results: All (731) [Free Full Text \(77\)](#) [Review \(79\)](#) [Manage Filters](#)

17 free full-text articles in PubMed Central

Craniectomy and orbitectomy in dogs and cats. [Can Vet J. 2010]

Myxofibrosarcoma of the orbit: a clinicopathologic case report. [Ophthal Plast Reconstr Surg. 2010]

Frontal skull craniotomy combined with moderate-dose radiotherapy effect [World J Surg Oncol. 2009]

See all (17)...

Find related data

Database: Select [Find items](#)

Search details

```
orbital[All Fields] AND ("tumours"[All Fields] OR "neoplasms"[MeSH Terms] OR "neoplasms"[All Fields])
```

Introduction

The screenshot shows a web browser window displaying the PubMed search results page. The search query "orbital tumors and neurosurgery and meningioma" is entered in the search bar and circled in red. Below the search bar, the results are displayed in a list format. The first result is "Fractionated stereotactic radiation therapy for orbital optic nerve sheath meningioma - a single institution experience and a short review of the literature." by Pacelli R, Cella L, Conson M, Tranfa F, Strianese D, Liuzzi R, Solla R, Farella A, Salvatore M, Bonavolontà G. The second result is "Surgical treatment of sphenoorbital meningiomas." by Saeed P, van Furth WR, Tanck M, Freling N, van der Sprenkel JW, Stalpers LJ, van Overbeeke JJ, Mourits MP. The third result is "Sphenoorbital meningioma: surgical technique and outcome." by Oya S, Sade B, Lee JH. The fourth result is "Gamma Knife surgery in the management of orbital tumors." by Xu D, Liu D, Zhang Z, Zhang Y, Li Y, Liu X, Jia Q, Zheng L, Song G. The fifth result is "Microsurgical management of tuberculom sellae meningiomas by the frontolateral approach: surgical technique and visual outcome." by Li-Hua C, Ling C, Li-Xu L. The search results are sorted by "Recently Added" and show "Results: 1 to 20 of 165". The page also includes a "Filter your results" section with "All (165)" selected, and a "Find related data" section with a "Database" dropdown menu set to "Select".

http://www.ncbi.nlm.nih.gov/pubmed?term=or... orbital tumors and neurosu... X

Ficheiro Editar Ver Favoritos Ferramentas Ajuda

NCBI Resources How To My NCBI Sign In

PubMed.gov PubMed orbital tumors and neurosurgery and meningioma Search

US National Library of Medicine National Institutes of Health RSS Save search Limits Advertised Help

Display Settings Summary, 20 per page, Sorted by Recently Added Send to Filter your results:

Results: 1 to 20 of 165 << First < Prev Page 1 of 9 Next > Last >>

All (165)
Free Full Text (15)
Review (19)
Manage Filters

3 free full-text articles in PubMed Central
Frontozygomatic approach to intraorbital tumors. [Skull Base. 2007]
Carcinoma of the breast metastatic to the optic nerve mimicking an optic nerve s [Skull Base. 2005]
OPTIC NERVE COMPRESSION BY AN INTRACANALICULAR MEN [Br J Ophthalmol. 1964]
See all (3)...

Find related data
Database: Select
Find items

Search details
orbital[All Fields] AND ("tumours"[All Fields] OR "neoplasms"[MeSH Terms] OR "neoplasms"[All Fields])

1. Fractionated stereotactic radiation therapy for orbital optic nerve sheath meningioma - a single institution experience and a short review of the literature.
Pacelli R, Cella L, Conson M, Tranfa F, Strianese D, Liuzzi R, Solla R, Farella A, Salvatore M, Bonavolontà G. J Radiat Res (Tokyo). 2011;52(1):82-7. Review.
PMID: 21293073 [PubMed - indexed for MEDLINE] Free Article
Related citations

