AN UNUSUAL CASE OF PARAPLEGIA…..

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Presenting a case of an eight year old female child,1st child,of non consanguineous marriage, residing in Aundh, Pune.
Brought by parents with the complaints of:

- Weakness in both lower limbs since 20days
- Pain in the neck and back since 10 days
- Loss of control of bowel and bladder since 10 days
- Fever since 2 days

HISTORY OF PRESENT ILLNESS:

- **Weakness of lower limbs** was insidious in onset,first noticed when the child had experienced frequent slipping of her slippers and frequent falls.In a span of 3 to 4 days weakness progressed rapidly resulting in inability to stand or walk .No involvement of upper limbs.
- Pai**n in neck and back** : Shooting pain aggravated by movement of neck,non radiating,band of pain present over upper part of abdomen
- **Loss of control of bowel and bladder:**characterized by continous dribbling of urine even though she has no urge to urinate.
- **Fever** was low grade,continuous not associated with rash,chills or rigors.H/o Reduced appetite and weight loss of 2 to 3kg in past 2 months .

- No h/o headache,vomiting,convulsions,altered sensorium
- No h/o trauma
- No history s/o any cranial nerve involvement
- No h/o numbness or paresthesia in limbs
- No h/o any abnormal movements
- No H/O suggestive of temperature instability (hyper/hypothermia), Excessive or decreased sweating

PAST HISTORY:

No h/o similar illness in the past

No H/O tuberculosis

- BIRTH HISTORY:

FT/NVD/Birth weight-2.5kg/No h/o NICU admission/No perinatal complications.

- FAMILY HISTORY:

No h/o similar illness in family

No h/o Tuberculosis.

- DEVELOPMENT HISTORY: Achieved all milestones according to the age

- IMMUNIZATION HISTORY:Completely immunized upto the age

- NUTRITION HISTORY:

By 24 hr recall method, there is adequate intake of calories and protein

- CLINICAL EXAMINATION:

Conscious,well oriented to time ,place and person.

- VITALS: HR 98/min

  RR 22/min

  Temp:98.7degree F

  BP 100/58

  SPO2 98% ON room air

  Peripheral pulses well felt

Pallor present,
No clubbing,
No icterus
No cyanosis
No edema.

- Examination of lymph nodes:

Palpable at:

- Submental
- Submandibular
- Superficial cervical nodes

Hard in consistency,fixed measuring approximately 2cm .

- Rest of the lymph nodes were normal.

- Anthropometry:

Height 118cm

Weight 13kg

BMI 9.3

	-3SD	-2SD	-1SD	median
Weight for age:	16.3	18.6	21.4	25
Height for age:	109.2	115	120.8	126.6
BMI for age:	11.9	12.9	14.1	15.7

Indicates underweight.

CNS examination:

- Higher motor functions:
- Cognitive functions:

Level of consciousness: normal

Orientation: well oriented to time,place and person.

Attention and concentration :normal

Memory :normal

Intelligence :normal

- Mood and mental state: normal
- Speech and language: normal

- Cranial nerve function:
  - Olfactory nerve- smell normal
  - Optic nerve-vision normal,fundus normal
  - Occulomotor N–movements of eyes in all directions normal ,reflexes normal
  - Trochlear N – normal
  - Trigeminal N-sensations over face,muscles of mastigation and reflexes normal
  - Abducent N: normal

- Facial N: movement of muscles of facial expression normal,sensation over anterior 2/3rd of tongue normal
- Vestibulocochlear N:normal
- Glossopharyngeal N: normal
- Vagus N :normal
- Spinal accessory N: normal
- Hypoglossal nerve:normal

- **Motor system:**

Bulk of muscles:

Upper limbs(b/l) :normal and symmetrical

Lower limbs(b/l) : wasting present(distal more than proximal)

Tone:	R	L
Upper limbs:	N	N
Lower limbs:	hypotonic	hypotonic

Power :

Upper limbs :

- Shoulder - grade V
- Elbow - grade V
- Wrist - grade V
- Hand grip - Normal

- Lower limbs:
- Hip : Abduction & Adduction -Grade 11

  Flexion & Extension – Grade 11
- Knee : Flexion & Extension – Grade 11
- Ankle :- Grade 1

Reflexes:

- Deep tendon reflexes:

	R	L
Biceps-	++	++
Triceps	++	++
Supinator	++	++
Knee jerk	--	--
Ankle jerk	--	--

- Superficial reflexes:

  Abdominal reflex:absent

  Plantar reflex:no response

Sensory system

- Touch- Impaired in both lower limbs up to T7 level with a band of hyperesthesia around T6-T7
- Pain – normal
- Temperature – normal
- Vibration – normal in UL(B/L)

  Impaired in LL(B/L)
- Proprioception – normal in UL(B/L)

  Impaired in LL(B/L)
- Joint position sense-normal in UL(B/L)

  Impaired in LL(B/L)
- Cortical sensations-normal

- LHermitt’s sign present-it’s an electrical sensation that runs up & down the spine on flexing the neck

- Cerebellar signs: No cerebellar signs

- Examination of spine and cranium:
  - No spine tenderness or deformity
  - Size and shape of skull normal

- No signs of meningeal irritation.

- CARDIOVASCUAR SYSTEM:

S1,S2 heard,no audible murmur.

- RESPIRATORY SYSTEM:

Air entry bilaterally equal,no adventicious sounds heard

- PER ABDOMEN:

Soft,non tender,no organomegaly.

