2025

KARNATAKA RADIOLOGY EDUCATION PROGRAM

SPINAL DYSRAPHISM

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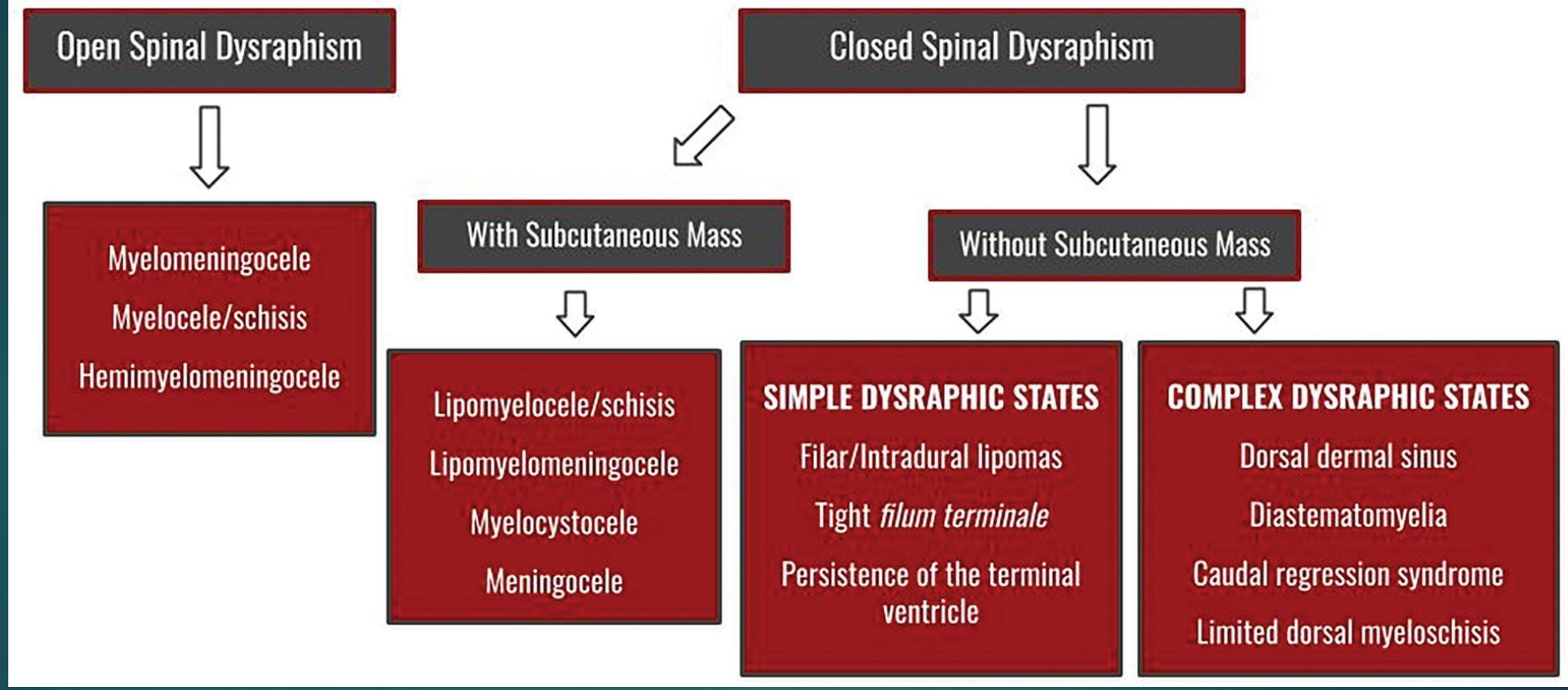
INTRODUCTION

- Spinal dysraphism (SD) is a collective term for congenital malformations of the spine and spinal cord. It includes a wide range of congenital anomalies resulting from aberrations in the stages of gastrulation, primary neurulation and secondary neurulation. Spinal dysraphism have a prevalence of ~1 to 3 per 1000 live births with the lumbosacral spine being the most common site. Spinal dysraphism may lead to neurological impairment of varying severity including weakness of the extremities, incontinence of bowel and bladder, and sexual dysfunction, among others.

