Malignant Spinal Cord Compression

- Most common location of bone mets → Spine
- " " " " Spine " → Thoracic spine

Of patients who develop MSCC, most common cancers

1) Lung (25%)
2) Prostate (16%)
3) MM (11%)
4) Breast (7%)

Highest cancer specific incidence → MM (15%)
Lymphoma (14%)
Prostate (6%).

Causes in Pediatric → Lymphoma
Ewing
Neuroblastoma
Primary vertebral OS.

- Mostly the invasion is from ant aspect, from vertebral body due to hematogenous mets.
- 2° Mechanism → Vertebral #
- Leptomeningeal spread can occur to epidural space
- Intradural tumors like meningioma can also cause it

Clinical

(1) Pain → Most common feature

- Biologic → Due to destruction of vertebrae & Post. longitudinal ligament → Night & morning Pain present while lying down
- Mechanical → Spinal instability → Movement related
- Radicular → Nerve compression → Radiating Pain along nerve distribution
- Funicular → Irritation of long tracts → constant dull aching Pain (Respective of posture)

- Usually it exists ~ 8 weeks prior to Dx of MSCC.
- Starts with bony vertebrae, and progresses rapidly once epidural venous plexus is infiltrated.
- ★ If Pain disappears without treatment, it indicates ADVANCED destruction of nerve roots causing permanent sensory damage.
- Usually pain is worse at night due to diurnal release of endogenous steroids.

Page
Date

② Motor → Motor deficit, as weakness & Spasticity is the earliest sign

- Early symptoms – leg heaviness & difficulty in climbing stairs

- Most of have paraperesis as level of compression is at thoracic spine.

- If higher, it can lead to quadriparesis, resp. failure.

- If extends to lumbar spine, it can cause conus medullaris syndrome – distal LL weakness
– Saddle paresthesia
– Bladder / Bowel overflow.

- Horner syndrome (PAMELA) suggests transforaminal progression at cervicothoracic junction & invasion of stellate ganglion.

③ Sensory → Sensory loss is usually ascending in nature

- It is typically at 1-5 levels below actual level of cord damage

- Lhermitte Phenomenon can be seen in cervical spine mets.

Bladder & Bowel retention are rarely the sole features & occur late EXCEPT
- Compression at level of conus
- Sacral nerves.

Diagnosis - Ix of choice → MRI

- Sagittal T1 or STIR sequences of entire spine for screening
Sagittal T2 weighted sequences done to look for cord compression & lesion within cord itself

- Sensitivity of MRI - 93 - 100%.
Specificity → 97 - 100%.

- Whole spine screening should be done to look for assessing other sites as well.

MRI based Score → ~~Bilsky~~ MSCC score

0 → Bone only disease

1 → Epidural extension without contact with spinal cord or just spinal cord abutment but no displacement

1a → Epidural tumour without thecal sac compression

1b → Thecal sac compression but no cord contact

1c → Thecal sac compression & cord contact

2 → Displaces or compresses Spinal cord without circumferential tumor extension or obliteration of CSF space
(hence, CSF visible around cord)

3 → Cord compression with CSF obliteration.

Grade 2, 3 → High grade.

CT myelography → Done in patients who cannot undergo MRI.

Other use of Myelography →
- In patients with indwelling spinal orthopedic hardware
- In pts undergoing treatment Planning for radiosurgery or RT.

Management

- If there is no histological evidence of malignancy DO NOT start steroid before taking biopsy.
- Steroids → Once biopsy taken, start patient on steroids.
  Vecht CJ et al study → low dose dexa (10 mg) is as effective as high dose (100 mg)
  Dose → 10 mg IV f/b 16 mg orally in divided doses

Page
Date

* Multiple prognostic scores to estimate prognosis

1) Tokuhashi score & Revised Tokuhashi score
   - General condition
   - Number of extraspinal foci
   - Number of mets in vertebral body
   - Mets to internal organs (Resectable or not)
   - Primary site
   - Palsy (Acc to Frankel A, B, C, D)

   Highest Score → 15

2) Tomita score

3) Modified Bauer score → Most favoured score

   (A) Score Calculation

Points	Positive Prognostic factors
1	No visceral mets
1	No lung cancer
1	Primary site - Breast, Kidney, lymphoma (B)(L) or myeloma
1	Solitary met

   (B) Score interpretation
   - 0 ← 1 → Supportive care, no surgery
   - 2 → Short term palliation, Dorsal surgery
   - 3-4 → Middle-term control, ventrodorsal surgery

4) Oswestry Spinal Risk index

5) Spinal instability Neoplastic score (SINS)

(1) Spine location
(2) Pain relief with recumbence or pain with movement
(3) Bone lesion quality (lytic / mixed / blastic)
(4) Radiographic Spinal alignment
(5) Vertebral body collapse (>/< 50%)
(6) Posterolateral involvement of ~~vertebra~~ Spinal elements

Score
0–6 - Spine stable
7–12 - Indeterminate - Warrant Surgical consulta
13–18 - Instability - surgery.

* SC, basically, in patient with Poor life expectancy, treatment should be along lines of best supportive care or Palliative RT

If life expectancy >2 months, then same definitive management can be planned

Date

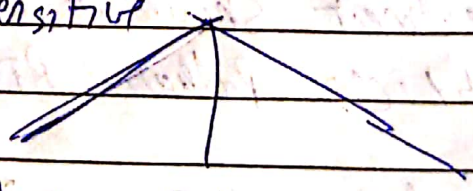
MANOP Algorithm

(1) Mechanical → If spine is unstable → fix it.
Primary RT SHOULD NOT be given upfront

(2) Neurologic → Grade 0 – no intervention
Grade 1-3 – Intervention needed based on histology & radiosensitivity.