Case Summary

- 8 year old girl with normal development and with no prior significant illness presented with acute onset of paraplegia which progressed rapidly along with bowel and bladder involvement and fever
- Examination showed pallor, significant cervical lymphadenopathy
- Normal higher mental functions, no cranial nerve involvement
- Wasting, hypotonia, absent reflexes in lower limbs, impaired dorsal column sensations with band of hyperaesthesia at T6-T7 level
- Positive LHermitt's sign
- Normal spine examination

Clinical Diagnosis

- Functional Diagnosis – Paraplegia with motor and sensory involvement
- Anatomical Localization – Spinal cord – Extramedullary – Extradural/ Intradural lesion, Most probably T6-T7 spinal segment
- Etiological possibilities
  - Infectious – Spine Tuberculosis
  - Malignancy – metastasis
  - Vascular – Ischemia, Less likely

LAB EVALUATION:

Hemogram:

Hb 8.4

Tlc 8900 (n 71,l 20,m 9)

Plt 325000

LDH 764

PBS:Microcytic hypochromic with mild neutrophilic predominance with hypersegmented neutrophils

LFT’S:

S.Bilirubin T 0.28,

D 0.14

I 0.14

SGPT 8,

SGOT 21,

S.Protein 7.68,

S.alb 4.19

S.Glob 3.49

A:G 1.20

- RFT’S:

S.Creat 04,S.Urea 19,s.uric acid 2.6

S.Na 134

S.Potassium 3.7

S.Cl 98

Sr calcium 8.6

- URINE ANALYSIS:Urine routine and culture normal
  Negative for urinary catecholamines.
- HIV – negative
- CRP- Negative
- PT with INR-normal

- CSF analysis:gross:2-3 ml

Colourless,clear,no clot,coagulum,cobweb seen.

Microscopy:total no of nucleated cells:zero

Culture/sensitivity: no growth

RADIOLOGICAL INVESTIGATIONS

- X RAY SKULL and X RAY chest are normal

- **Ultrasonography of abdomen and pelvis:**

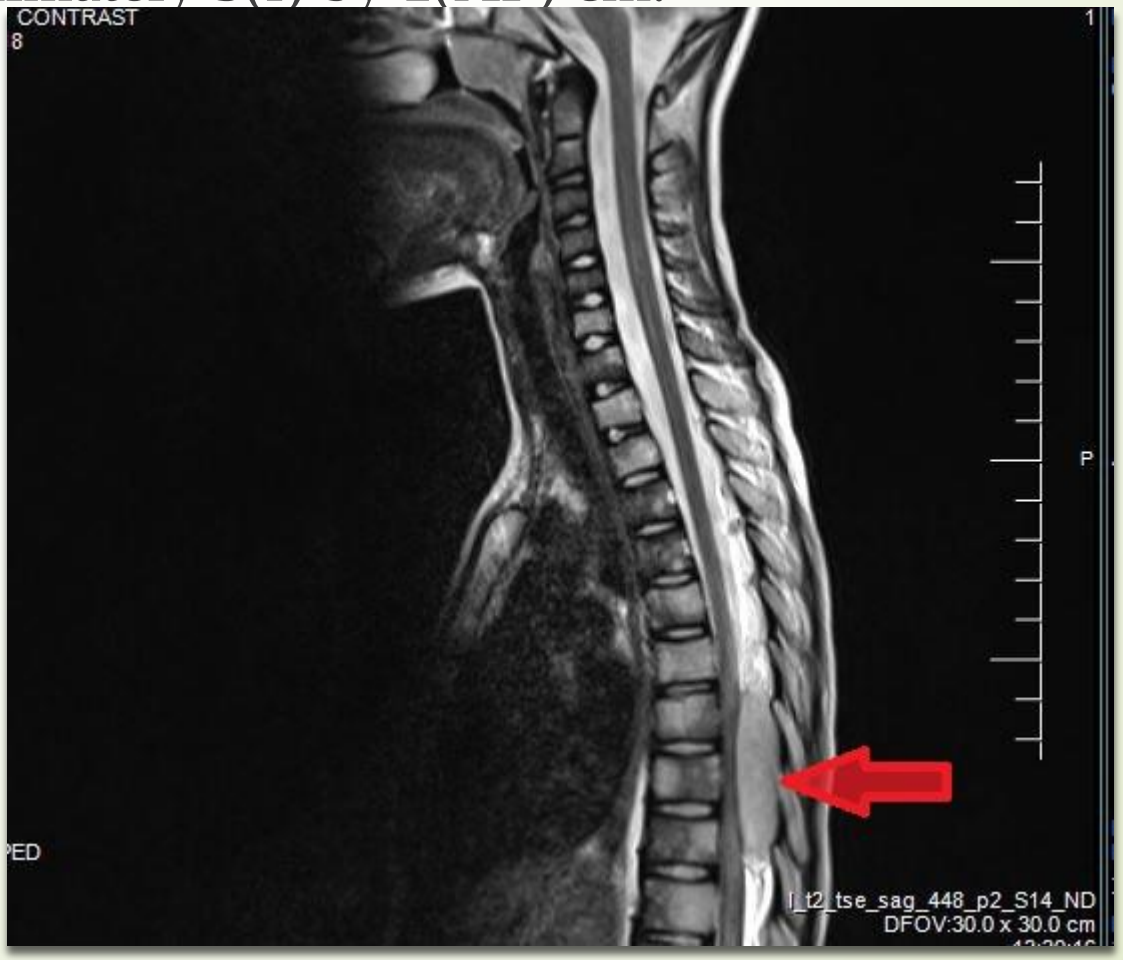
s/o Minimal ascites with small mesenteric lymph nodes of size 1cm

- **MRI dorsolumbar spine with whole spine screening(plain plus contrast):**

s/o A well defined extradural homogenously enhancing soft tissue mass lesion is noted posterior to spinal cord at D7 to D9 level causing extradural compression and anterior displacement of adjoining spinal cord.It measures approximately 5(l) by 1(AP) cm.