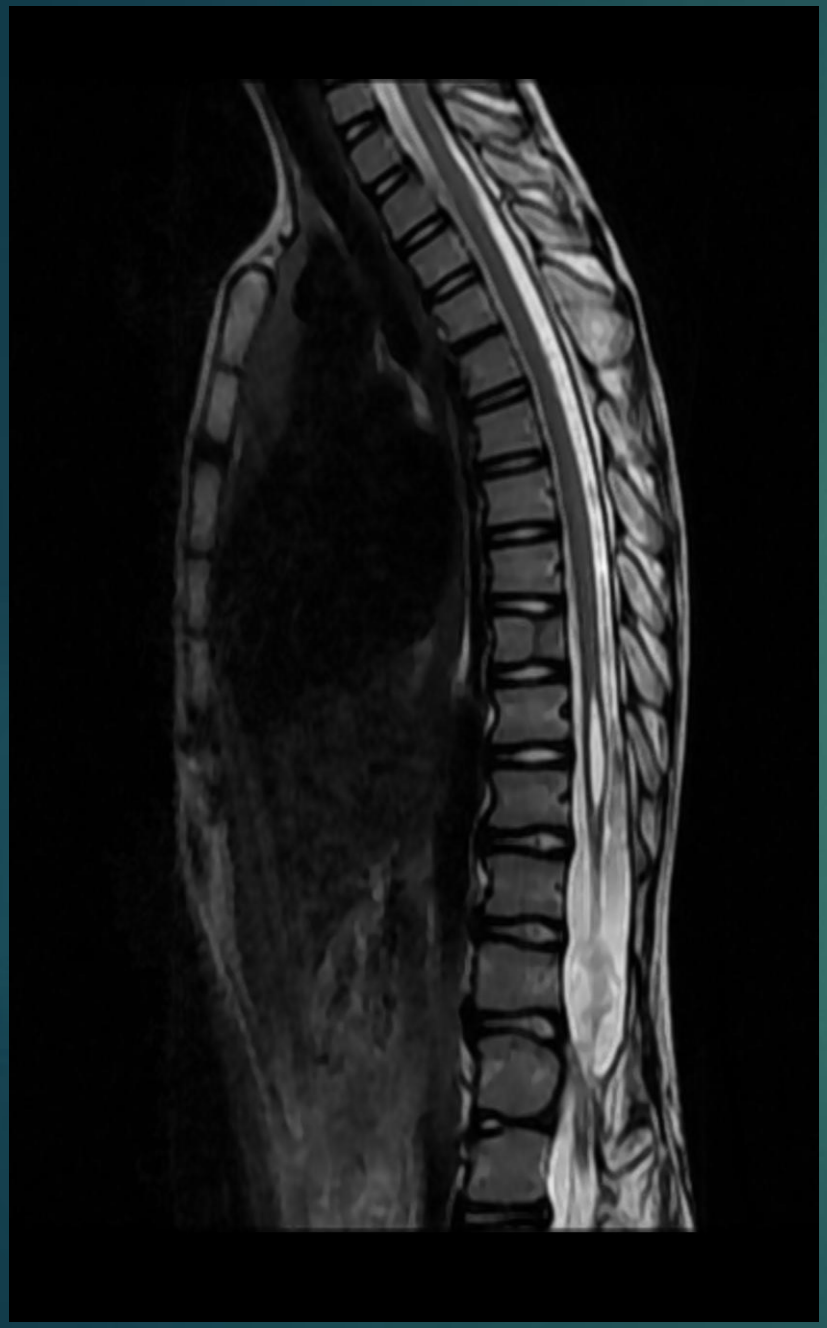
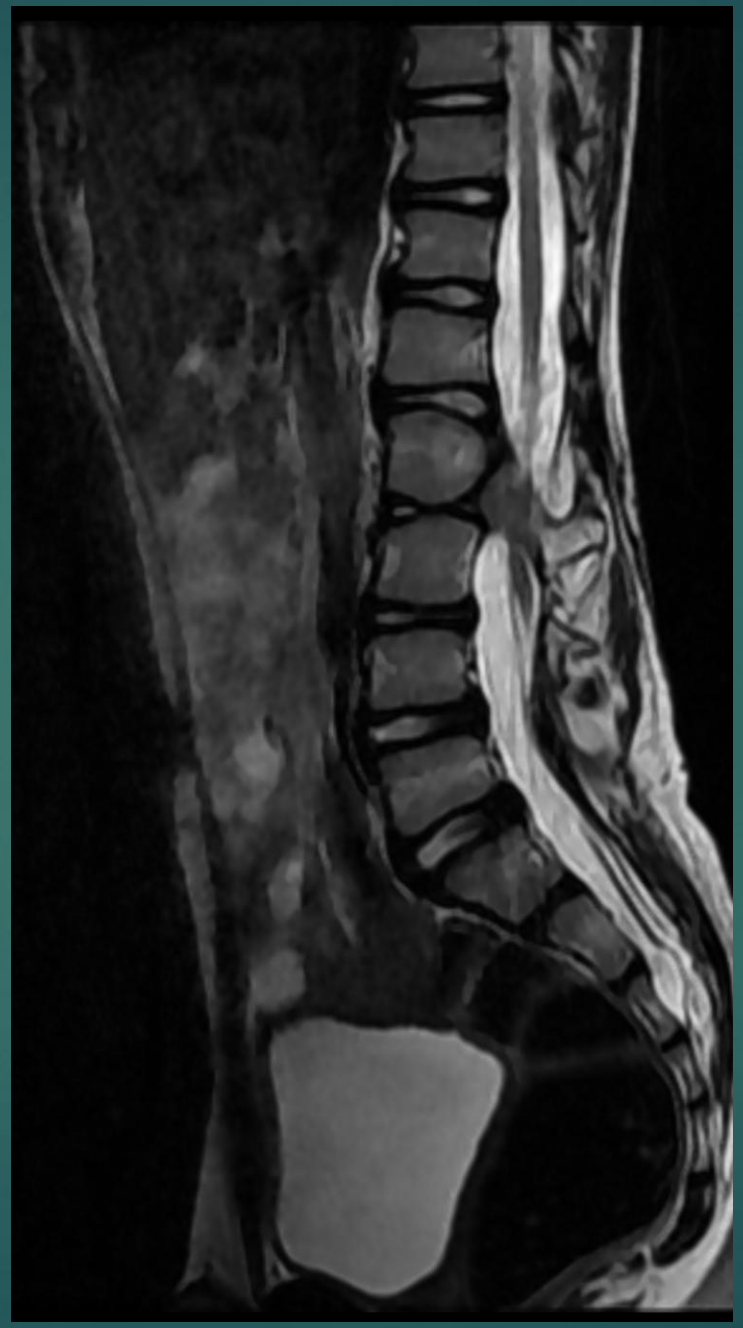
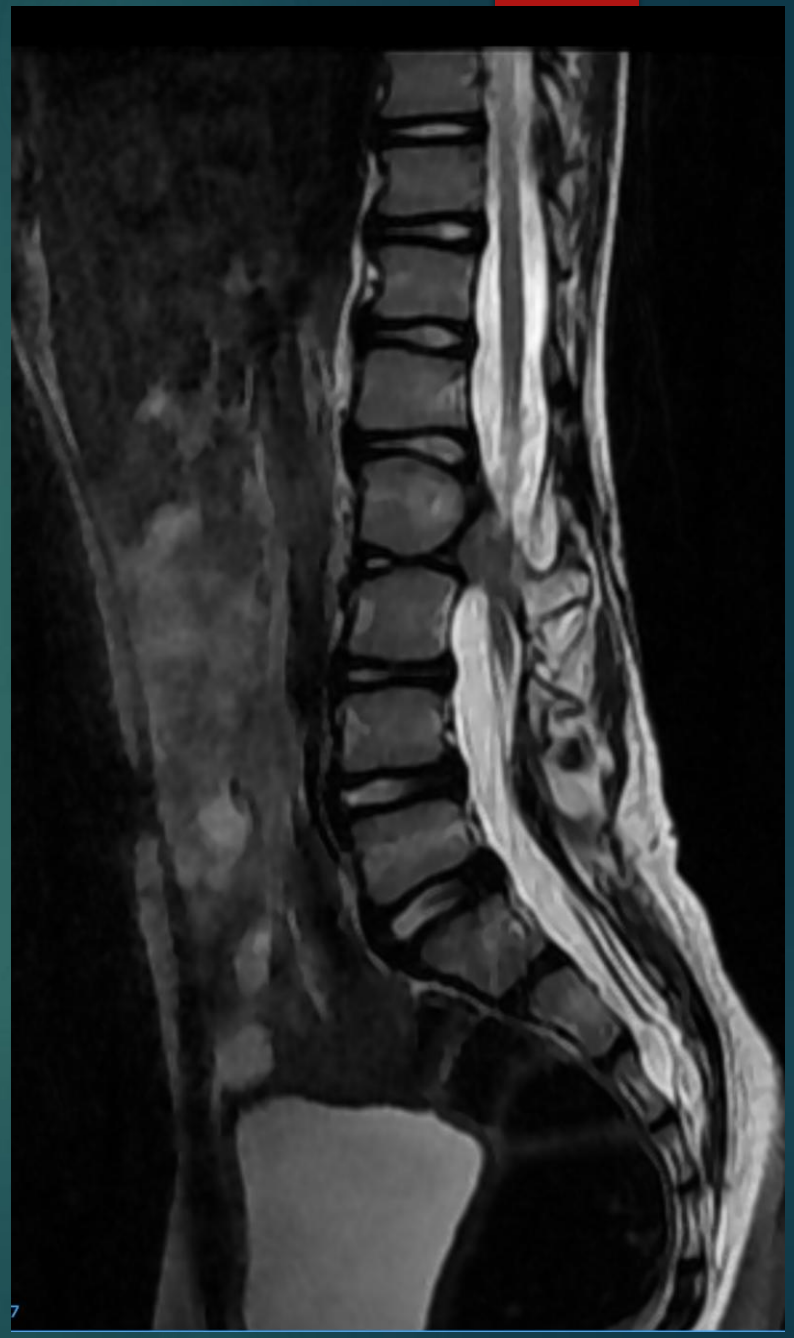
- MRI is the modality of choice for diagnosis, surgical planning and postoperative assessment of SDs because of its high spatial resolution and tissue contrast.

