常見神經外科疾病及治療

嘉義長庚醫院 神經外科

高之皓醫師

2026/2/24

演講大綱

- 常壓性水腦症
- 脊椎腫瘤治療
- 腕隧道症候群診斷及治療

嘉義長庚紀念醫院
CHANG GUNG MEMORIAL HOSPITAL

常壓性水腦症 (Normal Pressure Hydrocephalus)
臨床診斷與治療策略

常壓性水腦症 (NPH)

- iNPH：idiopathic, 常發生於年長者
- Secondary：因外傷、腦出血等其他原因
- 老年人口盛行率高達 1.5%
- 常被診斷為失智症

典型症狀 Hakim-Adams triad

1. 步態障礙 (Gait) - 最早出現

- 磁性步態 (Magnetic gait)
- 寬基底、小碎步
- 轉身困難

2. 認知障礙 (Cognition)

- 額葉-皮質下功能障礙
- 思考緩慢、冷漠
- 記憶提取困難

3. 尿失禁 (Incontinence)

- 尿急 → 頻尿 → 失禁
- 額葉抑制喪失

Magnetic gait

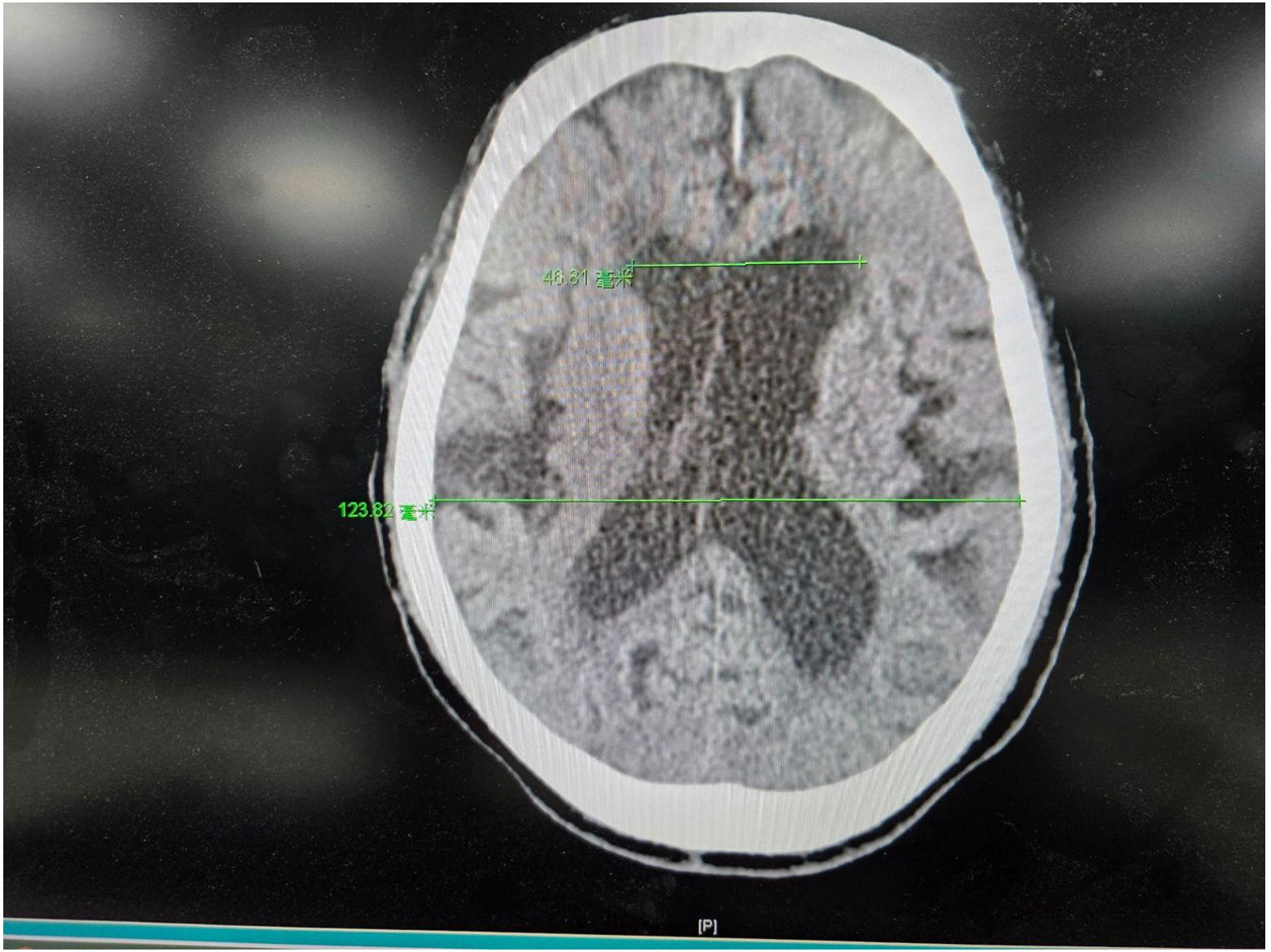
- “感覺腳被地板吸住”
- Wide-based stance
- Shuffling steps
- Fair arm swing

與其他神經疾病區別

特徵 (Feature)	常壓性水腦症 (NPH)	阿茲海默症 (Alzheimer's)	帕金森氏症 (Parkinson's)
發病順序	**步態障礙先於失智**	記憶減退顯著，步態晚期才異常	動作症狀為主
步態特徵	磁性步態、寬基底	早期正常	慌張步態、窄基底
震顫	罕見（無靜止性震顫）	無	**靜止性震顫**
認知缺損	精神運動遲緩	皮質性（失語、失認）	執行功能障礙

診斷

- 影像學檢查
  - Brain MRI 可比 CT 提供更多資訊 (如tumor等)
  - Evan’s index > 0.3
  - Communicating hydrocephalus
- CSF drainage
  - Tap test
  - Lumbar drainage test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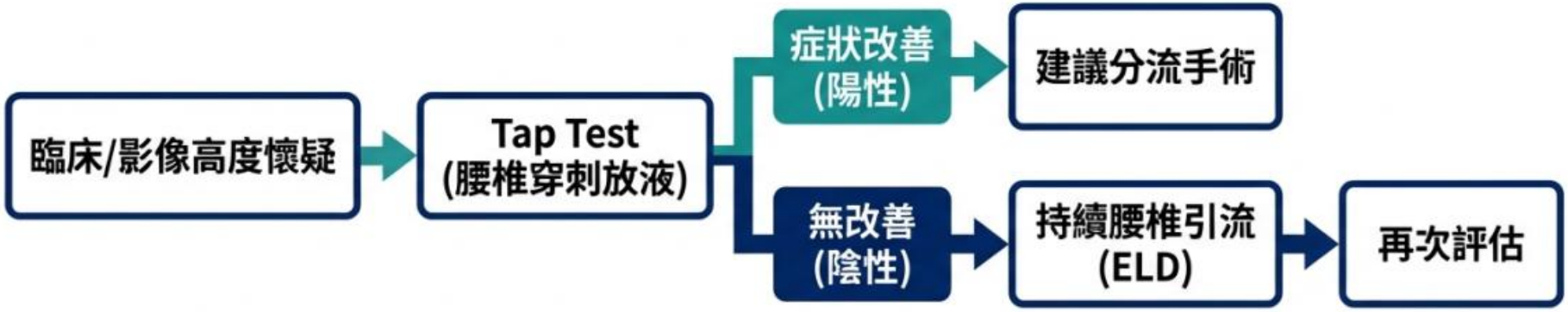
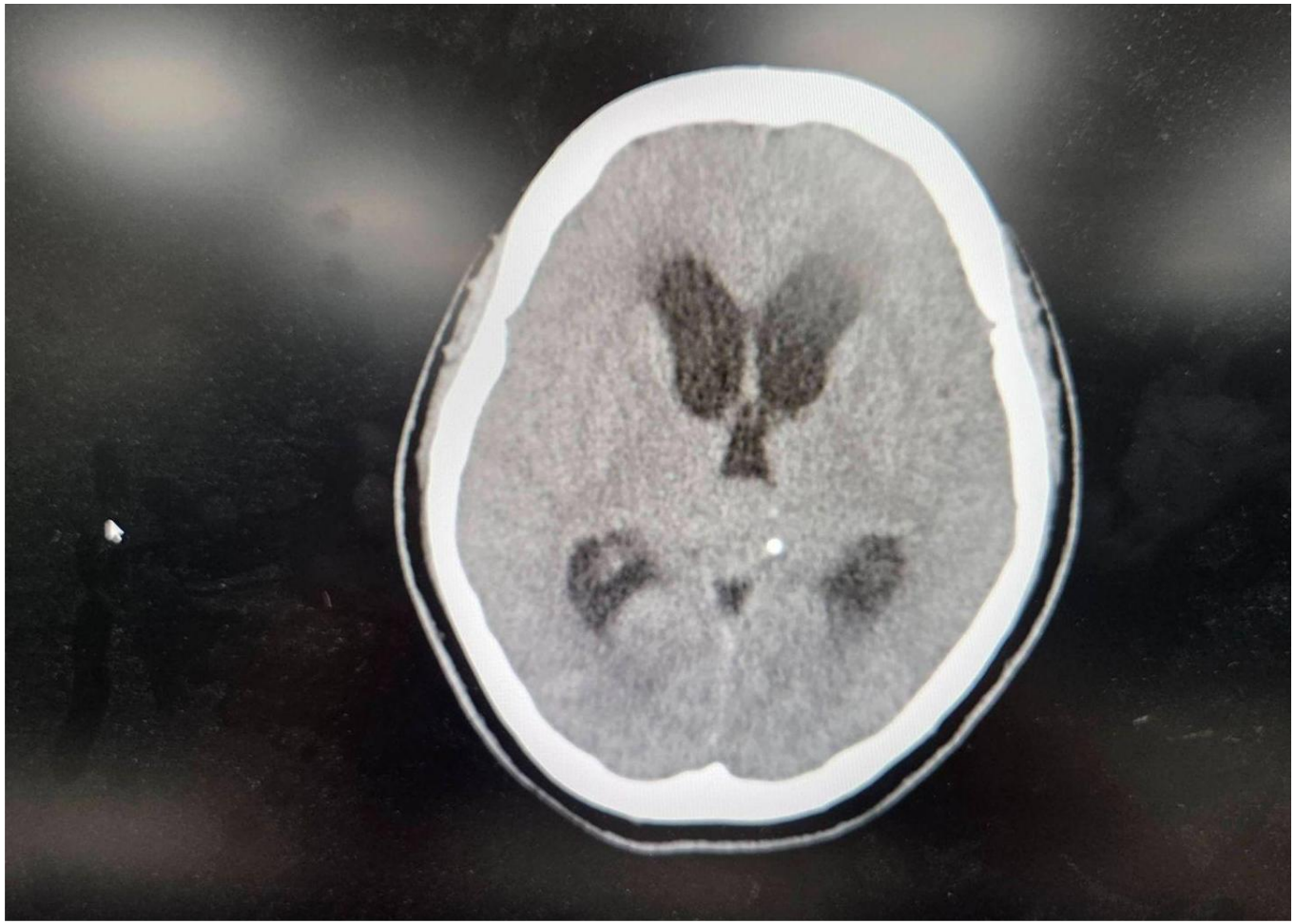


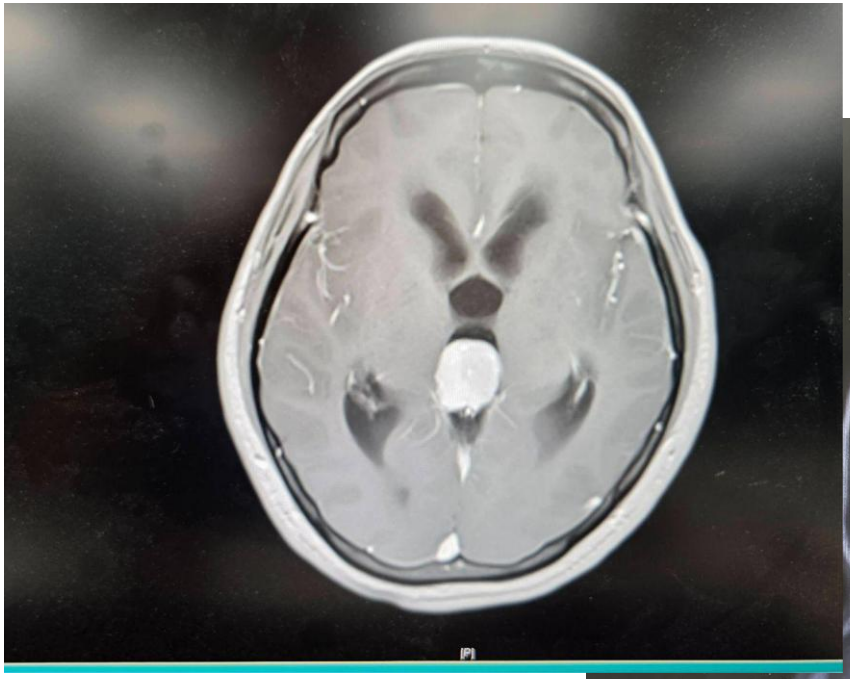
Tap Test (Miller Fisher Test)

- 移除 40-50 ml 腦脊髓液
- 評估前後步態 (速度、步數)
- 陽性預測值 (PPV)：73-100%

持續腰椎引流 (ELD)

- 用於 Tap Test 陰性但仍懷疑者
- 連續引流 3 天 (約 300ml/day)
- 敏感度高於單次測試



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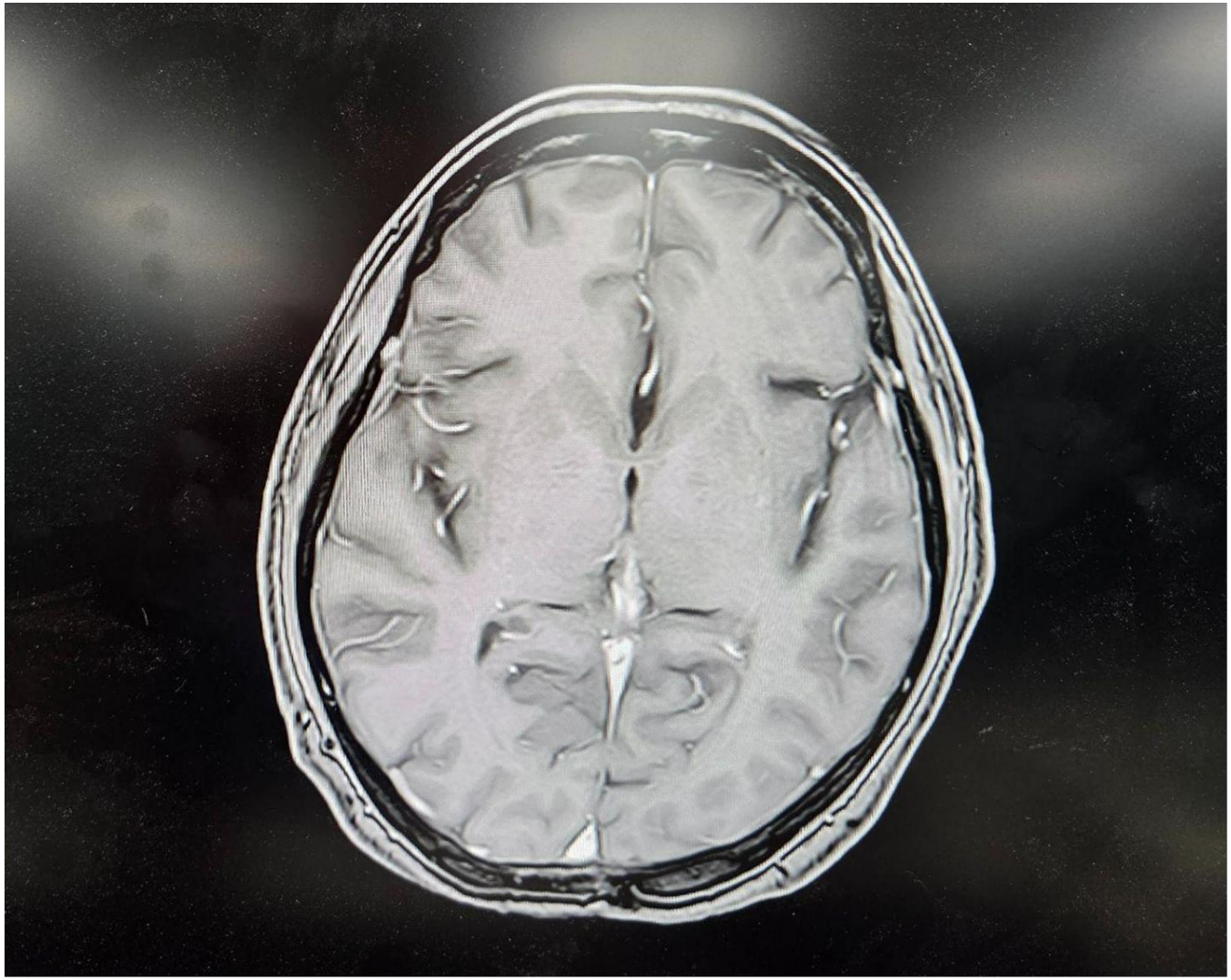