- **SPINAL T2W SAGGITAL**

DORSAL LESION



Another extradural soft tissue intensity lesion measuring approximately 1.2 by 0.4 cm is noted in the sacral spinal canal at s2-s3 level with

Altered marrow signal in all

the dorsal,lumbar,vertebrae,sacrum and

iliac bones showing heterogenous post

Contrast enhancement.

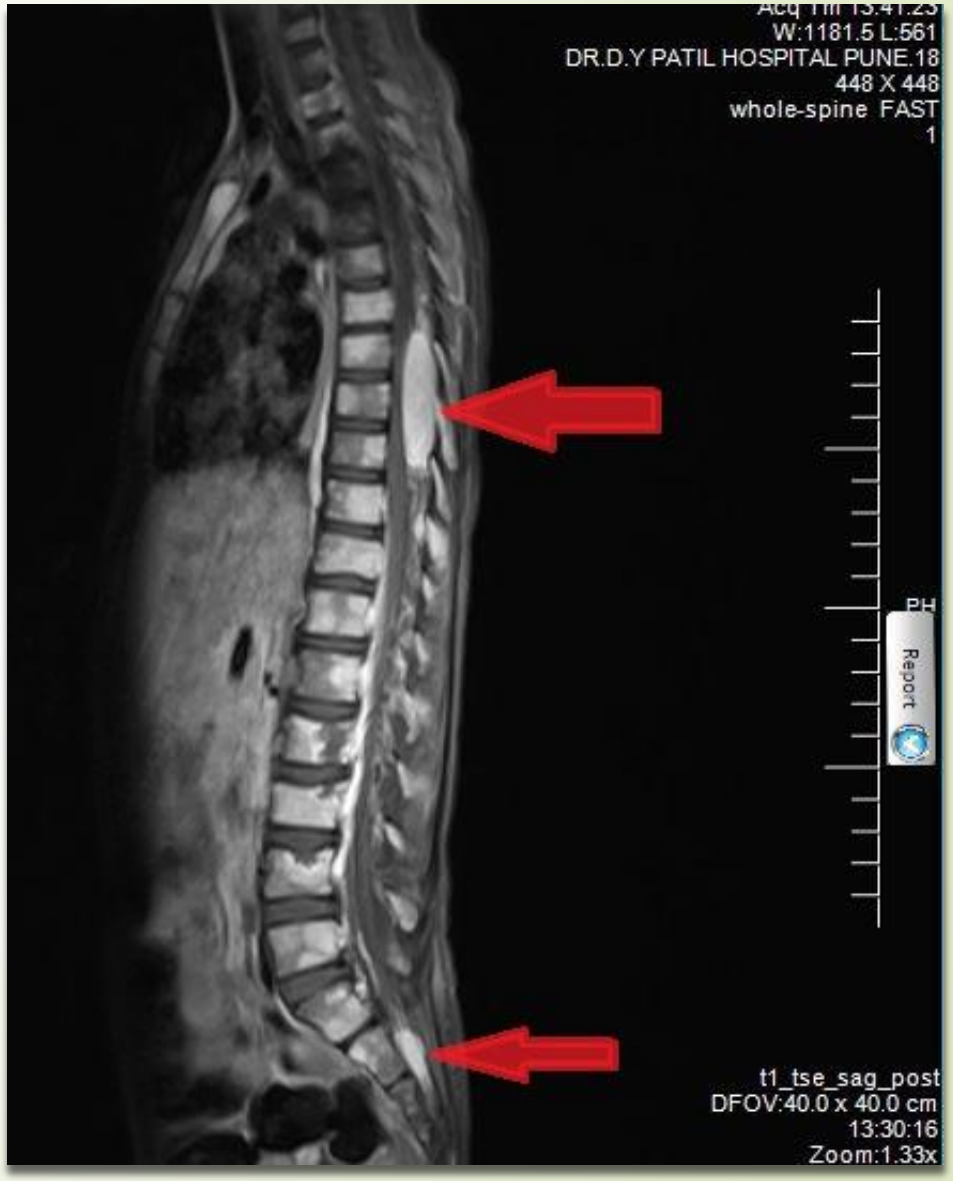
Findings s/o:

- Lymphoma
- Metastasis
- WHOLE SPINE SCREENING SHOWED:

