MRI OF ORBITAL MASSES

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Vascular lesion

CAPILLARY HAEMANGIOMA

: (1) lobular contour ▣ borders,

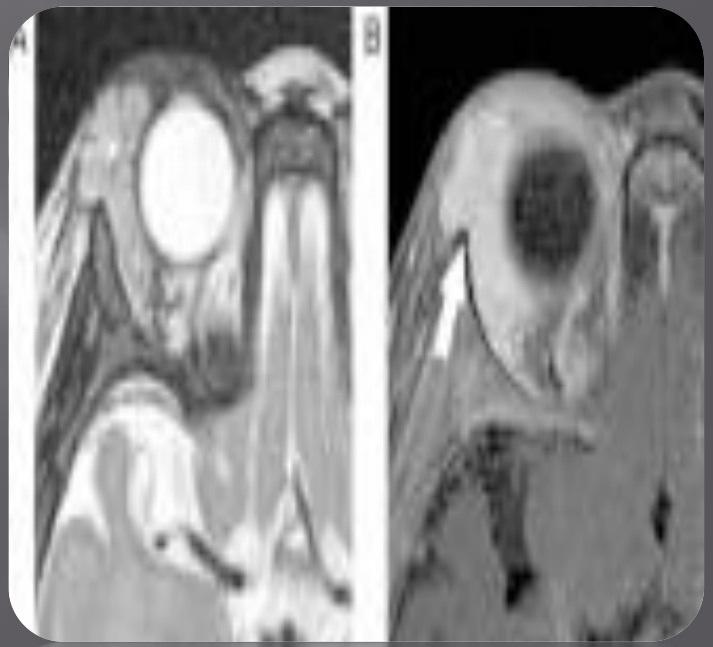
(2) bright T2 signal with ▣ T2 dark septa between lobules,

(3) fine internal flow ▣ voids,

(4) intense, homogeneous ▣ enhancement, and

(5) preservation of ▣ adjacent bone .

INFANTILE HAEMANGIOMA



Capillary haemanioma

DIFFERENTIAL DIAGNOSIS

- Rhabdomyosarcoma, vascular malformation, infantile fibromatosis, and infantile fibrosarcoma.

KEY FEATURES

- Bright T2 signal, lobular borders, fine internal flow voids, extraconal location, and intense homogeneous enhancement.

'Cavernous hemangioma' (solitary, encapsulated venous-lymphatic malformation)

- Cavernous hemangioma typically appears as a well-circumscribed intraconal mass.
- Larger lesions will distort surrounding structures, as opposed to lymphoma which molds around structures.
- CT shows homogeneous soft tissue density, and may show small calcifications or phleboliths.
- MR shows isointense T1 signal, bright T2 signal, dark internal septations, and a dark circumferential rim that represents a fibrous pseudocapsule

'Cavernous hemangioma' (solitary, encapsulated venous-lymphatic malformation)

