BENIGN PRIMARY SPINAL BONY TUMORS

Dr Sumit Sinha *MS, DNB, MNAMS, MCh*

Faculty, AO Spine
Faculty, Advanced Trauma Life Support
Fellow, Fujita Health University, Japan
Spine fellow, Pontificial Catholic university, Curitiba, Brazil
Associate Professor
Deptt of Neurosurgery, All India Institute of Medical Sciences
and Associated JPNA Trauma center, New Delhi

SPINAL BONY TUMORS

CELL OF ORIGIN	BENIGN	MALIGNANT
Osseous	Osteoid osteoma osteoblastoma	osteosarcoma
Cartilagenous	Osteochondroma Enchondroma Chodroblastoma Chondromyxoid fibroma	chondrosarcoma
Fibrous	fibroma	Fibrosarcoma MFH
Marrow		Ewings sarcoma MM Lymphoma
Others	Hemangioma Eosinophillic granuloma ABC	Giant cell tumor

SPINAL BONY TUMORS

Benign Bone Tumors

Tumor	Age (Years)	Sex	Location	Radiograph	Treatment	Comments
Osteoid osteoma	<30	M	Posterior elements	Nidus and sclerosis	Excision	Painful scoliosis
Osteoblastoma	<30	M	Posterior elements	Radiolucent	Excision	Painful scoliosis
Hemangioma	>30	M, F	Body trabeculae	Vertical	None or surgery if symptomatic	Most are asymptomatic
Giant cell tumor	>20	F	Body and sacrum	Radiolucent	Excision (rad.?)	Recurrence is common
Aneurysmal bone cyst	<25	M, F	Posterior elements	Lytic and expansile	Excision	May involve next vertebra
Eosinophilic	<20	M	Body	Radiolucent or collapse	Usually none	Self-limiting process
Osteochondroma	10–20	M	Posterior elements	Exophytic	Excision if symptomatic	May become malignant

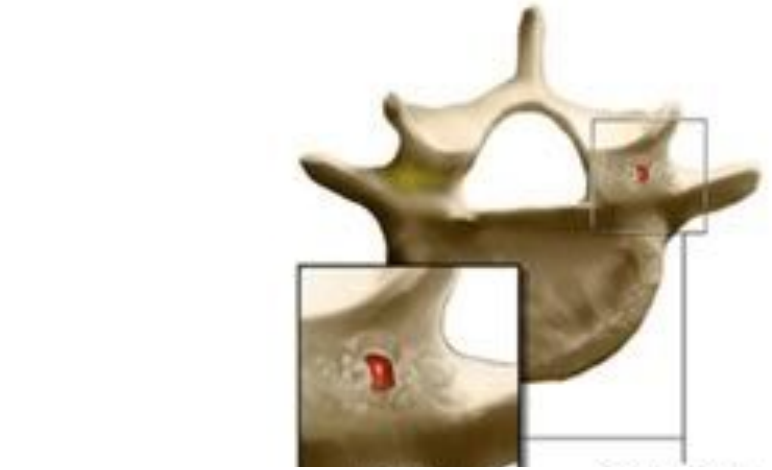
SPINAL BONY TUMORS

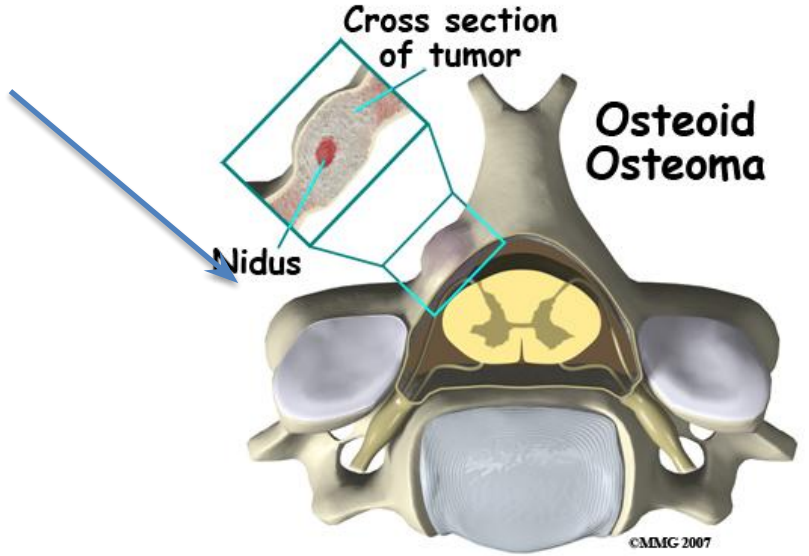
Osteoid osteoma

- Teens, males
- Spine- <10%
- Arise from cancellous bone
- <2 cm
- MC site- L spine- posterior

Elements-

  - Neural arch- 75%
  - Facets- 18%
  - VB- 7%





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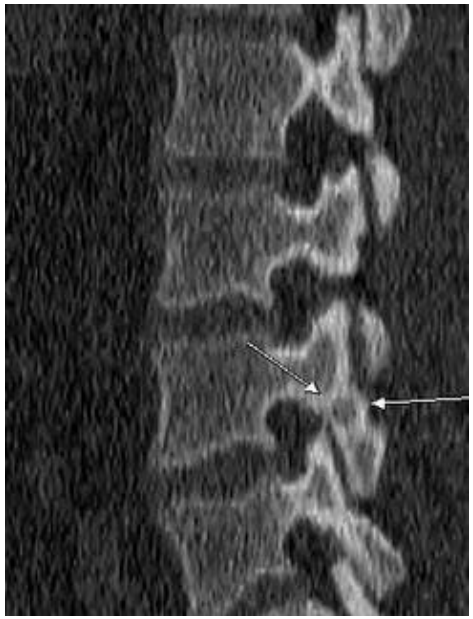
Osteoid Osteoma (Contd.)