2. Surgical treatment of sphenoorbital meningiomas.
Saeed P, van Furth WR, Tanck M, Freling N, van der Sprenkel JW, Stalpers LJ, van Overbeeke JJ, Mourits MP. Br J Ophthalmol. 2011 Jul;95(7):996-1000. Epub 2011 Jan 17.
PMID: 21242579 [PubMed - indexed for MEDLINE]
Related citations

3. Sphenoorbital meningioma: surgical technique and outcome.
Oya S, Sade B, Lee JH. J Neurosurg. 2011 May;114(5):1241-9. Epub 2010 Dec 24. Erratum in: J Neurosurg. 2011 May;114(5):1485.
PMID: 21184631 [PubMed - indexed for MEDLINE]
Related citations

4. Gamma Knife surgery in the management of orbital tumors.
Xu D, Liu D, Zhang Z, Zhang Y, Li Y, Liu X, Jia Q, Zheng L, Song G. J Neurosurg. 2010 Dec;113 Suppl:34-8.
PMID: 21121785 [PubMed - indexed for MEDLINE]
Related citations

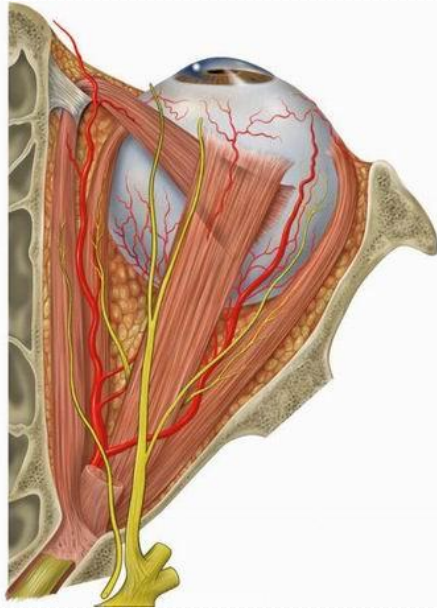
5. Microsurgical management of tuberculom sellae meningiomas by the frontolateral approach: surgical technique and visual outcome.
Li-Hua C, Ling C, Li-Xu L. Clin Neurol Neurosurg. 2011 Jan;113(1):39-47. Epub 2010 Oct 13.

Anatomy



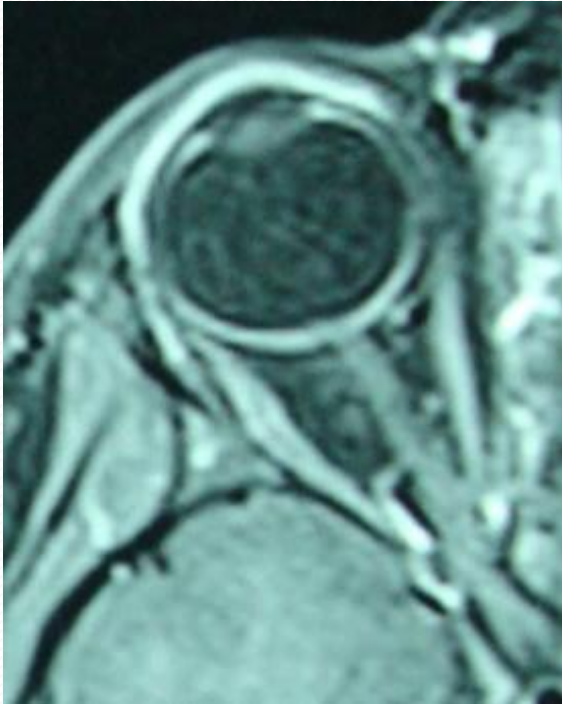
- Mesenchymal cells
- 7 bones
- 30 ml volume
- 45 mm medial length
- 40 mm width
- 35 mm height

