Neurosarcoidosis: Presentation as a Skull Base Lesion

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- Financial disclosures
  - Nothing to disclose

Case Presentation

- 30 year old black female, 5 months history of progressive left sided:
  - Periorbital headache
  - Proptosis
  - Decreased visual acuity
  - Decreased facial sensation and strength
  - Nausea and emesis
  - Treated for cluster headaches

Case Presentation

- PMH: Headaches, HTN
- PSH: None
- SH: Single mother of 3 children, 10 pack year smoking history
- FH: Mother with cancer

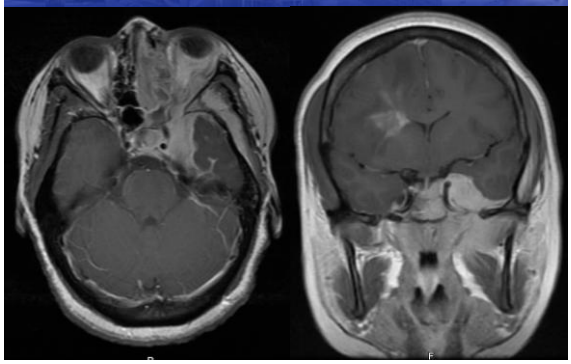
Case Presentation

- Physical exam:
  - Left proptosis
  - Decreased left visual acuity
  - Decreased left facial sensation
  - House-Brackmann II on left
  - Remaining neurological exam normal

Case Presentation

- Nasal endoscopy
  - Medialized left middle turbinate
  - Left middle meatal fleshy mass
  - Bilateral infiltrated nasopharynx

Case presentation



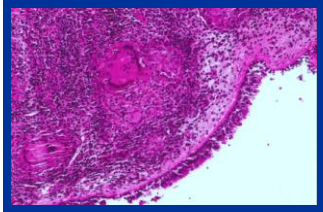
Case Presentation

- Initial biopsy in the office:
  - Mixed B, T, and plasma cells
  - Negative for malignancy
  - Flow cytometry – no aberrant immunophenotype

Case Presentation

- Nasal endoscopy with biopsy in OR
  - Negative AFB and fungal stains/cultures
  - Aerobic cultures: +MSSA

Case Presentation

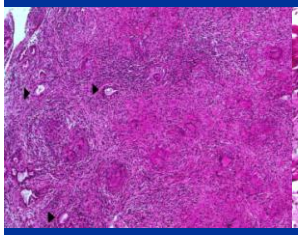


(200X magnification, H&E).

- Ciliated columnar sinonasal mucosa
- Submucosal non-caseating granulomata
- Numerous Langhans-type giant cells

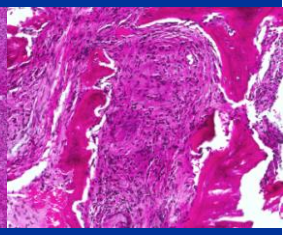
Case Presentation

Non-caseating granulomata



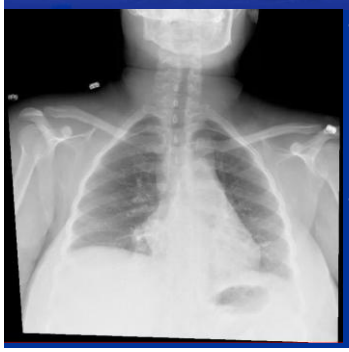
(100X magnification, H&E)

Bone involvement



(200X magnification, H&E

Case Presentation



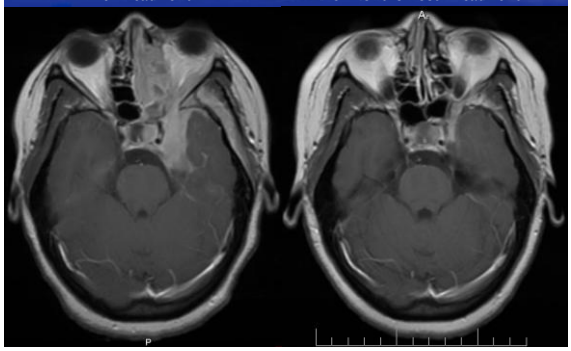
- CXR
  - Prominent bilateral hilar adenopathy
  - Chronic interstitial changes
- Laboratory
  - Elevated ACE
  - 59 units/L

Case Presentation

- Initial Therapy
  - Prednisone 60 mg QD
- 2 months
  - Mycophenolate mofetil 1 gm BID added
- 4 months
  - Prednisone 50mg QD
  - Micophenolate mofetil to 1500mg BID
- Clinical Response
  - Initial improvement in vision
  - OS central scotoma and bitemporal visual field loss OS>OD
  - Resolution of CN V and VII symptoms
  - Headache resolution