- Backache-
  - not relieved by rest
  - Worse at night and with recumbency
  - relieved by NSAID
- PAINFUL SCOLIOSIS in adoloscents
- *Any back pain > 6 weeks in children/ young adults- Tc Bone scan- increased uptake*

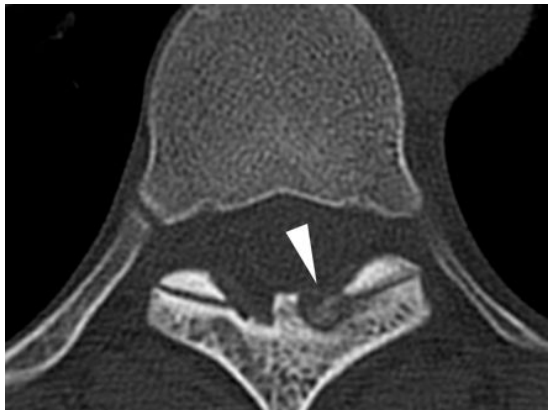
SPINAL BONY TUMORS

Osteoid osteoma (Contd.)

- Radiology-

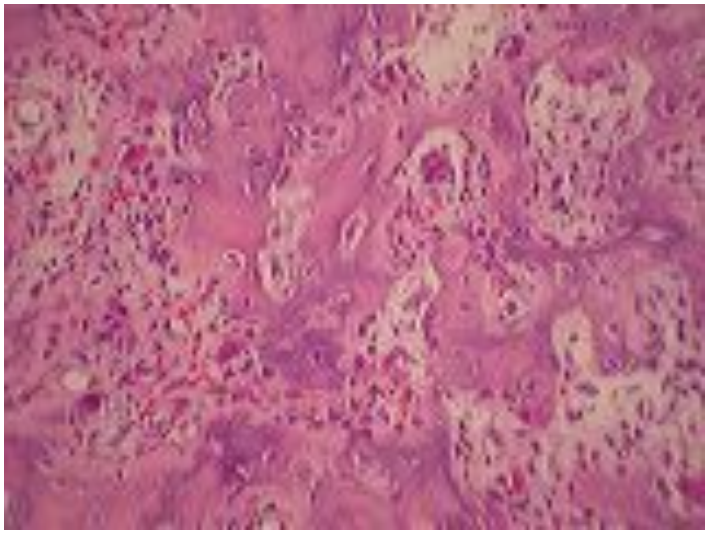


Round/ oval lesion– radiolucent center with peripheral sclerosis; (< 2 cm diameter)



CT scan shows the nidus (arrowhead) with a small area of calcification and no perinidal sclerosis

SPINAL BONY TUMORS



Osteoid osteoma (Contd.)

Histology

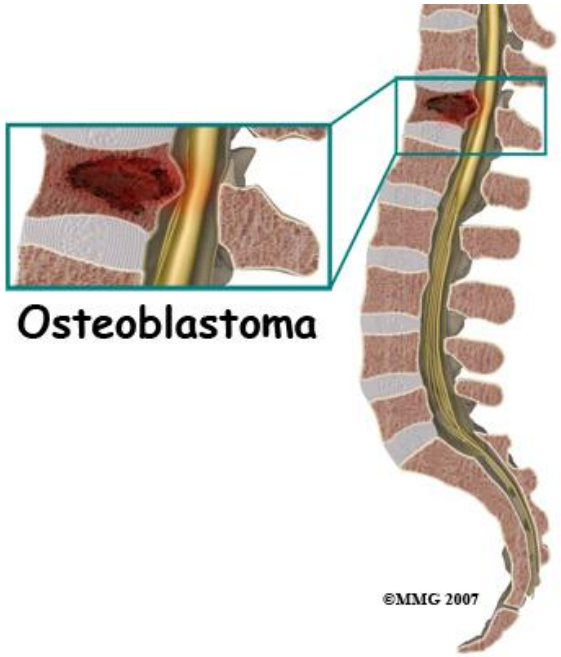
- Background of vascularised connective tissue with trabeculation
- Surrounding reactive cortical bone

SPINAL BONY TUMORS

Osteoid osteoma (Contd.)- Treatment

- NSAID's
- Surgical- goal is **complete excision**
- Curettage/ intralesional excision- 50% recurrence
- Alcohol/ laser/ RF ablation
- RT- residual/ recurrent lesions

SPINAL BONY TUMORS



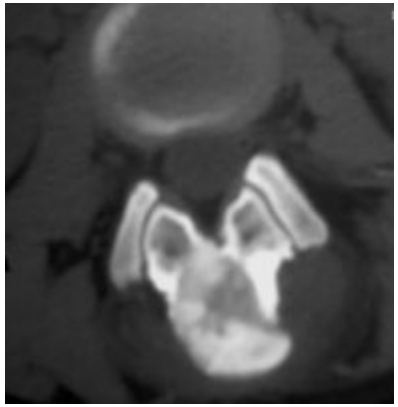
Osteoblastoma

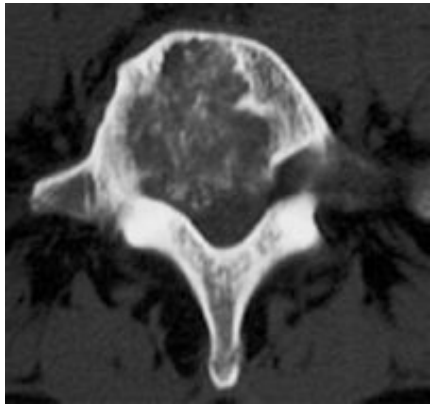
- 2-3 decade; males>females
- 40% located in spine
- > 2 cm
- Pain- more constant, less severe, (opposed to osteoid osteomas)- unresponsive to NSAID's
- Treatment- complete surgical excision- wide en bloc

SPINAL BONY TUMORS

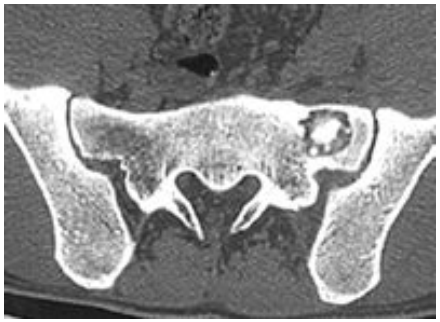
Osteoblastoma (Contd.)

- X Ray- Expansile lesion with well circumscribed margins and homogenous ossification
- CT-





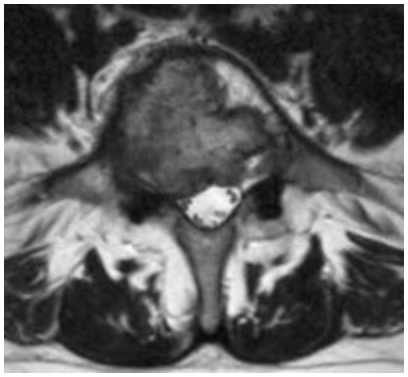
destructive expansile lesion with osteoid matrix extending into the spinal canal.

