Management in METASTATIC CORD COMPRESSION

Janista Wongratanacheewin
MSK oncoloy, Department of orthopaedics, Faculty of Medicine
Khon Kaen University

GUIDELINE MANAGEMENT IN MSCC

National Comprehensive Cancer Network®

NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®)

Central Nervous System Cancers

Version 1.2023 — March 24, 2023

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NCCN Guidelines for Patients® available at www.nccn.org/patients

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CLINICAL PRESENTATION

- Breast, Lung, Prostate, Renal, Thyroid and Colorectal primary cancer
- 95% Extradural, mostly thoracic region
- **Pain**
  - Local pain: Tumor growth
    - Steroid and Medication
  - Mechanical pain: Spinal instability (SINS ≥13)
    - Surgical stabilization
  - Radicular pain: nerve root are compressed
    - Surgical decompression

Spinal neoplastic instability score (SINS)

Element of SINS	SCORE
Location	
Junctional (occiput-C2, C7-T2, T11-L1, L5-S1)	3
Mobile spine (C3-C6, L2-L4)	2
Semi-rigid (T3-T10)	1
Rigid (S2-S5)	0
Pain relief with recumbency and/or pain with movement/loading of the spine	
Yes	3
No (occasional pain but not mechanical)	1
Pain free lesion	0
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
De novo deformity (kyphosis/scoliosis)	2
Normal alignment	0
Vertebral body collapse	
> 50% collapse	3
< 50% collapse	2
No collapse with > 50% body involved	1
None of the above	0
Posterolateral involvement of the spinal elements (facet, pedicle of CV joint fracture or replacement with tumor)	
Bilateral	3
Unilateral	1
None of the above	0

MANAGEMENT

- **GOAL**: Palliation and improvement of QoL
  - Preservation of neurologic function
  - Pain relief
  - Stabilization of mechanical structure
- Patients should life expectancy > 3 mo.
- Paraplegia over 24 hr. >> low chance of improvement (Excluded hematologic malignancy)
- Surgery followed by **Adjuvant EBRT**
- Corticosteroid
  - Routine initial prescription in pts with cord compression
  - High dose (96 mg daily) and Low dose (10-16 mg daily) is unclear

CORTICOSTEROID IN MSCC

CORTICOSTEROID in MSCC

Mechanism of action

- Decrease **tissue edema and inflammation** at site of cord compression
  - Dose-dependent manner on the reduction of capillary permeability to small molecule
  - Decrease water content
- Steroid-induced hyperglycemia
  - Increase osmotic gradient across the blood-spinal cord barrier

Review Article

AOSPINE

Global Spine Journal
2017, Vol. 7(3) 272-279

DOI: 10.1177/2192568217699189
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Corticosteroid Treatment for Metastatic Spinal Cord Compression: A Review

Gordon D. Skeoch, BA[1], Matthew K. Tobin, BS[1], Sajeel Khan, MD[1], Andreas A. Linninger, PhD[1], and Ankit I. Mehta, MD[1]

- Narrative review 7 articles
- 2017 (1977-2015)
- Dexamethasone treatment in MSCC
- Clinical outcome and Adverse event

Table 2. Dexamethasone Effects on MSCC, Dose-Dependent Outcomes, and Systemic Side Effects in Clinical Studies

Study	Group I	Group II	Effect of Dexamethasone on MSCC	Effect of Dexamethasone Dose	Systemic Side Effects
Greenberg et al[11]	100 mg initial IV dexamethasone, followed by 3 days of 24 mg orally 4×/day, then tapered to zero at day 14		• 57% of patients ambulatory following treatment, 28% of whom were nonambulatory before treatment onset • No regain of ambulatory abilities in patients who were completely paraplegic pretreatment onset • Significant pain relief		• Nonfatal ruptured duodenal ulcer on day 4 of treatment in one patient