Anatomy



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

Anatomy

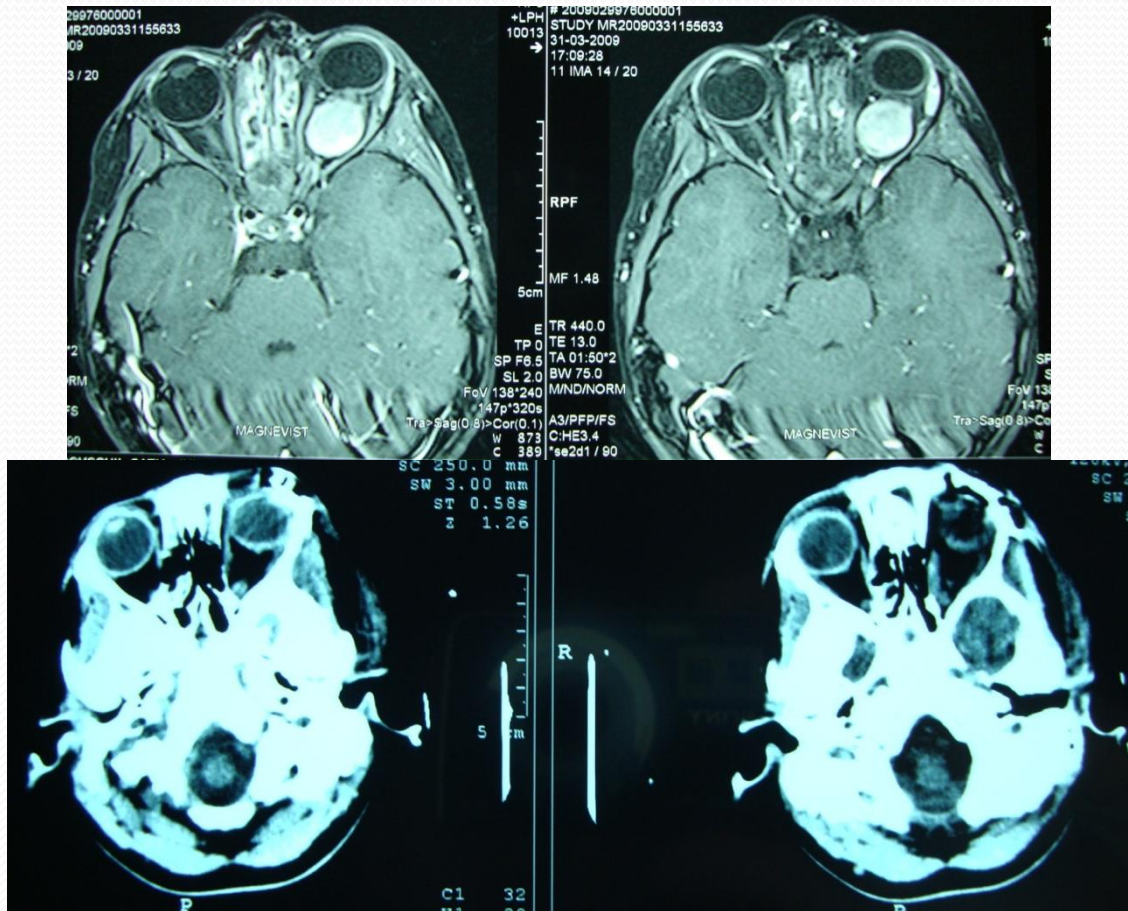


- Anterior compartment
 - lids
 - lacrimal apparatus
 - anterior soft tissues
- Posterior compartment
 - intraconal space
 - cone
 - extraconal space