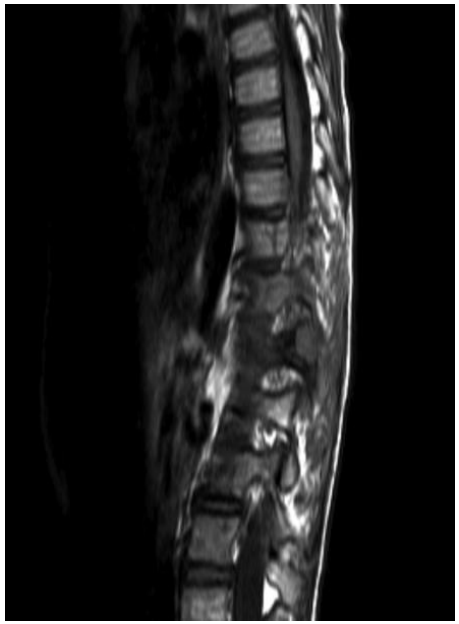


hypoattenuating area with central calcifications and minimal surrounding sclerosis.

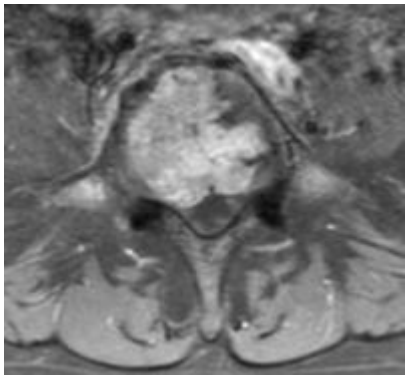
SPINAL BONY TUMORS

MRI





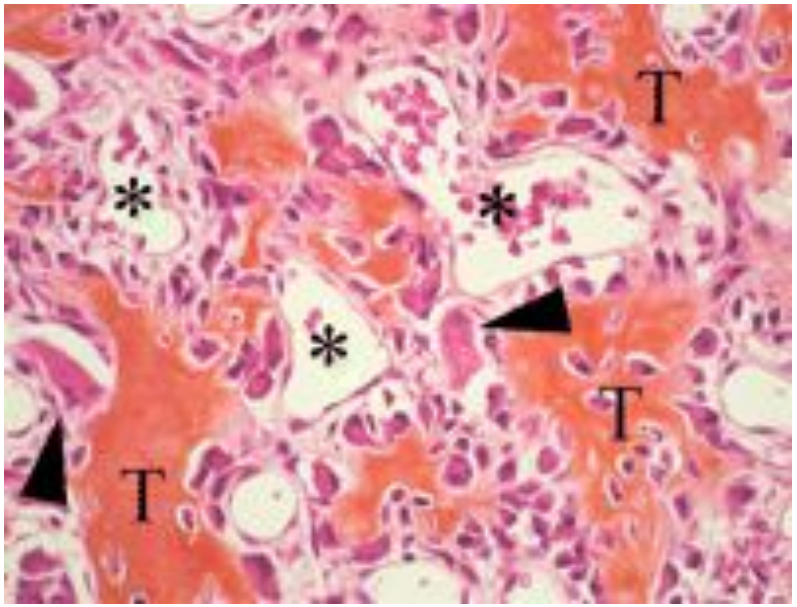
Mass with low signal intensity



Axial contrast-enhanced fat-saturated T1-weighted MR image shows marked enhancement of the lesion

SPINAL BONY TUMORS

Histology



Bone-forming tumor with irregular anastomosing trabeculae (T) lined by regular osteoblasts and osteoclasts (arrowheads) and with rich vascularity (*).

SPINAL BONY TUMORS

Osteochondroma

- 2-3 decade
- 1/3 of all benign bony tumors
- 1-2% located in spine-
  - LS (50%)
  - TH (30%)
  - CX (20%)

  } posterior elements- spinous process
- Pathogenesis- abnormal cartilage growth

SPINAL BONY TUMORS

Osteochondroma- symptoms-

- Frequently asymptomatic
- Painless prominence of bone
- Pain- mild, increases with activity
- Associated with kyphosis and spondylolisthesis
- Nerve/ spinal compression

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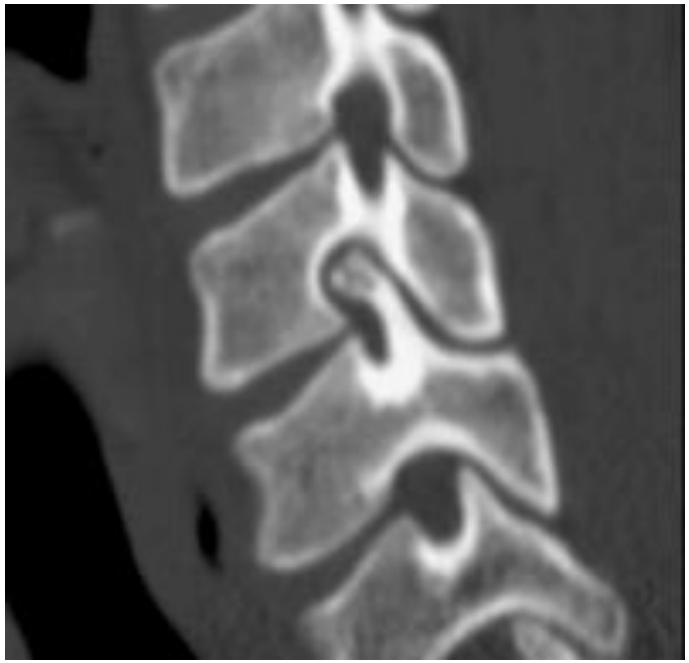
CT-