Case Presentation

Pre-Treatment 2.5 Months Post-Treatment



Case Presentation

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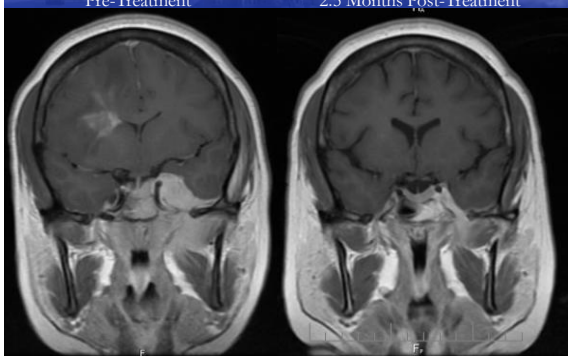

Case Presentation

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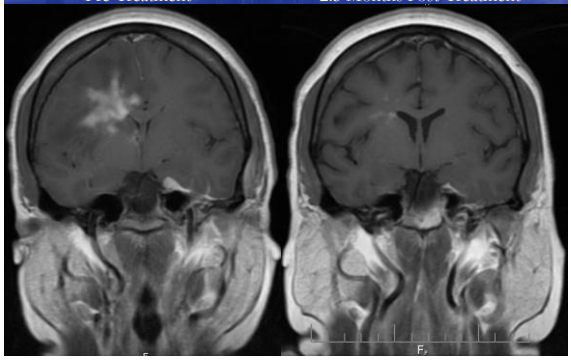

Sarcoidosis

- Multisystem granulomatous disease
- Unknown etiology
- Lungs, skin, & eye involvement most common
- 5-15% with neurologic complications

James DG, Sharma OP. Neurosarcoidosis. *Proc R Soc Med.* 1967;60:1169–1170.

Sarcoidosis

- Ubiquitous worldwide
- Environmental predisposition
  - Aerosolized metal exposure
  - *Mycobacterium* and *Propionibacterium*
- Genetic predisposition
  - West African
  - Northern European

Neurosarcoidosis

- Difficult diagnosis
  - Any part of nervous system affected
    - Variable presentation
  - No specific sign or symptom
  - Histopathologic ambiguity

Neurosarcoidosis

- Present as neurologic condition or skull base lesion

TABLE 1. Neurological Manifestations

Neurological Features	Frequency	Prognosis* Acute	Prognosis* Chronic
Cranial neuropathy	50%–75%	Good	Good
Parenchymal brain lesions	50%	Fair	Poor
Cognitive/behavioral manifestations	20%	Good	Fair
Meningeal disease	10%–20%	Good	Poor
Peripheral neuropathy	15%	Fair	Fair
Seizures†	5%–10%	Good	Good
Spinal lesions	5%–10%	Good	Fair
Myopathy	1.4%–2.3%	Fair	Poor

*Acute is defined as <3 months; chronic is defined as >3 months.
†If there is active brain inflammation seizures may be refractory; if the inflammatory process can be controlled seizures usually respond to standard anti-seizure medications.

Terushkin, et al. Neurosarcoidosis: Presentation and Management. *The Neurologist.* 2010;16:1-15.

Neurosarcoidosis

TABLE 2. Selected Differential Diagnosis of Neurosarcoidosis

Class	Differential Diagnosis
Neurological diseases	Multiple sclerosis
	Acute demyelinating encephalomyelitis
Infectious diseases	Lyme disease
	Tuberculosis
	Brucellosis
	Toxoplasmosis
	Coccidyomycosis
	Neurosyphillis
	Cryptococcocis
Neoplastic processes	Lymphoma
	Primary CNS neoplasia
	Metastatic carcinoma
Vasculitis	Wegener's granulomatosis
	Churg-Strauss syndrome

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Neurosarcoidosis

- Predilection for the skull base
  - CN VII
    - Most common neuropathy (50-65%)
  - CN II
    - 2nd most common neuropathy
    - Most common affected on imaging
  - Neuroendocrine-related symptoms

Neurosarcoidosis

- Greater than 90% have systemic signs of sarcoidosis
- Up to 30% of sarcoidosis initially present as neurosarcoidosis
- Rare presentations of isolated neurosarcoidosis

Neurosarcoidosis

- Systemic Testing
  - CNS and pulmonary imaging
  - ACE level
  - CSF testing
- Non-specific
- "The diagnosis of sarcoidosis is never definitive."

Judson MA. The diagnosis of sarcoidosis. *Clin Chest Med.* 2008;29:415–427, viii.

Neurosarcoidosis

- Therapy
  - Early initiation to prevent:
    - Acute CNS complications
    - Permanent CNS damage
  - Prednisone
    - 0.5 – 1 mg/kg/day with taper
    - Up to 1 year of treatment

Neurosarcoidosis

- Other anti-inflammatory medications
  - Methotrexate (MTX)
  - Mycophenolate mofetil (MMF)
  - Cyclophosphamide
  - Azathioprine
  - Chloroquine and hydroxychloroquine
  - Thalidomide
  - Infliximab

Neurosarcoidosis

- Radiotherapy
  - Reserved for pharmacotherapy failure or intolerance
  - 1.5 Gy/d
  - Total dose 20 Gy
- Surgical therapy
  - Diagnosis
  - Life-threatening medical failure
    - Shunting
    - Resection

Conclusion

- Neurosarcoidosis diagnosis should be considered for a skull base lesion
- Must maintain high level of suspicion
- Systemic testing should be conducted