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



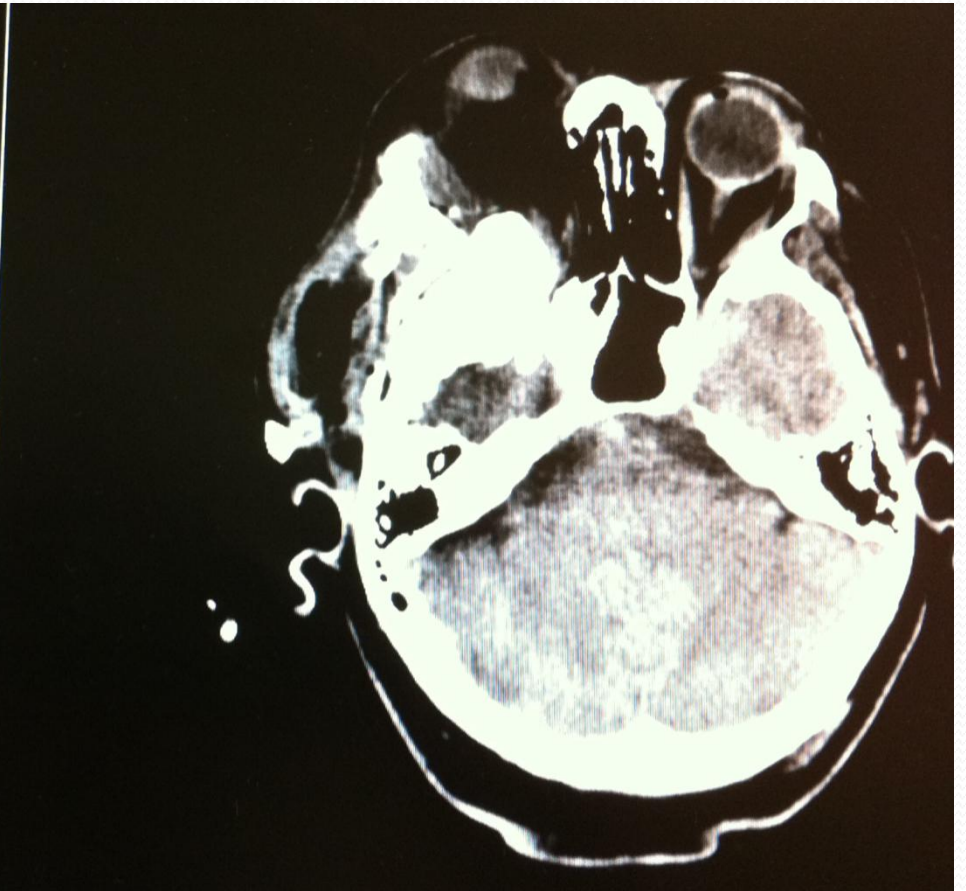
II CN ganglioglioma



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

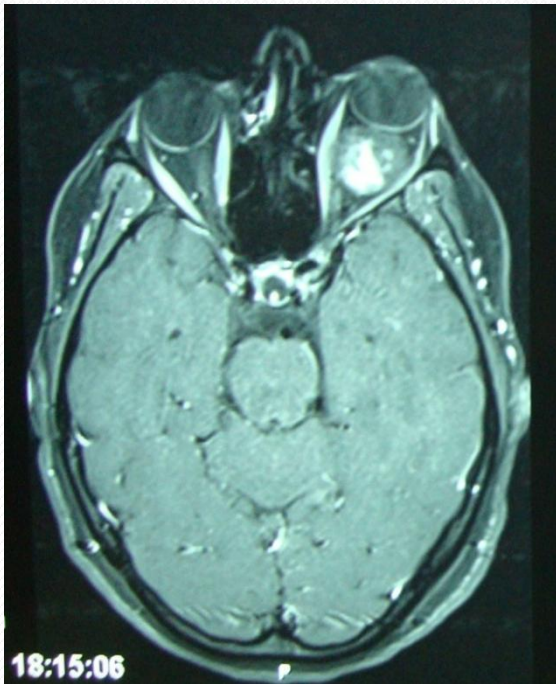
Vascular lesions

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

Capillary hemangiomas

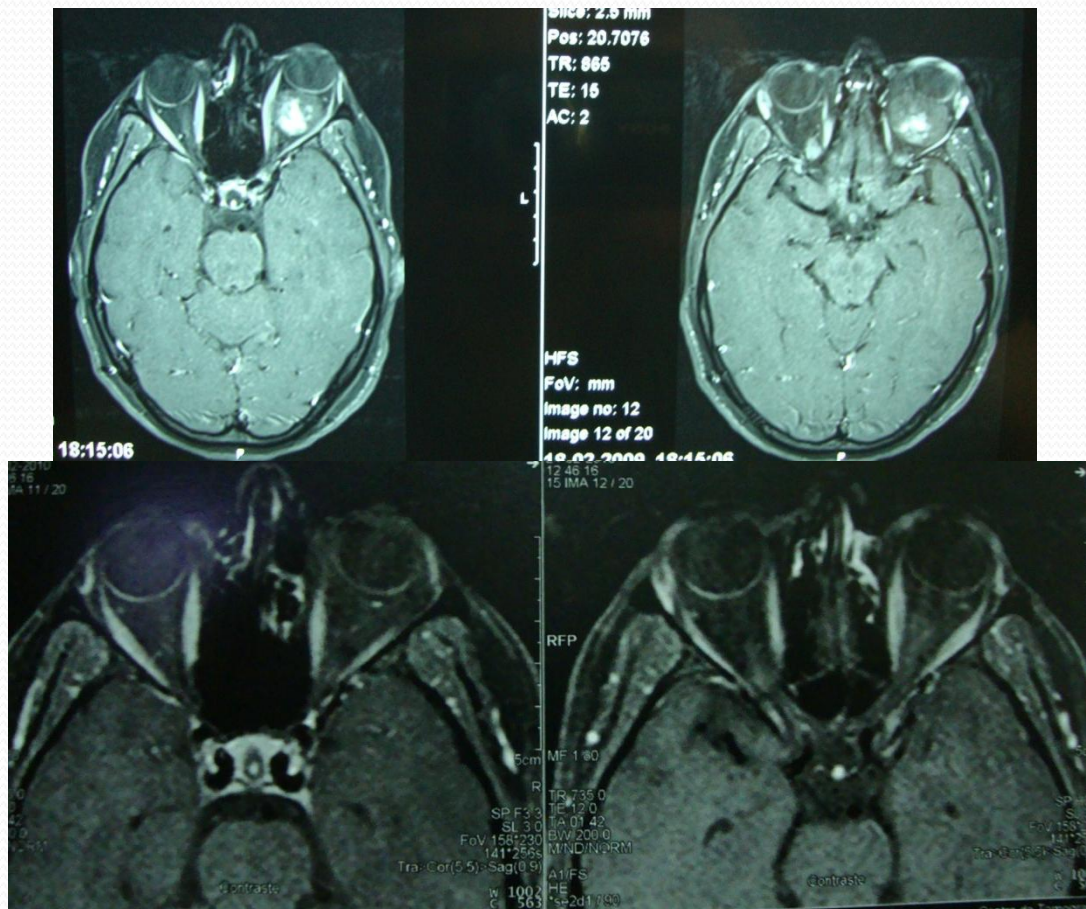
- Benign
- Infiltrative
- Associated cutaneous manifestations (strawberry nevi)
- 6 months
- Spontaneous resolution over 3-5 y (cosmetic deformity, amblyopia)
- Tx: argon laser therapy or steroids (involution)

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

Hemangiopericytomas

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

Tumours of mesenchymal origin

- Rhabdomyosarcoma
 - most common malignant tumour children
 - rapidly progressive
 - good response RT and CTH
- Fibrous histiocytoomas
 - most common orbital tumour adults
 - insidious, locally infiltrating
 - benign (high recurrence → resected wide margins)
 - malignant fibrous histiocytoomas: metastasize, death