Straigtening of cervical spine.craniovertebral

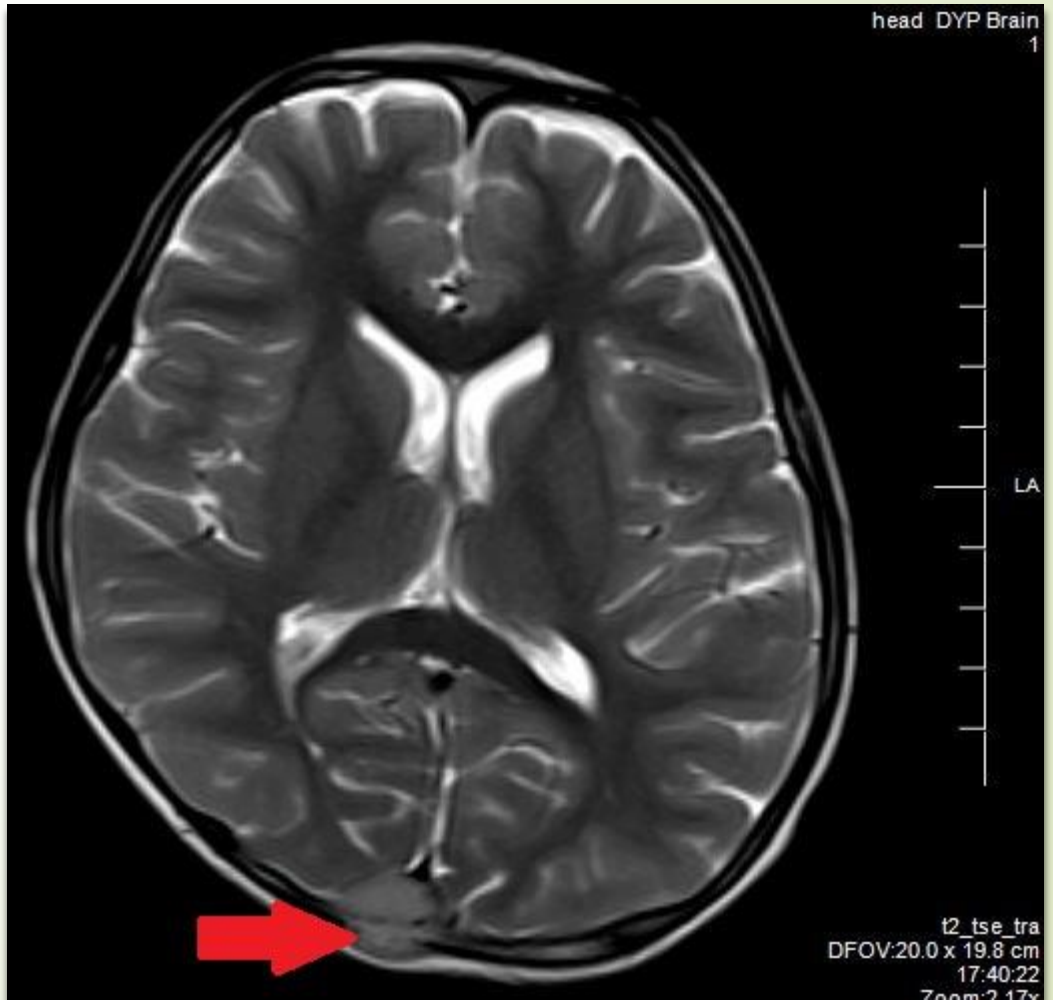
junction appears normal

- **SPINAL T1 SAGGITAL-DORSAL PLUS SACRAL**

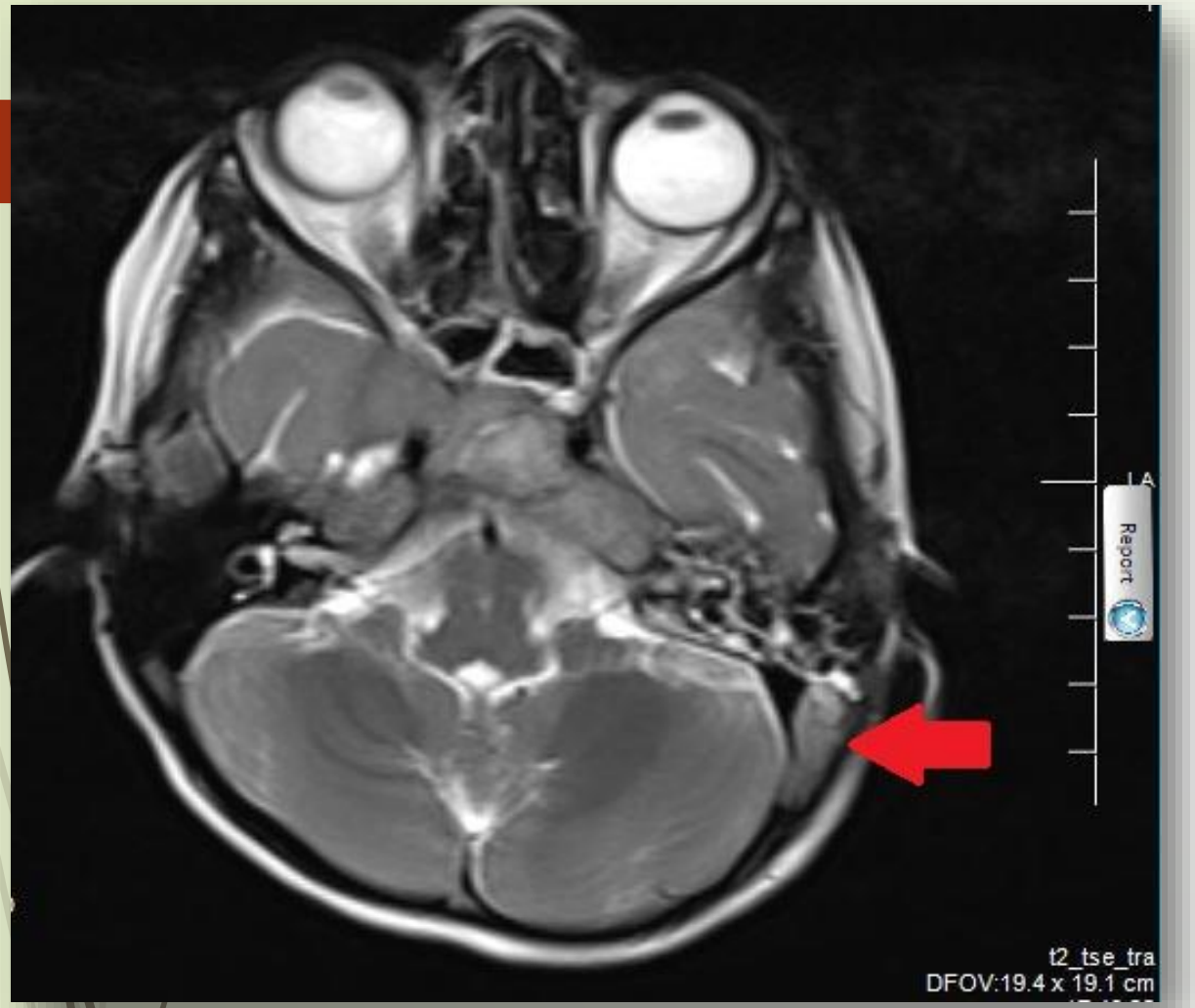


MRI Brain(plain plus contrast)

Destruction of outer and inner tables of cranial vault with involvement of diploic space with associated extradural soft tissue component is noted in occipital bone on right side of the midline causing extrinsic compression on adjoining posterior vertical portion of superior saggital sinus.Soft tissue component measuring 2*1.5cm,Extradural Component measures 1.6*0.7cm, Sub galeal soft tissue component measuring 1.6*0.5cm