1

- 1980
- 83 pts
- Dexamethasone with concurrent RT
- In 57% of ambulatory, 28% were non ambulatory pts.
- Inconclusive due to RT
- No controlled group

Table 2. Dexamethasone Effects on MSCC, Dose-Dependent Outcomes, and Systemic Side Effects in Clinical Studies

Study	Group I	Group II	Effect of Dexamethasone on MSCC	Effect of Dexamethasone Dose	Systemic Side Effects
Vecht et al[12]	10 mg initial IV dexamethasone, followed by 16 mg daily orally	100 mg initial IV dexamethasone, followed by 16 mg daily orally	• Significant decrease in pain rating	• No significant difference in pain relief, ambulatory capacities, or survival	

2

- 1989
- 37 pts
- Low (10 mg) versus High (100 mg) dose Dexamethasone
- Pain relief both group
- No significant in between group (Pain, ambulation and survival)

Table 2. Dexamethasone Effects on MSCC, Dose-Dependent Outcomes, and Systemic Side Effects in Clinical Studies

Study	Group I	Group II	Effect of Dexamethasone on MSCC	Effect of Dexamethasone Dose	Systemic Side Effects
Heimdal et al[7]	4 mg initial IV dexamethasone 4×/day, then tapered to zero at day 15	96 mg initial IV dexamethasone, then tapered to zero and day 15		• No significant difference in rate of ambulation posttreatment	• 28.6% incidence of side effects in high-dose group (GI bleeding, GI perforation, pneumonia, hyperglycemia, and wound infection), compared to 7.9% incidence of side effects in normal-dose group (pneumonia and wound infection) • 14.3% incidence of serious side effects in high-dose group, compared to 0% incidence of serious side effects in normal-dose group

preserved gait

3

- 1992
- 83 pts
- Low (4 mg x 4 days) versus High (96 mg) dose Dexamethasone
- High dose gr.: S/E 28.6% of pts, 14.3% serious effect
- Low dose gr.: S/E 7.9% of pts, no serious effect
- No sig of increase ambulation rate in High dose gr.

Table 2. Dexamethasone Effects on MSCC, Dose-Dependent Outcomes, and Systemic Side Effects in Clinical Studies

Study	Group I	Group II	Effect of Dexamethasone on MSCC	Effect of Dexamethasone Dose	Systemic Side Effects
Sørensen et al[13]	Control (no dexamethasone treatment)	96 mg initial IV dexamethasone, followed by 3 days of 24 mg orally 4×/day, then tapered to zero at day 14	• Preservation of gait in ambulatory patients • Restoration of gait in non-ambulatory patients	• Success of treatment in 81% of dexamethasone cohort, compared to 63% in control cohort	• Incidence of side effects (hypomania, psychosis, and perforated gastric ulcer) in 3 patients in high-dose cohort

4

- 1994
- 57 pts, RCT
- 96 mg then 24 mg x 3 days of Dexamethasone concurrence with RT
- Preservation of gait in ambulatory pts
- Restoration of gait within 3 mo. of tx. in non-ambulatory pts.
  - 81% in treatment gr.
  - 63% in controlled gr.
- Adverse effect
  - 3 pts in treatment gr. (hypomania, psychosis, perforate gastric ulcer)

Corticosteroid Toxicity

Weissman DE et al,

Corticosteroid toxicity in neuro-oncology patients

- 1987, 59 pts
- Directly correlated with increased doses
  - **75%** in pts whose total dose > 400mg
  - **13%** in pts whose total dose < 400mg
- Directly correlated with duration
  - **76%** for longer than 3 wks.
  - **5%** for less than 3 wks.
- Infection
  - 28 separates infection in 13 pts
- Hyperglycemia, Proximal myopathy

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Recommendation dose
10 mg iv loading
then 6-10 mg q 6 hr.