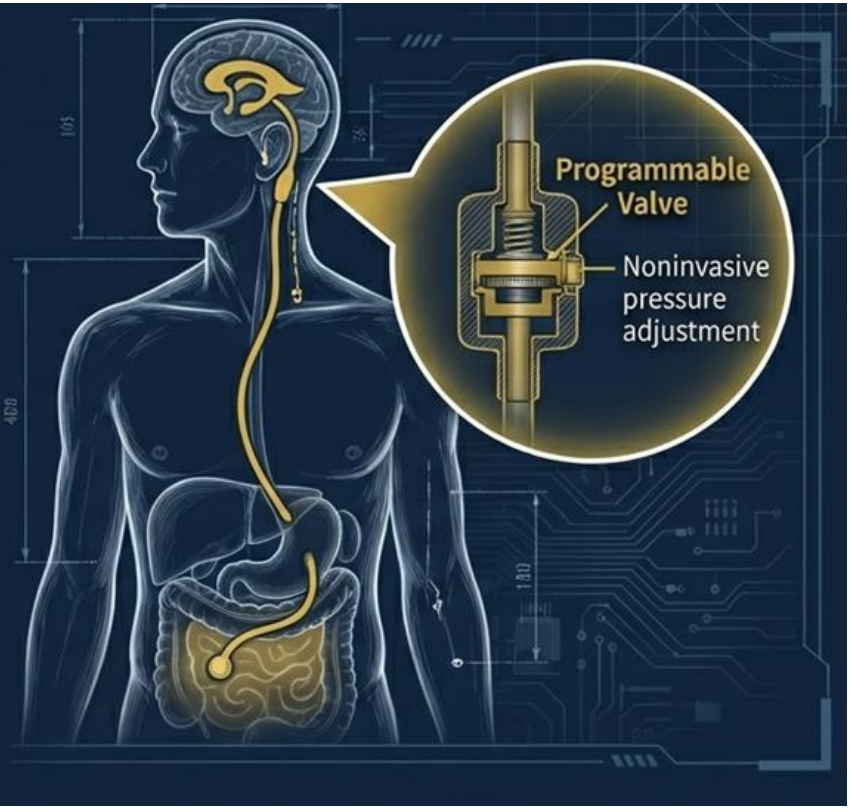
治療

標準術式：腦室腹腔引流術 (VP Shunt)

裝置特色：

- 可調壓式瓣膜 **(Programmable Valves)**：
  非侵入性調整壓力
- 抗虹吸裝置 **(Anti-siphon device)**：
  防止過度引流

⚠ **MRI Safety:** 需注意MRI後確認壓力設定



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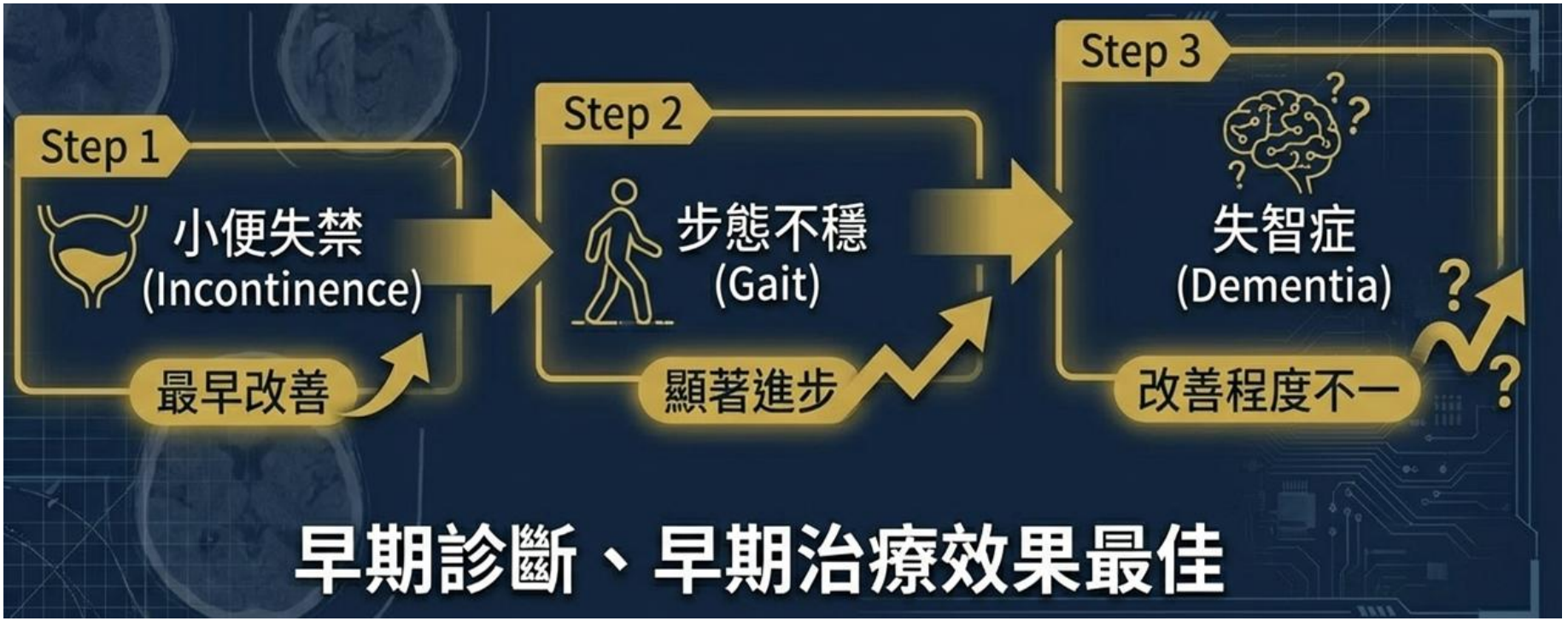
Step 1
小便失禁
(Incontinence)
最早改善
Step 2
步態不穩
(Gait)
顯著進步
Step 3
失智症
(Dementia)
改善程度不一
早期診斷、早期治療效果最佳

脊椎腫瘤治療回顧

脊椎腫瘤分類

- 腫瘤病理區分
  - 轉移性脊椎腫瘤
  - 原發性脊椎腫瘤
- 腫瘤位置區分
  - Extradural
  - Intradural extramedullary
  - Intradural intramedullary

轉移性脊椎腫瘤

- 佔脊椎腫瘤的九成
- 約30-70%的癌症病人會有腫瘤轉移至脊椎
- 常見原發部位
  - 肺癌
  - 乳癌
  - 攝護腺癌
  - 肝癌

如何選擇治療方式

- 評估病患預後 Prognostication
  - Tomita score
  - Modified Tokuhashi score
  - Ask your oncologist
- 評估病患 Performance
  - 手術病患最少符合 KPS≥ 30 or ECOG ≤ 3

Tomita Score

Slow: breast, thyroid
Moderate: kidney, uterus
Rapid: lung, stomach

Minimum requirement : ECOG Performance Status : 0 — 3 — 5
or
Karnofsky Performance Scale : 100 — 30 — 0%

Prognostic Scoring System

Factor / Point	Primary tumor	Mets. to vital organ	Bone mets.
1	slow growth	no met : 0	isolated
2	moderate growth	controllable	multiple
4	rapid growth	un-controllable	

Total P. Score	Life Expectancy	Treatment Aim	Surgery
2, 3	2y <	Long-term local control	En bloc exc.
4, 5	1 - 2y	Middle-term local control	Debulking
6, 7	6 - 12m	Short-term palliation	Palliative decompression
8, 9, 10	< 3m	Terminal care	No surgical treatment

Tomita K, Kawahara N, Murakami H, Demura S. Total en bloc spondylectomy for spinal tumors: improvement of the technique and its associated basic background. J Orthop Sci. 2006 Jan;11(1):3-12.

Ask Your Oncology Colleagues

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Prediction of survival in patients with symptomatic spinal metastases: Comparison between the Tokuhashi score and expert oncologists

Kenny Yat Hong Kwan [a, *], Tai Chung Lam [b], Horace Cheuk Wai Choi [b], Hui Yu Koh [a], Kenneth Man Chee Cheung [a]

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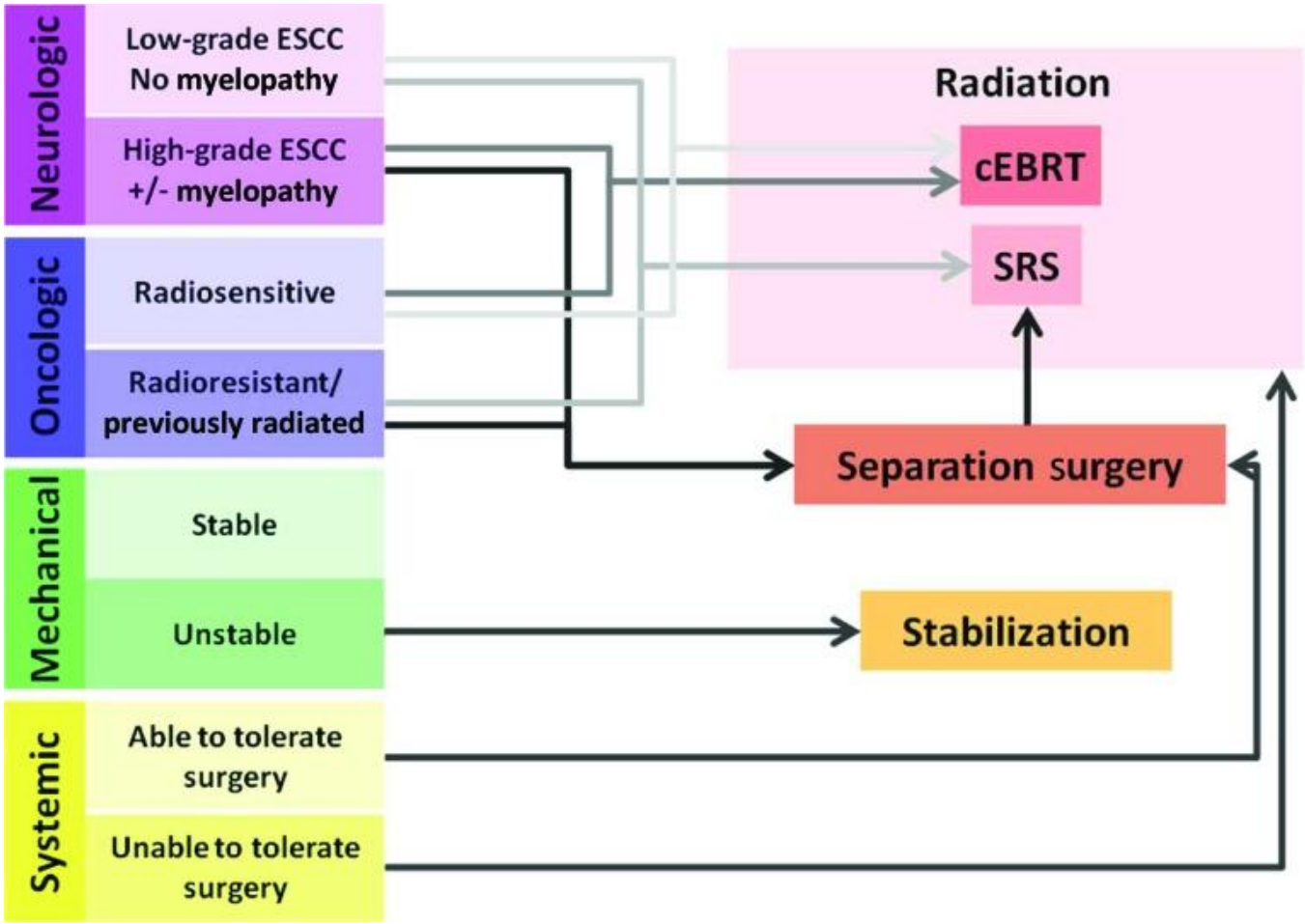
		1 (≤6 months)	2 (7–12 months)	3 (≥13 months)
Actual survival class	1 (≤6 months)	33 (60.0%)	15 (27.3%)	7 (12.3%)
	2 (7–12 months)	9 (45.0%)	8 (40.0%)	3 (15.0%)
	3 (≥13 months)	15 (13.6%)	23 (20.9%)	72 (64.5%)

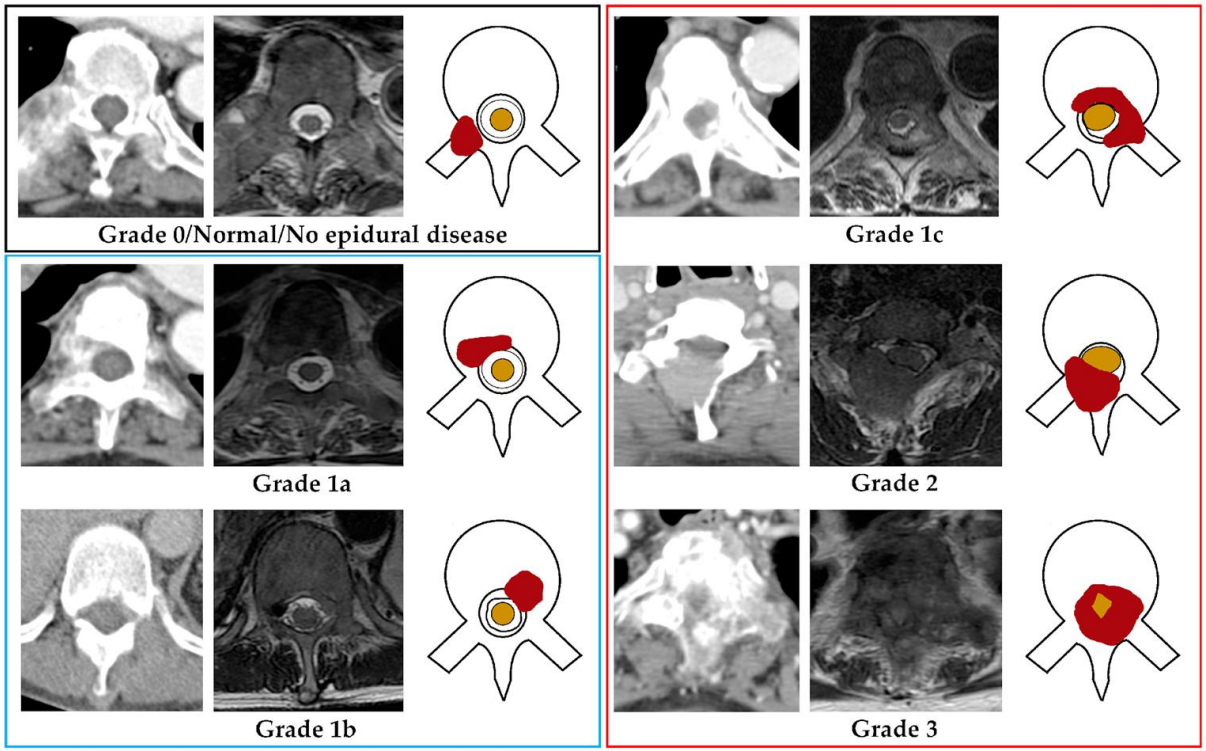
Kwan KYH, Lam TC, Choi HCW, Koh HY, Cheung KMC. Prediction of survival in patients with symptomatic spinal metastases: Comparison between the Tokuhashi score and expert oncologists. Surg Oncol. 2018 Mar;27(1):7-10.