- **AXIAL T2 W:LEION ON THE RIGHT SIDE OF OCCIPITAL BONE**

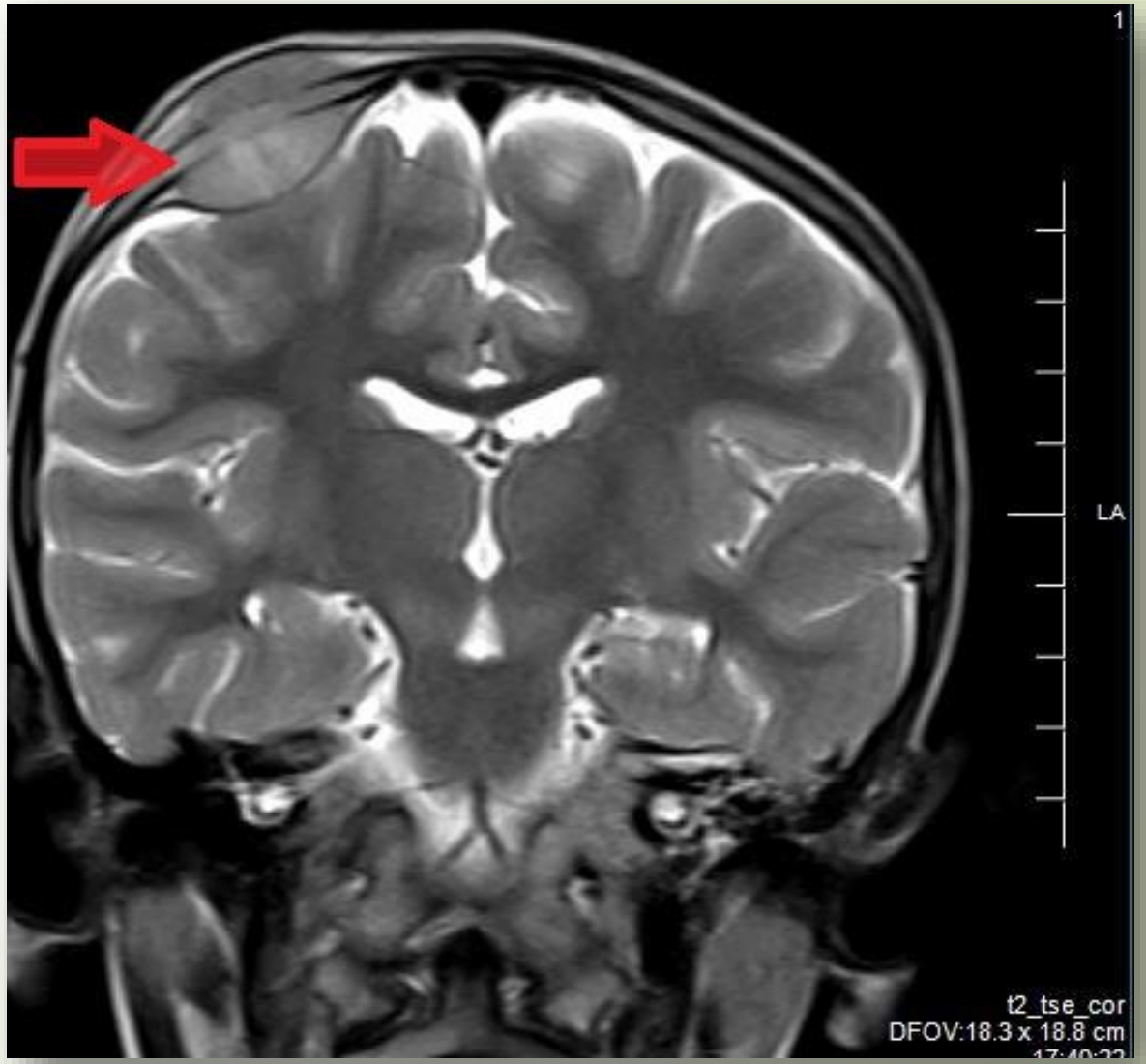


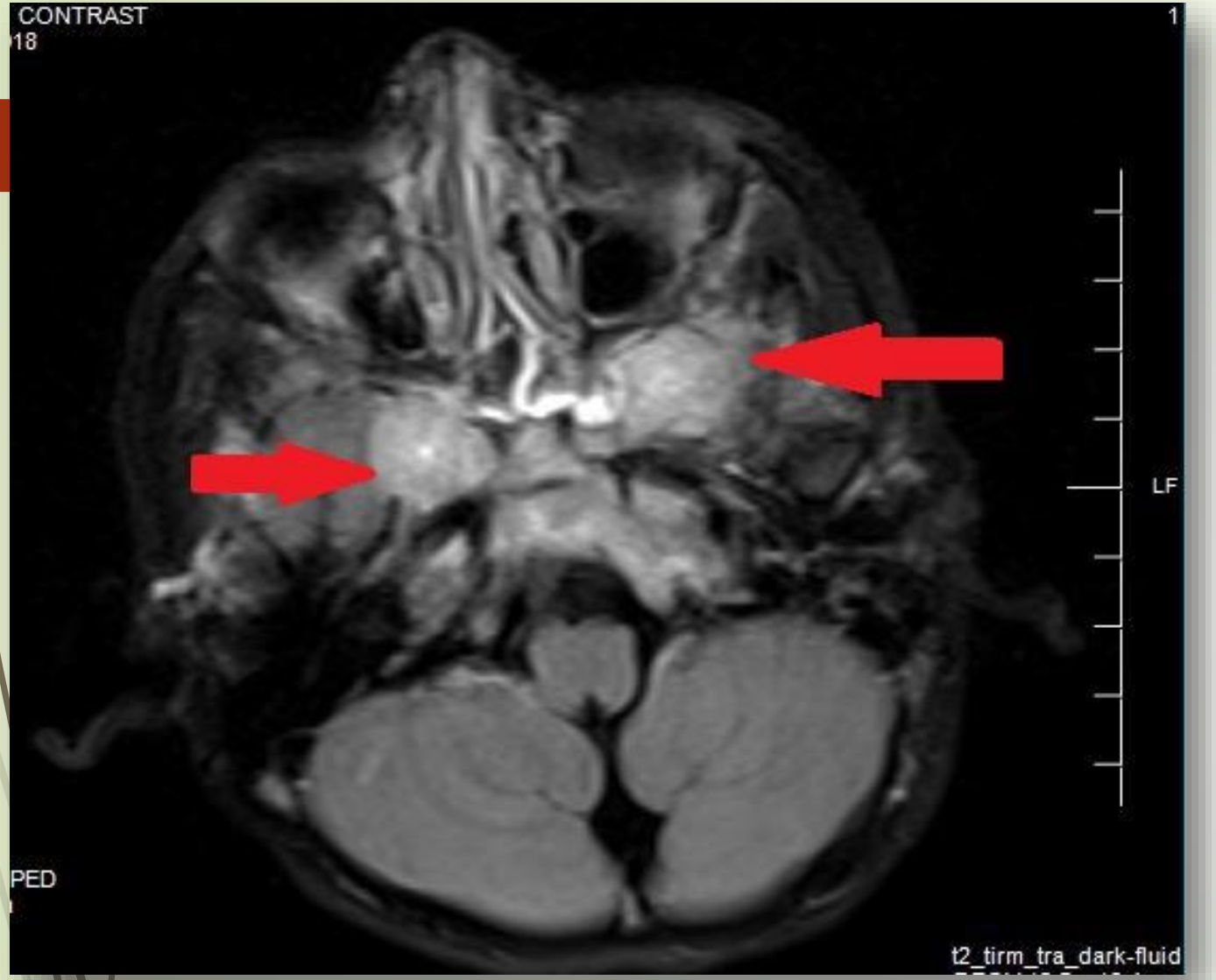
AXIAL T2W : ON LEFT SIDE OF OCCIPITAL BONE BEHIND LEFT MASTOID

- Similar lesion is noted in occipital bone on left side just behind left mastoid with associated soft tissue component measuring approximately 1.2*0.6cm

CONTRAST CORONAL-FLAIR:LESION ON RIGHT PAREITAL BONE MEASURING 3.4 BY 2.5BY3.2cm

- Similar lesion is noted on the Right parietal bone with associated soft tissue component measures approximately 1.6*0.5cm.





Similar lesion is noted on basispenoid bone and floor of middle cranial fossa on either side with the right paracellar soft tissue component measuring approx. 1.8*1.7cm and left paracellar soft tissue component measuring 1.9*1.5cm

CONTRAST AXIAL FLAIR: LESIONS IN THE FLOOR OF MIDDLE CRANIAL FOSSA ON EITHER SIDE WITH THE RIGHT PARASELLAR SOFT TISSUE COMPONENT MEASURING 1.8 BY 1.7cm AND LEFT PARACELLAR SOFT TISSUE 1.9 BY 1.5cm .

- Impression:

Multiple bone lesions involving occipital bone on the right side of midline,occipital lobe on the left side behind left mastoid,right parietal bone,basisphenoid and floor of middle cranial fossa on either side with associated extradural soft tissue component.