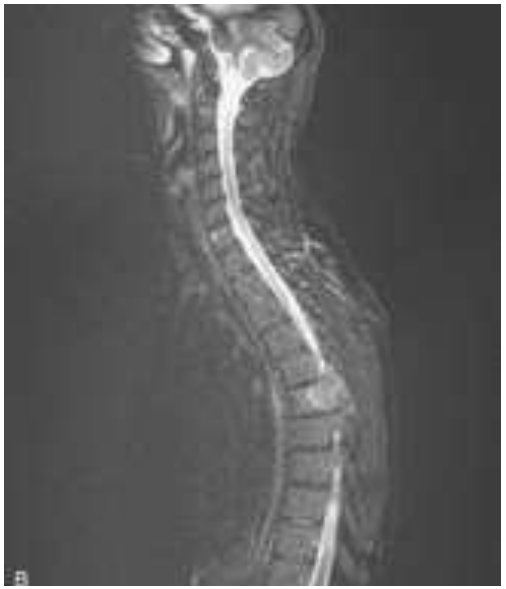


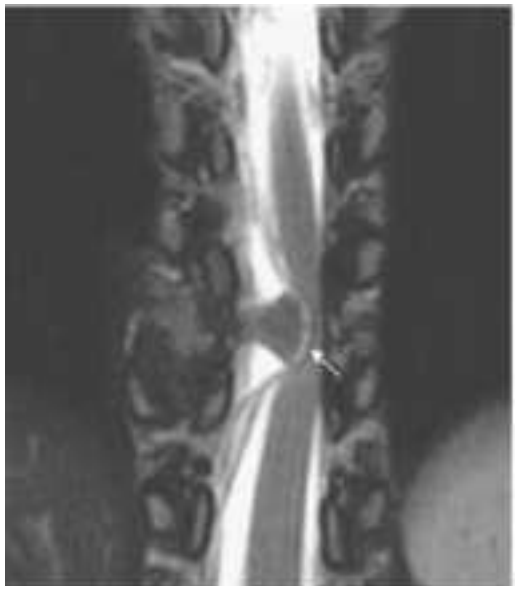
Cortical continuity of the osteochondroma with the C6 posterior arch.

SPINAL BONY TUMORS

Osteochondroma

- MRI-

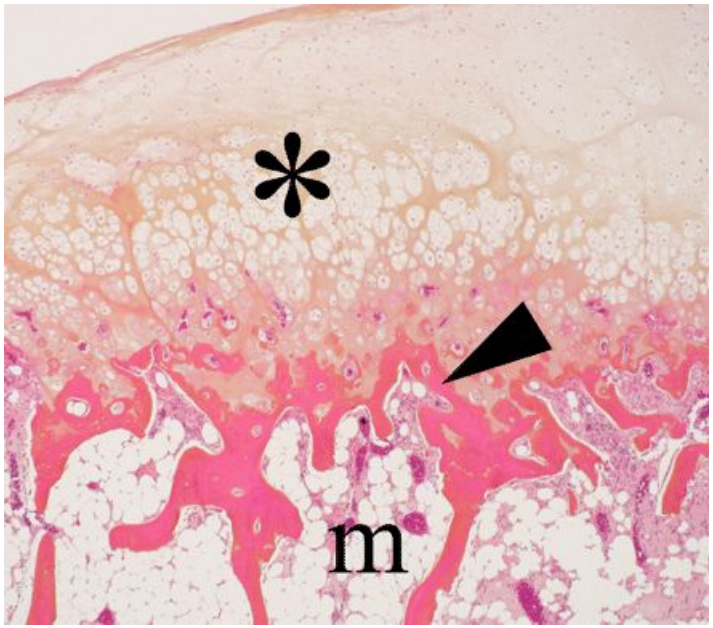




- RN scan- increased uptake

SPINAL BONY TUMORS

Histology



regular cartilaginous cap (*) undergoing enchondral ossification (arrowhead) leading to medullary bone *(m)*.

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Osteochondroma

Treatment-

- Asymptomatic- observe
- Surgery- persistant pain/ disability/ X ray s/o malignancy
- Change into malignant chondrosarcoma (10% with multiple lesions)

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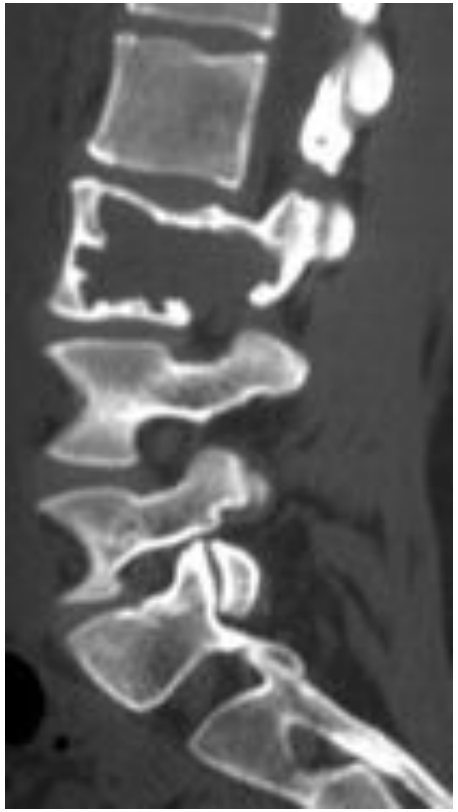
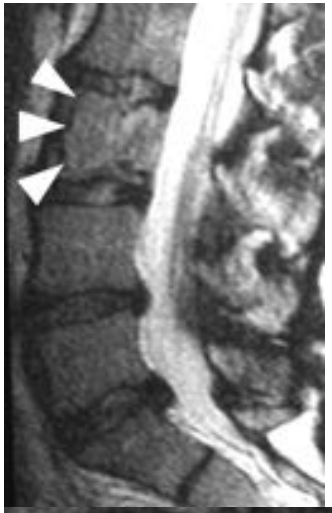
Chondroblastoma- Radiology



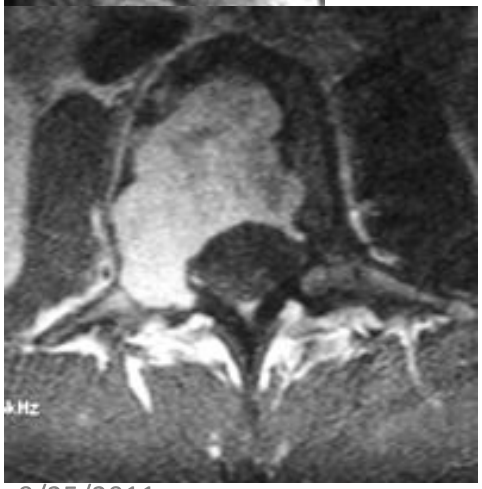
Sagittal reformatted CT image- lytic lesion of the L3 vertebral body with sclerotic margins