NOMS Framework



Laufer I, Rubin DG, Lis E, Cox BW, Stubblefield MD, Yamada Y, Bilsky MH. The NOMS framework: approach to the treatment of spinal metastatic tumors. Oncologist. 2013 Jun;18(6):744-51.

Epidural Spinal Cord Compression (ESCC)



Hallinan JTPD, Ge S, Zhu L, Zhang W, Lim YT, Thian YL, Jagmohan P, Kuah T, Lim DSW, Low XZ, Teo EC, Barr Kumarakulasinghe N, Yap QV, Chan YH, Tan JH, Kumar N, Vellayappan BA, Ooi BC, Quek ST, Makmur A. Diagnostic Accuracy of CT for Metastatic Epidural Spinal Cord Compression. Cancers (Basel). 2022 Aug 31;14(17):4231.

Table 1. Summary of expected radiation response based on histology

Study	Lymphoma, seminoma, myeloma	Breast	Prostate	Sarcoma	Melanoma	Gastrointestinal	NSCLC	Renal
Gilbert et al. [8]	F	F	U	U	U	U	U	U
Maranzano et al. [9]	F	F	F	U	U	U	U	U
Rades et al. [13]	F	I	I	I	U	I	U	I
Rades et al. [12]	F	F	F	U	U	U	U	U
Katagiri et al. [11]	F	F	F	U	U	U	U	U
Maranzano et al. [10]	F	F	F	U	U	U	U	U
Rades et al. [14]	F	I	I	I	U	I	U	I

Adapted from [7].
Abbreviations: F, favorable; I, intermediate; NSCLC, non-small cell lung cancer; U, unfavorable.

Laufer I, Rubin DG, Lis E, Cox BW, Stubblefield MD, Yamada Y, Bilsky MH. The NOMS framework: approach to the treatment of spinal metastatic tumors. Oncologist. 2013 Jun;18(6):744-51.

SINS score

- Stable 0-6
- Impending instability 7-12
- Unstable 13-18

Component	Score
Location	
Junctional (O-C2; C7-T2; T11-L1; L5-S1)	3
Mobile spine (C3-6; L2-4)	2
Semirigid (T3-10)	1
Rigid (S2-S5)	0
Mechanical pain	
Yes	3
No	2
Pain free lesion	1
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
Deformity (kyphosis/scoliosis)	2
Normal	0
Vertebral body collapse	
>50% collapse	3
<50% collapse	2
No collapse with >50% body involved	1
None of the above	0
Posterolateral involvement	
Bilateral	3
Unilateral	1
None of the above	0

[a]Data adapted from Fischer et al.[9]

Table 1 – Phase I and II studies assessing single dose stereotactic irradiation to the spine.

Author, year	No. patients/no. lesions	Prior RT	Dose/coverage	Constraints/dose to spinal cord	Histology	Median F/U (months)	Local control
Gerszten et al., 2005	50/68	48/68	12.5–22.5 Gy (mean, 19 Gy)/80% IDL	13 Gy (max. dose actually received)	Breast	16	100%
Gerszten et al., 2005	28/36	23/36	17.5–25 Gy (mean, 21.9 Gy)/80% IDL	13.1 Gy (max. dose actually received)	Melanoma	13	93%
Gerszten et al., 2006	77/87	70/87	15–25 Gy (mean, 20 Gy)/80% IDL	12 Gy (max. dose actually received)	Lung	16	100%
Gerszten et al., 2007	393/500	344/500	12.5–25 Gy (mean, 20 Gy)/80% IDL	NR (mean volume of spinal canal dose >8 Gy 0.6 cm^3	Mixed	21	88%
Yamada et al., 2008	93/103	0/103	18–24 Gy/100% IDL	14 Gy (max. dose)	Mixed	15	90%
Amdur et al., 2009	21/25	12/25	15 Gy/95% PTV	≤12 Gy to 0.1 mL (no previous RT) ≤5 Gy to 0.5 mL (if previous RT)	Mixed	8	95%
Yamada et al., 2011	412/362	0/363	18–24 Gy/100% IDL	14–15 Gy (max point dose)	Mixed	36	90% (98% in breast and prostate)
Garg et al., 2012	61/63	0/63	16–24 Gy/80–90%	≤10 Gy to 0.01 cm^3 ≤12 Gy (spinal cord + 2 mm)	Mixed (renal versus non-renal)	19.7	88%
Ryu et al., 2014	39/NR	NR	16 Gy/90% PTV (accepted >80%)	≤10% partial spinal cord, max 10 Gy ≤0.35 cm^3 absolute spinal cord, max 10 Gy	NR (no exclusion criteria for histology)	NR	NR

IDL, isodose line.

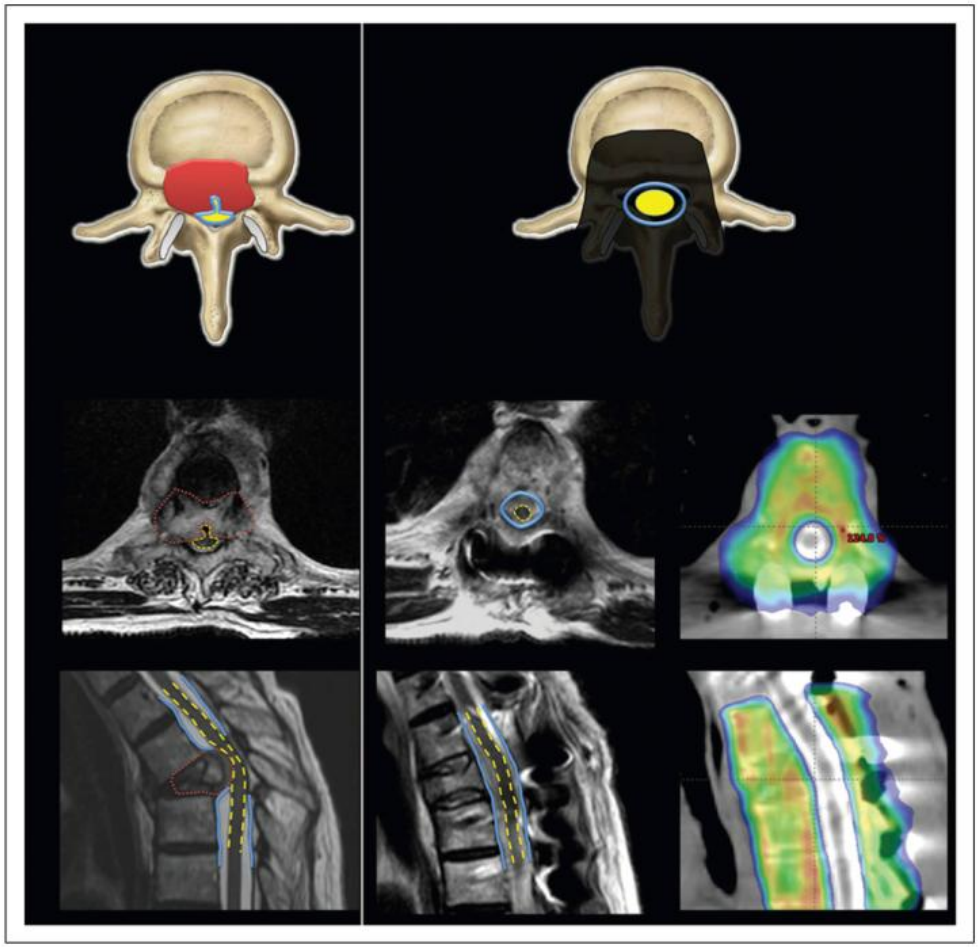
Greco C, Pares O, Pimentel N, Moser E, Louro V, Morales X, Salas B, Fuks Z. Spinal metastases: From conventional fractionated radiotherapy to single-dose SBRT. Rep Pract Oncol Radiother. 2015 Nov-Dec;20(6):454-63.

Table 3. Current NOMS decision framework

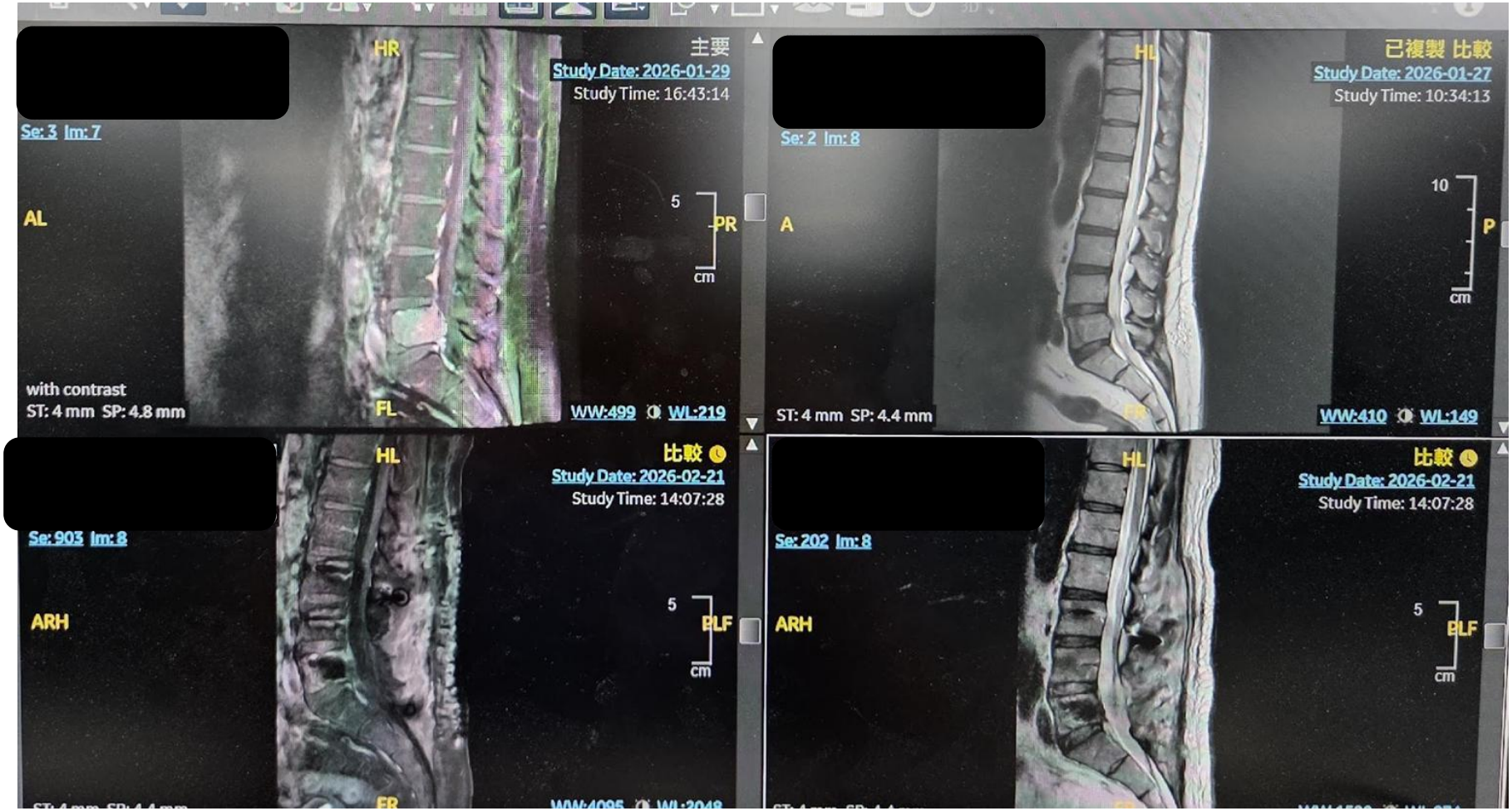
Neurologic	Oncologic	Mechanical	Systemic	Decision
Low-grade ESCC + no myelopathy	Radiosensitive	Stable		cEBRT
	Radiosensitive	Unstable		Stabilization followed by cEBRT
	Radioresistant	Stable		SRS
	Radioresistant	Unstable		Stabilization followed by SRS
High-grade ESCC ± myelopathy	Radiosensitive	Stable		cEBRT
	Radiosensitive	Unstable		Stabilization followed by cEBRT
	Radioresistant	Stable	Able to tolerate surgery	Decompression/stabilization followed by SRS
	Radioresistant	Stable	Unable to tolerate surgery	cEBRT
	Radioresistant	Unstable	Able to tolerate surgery	Decompression/stabilization followed by SRS
	Radioresistant	Unstable	Unable to tolerate surgery	Stabilization followed by cEBRT

Low-grade ESCC is defined as grade 0 or 1 on Spine Oncology Study Group scoring system [5]. High-grade ESCC is defined as grade 2 or 3 on the ESCC scale [5]. Stabilization options include percutaneous cement augmentation, percutaneous pedicle screw instrumentation, and open instrumentation. For patients with significant systemic comorbidities that affect the ability to tolerate open surgery, stabilization may be limited to cement augmentation and/or percutaneous screw augmentation.
Abbreviations: cEBRT, conventional external beam radiation; ESCC, epidural spinal cord compression; NOMS, neurologic, oncologic, mechanical, and systemic; SRS, stereotactic radiosurgery.

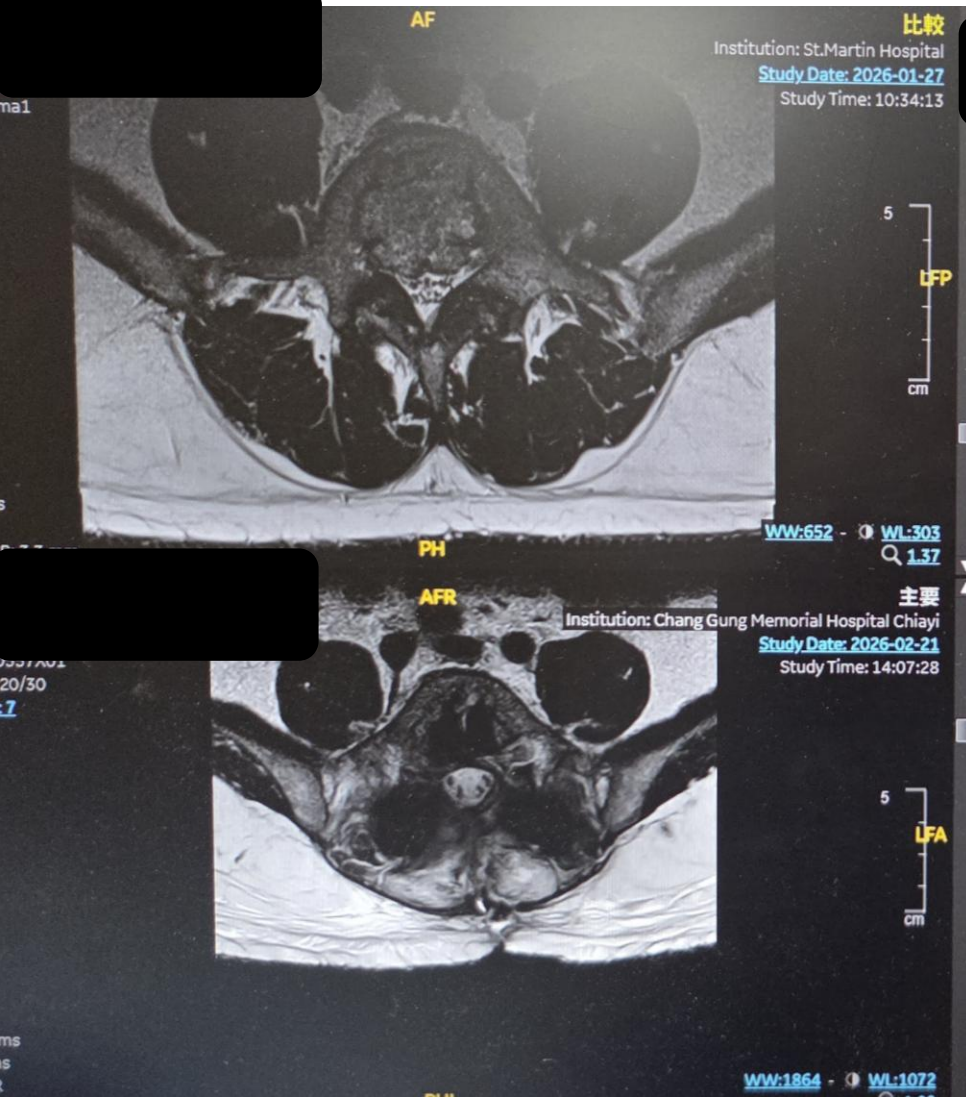
Laufer I, Rubin DG, Lis E, Cox BW, Stubblefield MD, Yamada Y, Bilsky MH. The NOMS framework: approach to the treatment of spinal metastatic tumors. Oncologist. 2013 Jun;18(6):744-51.



