La radioterapia nella palliazione extracranica

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Taranto, 20 Gennaio 2006

RT palliativa polmonare III e IV stadio

The 12 randomized trials of palliative radiotherapy for advanced lung cancer

Trial	No. Patients	Regimens compared
Simpson (1985)	316	40 Gy/20 F vs **30 Gy/10 F** vs 40 Gy/10 F
Teo (1988)	273	45 Gy/18 F vs 31.2 Gy/4 F
MRC (1991)	369	**30 Gy/10 F** or 27 Gy/6 F vs **17 Gy/2 F**
MRC (1992)	235	**17 Gy/2 F** vs **10 Gy**
Abratt (1995)	84	35 Gy/10 F vs 45 Gy/15 F
MacBeth (1996)	509	36 or 39 Gy/12-13 F vs **17 Gy/2 F**
Rees (1997)	216	**17 Gy/2 F** vs 22.5 Gy/5 F
Reinfuss (1999)	240	50 Gy/25 F vs 40 Gy/10 F vs delayed RT
Nestle (2000)	152	32 Gy/16 F vs 60 Gy/30 F
Gaze (2001)	148	**10 Gy** vs **30 Gy/10 F**
Bezjak (2002)	230	20 Gy/5 F vs **10 Gy**
Sundstrom (2004)	407	**17 Gy/2 F** vs 42 Gy/15 F vs 50 Gy/25 F

Total 3179

The 12 randomized trials of palliative radiotherapy for advanced lung cancer

Results

- The short-course RT is safe and effective tool for palliating lung cancer symptoms and
- is appropriate for selected poor-prognosis patients

but

- Perhaps one dose is not enough
- Dysphagia appeared early with short-course RT
- There could be a survival benefit in selected cases if protracted RT is used (3-year survival: 6% vs. 1%)

JA Bogart Hypofractionated RT for advanced NCSLC…. J Clin Oncol 2004

Short-course palliative radiotherapy in non-small-cell lung cancer: results of a prospective study.

Lupattelli M., Maranzano E., et al. Am J Clin Oncol. 2000 Feb;23(1):89-93.

Results

- stage IIIB e IV (81 evaluable pts)
- 8 Gy x 2
- PS: 2-3
- Clinical palliation in 77% pts
- PS improvement in 73% pts
- Median survival: 5 months
- Median palliation time: ≈ 50% of pt survival time
- WHO grade III dysphagia in 5% of pts

Radioterapia ipofrazionata e vinorelbina concomitante nel trattamento palliativo di pazienti stadio III-IV affetti ad NSCLC: studio di fase I-II

Campoccia S., Silvano G., Maranzano E., et al. Tumori, Suppl. 2, Vol 86, S40, 2000

Risultati

- stadi IIIB e IV (35 pts): studio ***dose finding***
- 8.5 Gy x 2 (17 Gy) ovvero 5 Gy/fr,1fr/sett x 12 sett (60 Gy)
- Dose massima di Vinorelbina settimanale:

  17 Gy: 20 mg/m^2

  60 Gy: 10 mg/m^2

- Entrambi gli schemi sono fattibili e offrono un buon controllo dei sintomi

Metastasi ossee

EDITORIALS

Palliative Single-Fraction Radiation Therapy: How Much More Evidence Is Needed?

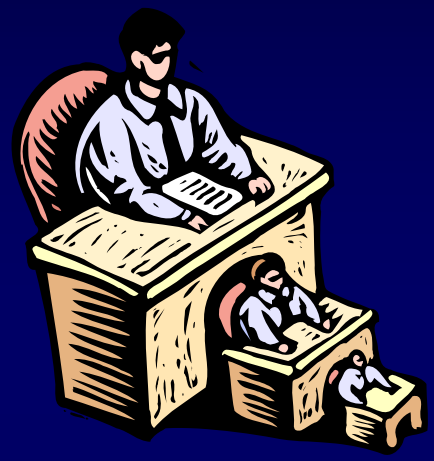
Lisa Kachnic, Lawrence Berk

Journal of the National Cancer Institute, Vol. 97, No. 11, June 1, 2005

In conclusion, three very large randomized trials—the Dutch Bone Metastases Study with 1171 patients, the BPTWG with 765 patients, and the RTOG trial reported in this issue with 898 patients—have all demonstrated that single-fraction radiation therapy is sufficient to achieve palliation of painful bone metastases. It remains to be seen if this approach will become standard of care in the United States. The outcome may distinguish whether radiation oncologists in the United States practice evidence-based or remuneration-based medicine.