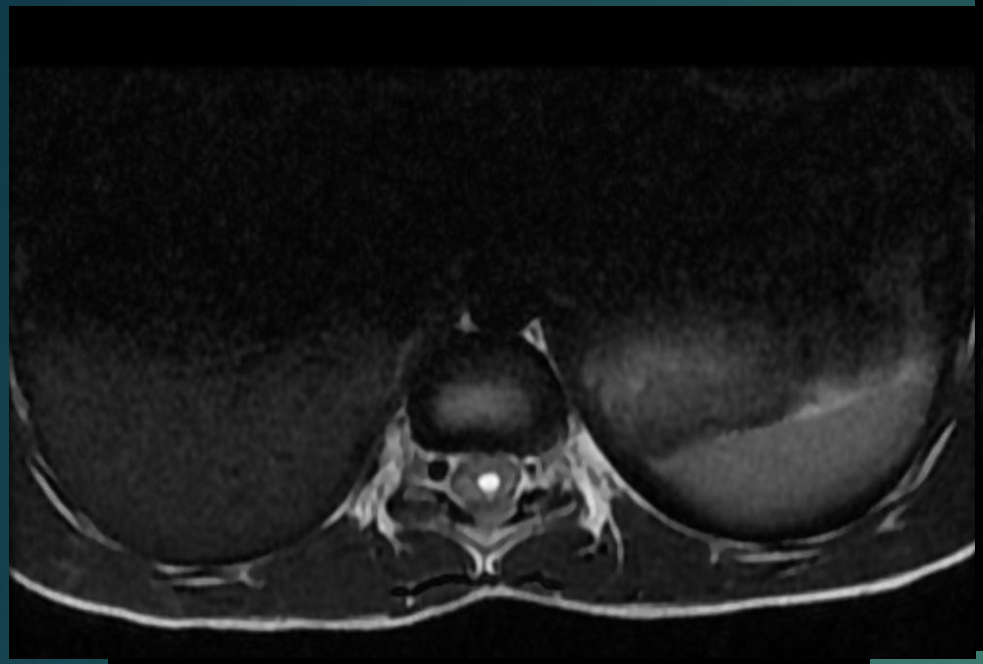
Clinico-Radiological Classification of Spinal Dysraphisms