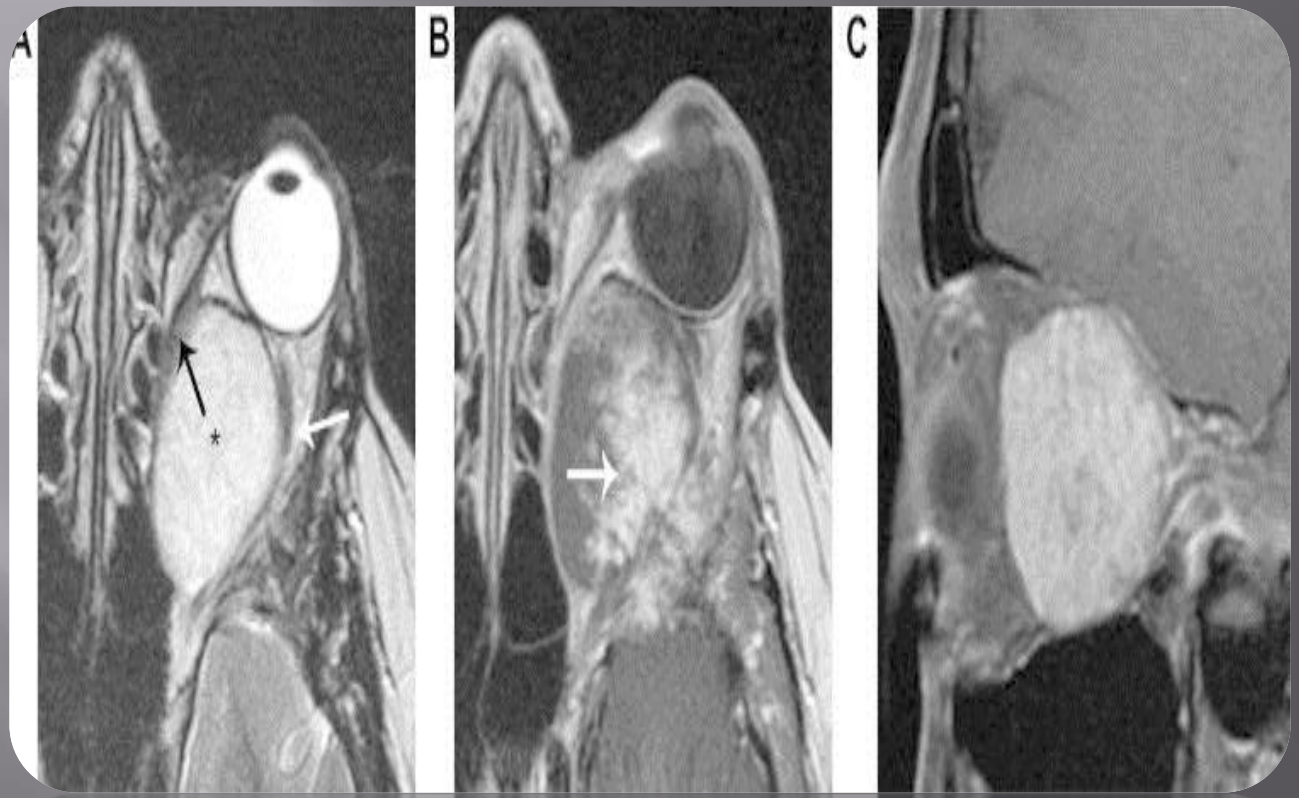
DIFFERENTIAL DIAGNOSIS

- **Venous varix, schwannoma, optic nerve sheath meningioma, and lymphoma.**

KEY IMAGING FEATURES

- **Intraconal location; very bright T2 signal with hypointense pseudocapsule; and an early nodular enhancement with progressive accumulation of contrast on later phase images**

Cavernous hemangioma



Lymphangioma (venous lymphatic malformation)

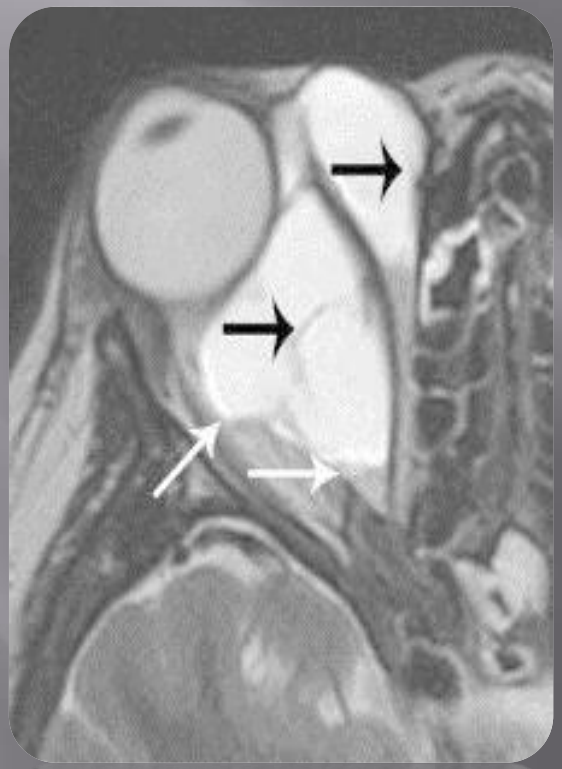
- lymphangiomas exhibit an infiltrative, trans-spatial growth pattern, often involving both the intraconal and extraconal compartments and pre- and post-septal compartments, violating fascial planes