Al Farii H, Aoude A, Al Shammasi A, Reynolds J, Weber M. Surgical Management of the Metastatic Spine Disease: A Review of the Literature and Proposed Algorithm. Global Spine J. 2023 Mar;13(2):486-498.



60y/o man, RCC with synchronous lung and spine L5 metastasis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比較
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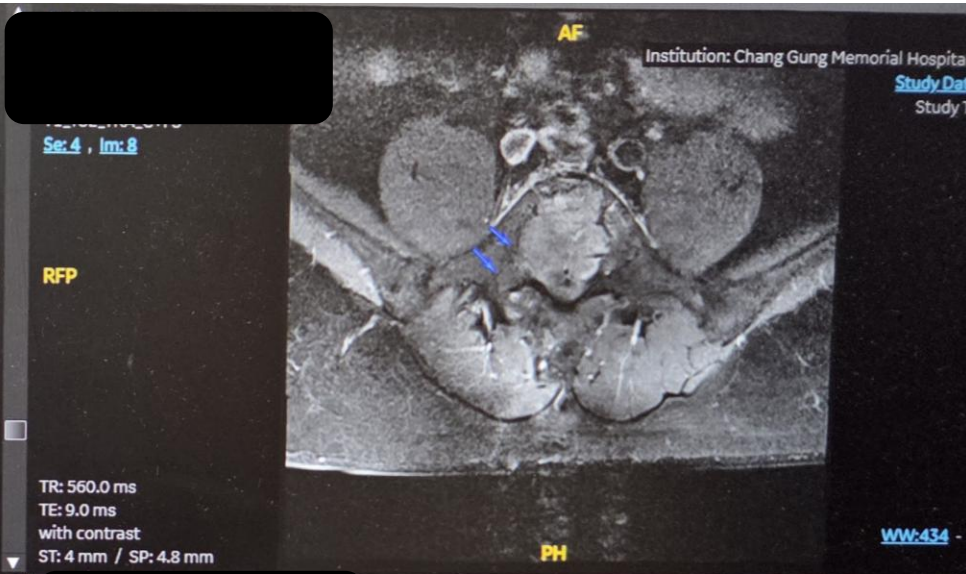
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Institution: Chang Gung Memorial Hospital
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RFP
TR: 560.0 ms
TE: 9.0 ms
with contrast
ST: 4 mm / SP: 4.8 mm
PH
WW:434

AFR
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Study Time: 14:07:28
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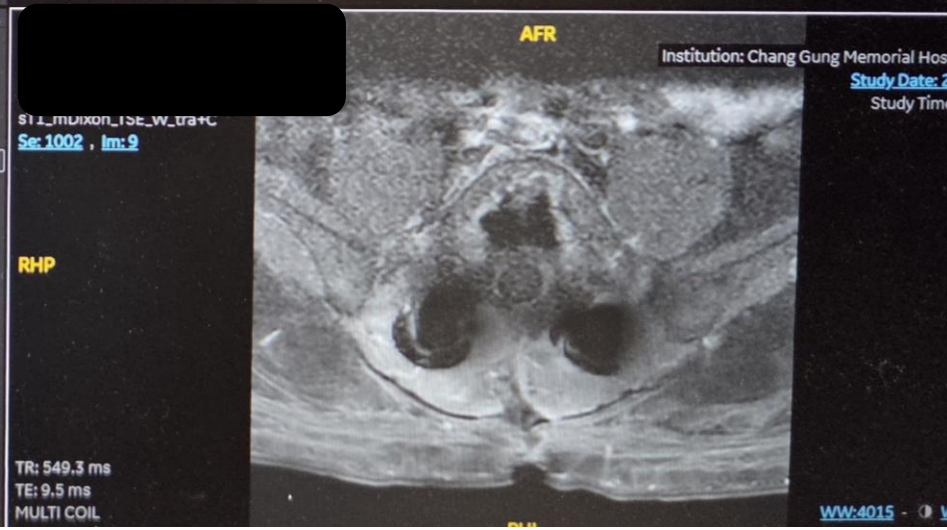
WW:1864 - WL:1072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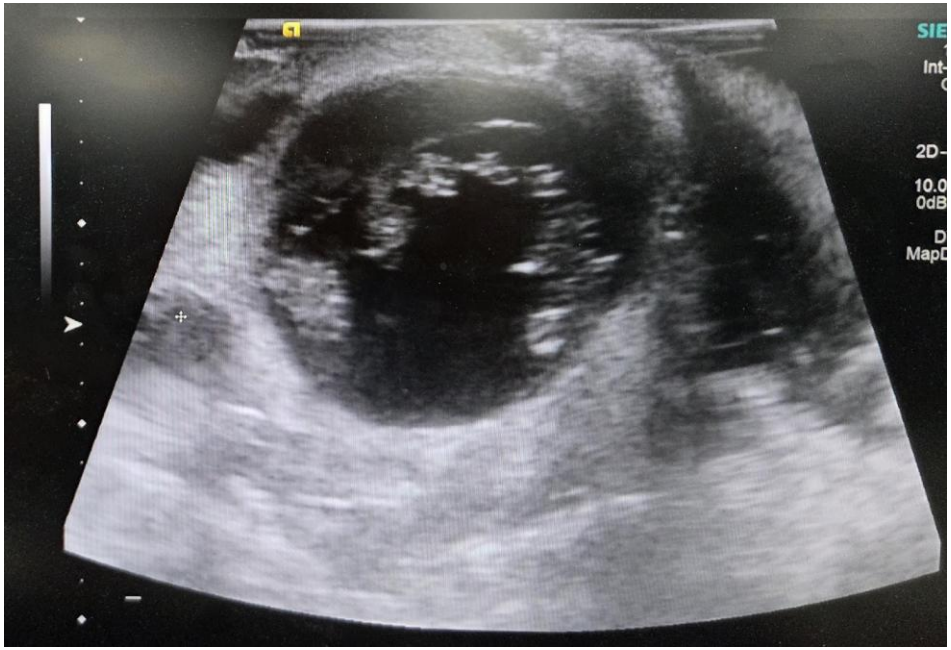
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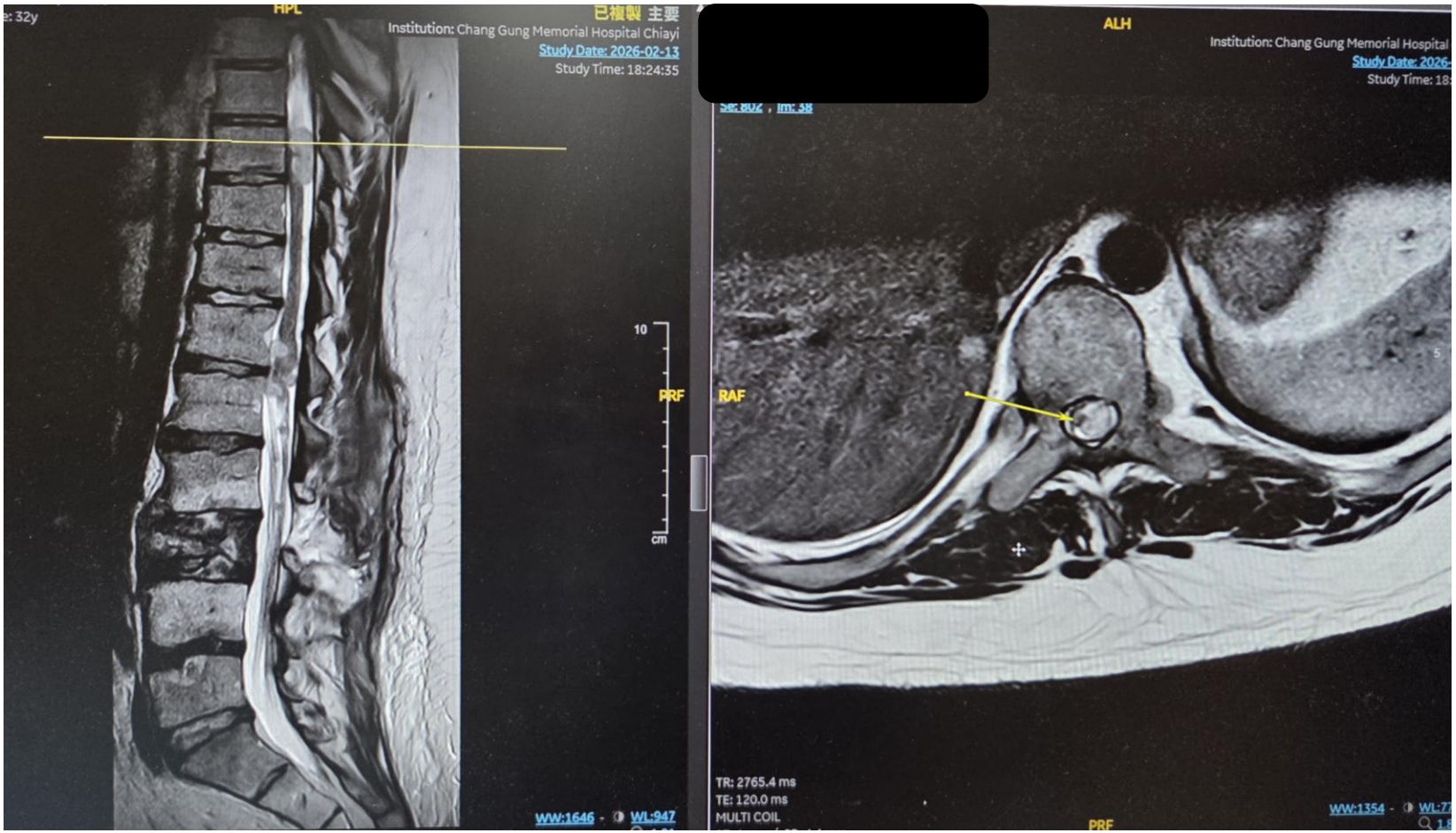
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Study Time: 18:24:35
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WL:947
ALH
Institution: Chang Gung Memorial Hospital
RAF
TR: 2765.4 ms
TE: 120.0 ms
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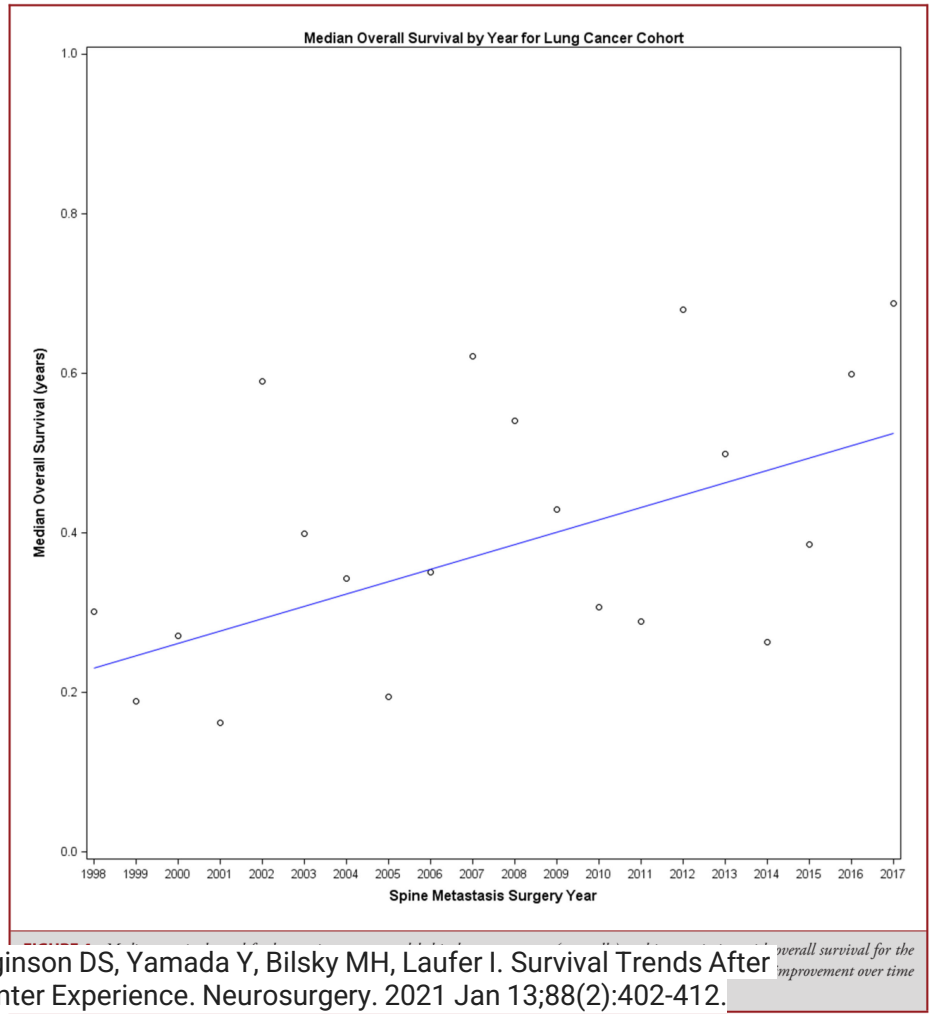
PRF
WW:1354

Suggested surgery for spinal metastasis

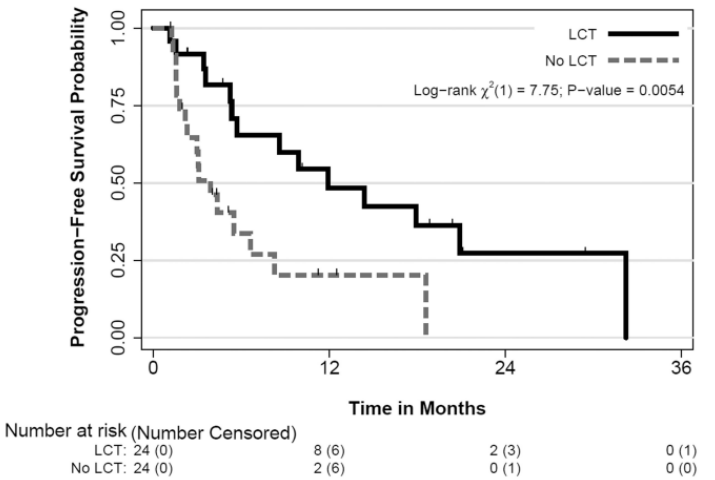
- Surgery improves local control and possibly survival
- Palliative surgery for estimated survival > 3 months
- Consider excisional surgery for estimated survival > 12 or 24 months
  - At least separation surgery
  - En bloc tumor resection in selective cases (solitary metastasis with primary disease under control)

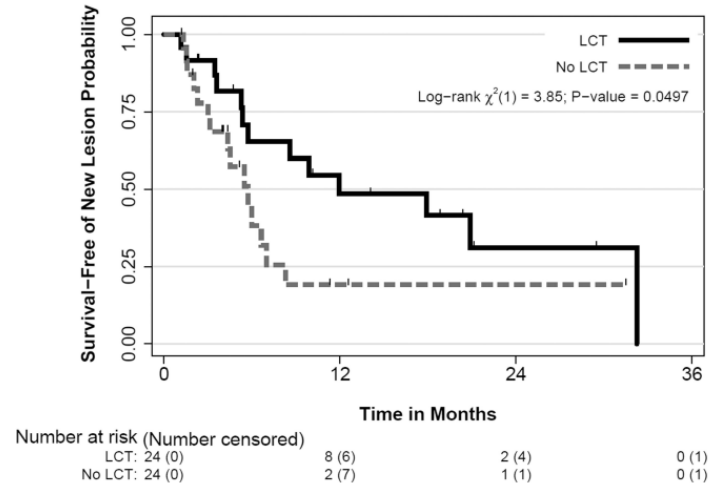
- A 2% (95% CI: 0%-5%) improvement in survival was noted with each progressive year of surgery



Rothrock RJ, Barzilai O, Reiner AS, Lis E, Schmitt AM, Higginson DS, Yamada Y, Bilsky MH, Laufer I. Survival Trends After Surgery for Spinal Metastatic Tumors: 20-Year Cancer Center Experience. Neurosurgery. 2021 Jan 13;88(2):402-412.