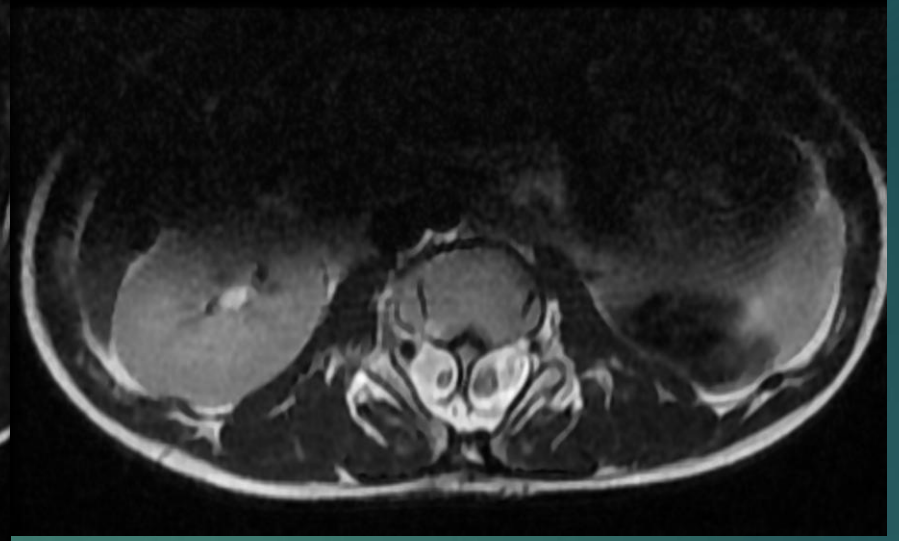


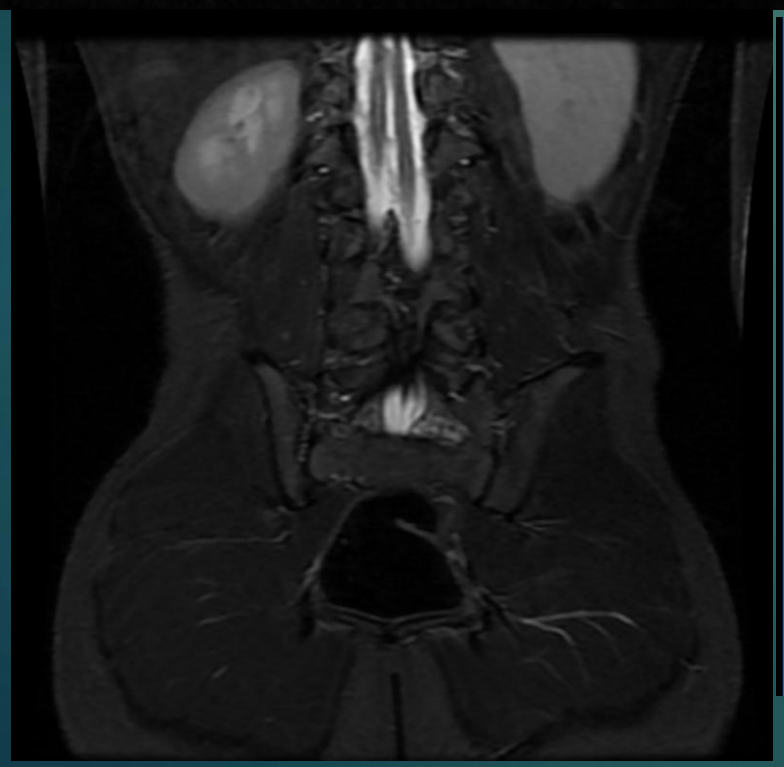
HISTORY

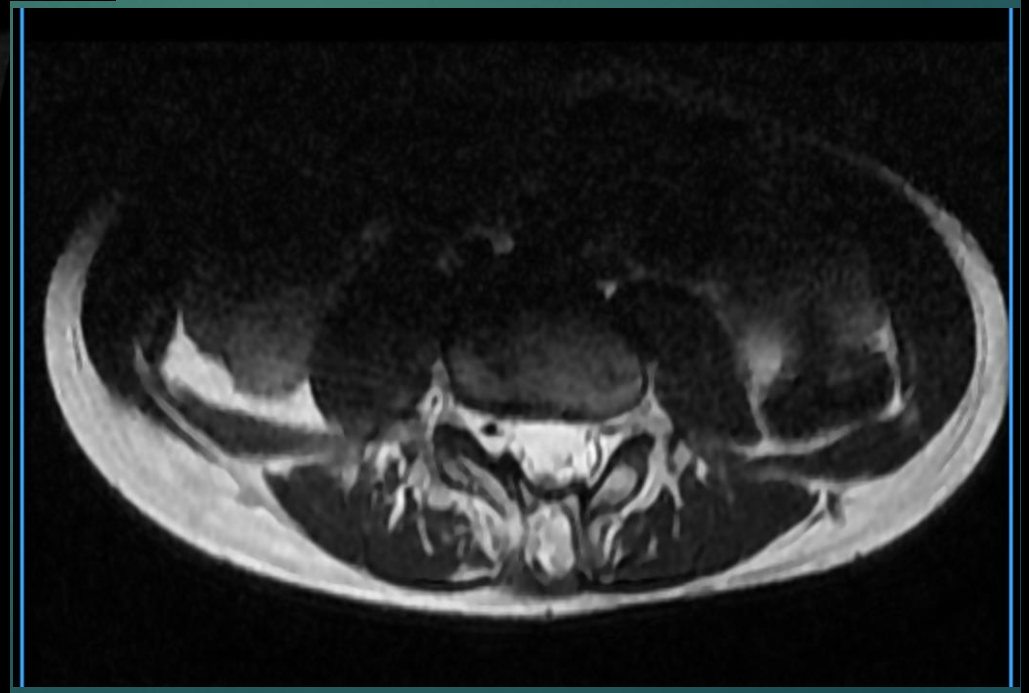
- 9 yr old child presents with
- C/o Recurrent ulcers over right foot with decreased sensation.