Opinion-based Medicine

Eminence-based Medicine



Evidence-based Medicine: Evidenza I studio/i fase III, Meta-analisi

Compressione midollare metastatica

JOURNAL OF CLINICAL ONCOLOGY

VOLUME 23 · NUMBER 15 · MAY 20 2005

Short-Course Versus Split-Course Radiotherapy in Metastatic Spinal Cord Compression: Results of a Phase III, Randomized, Multicenter Trial

E. Maranzano
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Radiation Therapy Alone for Spinal Cord Compression: Time to Improve Upon a Relatively Ineffective Status Quo

Y.Kwok, W.F. Regine, R.A.Patchell
Dpts of Radiotherapy and Neurosurgery,
University of Kentuchy, Lexington, USA

JOURNAL OF CLINICAL ONCOLOGY

VOLUME 23 · NUMBER 32 · NOVEMBER 10 2005

Radiotherapy Alone or Surgery in Spinal Cord Compression? The Choice Depends on Accurate Patient Selection

Ernesto Maranzano
Radiation Oncology Center, Azienda Ospedaliera, Terni, Italy

Radiation Dose in Spinal Cord Compression

Fergus Macbeth
Velindre Hospital, Cardiff, United Kingdom

Richard Stephens
Medical Research Council Clinical Trials Unit, London, United Kingdom

Peter Hoskin
Mount Vernon Cancer Centre, Northwood, United Kingdom

Radioterapia Stereotassica (SBRT)

PREMESSA

✓ Per essere efficace la RT palliativa dovrebbe:

1. essere intrapresa il prima possibile
2. essere effettuata in un breve periodo di tempo
3. non comportare tossicità

✓ Questi obiettivi in certi casi sono meglio perseguibili con le **Tecniche Speciali:**

Radioterapia stereotassica

SBRT: **studi clinici** (fase I-II)

Int J Radiat Oncol Biol Phys 2004-05

- ….Stereotactic intensity-modulated RT of paraspinal tumors: a preliminary report. Yamada, Leibel, MSKCC, NY
- Phase I ……SBRT for spinal metastases. Chang, MDACC, Houston
- A phase I……. SBRT for liver metastases. Schefter, University of Colorado
- Impact of IMRT and leaf width on SBR of liver and lung lesions. Dvorac, Vienna.
- …….predicts acute esophagitis …… Poltinnicov, TJUH, Philadelphia
- ……liver RT with active breathing control. Dawson, PMH, Toronto

SBRT: **Dosi**

	15 Gy x 3	8 Gy x 5	10 Gy x 5
Dose equivalente a frazioni di 2 Gy (EQD2):			
α/β = **3** (polmone)	162 Gy	88 Gy	130 Gy
α/β = **10** (tumore)	94 Gy	60 Gy	84 Gy

SBRT: Selezione

1. Orecchia, Cognetti Comunicato AIRO-AIOM sulla radiochirurgia stereotassica. Sito AIRO 2003.
2. ASTRO & ACR practice guideline for the performance of SBRT. IJROBP 2004

- Performance Status (IK ≥ 70)
- Controllo del primitivo
- Volume limitato (∅ ~ 3 - 4 cm; ∅ PTV≤5 cm)
- N. di lesioni limitato (1 - 3)
- Buona definizione del bersaglio

< 50% dei pazienti valutati sono elegibili per la SBRT

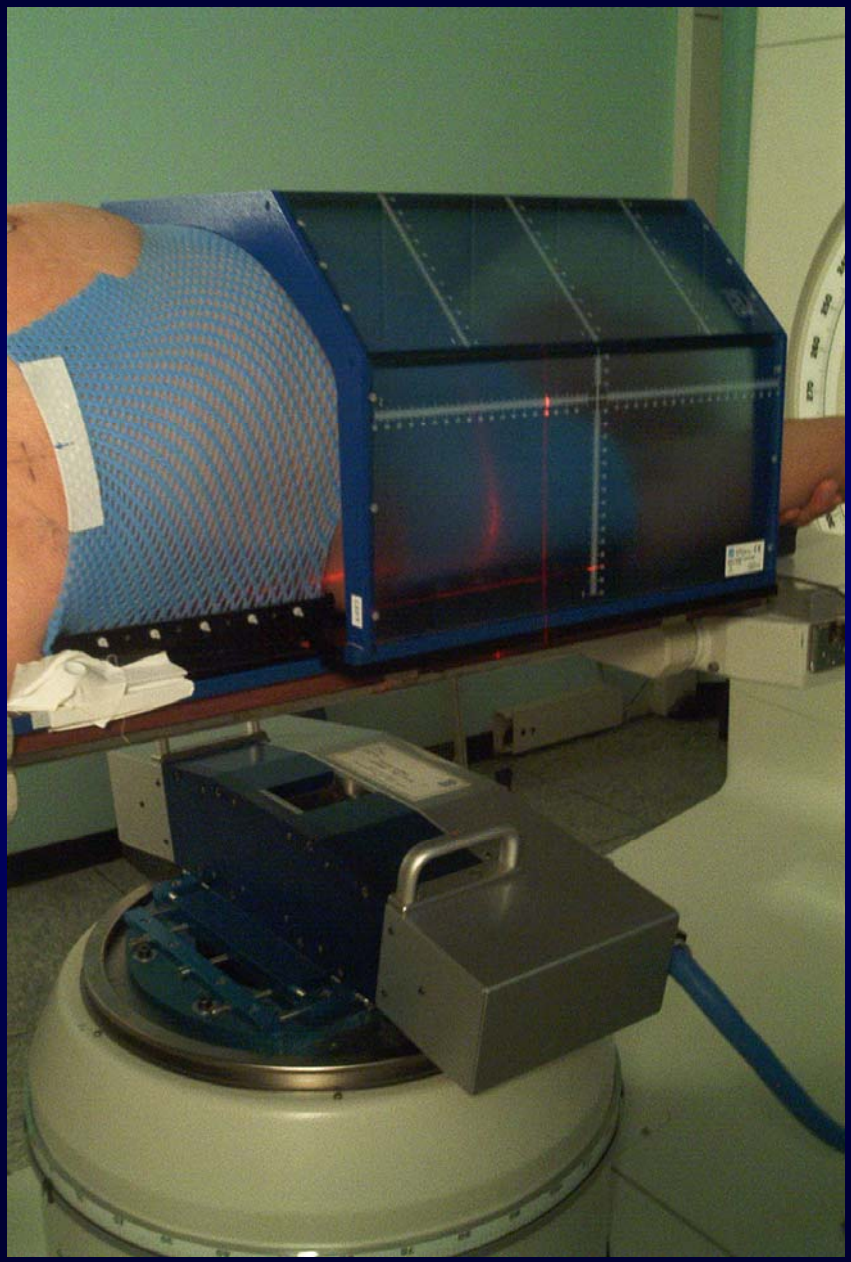
SBRT per metastasi: Pianificazione del trattamento