SPINAL BONY TUMORS

Chondroblastoma- Radiology



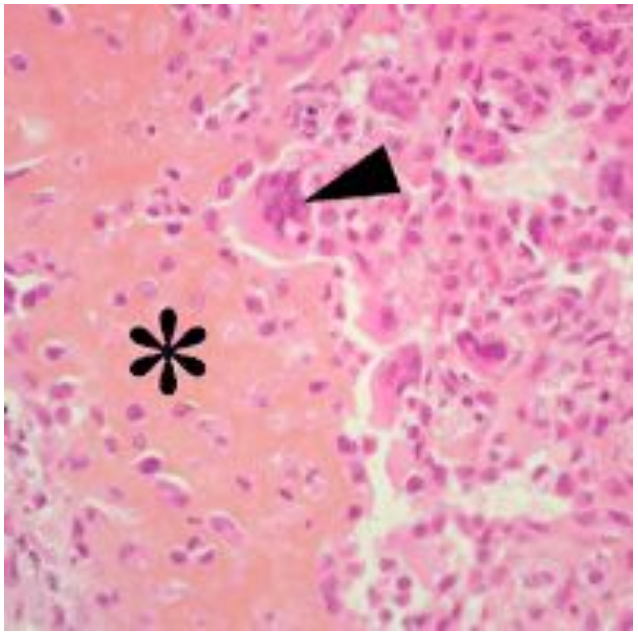
Sagittal T2-weighted MR image,- lesion (arrowheads) appears isointense relative to the normal vertebral bodies



Axial contrast-enhanced fat-saturated T1-weighted MR- marked enhancement

SPINAL BONY TUMORS

Chondroblastoma- Histology



sheets of uniform chondroblasts with abundant chondroid matrix (*) and some osteoclast type giant cells (arrowhead).

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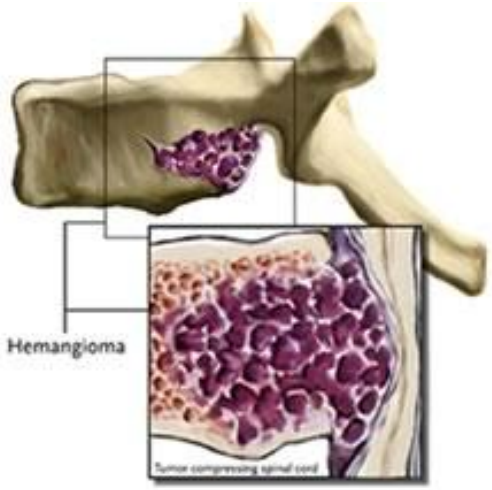
Vertebral hemangioma



- Dysembryogenetic/ hamartomatous origin
- > middle age
- Slight female predilection
- Site- Th/ L spine.
- usually confined to the vertebral body, occasionally extend into the posterior elements.

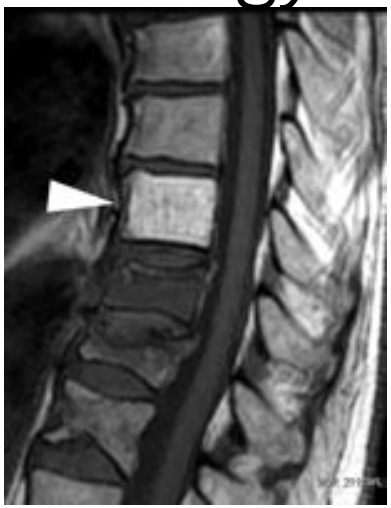
SPINAL BONY TUMORS

Haemangiomas- symptoms

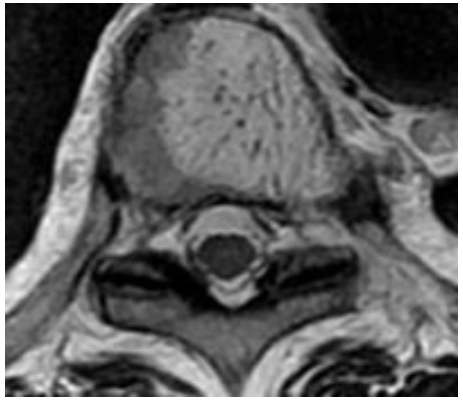
- Mostly asymptomatic.
- Occasionally- increase in size and compress the spinal cord and nerve roots

SPINAL BONY TUMORS

Radiology



Hemangioma of the T9 vertebral body in an 81-year-old woman with multiple osteoporotic compression fractures (T10–T12).



Axial T2-weighted MR image- well-circumscribed fatty lesion with coarse vertical trabeculae (polka dots).

SPINAL BONY TUMORS

Haemangioma- Histology

thin-walled vessels lined by flat, bland endothelial cells infiltrating the medullary cavity between bone trabeculae

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Haemangiomas- Treatment

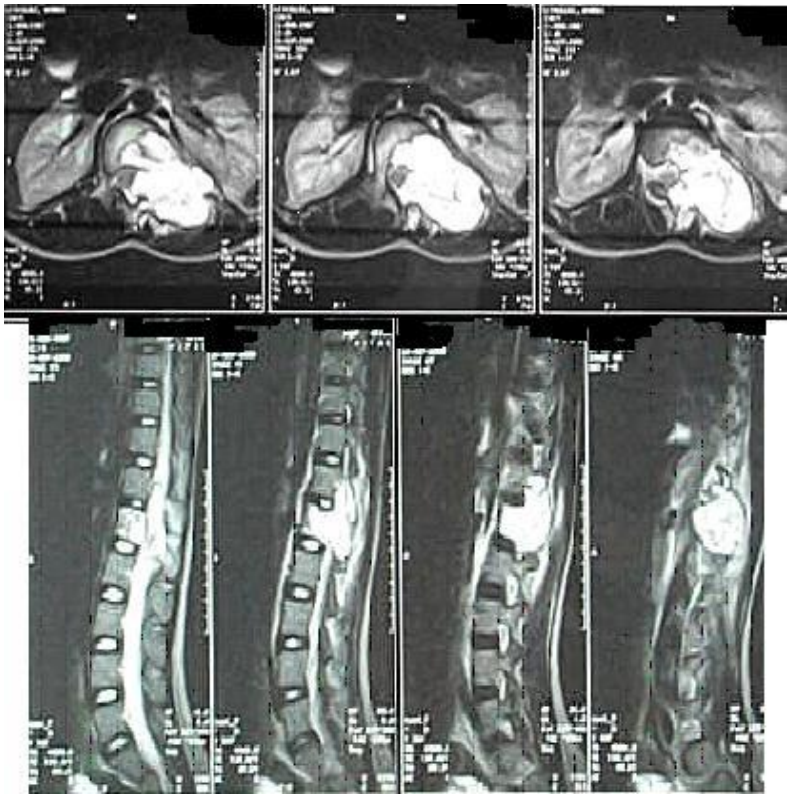
- Transarterial embolization- for painful intraosseous hemangioma and for reducing intraoperative blood loss before decompressive surgery
- Surgery- Rapid tumor growth with spinal cord compression