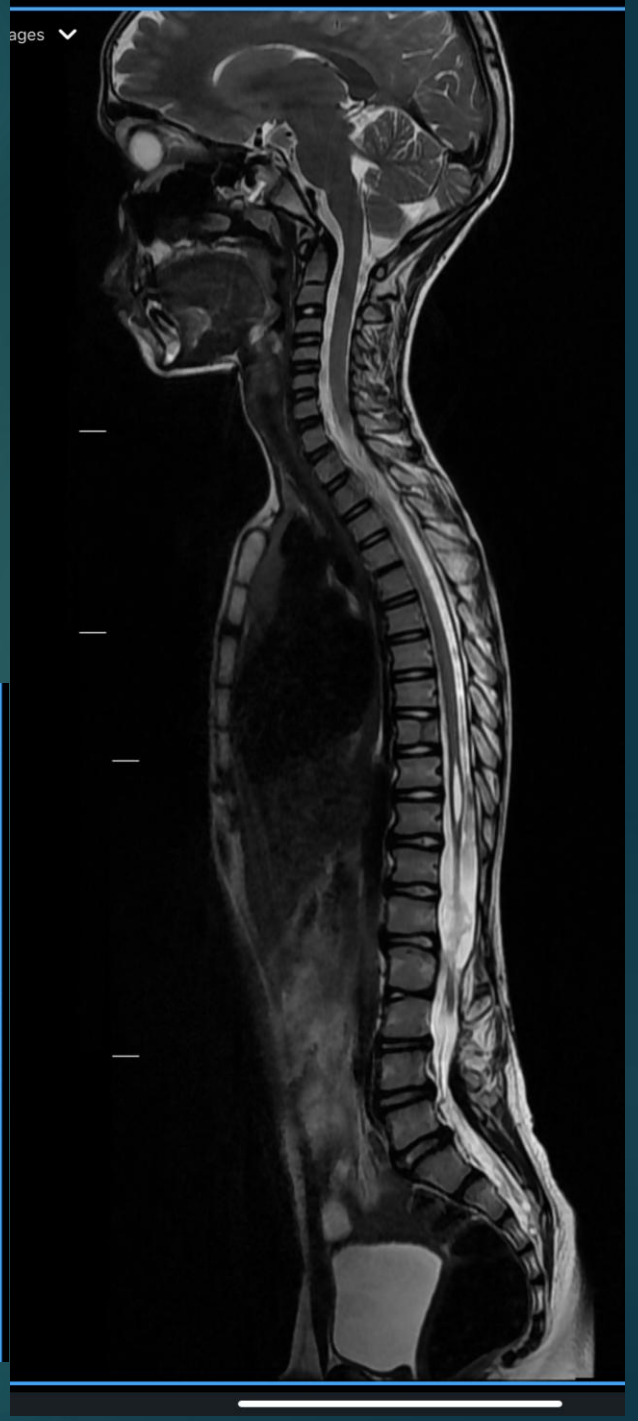













ages

- **FINDINGS:**

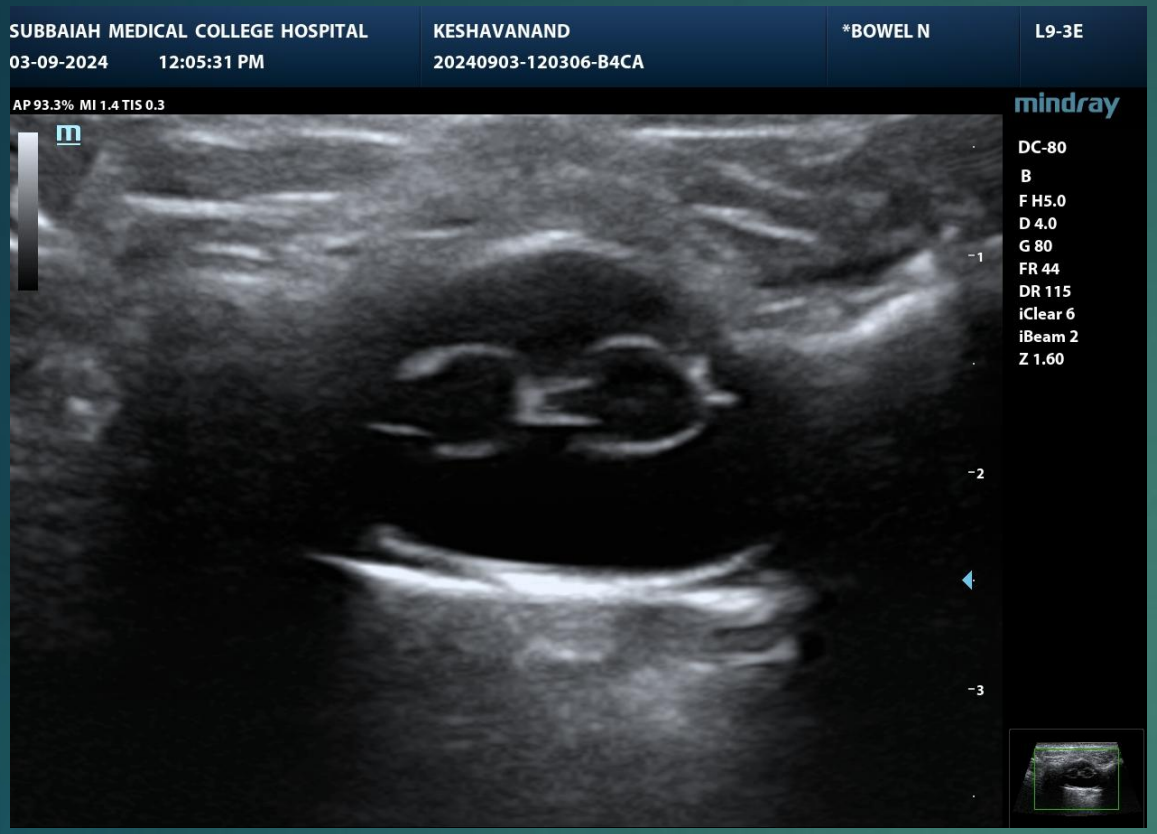
  Partial block vertebra noted at L2-L3 with thin rudimentary disc and fusion of lamina noted. Fusion of spinous process of L2-L3 vertebra.

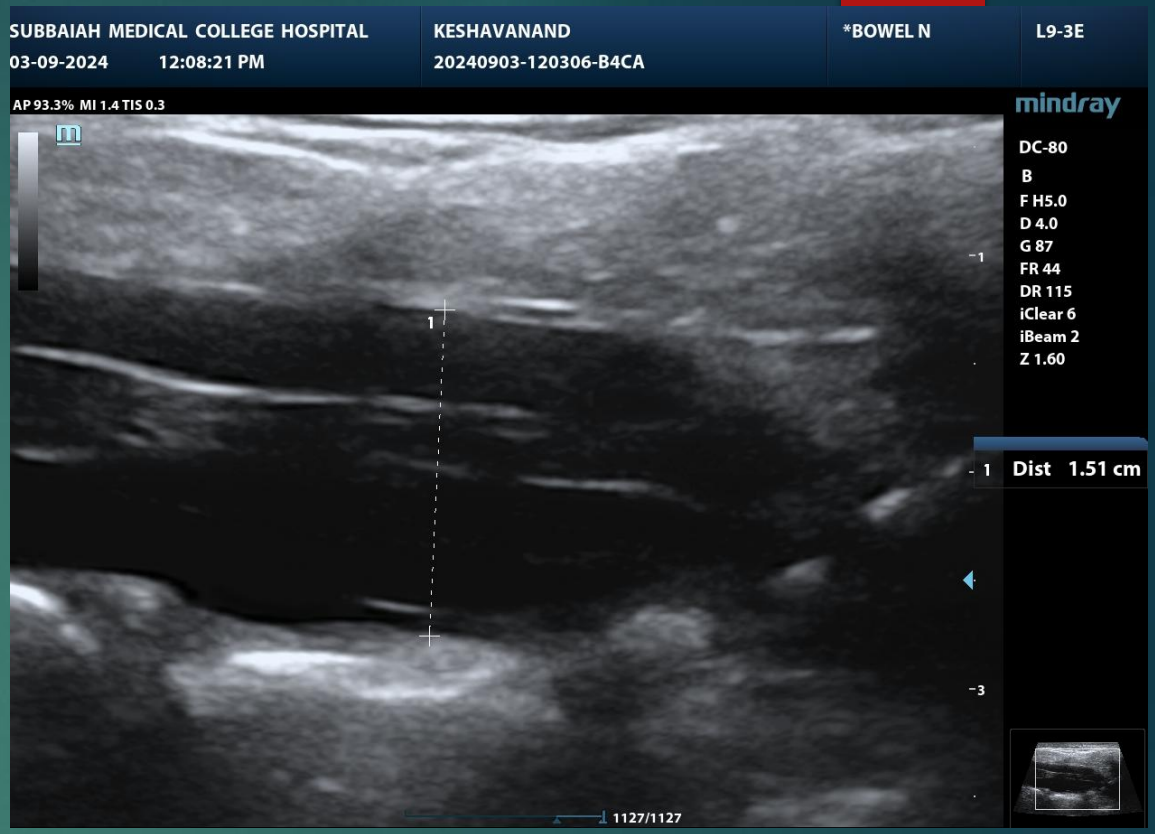
  Fusion defect with splaying of posterior elements noted from D12 to S5 levels with intact overlying skin.