Lymphangioma (venous lymphatic malformation)

- MR is accurate for delineating the anatomic location and vascular components, and fluid filled levels or menisci can be seen.
- The mass is usually isointense to slightly hyperintense relative to normal brain tissue on T1 weighted imaging and very hyperintense relative to the brain on T2 weighted imaging, with internal septations . T1 and T2 signal intensity vary depending on the presence and age of internal blood products.
- No flow voids or enlarged feeder vessels are usually found, in keeping with the low flow nature of lymphangioma and differentiating it from high flow lesions, including high-flow vascular malformations and true neoplasms such as capillaryhemangioma.

lymphangioma

- **Key imaging features**



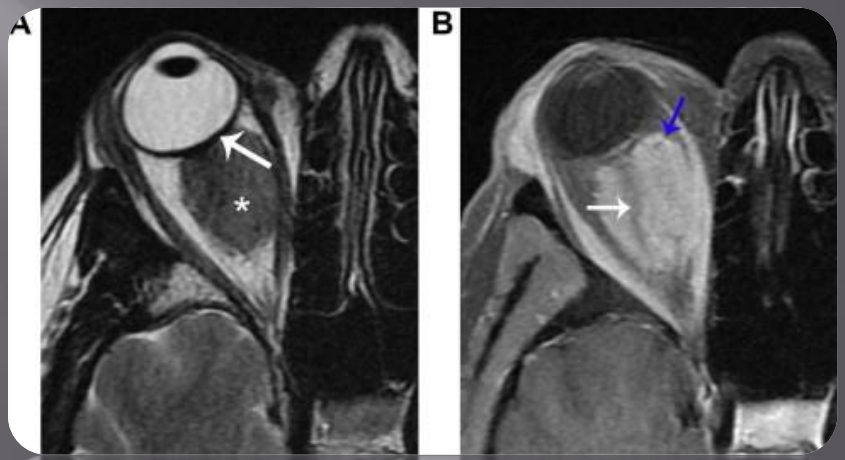
Trans-spatial, markedly T2 bright non-enhancing mass with internal septations, with or without layering blood products and solidly enhancing components.

Benign neoplasms

OPTIC NERVE SHEATH MENINGIOMA

- **The key imaging finding of optic nerve sheath meningioma is a homogeneously enhancing mass that surrounds the optic nerve. MRI typically shows homogeneous, intermediate T1 and T2 signals. The optic nerve may be in the center of the lesion, or may be eccentrically positioned.**

OPTIC NERVE SHEATH MENINGIOMA



Optic nerve sheath meningeoma

- Key imaging features
- Mass surrounding and constricting the optic nerve; calcification on CT; extension of tumor into the optic canal; “tram track” or “target” like enhancement.

Nerve sheath tumors

Schwannoma

. MR shows isointense T1 signal, and T2 hyperintensity. most schwannomas enhance with contrast. Although schwannoma enhancement is typically more homogeneous than cavernous hemangioma, in some cases schwannoma can show the same type of early nodular enhancement with progressive fill-in that is commonly seen with cavernous hemangioma.

The MR and CT appearance of schwannoma can overlap with optic nerve sheath meningioma.