Journal of *Clinical Medicine*

MDPI

Article

Survival and Functional Outcomes after Surgical Treatment for Spinal Metastasis in Patients with a Short Life Expectancy

Se-Jun Park [1,†], Chang-Hyun Ma [1,†], Chong-Suh Lee [2], Chung-Youb Jeon [1], Tae-Soo Shin [1] and Jin-Sung Park [1,*]

[1] Department of Orthopedic Surgery, Spine Center, Samsung Medical Center, Sungkyunkwan University, School of Medicine, Seoul 06351, Republic of Korea
[2] Department of Orthopedic Surgery, Haeundae Bumin Hospital, Busan 48094, Republic of Korea
* Correspondence: paridot@hanmail.net; Tel.: +82-2-3410-1583; Fax: +82-2-3410-0061
† These authors contributed equally to this work.

- 2023
  492 surgical cases
- Survival and functional outcome
  after surgery in spinal metastasis
- ≤ 6 mo. Survival (Revised Tokuhashi score ≤ 8)

Characteristic	Score
General condition (performance status [PS])	
Poor (PS 10%-40%)	0
Moderate (PS 50%-70%)	1
Good (PS 80%-100%)	2
No. of extraspinal bone metastases foci	
≥3	0
1-2	1
0	2
No. of metastases in the vertebral body	
≥3	0
1-2	1
0	2
Metastases to the major internal organs	
Unremovable	0
Removable	1
No metastases	2
Primary site of the cancer	
Lung, osteosarcoma, stomach, bladder, esophagus, pancreas	0
Liver, gallbladder, unidentified	1
Others	2
Kidney, uterus	3
Rectum	4
Thyroid, breast, prostate, carcinoid tumor	5
Palsy	
Complete (Frankel A, B)	0
Incomplete (Frankel C, D)	1
None (Frankel E)	2

[a]Criteria of predicted prognosis: Total score (TS) 0-8, <6 mo; TS 9-11, 6-12 mo; TS 12-15, ≥1 y.

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Article

Survival and Functional Outcomes after Surgical Treatment for Spinal Metastasis in Patients with a Short Life Expectancy

- Indication for surgery
  - Refractory pain after conservative treatment
  - Neurological deterioration **or**
    Potential neurological deficits with spinal column instability

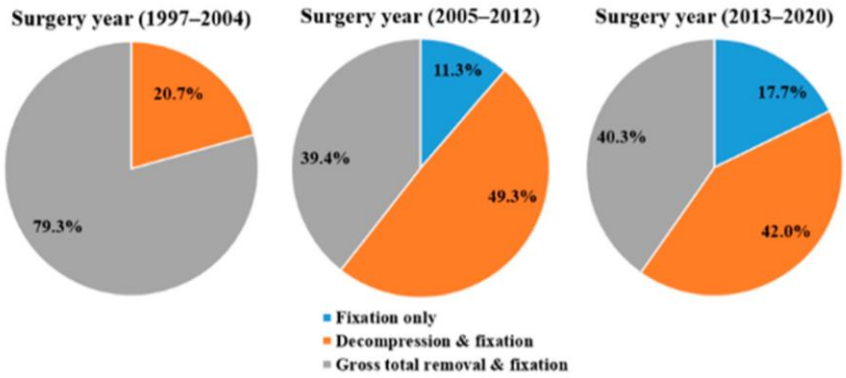

Figure 1. Trends in surgical methods for metastatic spinal tumors according to the year of surgery.

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Table 3. Overall survival data according to the top six common primary cancer sites.