Tumours arising from bone and cartilaginous structures

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

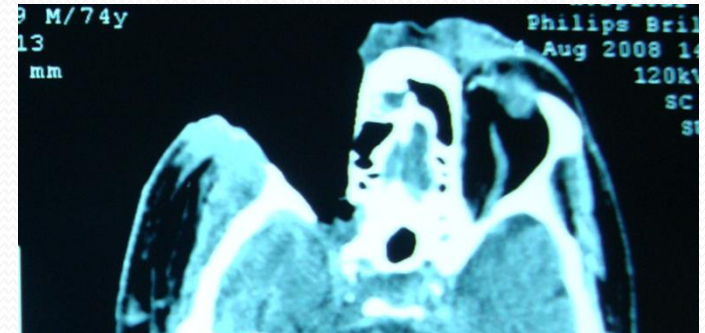
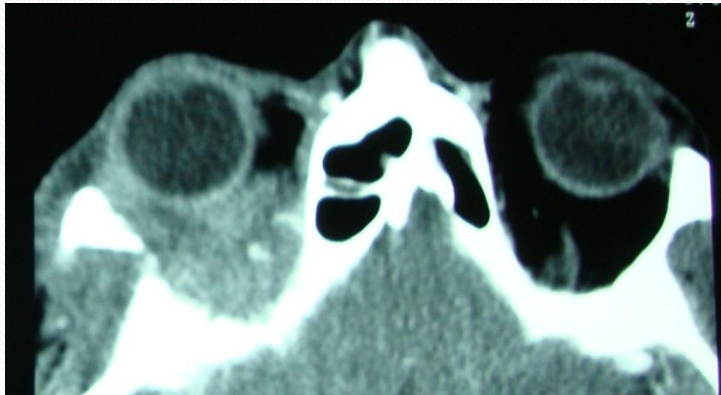


Other tumours

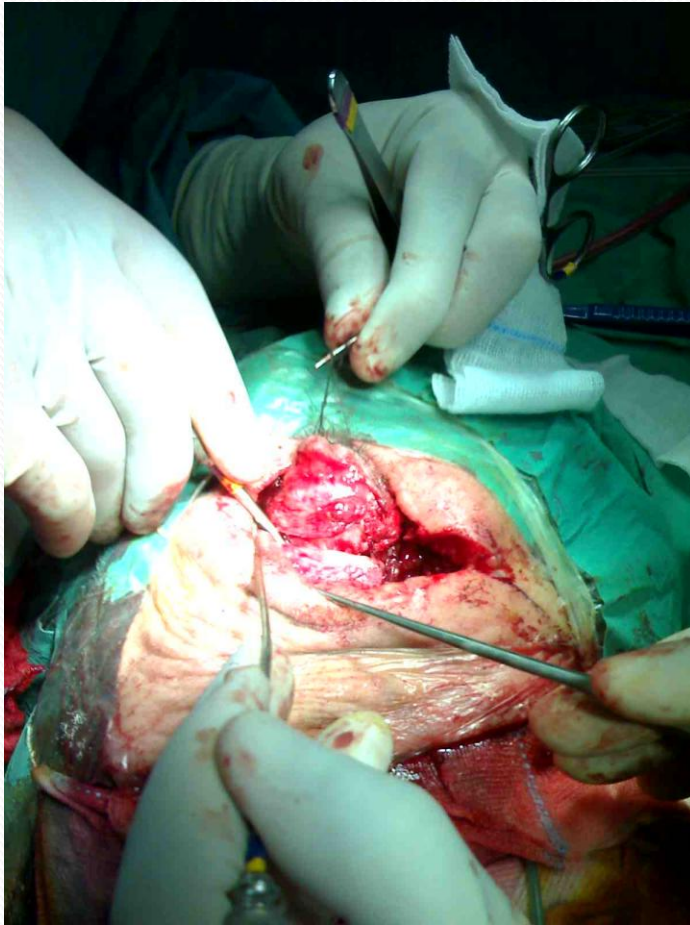
- Dermoid and epidermoid
 - benign cystic lesions
 - dermoid: located anteriorly, childhood
 - frontozygomatic suture (+ frequent)
- Orbital pseudotumour
 - large spectrum non-specific idiopathic inflammations
 - common cause proptosis 2nd to 7th decade life
 - multifocal involvement
 - dull orbital pain worse with eye movement (++) , proptosis (+++)
 - tx: steroids, surgery, RT, immunosuppressive agents

Lacrimal gland tumours

- 10% orbital tumours
- Superolateral, anterior orbit
- 1/2 malignant
- Radical surgery (skull bone and dura removal)