SPINAL BONY TUMORS

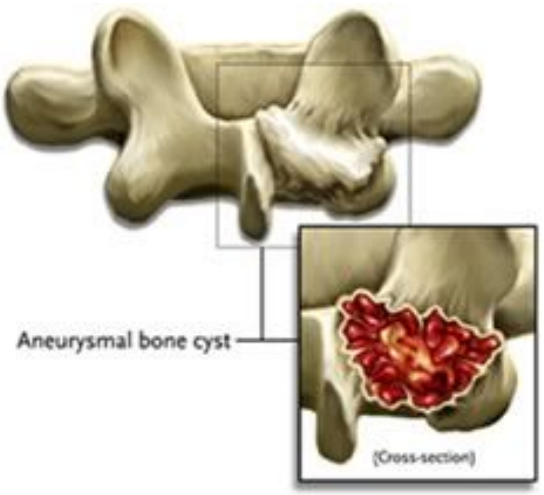
Aneurysmal Bone Cyst

Age- <20 yrs

Females >males



Fluid levels- heterogenous signal T1/T2

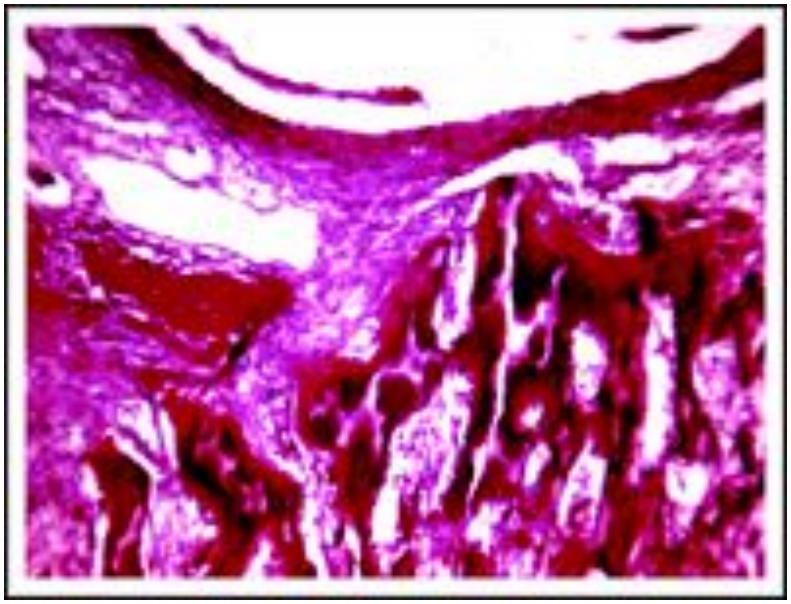


Cystic expansile lytic lesion- thin cortical shell-

MC site- long bones/ spine- thoracic vertebrae- posterior elements

SPINAL BONY TUMORS

Aneurysmal Bone Cyst- histology



blood-filled cystic spaces separated by a spindle cell stroma with osteoclast-like giant cells and osteoid or bone production

SPINAL BONY TUMORS

Aneurysmal Bone Cyst-Treatment-

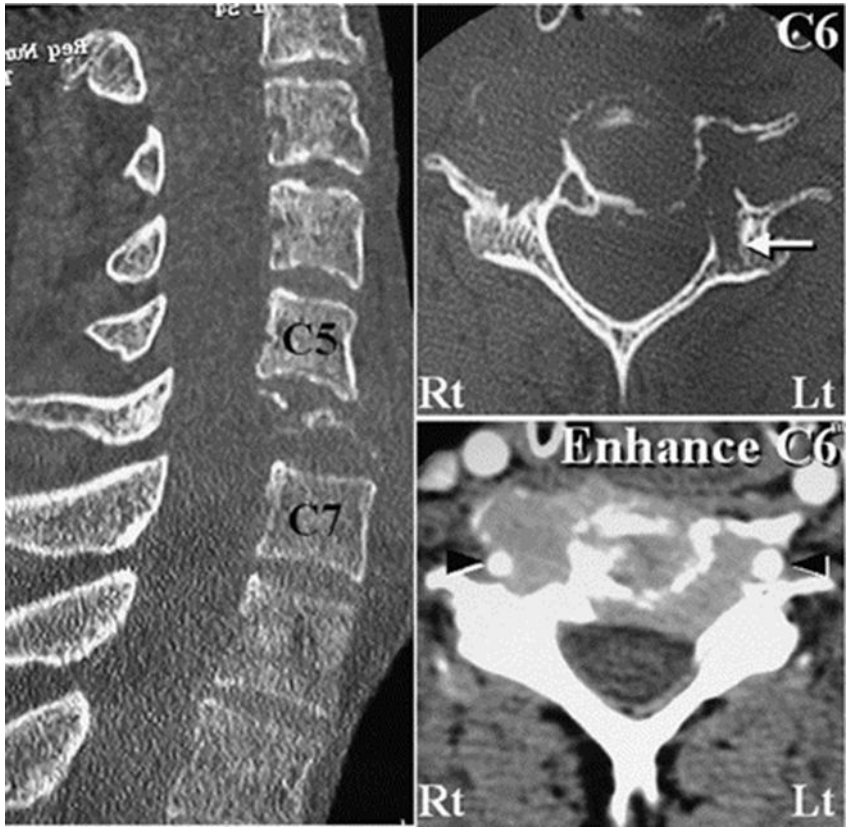
- Embolisation only
- Embolisation – surgery
- Complete surgical excision
- RT- for residual/ recurrent tumors