Following possibilities to be considered in differential diagnosis:

- Lymphoma
- Neuroblastoma
- Histiocytosis
- Metastases

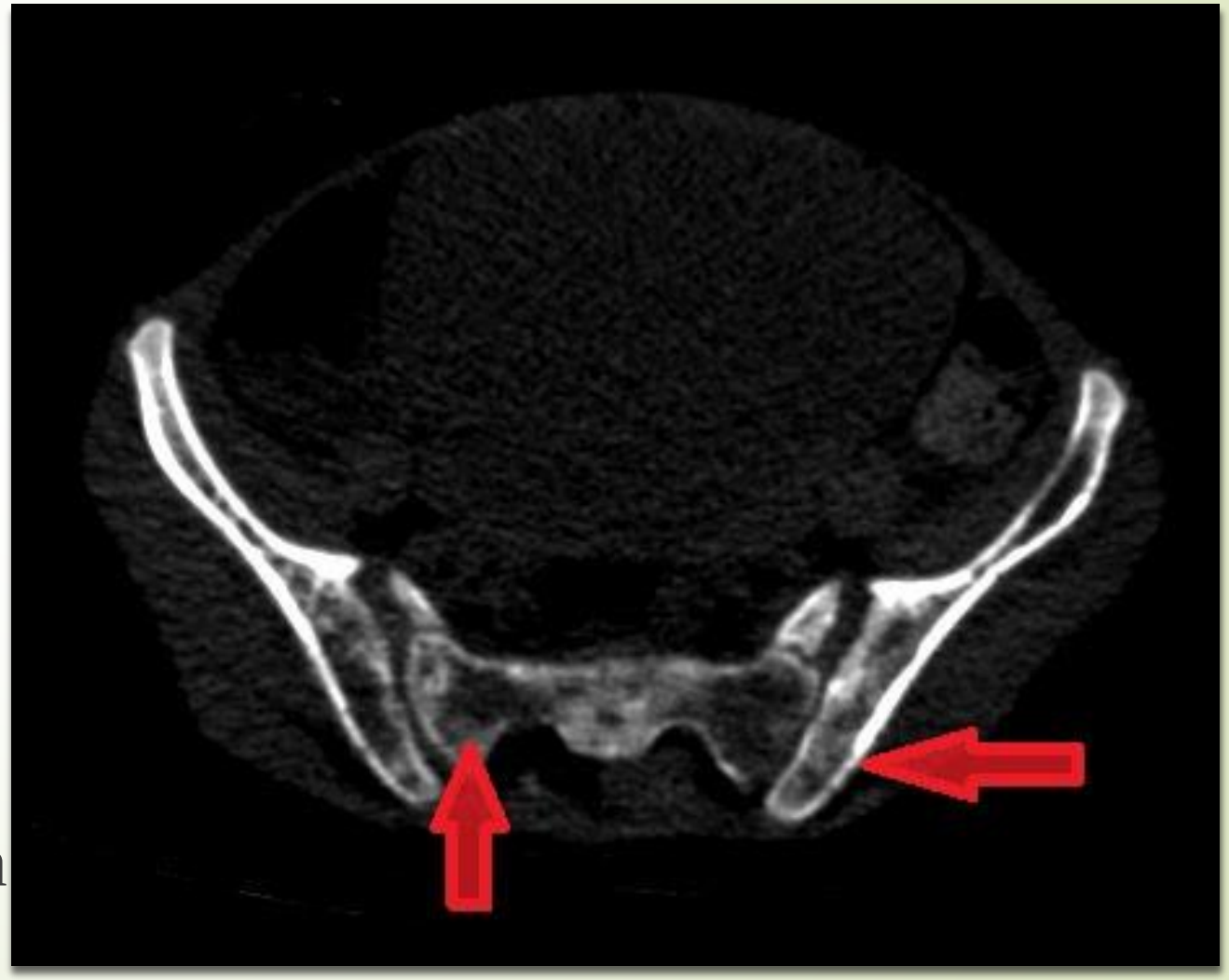
- CT ABDOMEN& PELVIS(PLAIN PLUS CONTRAST)

Multiple vertebrae,b/l iliac bones,sacrum and b/l femoral neck shows lytic lesions with sclerotic margins.pedicles of some vertebrae appear normal.

- Anterior extradural hypodense

SOL is seen in the **thoracic spinal** canal in mid and lower thoracic region.this is compressing the spinal cord.

- Left sided posterior extradural soft tissue density mass is seen in **sacral spinal** canal.adjacent portion of sacral bone is destroyed.



- Liver ,GB,Pancreas looks normal.

- B/l kidneys,adrenals,stomach,visualized bowel is unremarkable

- HRCT(CHEST)
  - Enlarged mediastinal or hilar lymphnodes.
  - There is no pleural effusion or pneumothorax

Histopathological examination of bone marrow :

Findings s/o malignancy

- **Bone marrow aspiration:**
- Marrow smears are cellular, and show a **predominance of large atypical mononuclear cells with blastic** morphology.
- These cells have **high N:C ratio**,round to oval nuclei with 1 to 2 nucleoli and **scanty blue cytoplasm**.
- Few myeloid and occasional erythroid precursors are seen.
- Megakaryotes not seen.no malarial parasite seen

- **Trephine biopsy**:
- Sections of trephine biopsy show fibrotic marrow separated by osseous trabeculae.
- Few foci of normal hemopoesis are seen.
- Focal areas show sheets and nests of cells **with hyperchromatic nuclei and scanty cytoplasm-consistent with involvement by a malignant round cell tumor**.
- No marked granulomas seen.There is a marked increase in the stromal fibrosis

- **Immunohistochemistry :Tumor cells are MIC -2 positive,and LCA,CD 34,TdT,CD 10,desmin,synaptophysin,CD 56 negative**

- Final diagnosis:

Bone marrow aspirate and trephine biopsy :

Bone marrow is involved by a malignant small round cell tumor-consistent with metastatic Primitive Neuroectodermal tumor

PET –CT(16 slice)

Physiological distribution of tracer is noted in brain,tonsils,vocal cords,heart,liver,kidney ,bladder and gut

Head:

- Ventricles and csf spaces are unremarkable.no mass effect or midline shift is noted.
- There is no abnormal enhancement and normal distribution of metabolic activity is noted intracranially.