- Local consolidation treatment (by surgery and/or RT) improves survival in NSCLC





Gomez DR, Blumenschein GR Jr, Lee JJ, Hernandez M, Ye R, Camidge DR, Doebele RC, Skoulidis F, Gaspar LE, Gibbons DL, Karam JA, Kavanagh BD, Tang C, Komaki R, Louie AV, Palma DA, Tsao AS, Sepesi B, William WN, Zhang J, Shi Q, Wang XS, Swisher SG, Heymach JV. Local consolidative therapy versus maintenance therapy or observation for patients with oligometastatic non-small-cell lung cancer without progression after first-line systemic therapy: a multicentre, randomised, controlled, phase 2 study. Lancet Oncol. 2016 Dec;17(12):1672-1682.

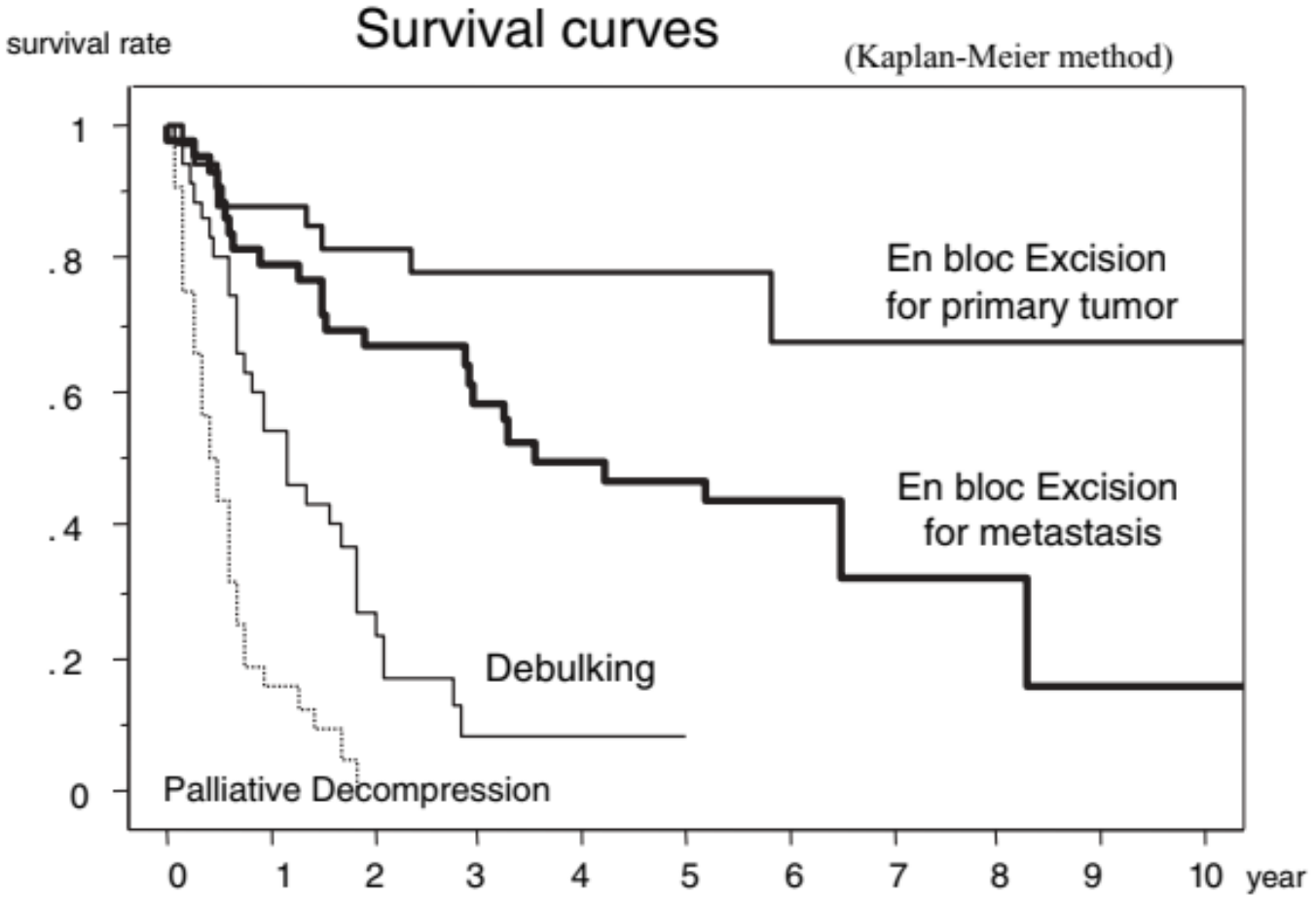


Fig. 5. Survival curves (Kaplan-Meier method)

Tomita K, Kawahara N, Murakami H, Demura S. Total en bloc spondylectomy for spinal tumors: improvement of the technique and its associated basic background. J Orthop Sci. 2006 Jan;11(1):3-12.

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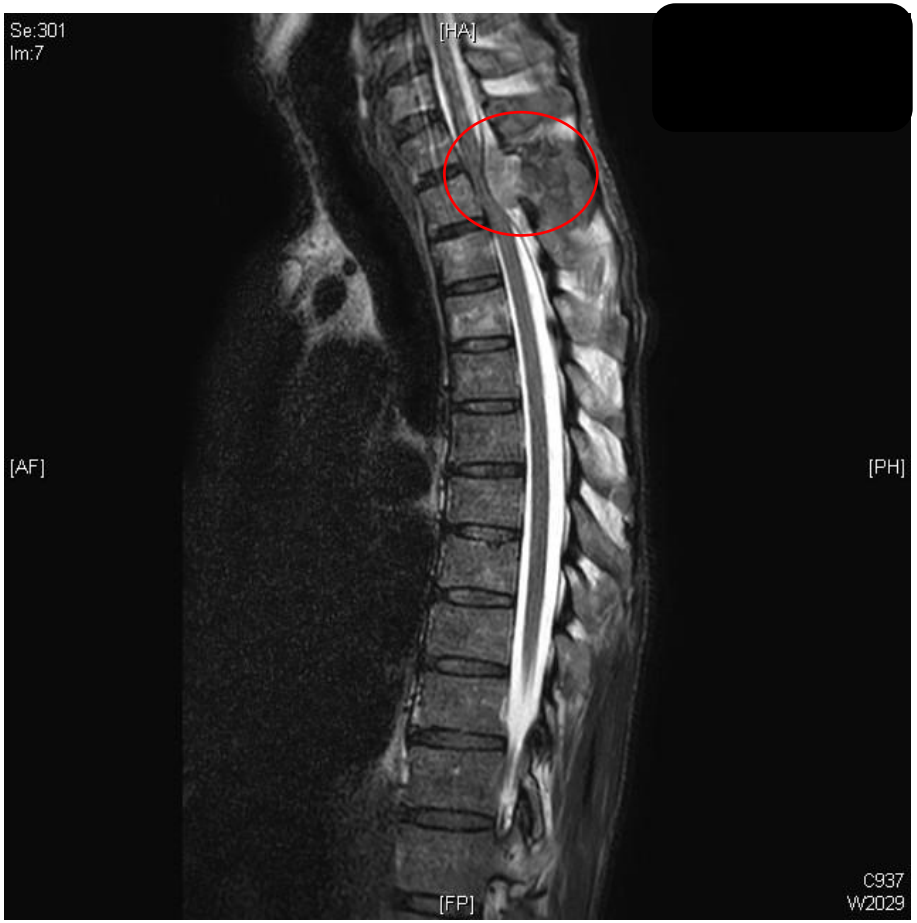
- Surgery improves local control and possibly survival
- Palliative surgery for estimated survival > 3 months
  - Pain control
  - Stabilization of spine
- Excisional surgery for estimated survival > 12 or 24 months
  - At least separation surgery + SBRT
  - En bloc tumor resection in selective cases (solitary metastasis with primary disease under control)

Case 1

- 66y/o man
- Acute onset lower limb weakness and numbness
- Upper back pain
- Multiple spine epidural mass
  - C7 vertebral body, T2, T3
  - T9 spinous process
- Epidural mass compressing spinal cord at T2-3
  - ESCC 3
- PSA >1000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Im:7
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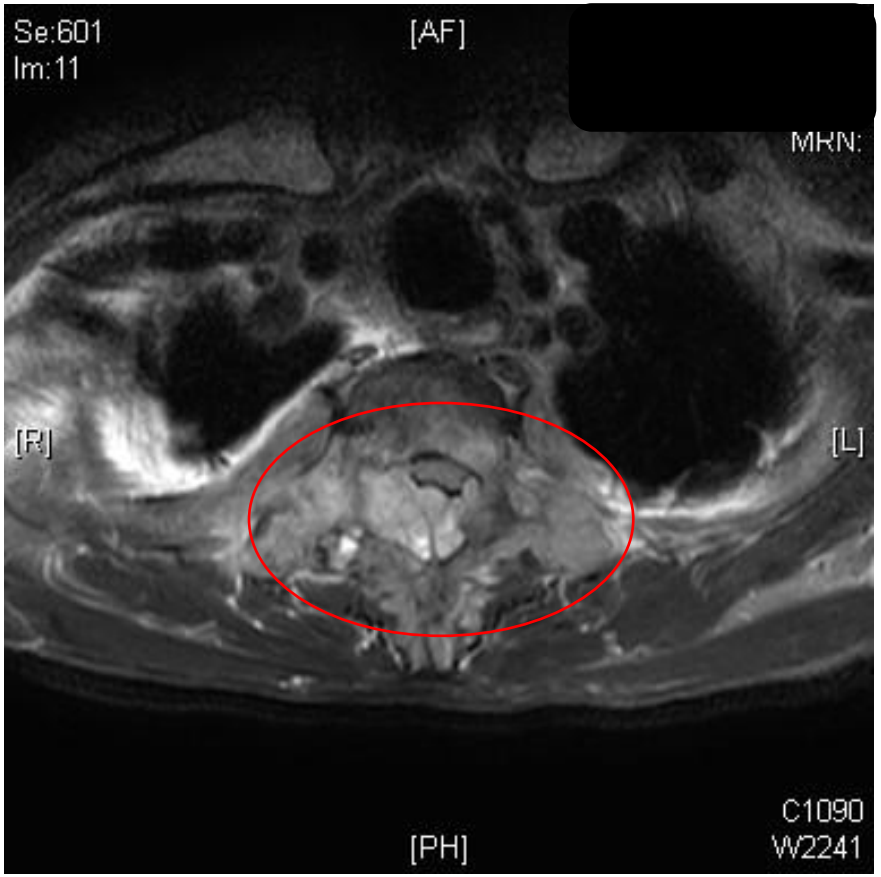
C937
W2029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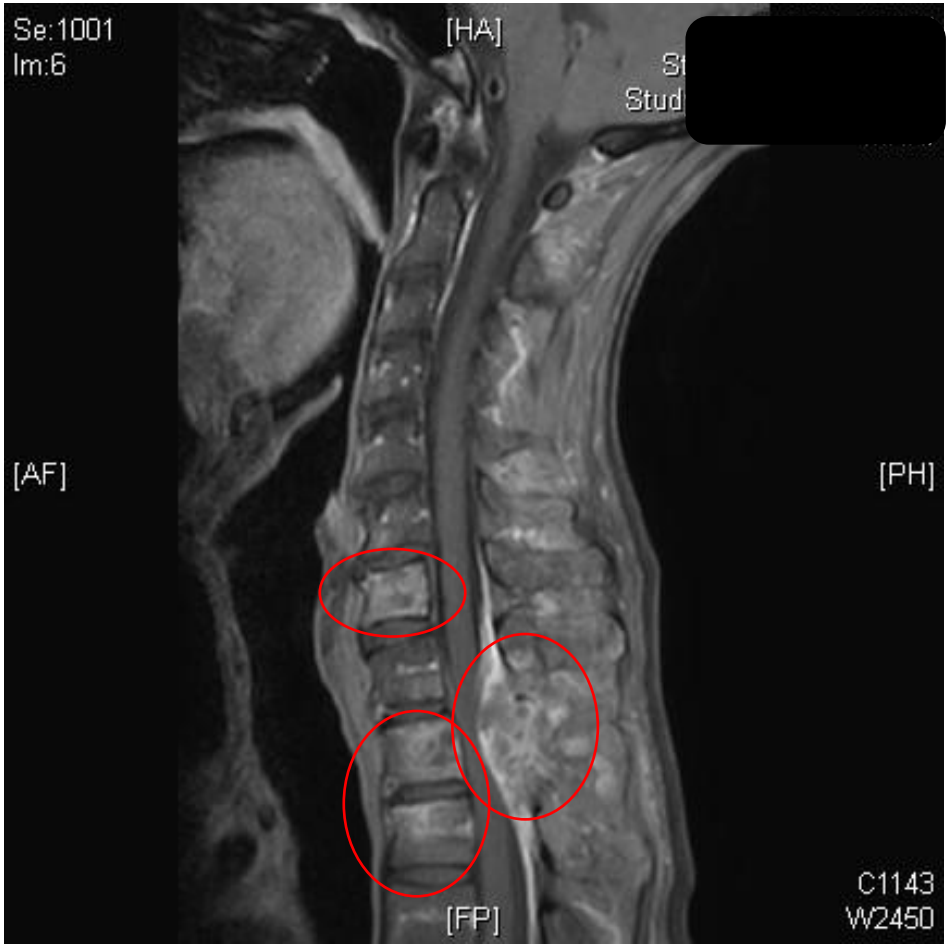
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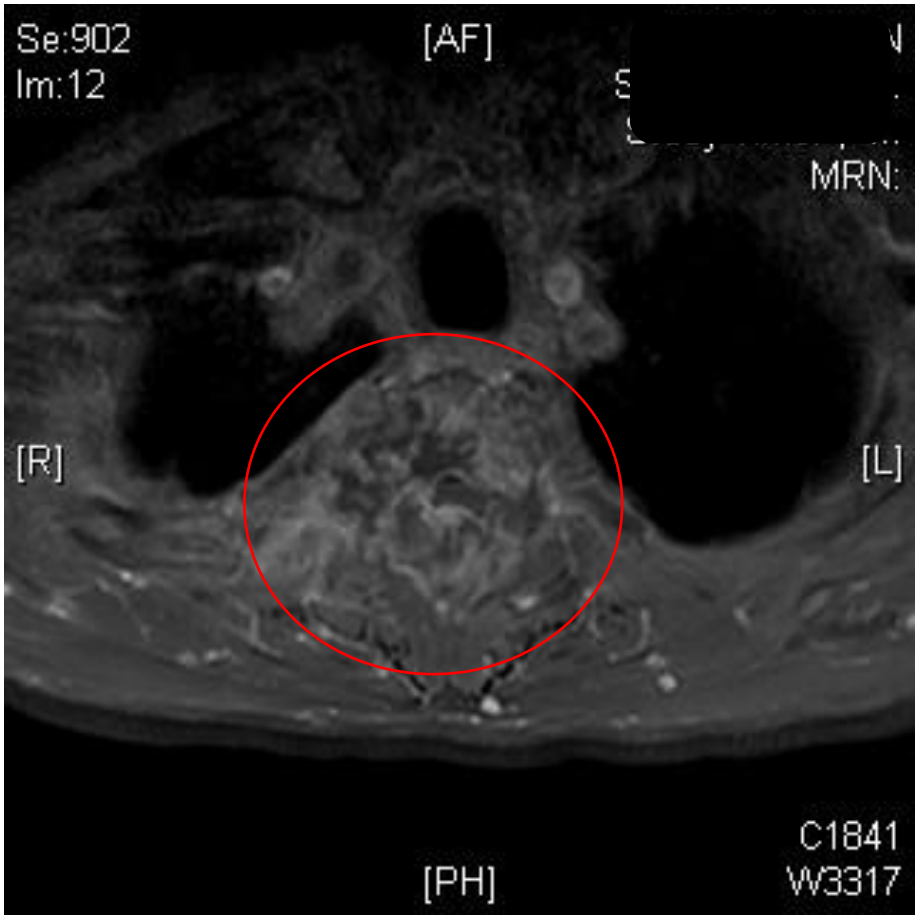
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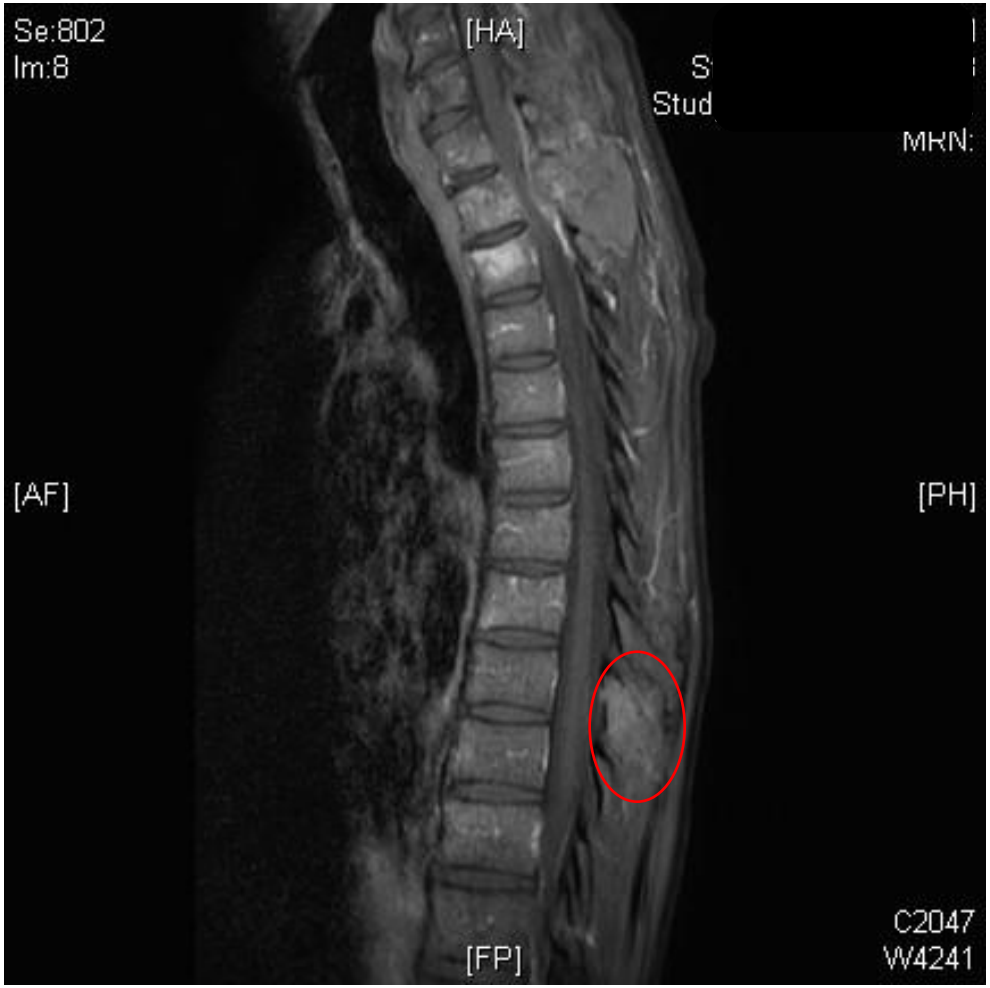
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S
Stud
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C2047
W4241