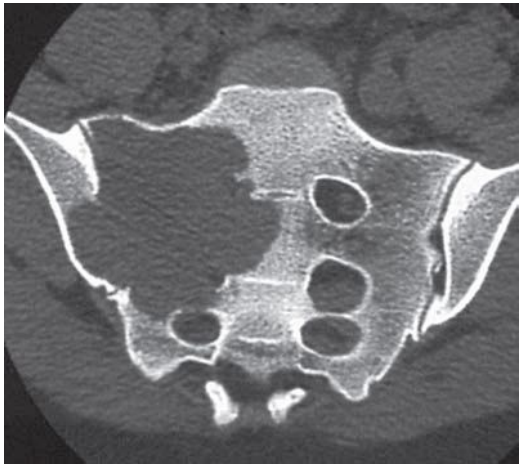
SPINAL BONY TUMORS

Giant cell tumors–

- 2-4th decade
- Females common
- Sacrum (MC Site)- upper part/ wing>L>Th>Cx
- Intervertebral disk invasion and extension into an adjacent vertebra

SPINAL BONY TUMORS



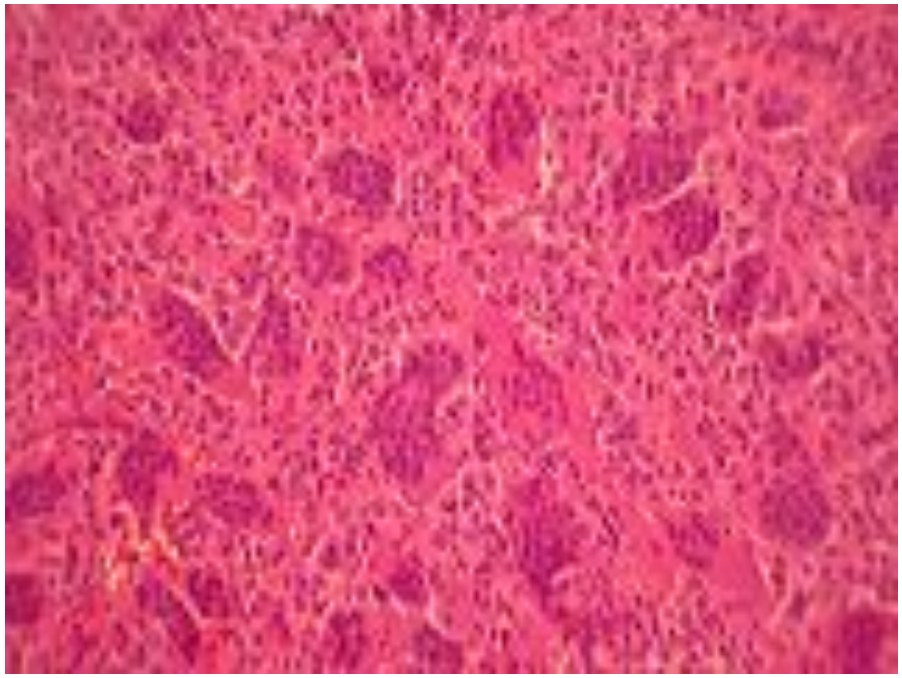


well-defined lytic lesion of the right upper part of the sacrum with extension through the right sacroiliac joint and absence of a sclerotic rim.

SPINAL BONY TUMORS

Giant cell tumors–

- Histology



osteoclast type giant cells with numerous nuclei (*) scattered among regular mononuclear cells.

SPINAL BONY TUMORS

Langerhans cell histiocytosis (histiocytosis X)-

- usually solitary and curable eosinophilic granuloma to the disseminated process (Schüller-Christian syndrome), to the disseminated and rapidly fatal variety-Letterer-Siwe disease
- 1/2,000,000 persons per year

SPINAL BONY TUMORS

- 5 and 10 years
- Vertebral involvement- 7.8%–25%

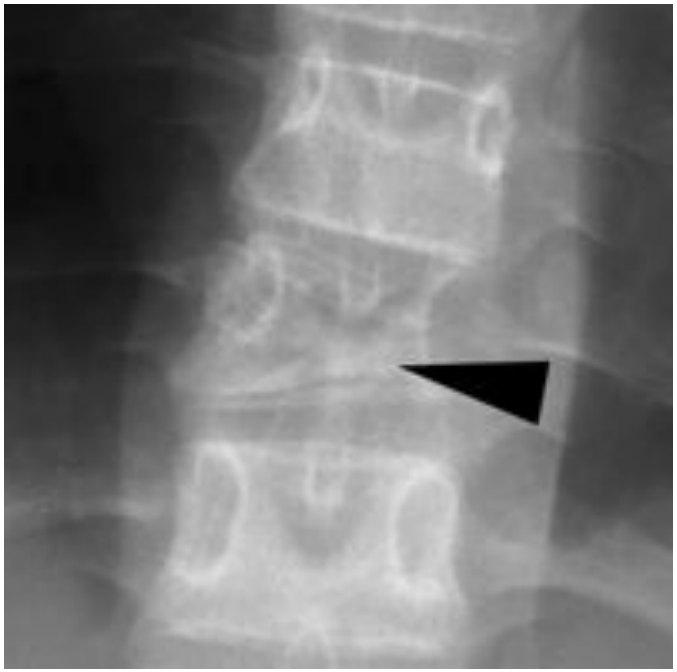
SPINAL BONY TUMORS

Treatment

- Controversial.
- Conservative- Patients without complications
- In patients with multifocal disorders- biopsy of extraspinal lesions and chemotherapy