Neck :

- Nasopharynx,oropharynx and hypopharynx are unremarkable.soft tissues are unremarkable.

- Multiple small low grade FDG avid **bilateral cervical nodes** are noted involving 1b,2a,2b,3 and 5 region larger one on **right level 3** measuring approximately 13 by 10 SUV 2.13

Thorax:

- Heart and mediastinal structures are unremarkable.
- There is no pleural or pericardial effusion.
- Well defined non **FDG avid nodule noted in right lower lobe posterior aspect of superior segment** measuring approx. 4mm

Small bilateral axillary and deep pectoral nodes with insignificant FDG uptake are noted ,larger one on left side measuring approx. 8 by 4 mmSUV 1.2

Primary origin of the tumor is not detected yet ,since the child presented in disseminated form of malignancy.

However, a follow up Bone marrow study and PET CT will help detect the primary tumor.

SUMMARY

8 year old female child with acute onset of paraplegia,involving bowel and bladder.Clinical examination S/O lesion at T6-T7 level .Radiological investigations (MRI brain,MRI spine,CT abdomen,pelvis) s/o compressive myelopathy with extradural lesion and multiple bony lesions involving occipital and parietal bones and dorsal and sacral vertebrae.Bone marrow study along with immunohistochemistry s/o **Metastatic peripheral Primitive Neuro ectodermal tumour**

FINAL DIAGNOSIS:

Metastatic Peripheral Primitive Neuroectoderm Tumor

- TREATMENT:
  - Treated with supportive measures – Analgesics, care of spine, limb physiotherapy
  - The child has been referred to higher centre for further management(chemotherapy/radiotherapy)

DISCUSSION:

Primitive neuroectodermal tumors (PNETs) are a group of highly malignant tumors composed of small round cells of neuroectodermal origin that affect soft tissue and bone.

- Batsakis et al (1996) divided the primitive neuroectodermal tumor (PNET) family of tumors into the following 3 groups based on the tissue of origin: [1]
- CNS primitive neuroectodermal tumors (PNETs) - Tumors derived from the central nervous system
- Neuroblastoma - Tumors derived from the autonomic nervous system
- Peripheral primitive neuroectodermal tumors (pPNETs) - Tumors derived from tissues outside the central and ANS.

- The following tumors are classified as peripheral primitive neuroectodermal tumors (pPNETs):
- Ewing sarcoma (osseus and extraosseous) [3]
- Malignant peripheral primitive neuroectodermal tumors (pPNETs) or peripheral neuroepithelioma of bone and soft tissues
- Askin tumor (peripheral neuroepithelioma of the thoracopulmonary region)
- Other less common tumors (eg, neuroectodermal tumor, ectomesenchymoma, peripheral medulloepithelioma)

- Epidemiology:

Peripheral primitive neuroectodermal tumors (pPNETs) are exceedingly rare, the annual incidence from birth to age 20 years is 2.9 per million population.

- Etiology :

Based on molecular cytogenetic analysis, both EFTs and peripheral primitive neuroectodermal tumors (pPNETs) are known to share the same reciprocal translocations, most commonly between chromosomes 11 and 22.

- Clinical features:
- Most peripheral primitive neuroectodermal tumors (pPNETs) manifest in the thoracopulmonary region (Askin tumor), pelvis, abdomen, and extremities.
- Clinical symptoms depend on the

i. site of presentation - include pain and swelling of the surrounding structures due to mass effect.

ii. individual cranial neuropathies,

iii. exophthalmos, epistaxis, nasal obstruction, anosmia.

iv. neck masses, and headache

- Differential diagnosis :

Other small, poorly differentiated, round cell tumors include

i. Peripheral primitive neuroectodermal tumors (pPNETs) /Ewing family of tumors (EFTs)
ii. Malignant lymphoma
iii. Rhabdomyosarcoma,
iv. Neuroblastoma

- Pathologic features:

- On light microscopy:

Peripheral (PNETs) appear as a monotonous collection of small, round, darkly stained cells

- Electron microscopy:

(pPNETs) reveals neurosecretory granules with microtubules and microfilaments. In addition, short dendritic processes lie between cells in contrast to Ewing sarcoma, in which the dendritic processes are absent.

- Immunohistochemistry :

The expression of the *MIC2* gene produces an antigen, MIC2, which consistently identifies both Ewing sarcoma and peripheral primitive neuroectodermal tumors (pPNETs).

In contrast, CNS PNETs and neuroblastomas uniformly lack the expression of the *MIC2*.

(pPNETs) typically coexpress CD99 (the glycoprotein *MIC2*) and vimentin. Other nonspecific markers include S-100, neuron-specific enolase, CD75, and synaptophysin.

- Diagnosis:

- Tissue biopsy with **cytogenetic and immunohistochemical studies** is paramount in diagnosing peripheral primitive neuroectodermal tumors (pPNETs).
- Radiologic studies such as **computed tomography (CT) scanning and magnetic resonance imaging (MRI)** are essential in determining the limits of tumor involvement and ruling out metastatic disease.
- On CT scans, peripheral primitive neuroectodermal tumors (pPNETs) appear **as heterogeneous/homogenous masses**, often invading surrounding tissues, including bone.
- A study by Ba et al found the masses to be hypodense on CT scans, with osteolytic destruction revealed when the tumors originated in bone.

- Prognosis :

The significant prognostic factors of peripheral primitive neuroectodermal tumors (pPNETs) include site, tumor volume, and the presence of metastasis.

MANAGEMENT

Current recommendations advocate

- Complete surgical resection whenever possible
- Adjuvant chemotherapy
- Radiotherapy

THANK YOU