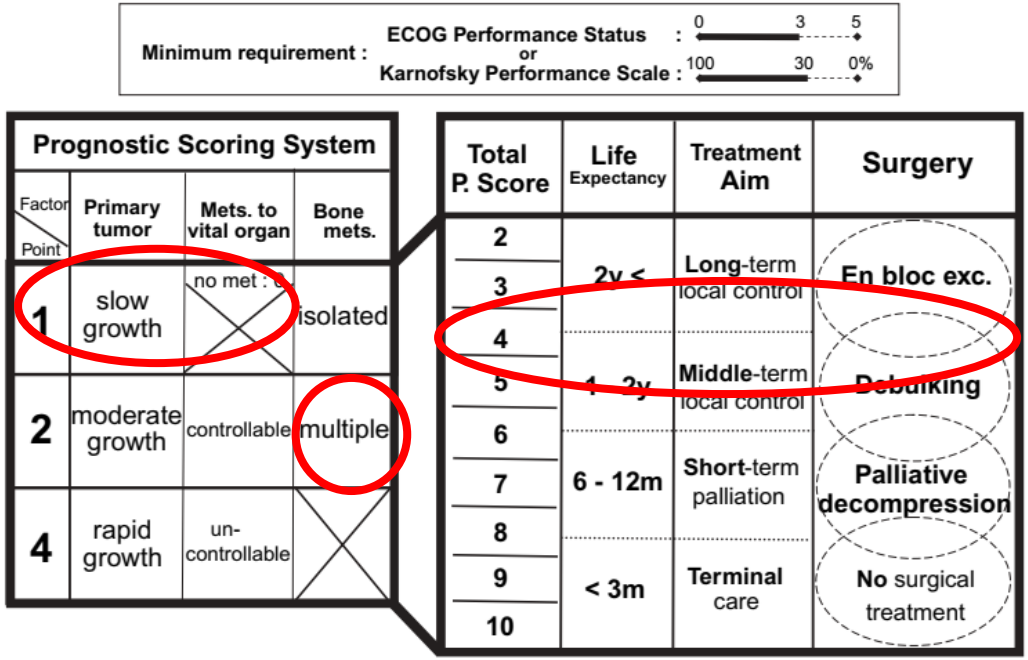
Multiple bone mets

NO!

?

Pre-op evaluation

- Tomita score (4)
- Whole body CT: suspected prostate ca no other organ mets
- Debulking surgery



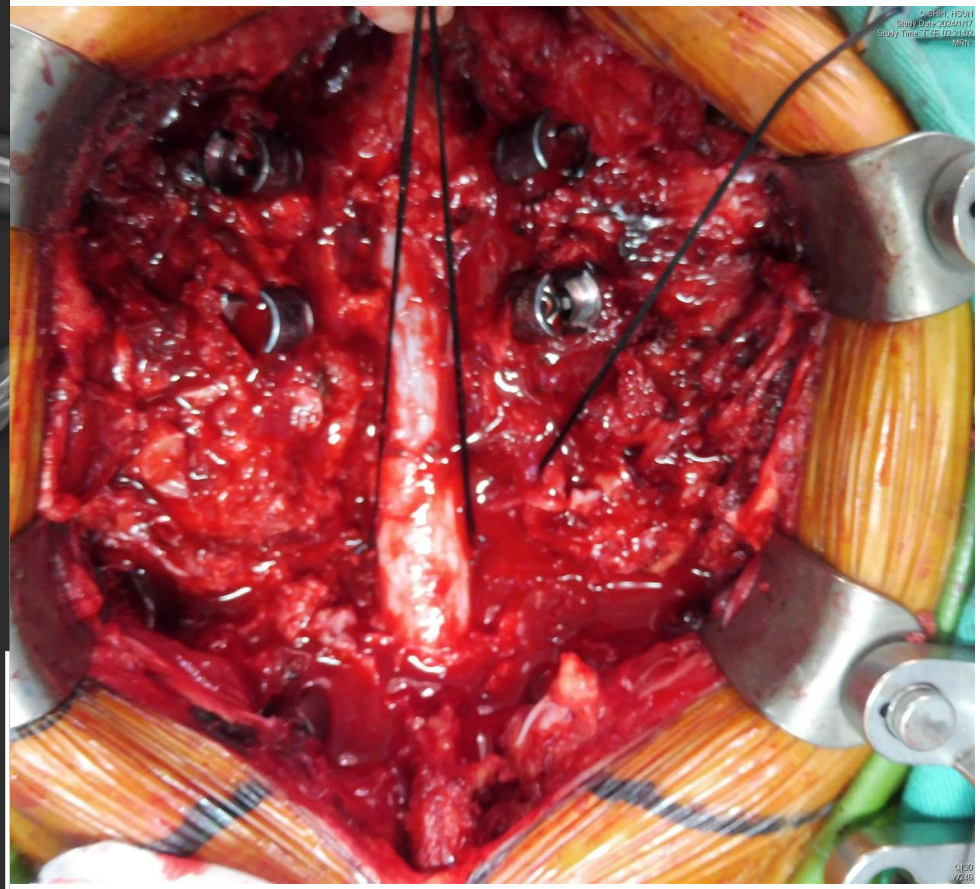
- SINS score (13, unstable
- Fixation needed

Component	Score
Location	
Junctional (O-C2; C7-T2; T11-L1; L5-S1)	3
Mobile spine (C3-6; L2-4)	2
Semirigid (T3-10)	1
Rigid (S2-S5)	0
Mechanical pain	
Yes	3
No	2
Pain free lesion	1
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
Deformity (kyphosis/scoliosis)	2
Normal	0
Vertebral body collapse	
>50% collapse	3
<50% collapse	2
No collapse with >50% body involved	1
None of the above	0
Posterolateral involvement	
Bilateral	3
Unilateral	1
None of the above	0

[a]Data adapted from Fischer et al.[9]