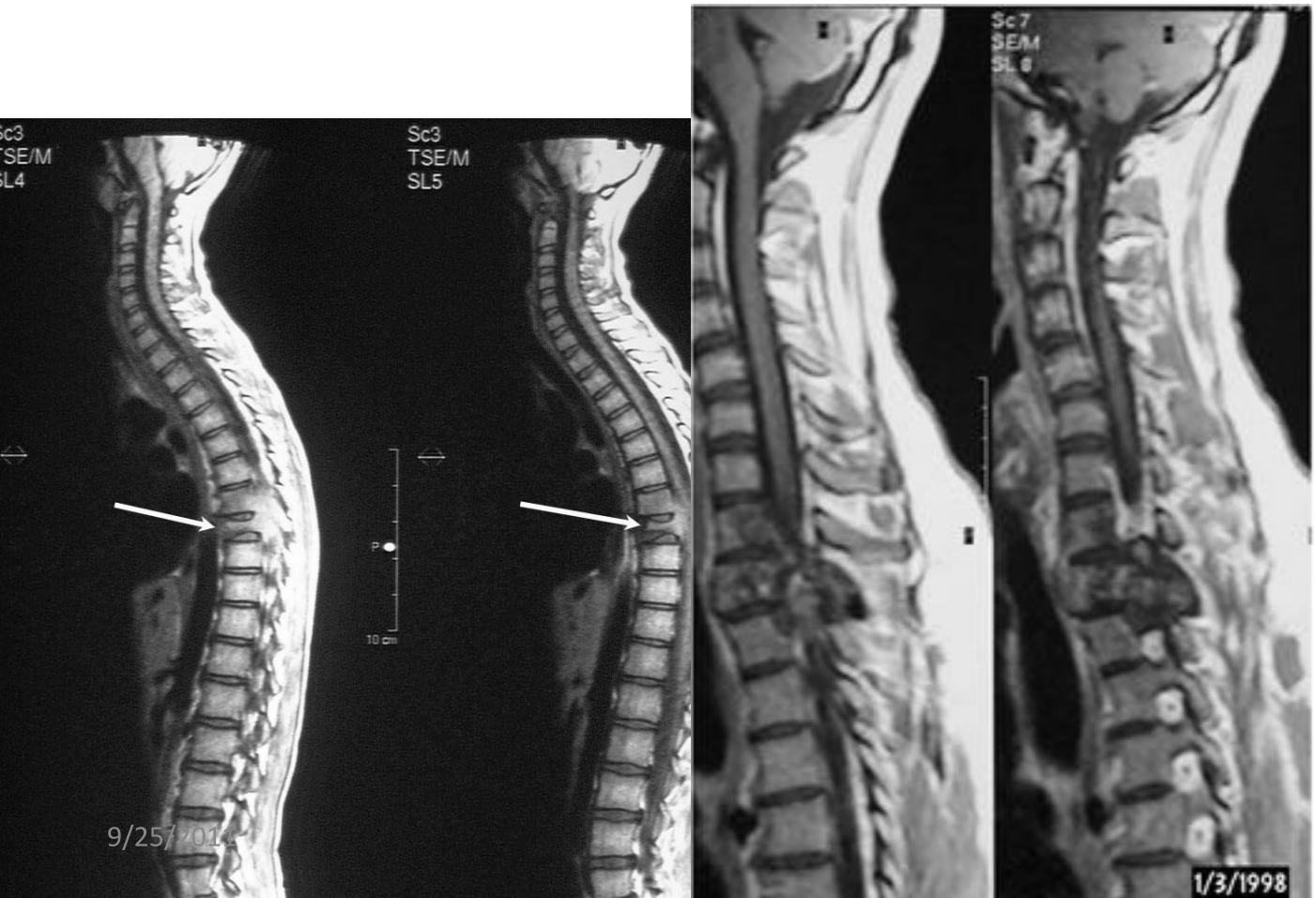
SPINAL BONY TUMORS

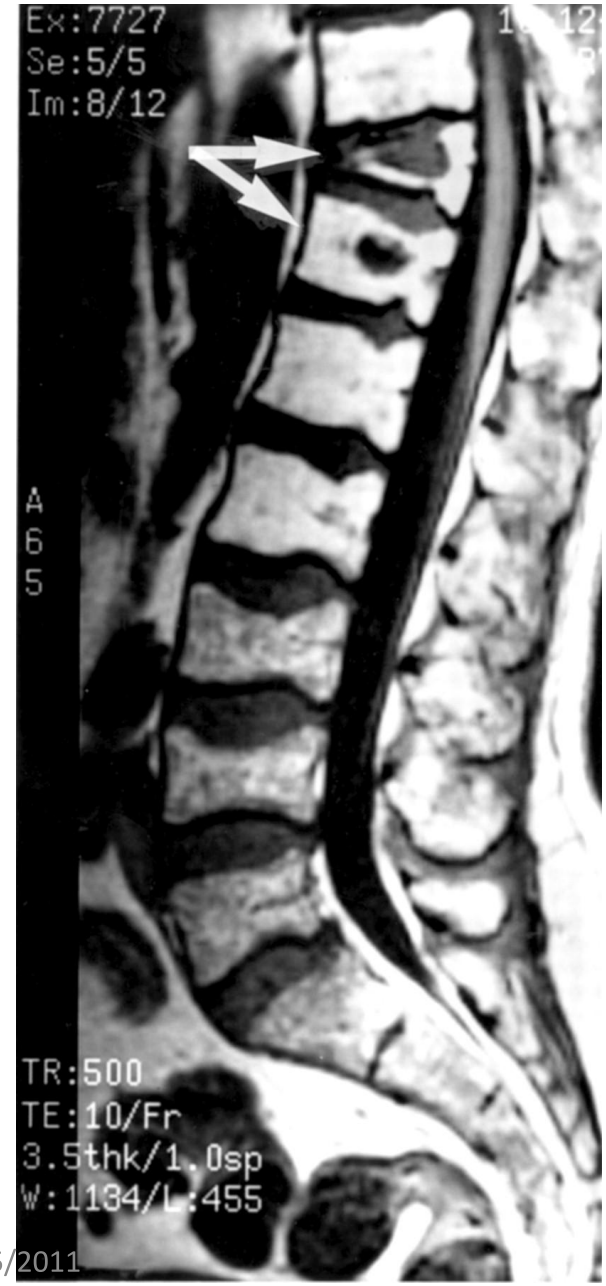
Radiology



Eosinophilic granuloma in a 12-year-old boy. Radiograph shows increased opacity in an incompletely collapsed vertebral body

Eosinophilic Granuloma

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