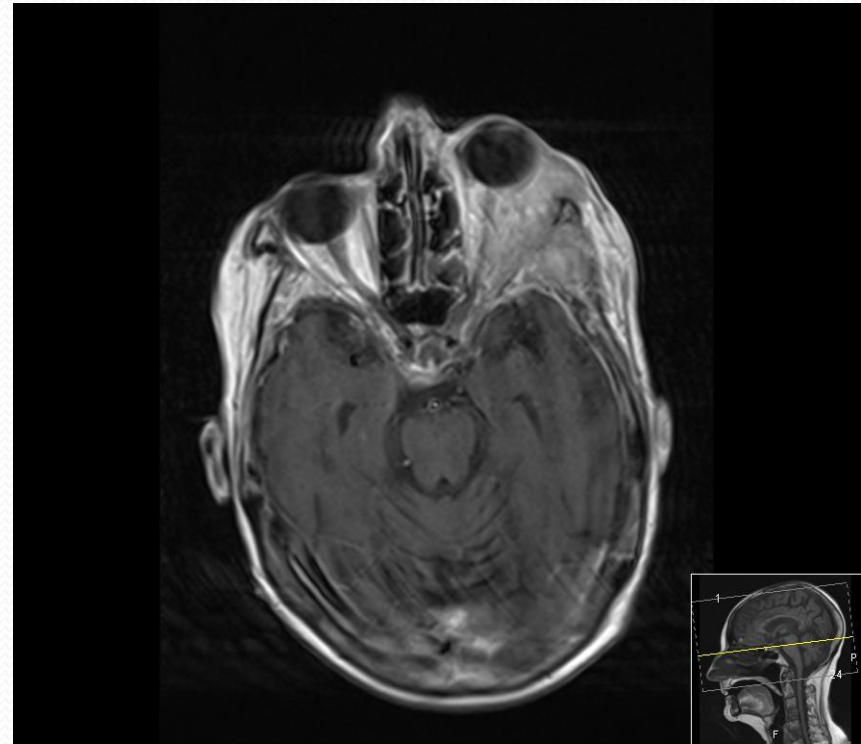


Adenoid cystic carcinoma



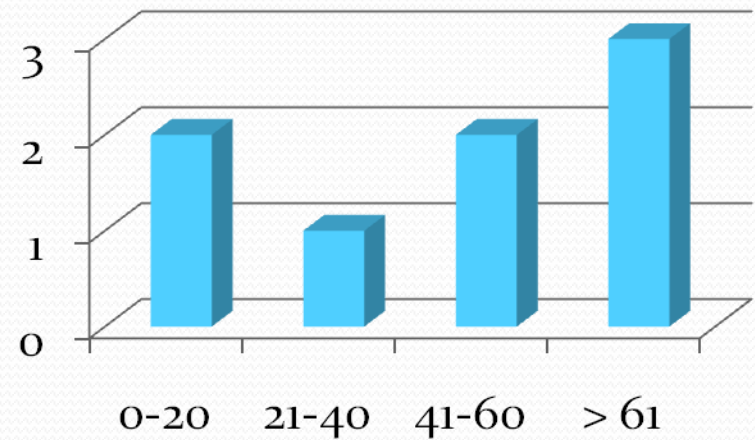
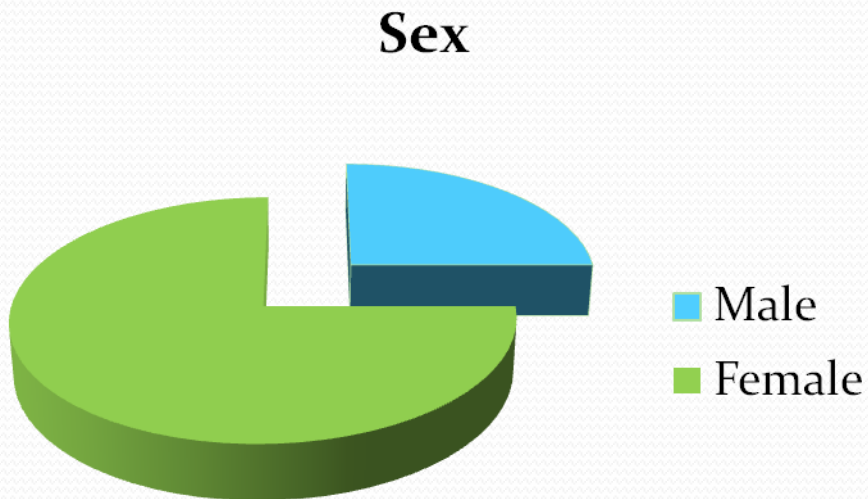
Metastatic lesions