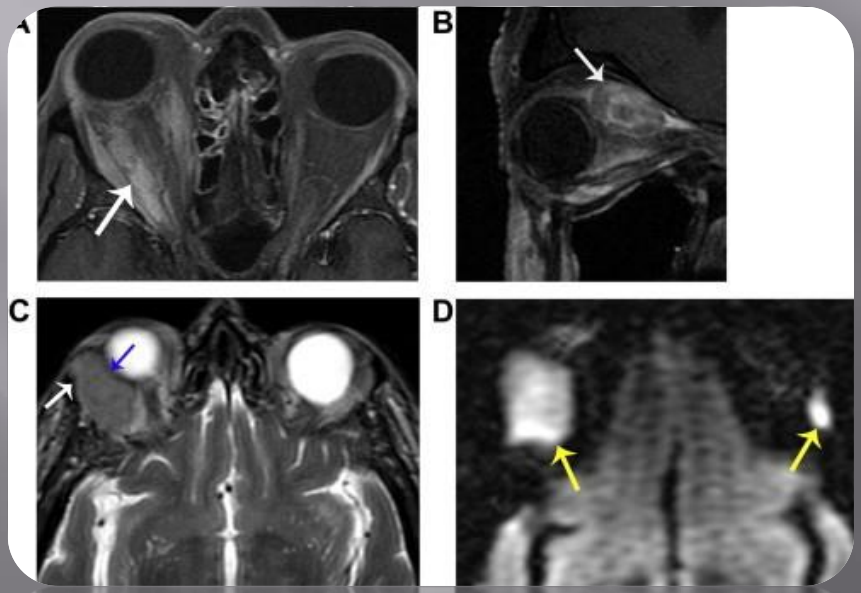
In challenging cases, one should look carefully for extension into the superior orbital fissure, which would favor schwannoma, or for extension into the optic canal, which would favor meningioma.

Nerve sheath tumors

- Neurofibromas often have a similar appearance to schwannomas, though plexiform neurofibromas typically show a more infiltrative growth pattern , and are frequently associated with other stigmata of NF-1.

Malignant neoplasms

ORBITAL LYMPHOID TUMORS

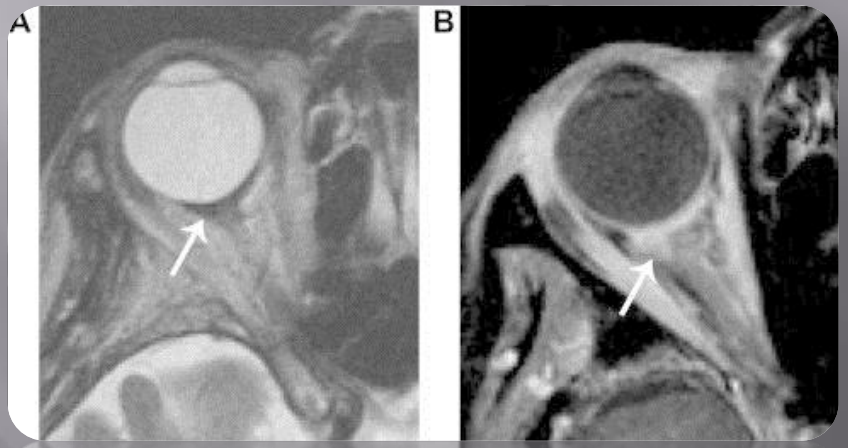


LYMPHOMA

- **Homogeneous intermediate T2 signal,**
- **lobulated margins with molding around normal structures, homogeneous enhancement, brighter DWI signal and lower ADC than surrounding normal orbital tissues.**

Metastatic tumors of the orbit

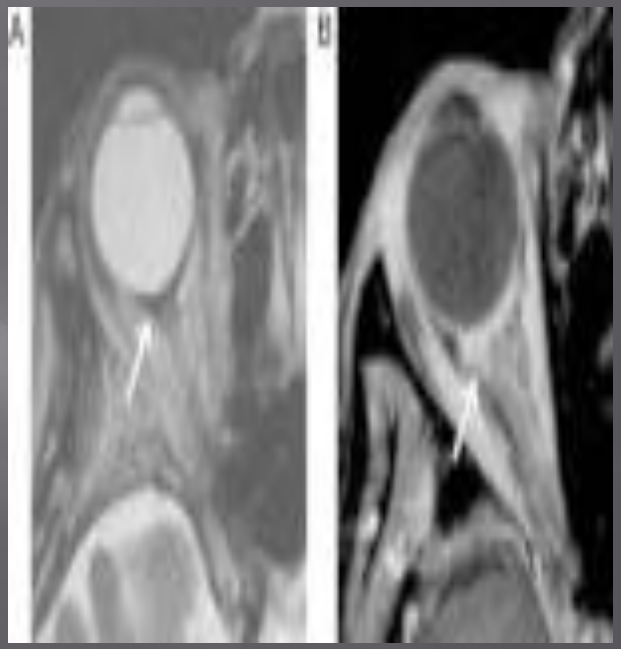
BREAST CANCER METASTASIS.