Pt i acute decompensation < 72hrs will benefit more from decompression.

(3) Oncologic → Whether tumor is radioresistant or radiosensitive



Sensitive	Intermediate	Resistant
- Lymphoma	- Breast	- RCC
- MM	- Prostate	- Melanoma
- Germinoma	- HPV + SCC	- Sarcoma
↓	↓	↓
Only EBRT (Low dose EBRT can also work)	EBRT or Surg f/b EBRT/SBRT	Surg → SBRT

(4) Preferred treatment

(1) Surgery – Role of surgery is in
→ Decompression
→ obtaining biopsy
→ Removal of epidural disease to allow SBRT
⇒ Local control when RT can't be given.

- The best outcomes are shown with circumferential decompression.
Most versatile approach is transpedicular which allows for 360° decompression in all parts of cervical spine.

(2) EBRT – Most common dose – 8 Gy 1#
- 20 Gy 5#
30 Gy 10#

SCORE 1 study → Multifraction EBRT (30-40 Gy) improves 1 yr local control

But in pt's very poor P.S., there is no benefit of local control.

SCORE 2 study → 30 Gy/10# Vs 20 Gy/5# in pt's of poor P.S. Non inferiority trial.

Further trial w/t on SCORE 2 compared 20 Gy/5# with 8 Gy 1#. No significant difference.

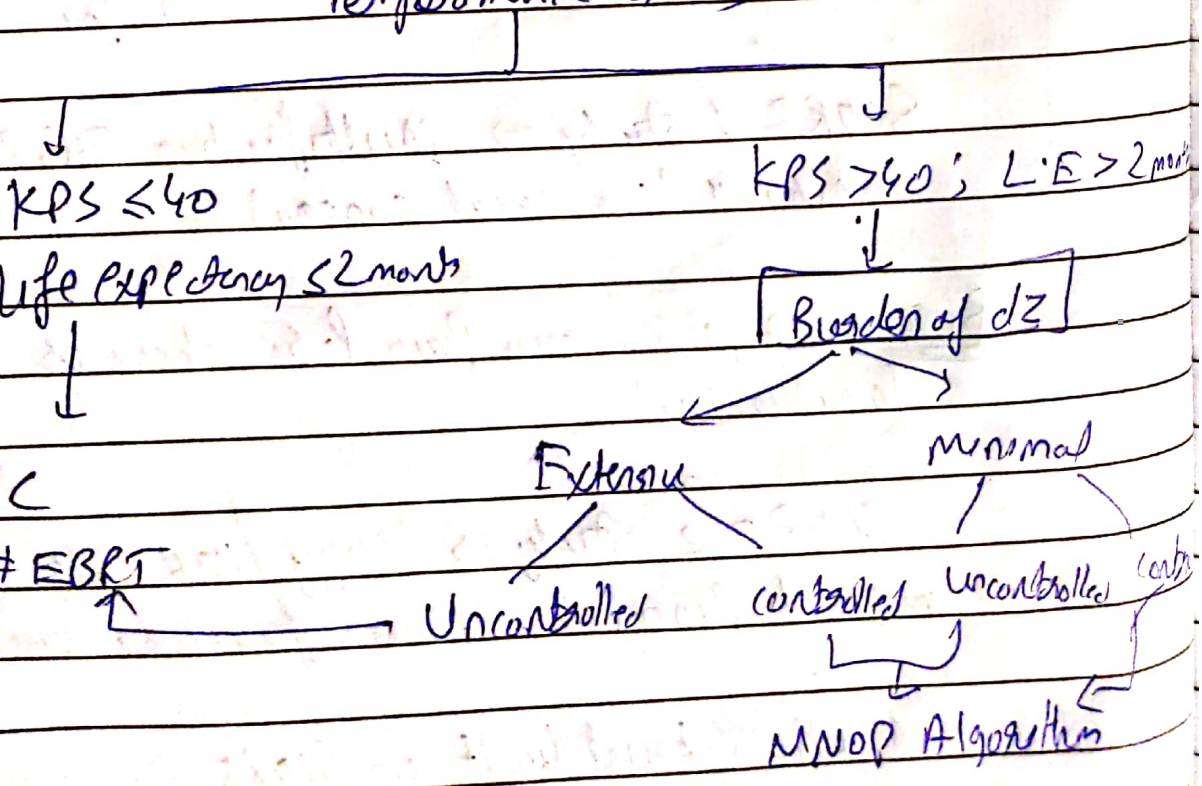
3) SBRT → Stereotactic Body RT.
Delivering high dose to tumor while sparing adjacent tissues.

Much more local control, even for radioresistant tumors.

Very little role left for it, as it can only be given in grade 0.
It needs 1-3 mm space between cord & tumor.

However, it can be given in an adjuvant setting

4) Other therapies - Chemo for NMZL
- Targeted therapies
- Radionuclide - Ra 223 dichloride for painful bone mets



M

N

O

P

Unstable → Stable

Stabilize Surgically

+/- of neuroology

- Histology of radioresponsive regs

Favorable | Intermediate | Poor

EBRT

EBRT or $S_x \rightarrow$ EBRT / SBRT

$S_x \rightarrow$ SBRT