  T2/STIR hyperintense syrinx measuring 2.7cms in length noted at the level of D10-D11 vertebral body.

FINDINGS

- MRI features of Diastematomyelia (Type I) with associated:
- Duplicated dural sac / cord with midline osseous spur.
- Low lying tethered cord.
- Syrinx (D10-D11).
- Multilevel spina bifida occulta.
- Moderate dural ectasia at lumbo-sacral level.





Retrospective USG reveals the duplicated dural sac and cord

DISCUSSION

- Diastematomyelia is a spinal dysraphism in which there is partial/complete sagittal clefting of one or more segments of the spinal cord, conus medullaris, and/or filum terminale dividing the spinal cord into two hemi cords which contains one central canal, one dorsal horn that gives origin to the ipsilateral segmental dorsal nerve root, and one ventral horn that gives origin to the ipsilateral segmental ventral nerve root. The involved segments may be contiguous or anatomically distant from each other.
- Depending upon the presence or absence of a fibrous partition or bony spur interposed between the hemi cords there are two types of Diastematomyelia.

1. type 1, the two hemi cords are located within individual dural tubes separated by an osseous, fibrous or cartilaginous septum.
2. type 2 having a single dural tube contains two hemi cords, sometimes with an intervening fibrous septum.

Discussion…

- symptoms and signs, ranging from cutaneous hairy patch and swelling at sacral region ,gait disturbance with mild atrophy or weakness of one or both lower extremities, absent deep tendon reflexes, progressive paraparesis, and bladder or bowel dysfunction.
- The diagnosis depends on presence or absence of bony spur and the associated features of spinal dysraphism such as spina bifida occulta, block vertebrae, widened interpediculate distance, hemivertebrae, and scoliosis which are commonly seen with type-I .

Discussion…

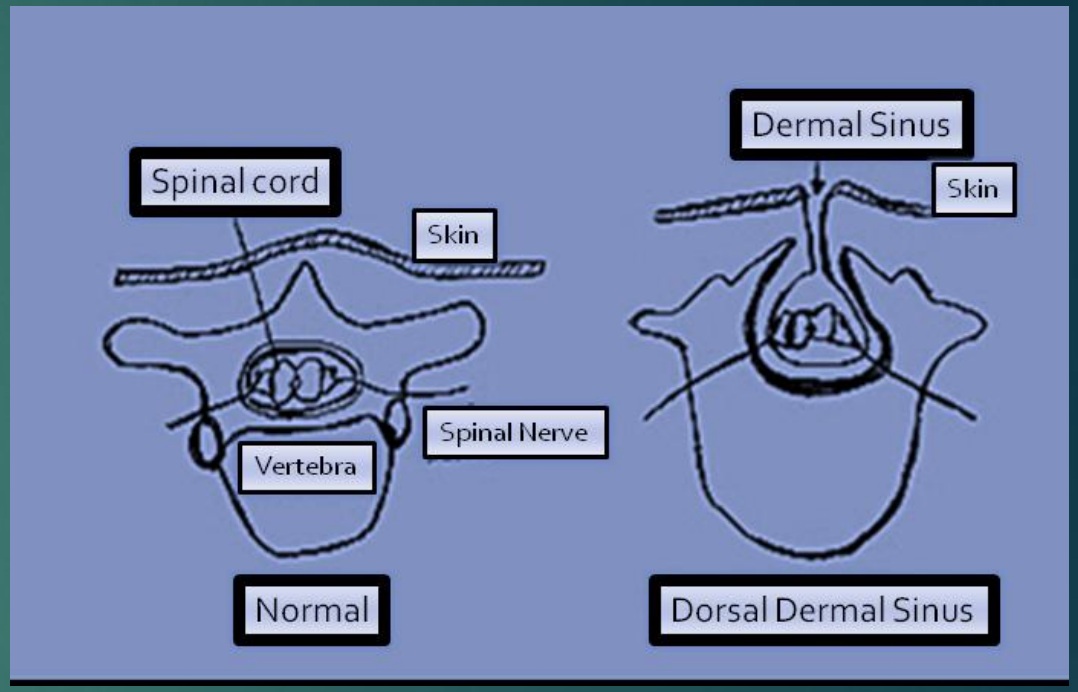
- The open forms of spinal dysraphism, such as meningocele and myelomeningocele, can be identified on obstetric sonography. The occult forms, such as intracanalicular lipoma and a tethered cord can be identified through sonographic screening of neonates and infants
- In late childhood and adults, plain radiographs of spine can give good details about abnormalities of spinal cord and vertebral bodies and bony spur. Computed tomography can demonstrate bony spur and its extent and relationship with vertebral bodies and vertebral anomalies more accurately. MRI with its better soft tissue contrast, allows visualization of extent of split in the cord and shows associated anomalies such as lipoma and syrinx. So accurate diagnosis can be made. T1WI is good for demonstrating lipomyelocele and filum terminale tethering. T2WI can show evidence of hydro syringomyelia.