CARCINOID TUMOR METASTASIS

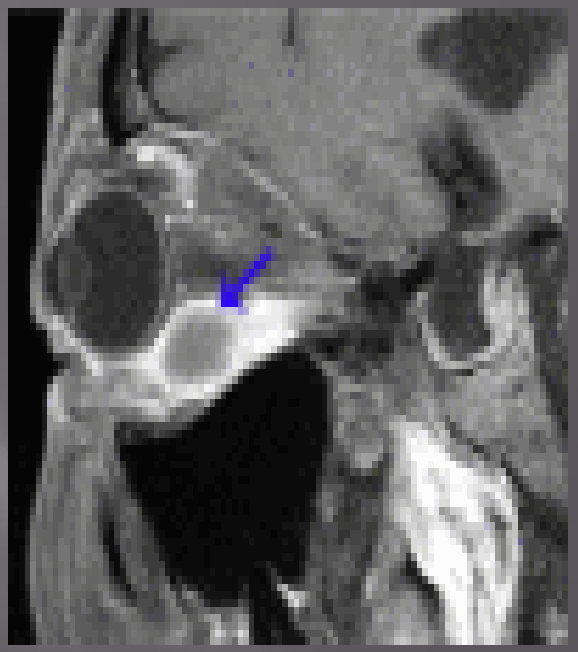
Metastatic tumors of the orbit

- Orbital metastases from breast cancer are often diffuse and irregular growing along the rectus muscles and fascial planes.
- Scirrhous (fibrotic) breast cancers are unique in their ability to produce enophthalmos and ophthalmoplegia. In these cases, the metastatic lesion is typically very T2 dark, reflecting its fibrotic nature



Metastatic tumors of the orbit

- Metastases from carcinoid , renal cell carcinoma and melanoma tend to be circumscribed.
- All orbital metastases show some degree of MRenhancement. Metastases may involve any structure in the orbit, including the intraconal or extraconal space, globe, extraocular muscles and bone .

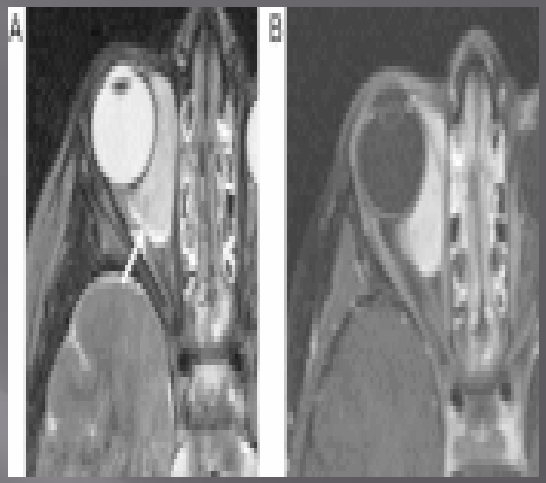


Colonic adenocarcinoma metastasis

- Axial T1 with contrast shows a necrotic mass centered in the right sphenoid triangle , with enhancing tumor and surrounding inflammation along the margins extending into the middle cranial fossa and extraconal orbi