Primary Cancer Site	N (%)	Median Months (95% CI)	6-Mo Survival Rate (95% CI)	1-Year Survival Rate, (95% CI)	2-Year Survival Rate, (95% CI)	90-Day Mortality, N (%)
All	492 (100%)	10.6 (9.0–12.2)	66.8% (64.7–68.9)	46.1% (43.8–48.4)	17.3% (15.5–19.1)	59 (12.0%)
Lung	153 (31.1%)	9.3 (7.2–11.4)	66.4% (62.6–70.2)	42.4% (38.3–46.5)	8.7% (6.3–11.1)	22 (14.3%)
Liver	87 (17.7%)	10.4 (7.0–13.8)	65.1% (60.0–70.2)	44.7% (39.3–50.1)	13.6% (9.2–18.0)	10 (11.5%)
Kidney	50 (10.2%)	14.2 (9.0–19.4)	84.0% (78.8–89.2)	57.7% (50.7–64.7)	27.5% (20.4–34.6)	2 (4.0%)
Colorectal	36 (7.3%)	5.3 (0.5–10.1)	46.8% (38.4–55.2)	29.2% (21.5–36.9)	0%	6 (16.7%)
Breast	34 (6.9%)	24.2 (10.1–38.3)	94.1% (90.1–98.1)	82.1% (75.5–88.7)	50.5% (41.7–59.3)	0 (0%)
Prostate	18 (3.7%)	8.5 (6.6–10.5)	66.7% (55.6–77.8)	42.4% (30.4–54.4)	24.2% (13.7–34.7)	2 (11.41%)

CI: confidence interval.

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Table 4. Trends of survival in the top six common primary cancer sites according to the three time frames.

Primary Cancer Site	1997–2004 Median Months (95% CI)	2005–2012 Median Months (95% CI)	2013–2020 Median Months (95% CI)	*p*-Value
All	7.0 (4.4–9.6)	8.5 (7.4–9.6)	13.8 (12.7–14.9)	<0.001
Lung	5.0 (1.5–8.5)	8.6 (6.9–10.3)	13.1 (8.5–17.7)	<0.001
Liver	7.0 (0–17.7)	8.0 (5.7–10.3)	13.7 (10.3–17.1)	0.083
Kidney	6.0 (4.3–7.7)	7.6 (5.0–10.2)	25.6 (17.7–33.5)	<0.001
Colorectal	N/C	5.3 (4.3–6.3)	9.3 (2.8–15.8)	0.337
Breast	15.2 (5.6–25.0)	24.2 (0–50.2)	32.8 (0.4–65.2)	0.148
Prostate	N/C	8.5 (4.3–12.7)	12.6 (6.8–18.4)	0.640

N/C: not counted, CI: confidence interval.

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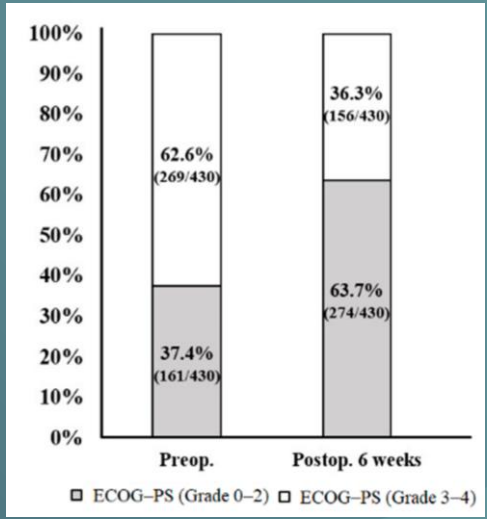
Table 5. Preoperative and postoperative performance status based on ECOG-PS grade.

Preoperative ECOG-PS	Number of Patients (N)	Postoperative ECOG-PS				
		Grade IV	Grade III	Grade II	Grade I	Grade 0
Grade IV	102	44	16	31	11	0
Grade III	167	25	61	53	25	3
Grade II	121	4	3	13	71	30
Grade I	34	1	2	2	4	25
Grade 0	6	0	0	0	2	4
Total	430	74	82	99	113	62

Light gray box: aggravated performance status; white box: no change in performance status; dark gray box: improved performance status. ECOG-PS: Eastern Cooperative Oncology Group performance status; 0: asymptomatic; I: restricted physically; II: ambulatory and capable of all self-care; III: capable of only limited self-care; IV: completely disabled.



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