- Children
 - neuroblastoma, Ewing tumour and Langerhans cell histiocytosis
- Adults
 - breast < lung < prostate < melanoma < G-I tract < kidney



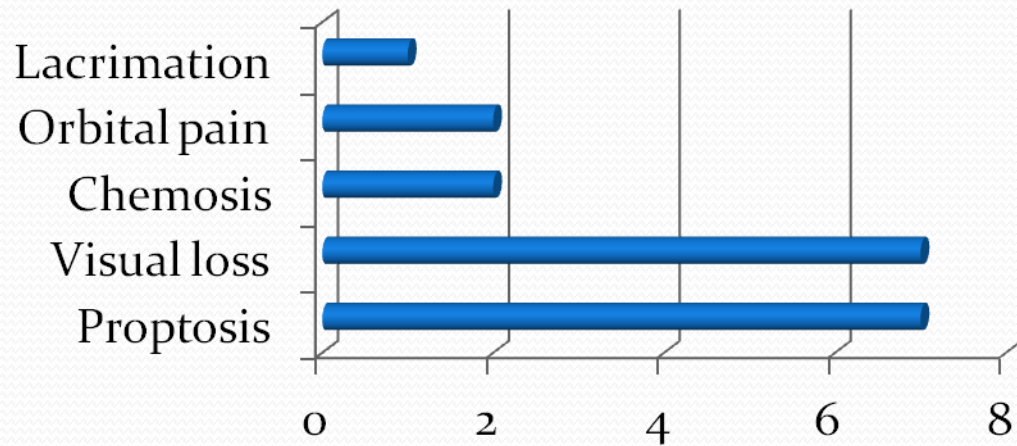
Results

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

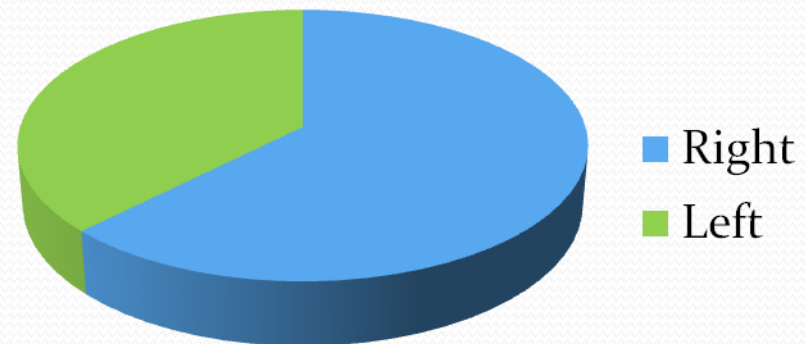


Results

Presentation



Laterality



Results

Location	
Extraconal	4
Intraconal	3
Intra and extraconal	1

Approach	
Lateral orbitotomy	4
Lateral supraorbital	2
Pterional (+ exenteration)	2
Fronto-orbital	1

Resection	
Total	3
Parcial	5
Biopsy	1

Histology	
Meningioma	3
Pilocytic astrocytoma	1
Ganglioglioma	1
Melanoma metastasis	1
Cavernous hemangioma	1
Adenoid cystic carcinoma	1

Results

Complications	
CSF leak	2
Superior rectus palsy	1

Visual acuity	
Improved	3
Stable	3
Worse	2

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



Conclusions

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