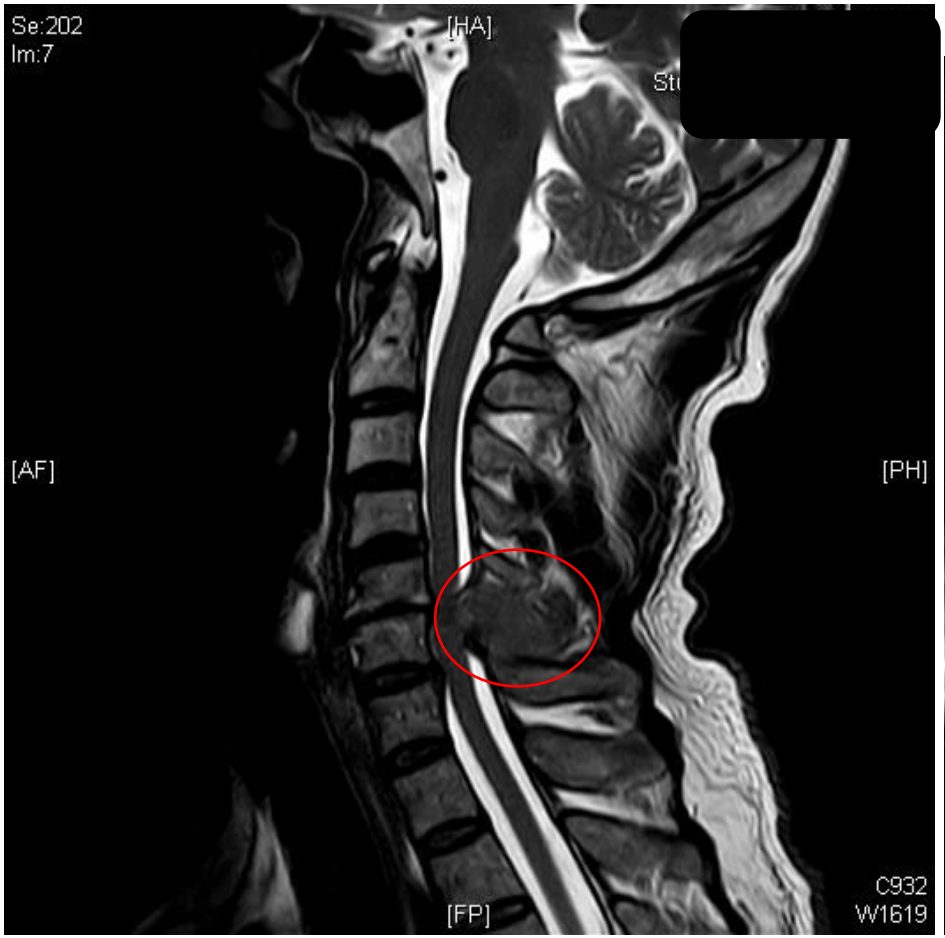

R
26


26



Case 2

- 59y/o man with HCC and hard palate cancer
- HCC s/p RFA, TACE and RT for skull tumor
  - AFP 14.1 (2023/12)
  - PIVKA-II 10389 (2023/12)
  - Bone scan: multiple bone mets (2023/9)
- Right shoulder pain and neck pain for days
- C-spine MRI
  - C6 spinous process, lamina and right lateral mass tumor
  - Right C6 root and VA encapsulated by tumor
  - ESCC 2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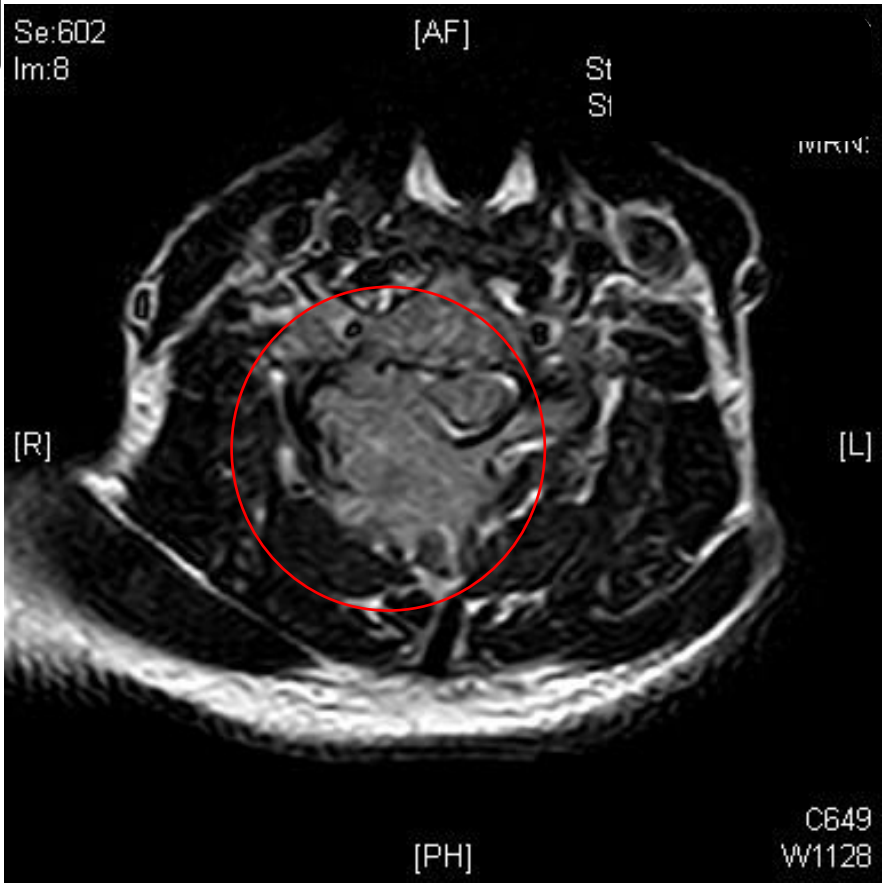
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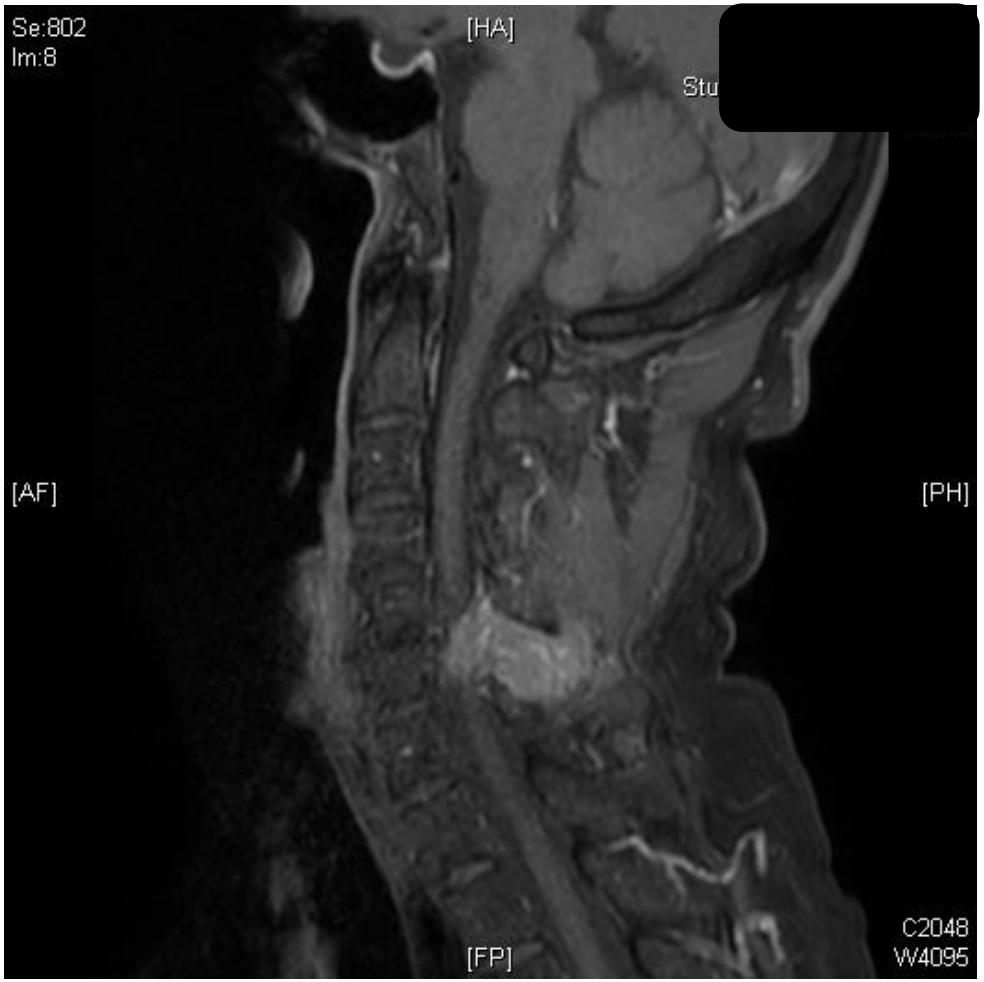
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W4095


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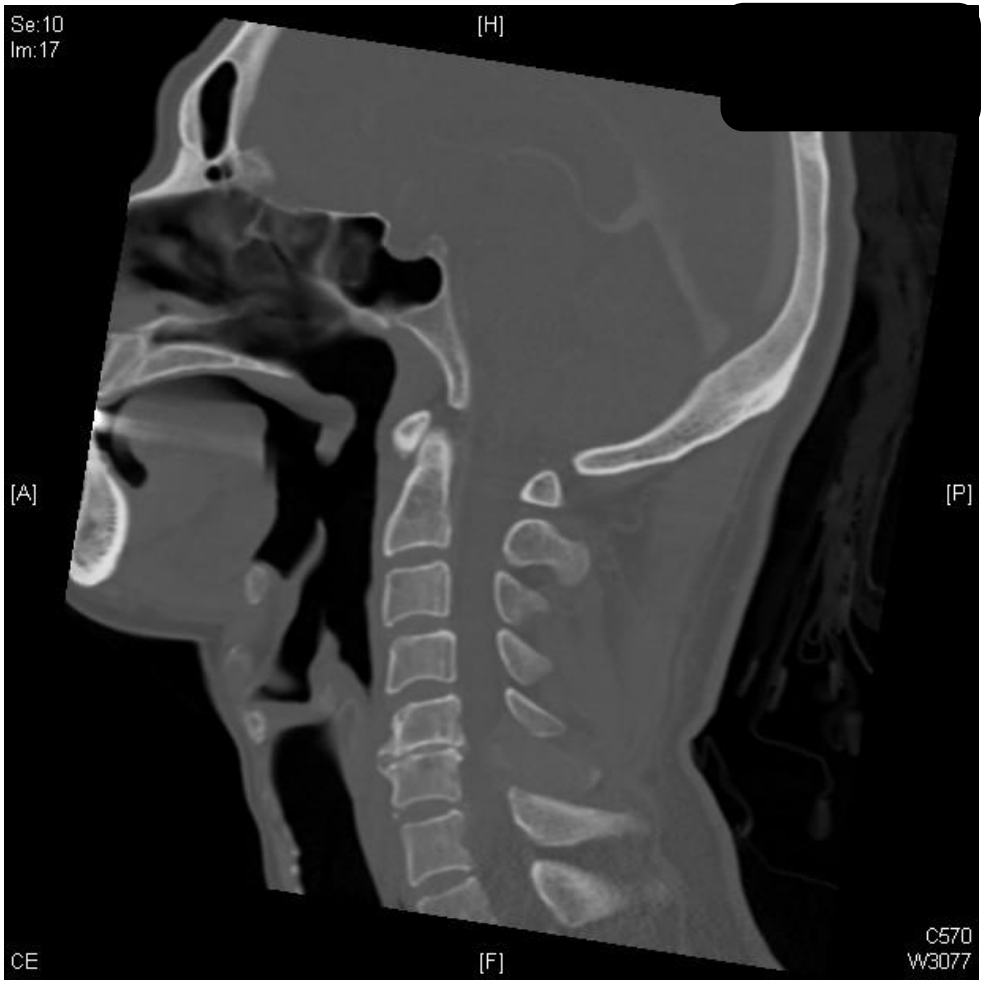
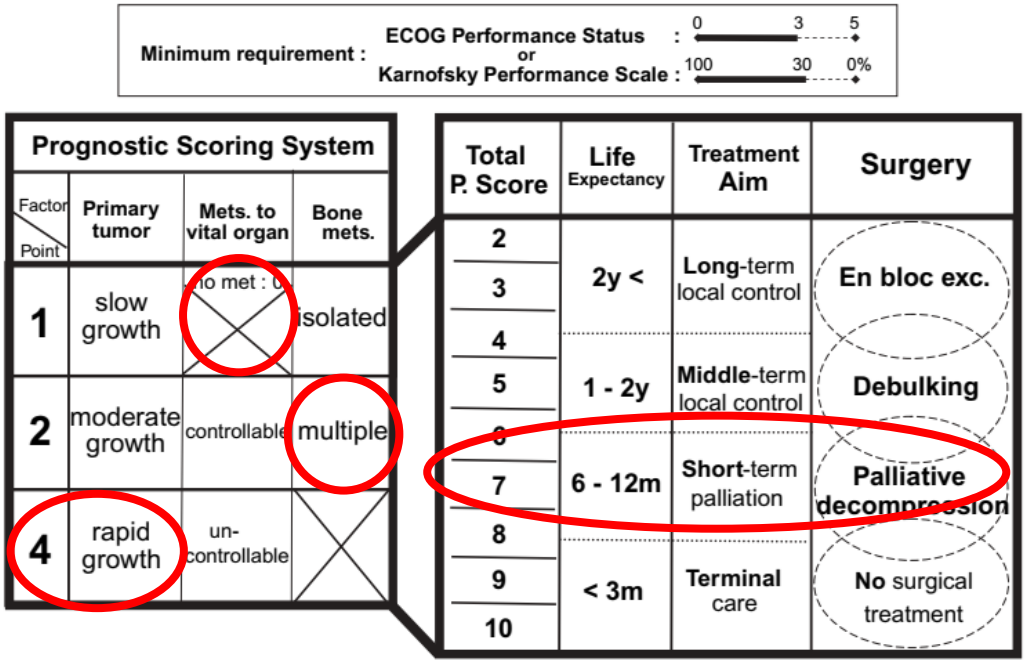

Se:10
Im:17
[H]
[A]
[P]
CE
[F]
C570
W3077

Pre-op evaluation

- Tomita score (7)
- Bone mets at skull
- Debulking surgery or palliative decompression



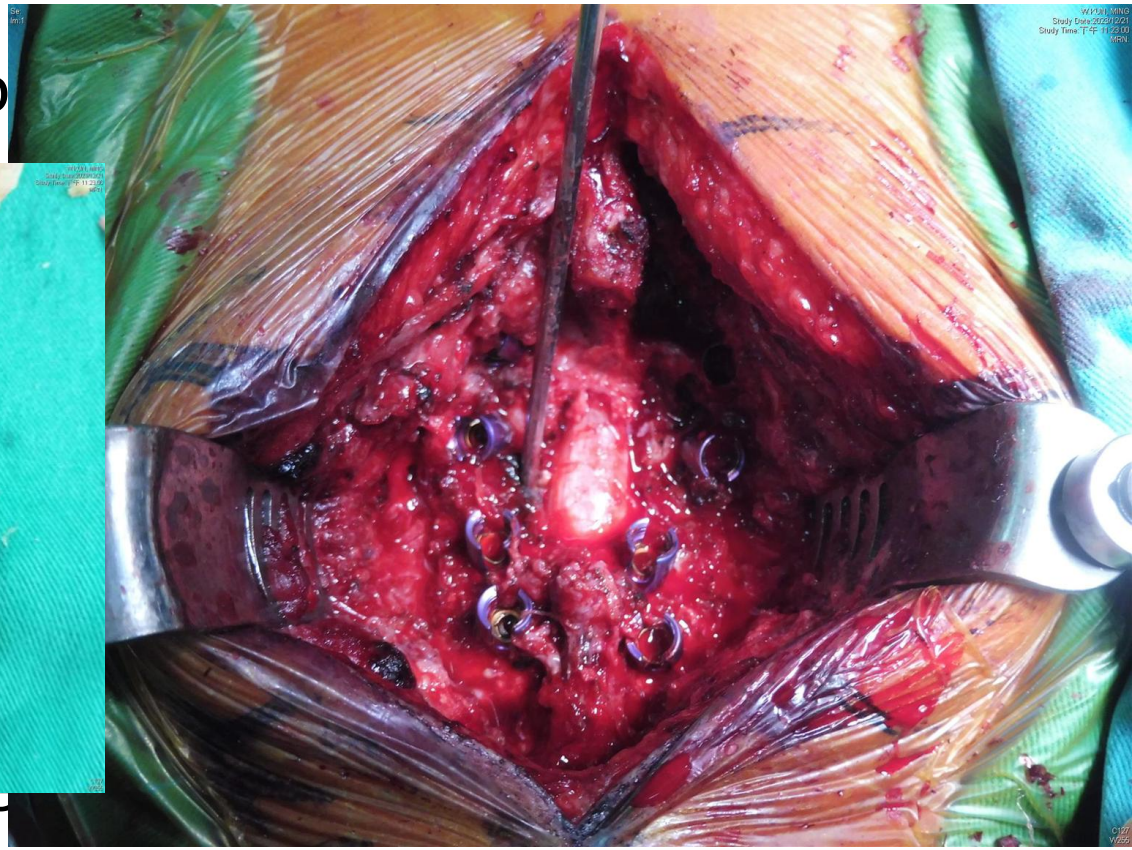
- SINS score (9, impending

Component	Score
Location	
Junctional (O-C2; C7-T2; T11-L1; L5-S1)	3
Mobile spine (C3-6; L2-4)	2
Semirigid (T3-10)	1
Rigid (S2-S5)	0
Mechanical pain	
Yes	3
No	2
Pain free lesion	1
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
Deformity (kyphosis/scoliosis)	2
Normal	0
Vertebral body collapse	
>50% collapse	3
<50% collapse	2
No collapse with >50% body involved	1
None of the above	0
Posterolateral involvement	
Bilateral	3
Unilateral	1
None of the above	0

[a]Data adapted from Fischer et al.[9]

Treatment

- Preop TAE for costo




R
28

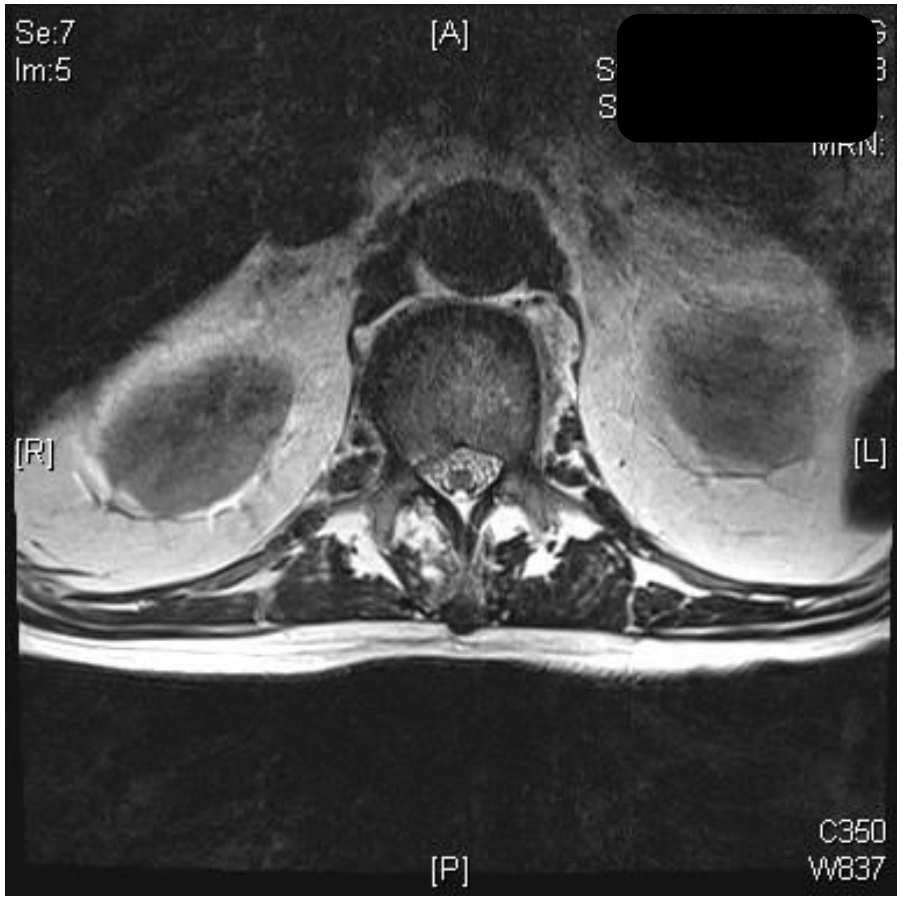

R
28

Case 3

Questionable treatment decision leads to poor outcome

- 75y/o man
- Lung SCC, T2N3M0, IIIb, s/p C/T, R/T
  - Liver and bone mets, IVb
- Low back pain, unsteady gait
- L-spine MRI
  - T10 and L1 vertebral body tumor
  - L1 conus medullaris compression, ESCC 1c


Se:3
Im:9
[H]
Stu
[A]
[P]
[F]
C474
W1038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W837