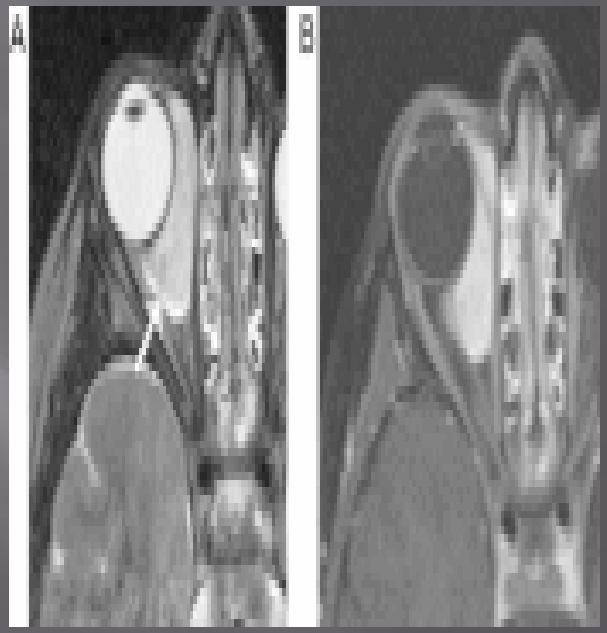
Rhabdomyosarcoma

- This is the most common soft tissue malignancy of childhood and most common primary orbital malignancy.

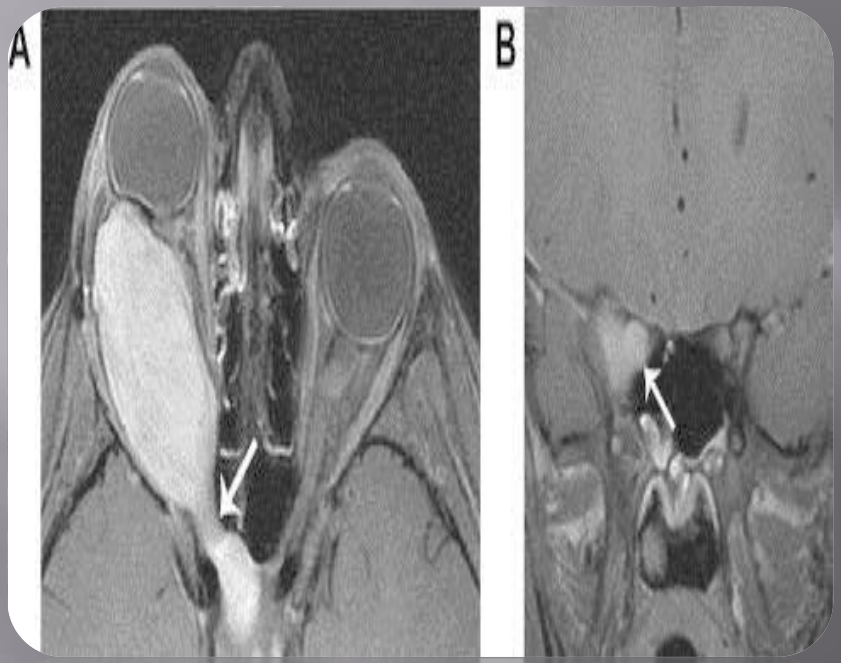


Rhabdomyosarcoma

- MR typically shows bright T2 signal, distinguishing rhabdomyosarcoma from other tumors such as chloroma (granulocytic sarcoma), lymphoma and metastatic neuroblastoma .
- On occasion, a pyogenic abscess may have a subacute presentation that mimics a necrotic rhabdomyosarcoma clinically and by imaging.In such cases, MRI with DWI is critical in distinguishing these entities, through demonstration of restricted diffusion of pus in an abscess cavity, as opposed to elevated diffusion in the necrotic portion of a tumor.



Optic nerve glioma



- The classic finding of optic nerve glioma is sharply circumscribed fusiform thickening and tortuosity of the optic nerve. Optic gliomas are typically T2 hyperintense, and usually show some enhancement, though a wide range of signal intensities and enhancement patterns may be encountered.
- Diffuse involvement of the substance of the nerve differentiates optic nerve glioma from optic nerve sheath meningioma, which surrounds the optic nerve. Any part of the optic nerve may be involved, from the globe to the optic chiasm

THANKS