Treatment

- Tethering of cord by bony spur should be relieved immediately after diagnosis, especially before growth spurt as most of patients are symptomatic during growth spurt, possibly due to traction by spur on spinal cord.
- Some studies prefer removal of spur when patient becomes symptomatic.

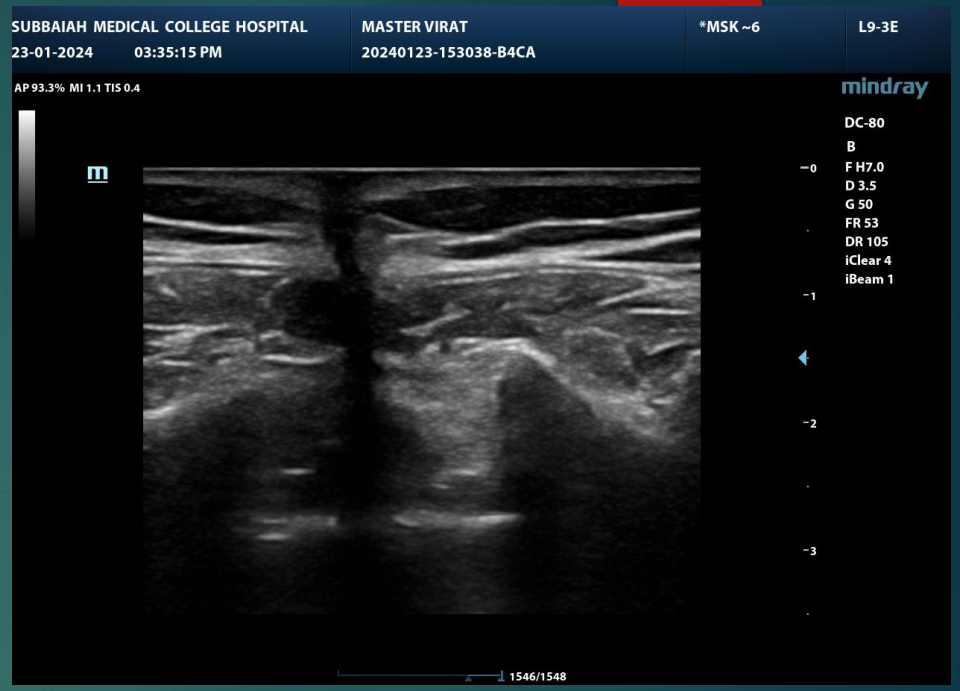
DORSAL DERMAL SINUS

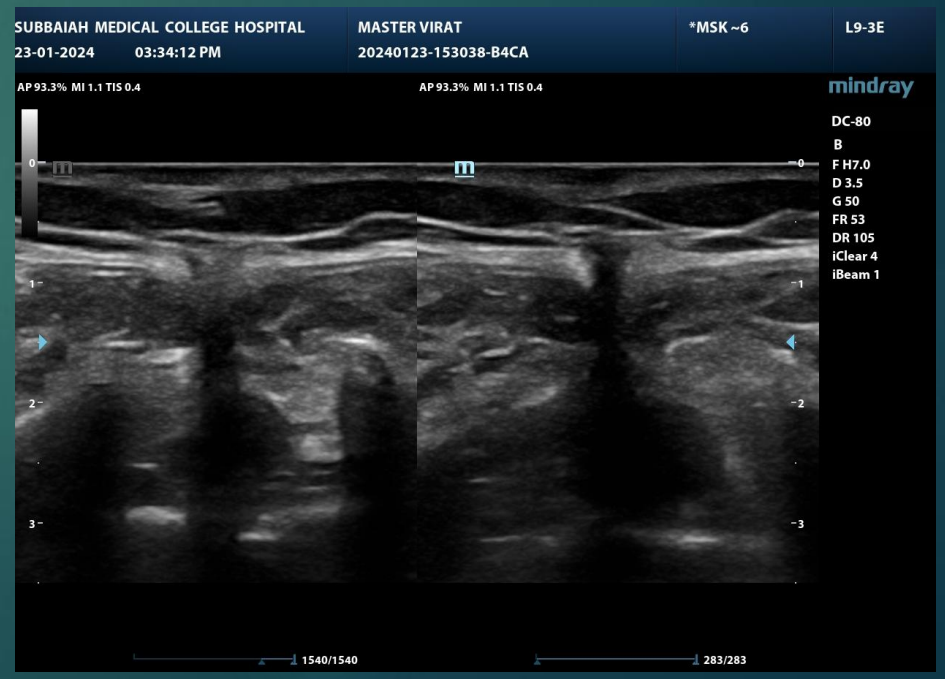
- Cutaneous stigmata over the spine above the level of the natal cleft are associated with a dorsal dermal sinus (DDS).
- DDS is associated with a range of abnormalities and its presence increases the risk of local and intra-spinal infection.



USG

- Hypoechoic sinus/track in the subcutaneous tissue in the lumbosacral region in midline communicating with spinal canal.
- MRI is the diagnostic imaging modality of choice for visualization





THANK YOU