Se:9
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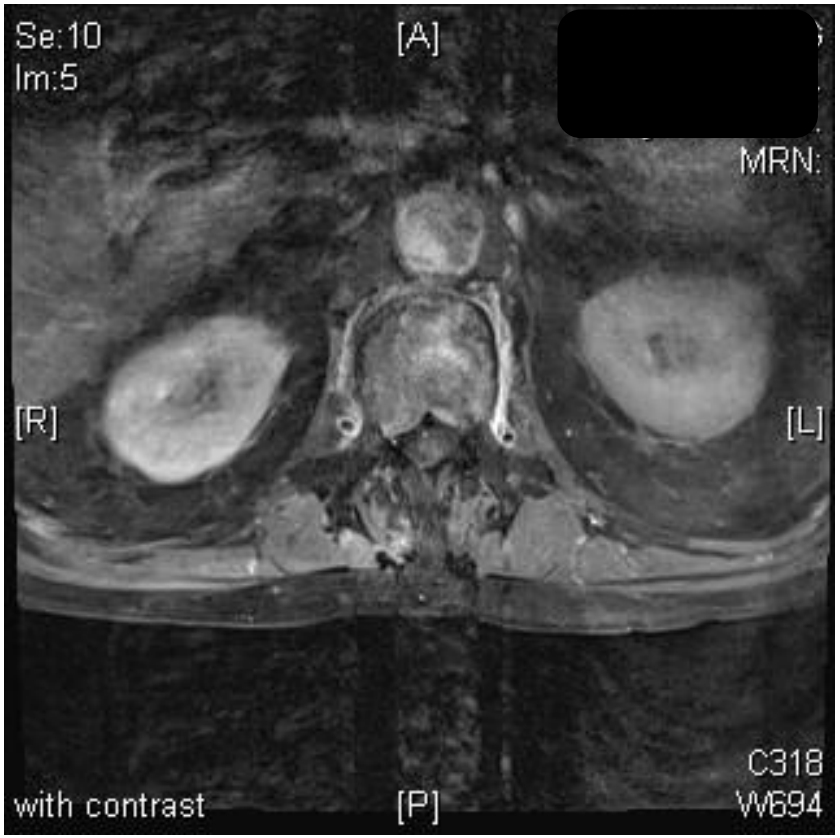
MRN:
[A]
[P]
C329
W737
with contrast
[F]


Se:10
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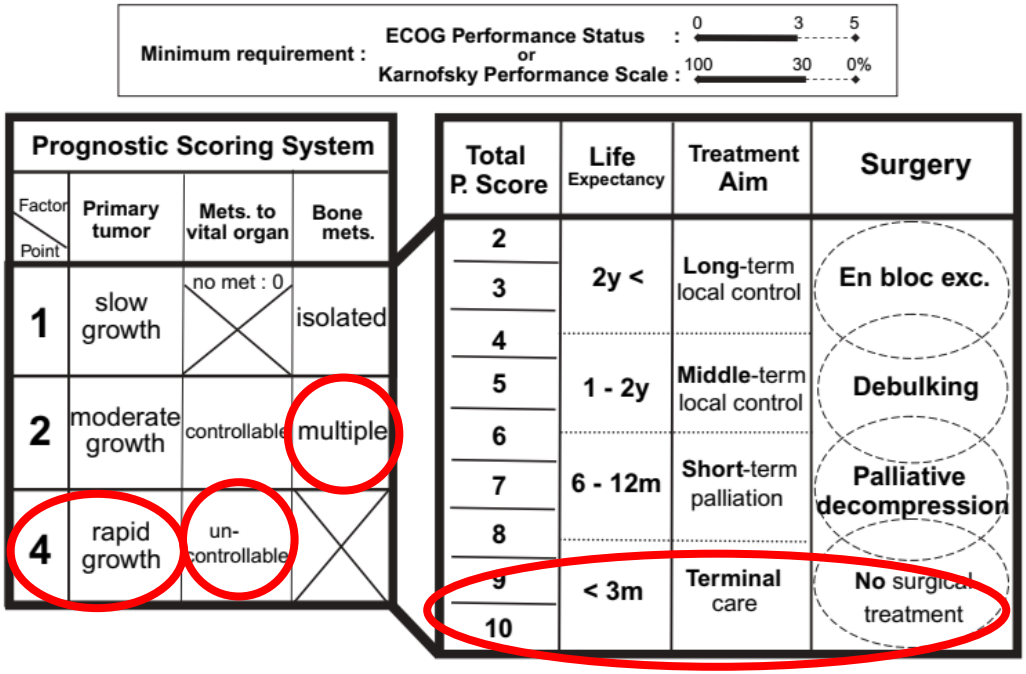
[R]
[L]
C318
W694
with contrast
[P]

Pre-op evaluation

- Tomita score (10)
- Multiple liver mets
- Right lung tumor
- Preop cardiac echo: EF 64.5%
- Preop lung function test: moderate obstructive impairment
- No surgical treatment

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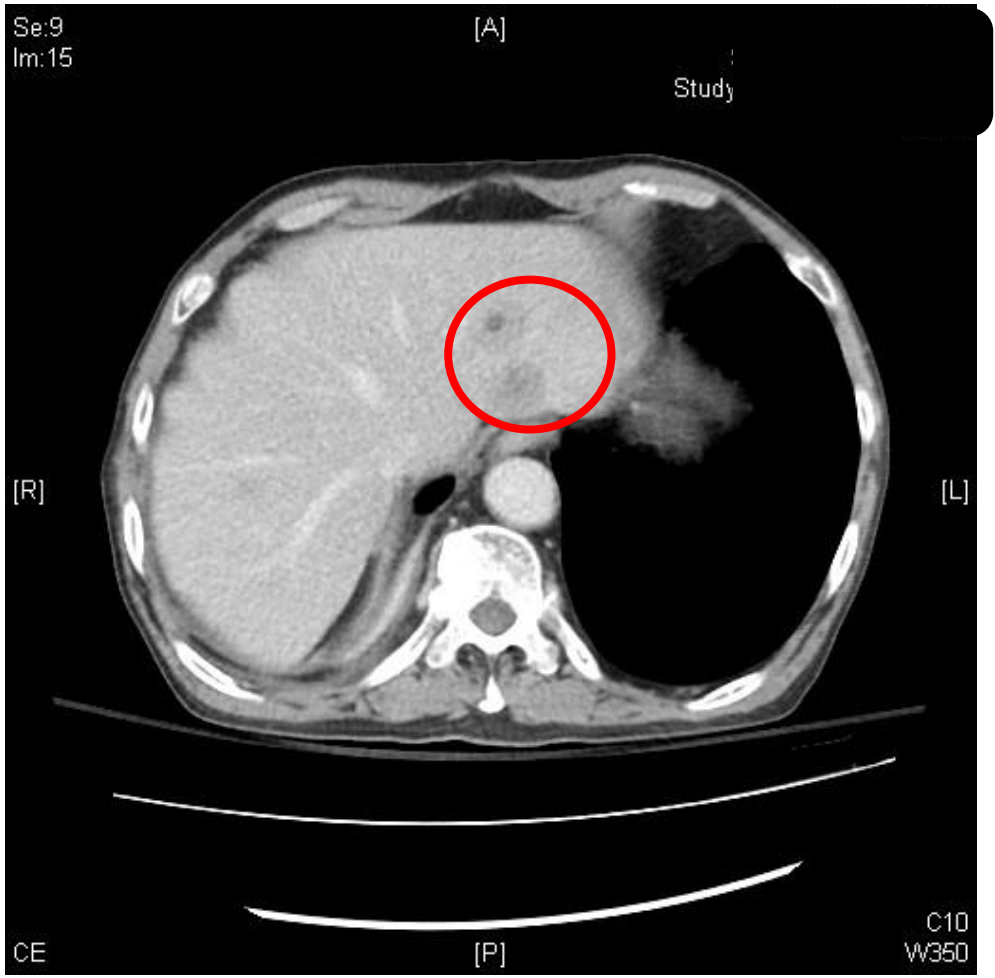
C-550
W1600


Se:9
Im:15
[A]
Study
[R]
[L]
CE
[P]
C10
W350

- SINS score (9, impending

Component	Score
Location	
Junctional (O-C2; C7-T2; T11-L1; L5-S1)	3
Mobile spine (C3-6; L2-4)	2
Semirigid (T3-10)	1
Rigid (S2-S5)	0
Mechanical pain	
Yes	3
No	2
Pain free lesion	1
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
Deformity (kyphosis/scoliosis)	2
Normal	0
Vertebral body collapse	
>50% collapse	3
<50% collapse	2
No collapse with >50% body involved	1
None of the above	0
Posterolateral involvement	
Bilateral	3
Unilateral	1
None of the above	0

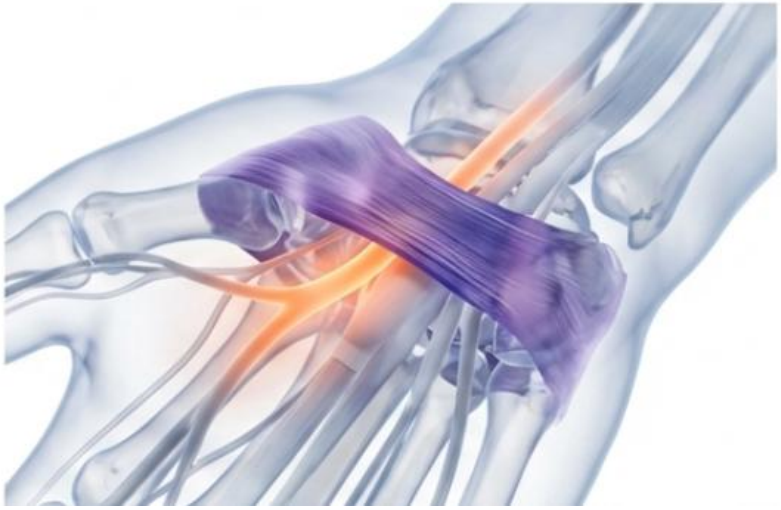
[a]Data adapted from Fischer et al.[9]

Treatment

Suggested surgery for spinal metastasis

- Surgery improves local control and possibly survival
- Palliative surgery for estimated survival > 3 months
- Consider excisional surgery for estimated survival > 12 or 24 months
  - At least separation surgery
  - En bloc tumor resection in selective cases (solitary metastasis with primary disease under control)
- Prognostication
- NOMS framework
- Multidisciplinary team

腕隧道症候群
Carpal Tunnel Syndrome
臨床評估、診斷與治療指引

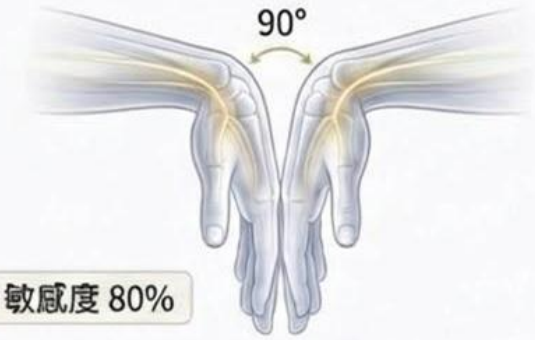


臨床症狀

Flick sign
(甩手徵象)

- **感覺異常 (Dysesthesias)**
  - 橈側 3.5 指麻木刺痛
  - 夜間加劇 (Nocturnal exacerbation)：患者常因麻痛而醒來
  - Flick sign（甩手徵象)：甩動手部可暫時緩解
- **運動功能 (Motor)**
  - 握力減弱，難以轉開瓶蓋
  - 大魚際肌 (Thenar muscle) 萎縮（晚期）
- **加重因子**
  - 駕駛、講電話、閱讀等需手部抬高動作

激發測試 (Provocative Tests)



Phalen's test

敏感度 80%

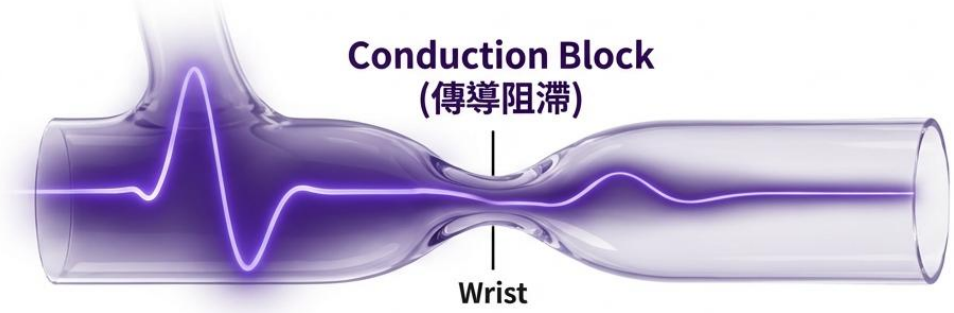
敏感度 80%

Tinel's sign

敏感度 60%

敏感度 60%

神經電生理診斷 (Electrodiagnostic Testing - EDX)



非手術治療方式

有效治療 Effective ✓

- ✅ 護具固定 (Splinting):
  採中立姿勢，>80% 緩解
- ✅ 類固醇注射
  (Steroid Injection):
  >75% 改善

無效/證據不足 Ineffective ✗

- ✗ 非類固醇消炎藥 (NSAIDs)
- ✗ 利尿劑 (Diuretics)
- ✗ 維他命 B6 (Vitamin B6)

超音波導引治療 (Ultrasound-guided Treatment)

水解離術 (Hydrodissection)

原理與目的 (Mechanism & Goal)

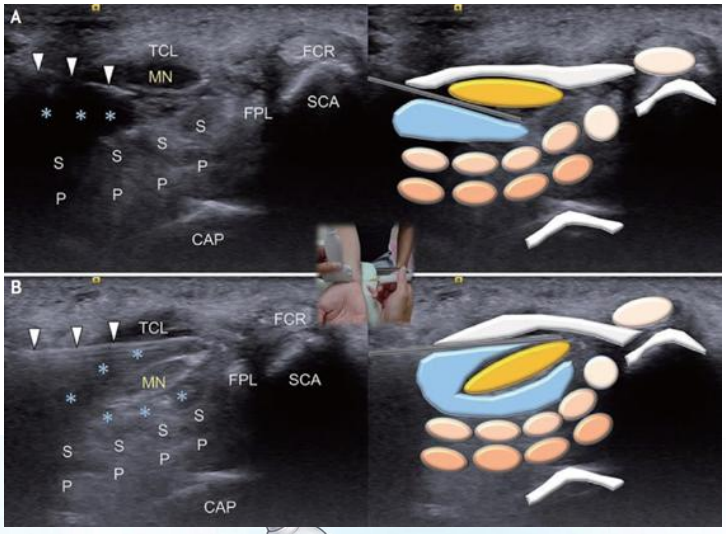
- 原理：利用液體 將沾黏的組織分離
- 目的：減少神經壓迫，改善血液循環

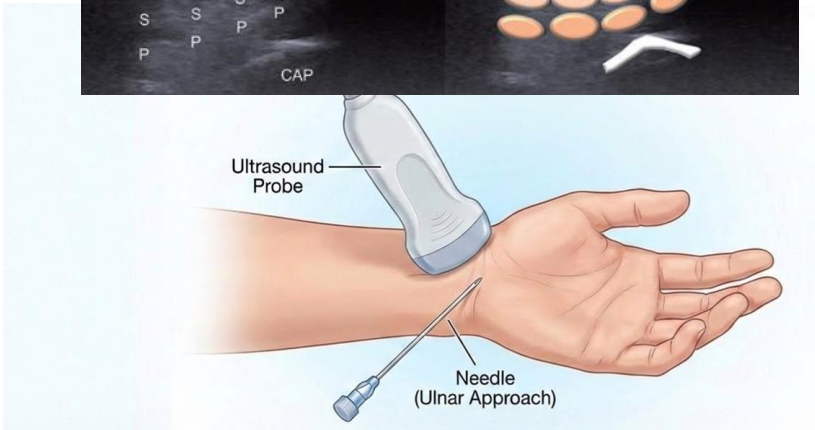
常用藥物配方 (Common Medication Formula)：

- Triamcinolone
- 2% Lidocaine
- Normal Saline

優點 (Advantages)

✅ 精準定位，即時影像監控
✅ 微創手術，傷口小，恢復快
✅ 門診進行，安全性高





Comments and Questions

嘉義長庚神經外科門診

週二上午、週四下午

嘉義市聖馬爾定醫院門診

週五下午