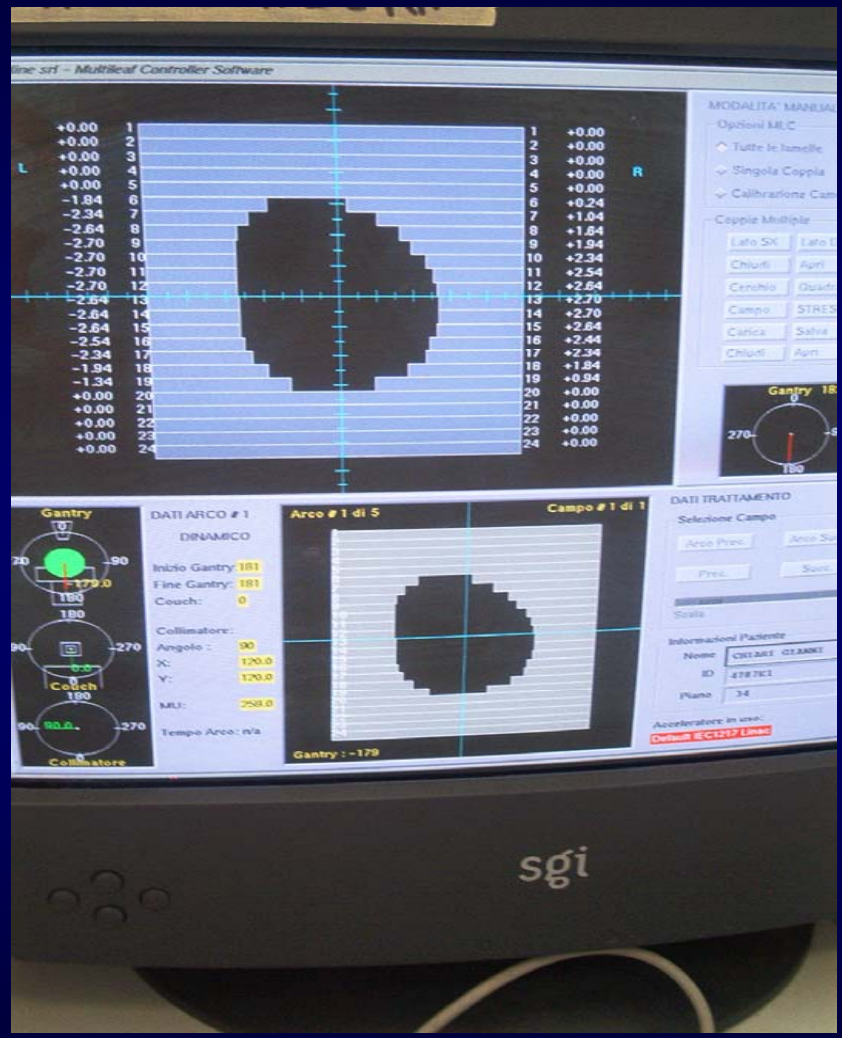
- ✓ Individuazione di bersaglio e organi a rischio con TC
- ✓ In genere CTV = GTV
- ✓ PTV da definire in base alla mobilità interna (respirazione)

✓ ORGANI A RISCHIO:

Dosi massime ammissibili:	Da non irradiare!
20% polmone omo: max 12 Gy	**esofago, tenue, organi cavi**
20% fegato/cuore: max 16 Gy	**grossi vasi**
midollo spinale: max 15 Gy	

Micro multi leaf dinamico





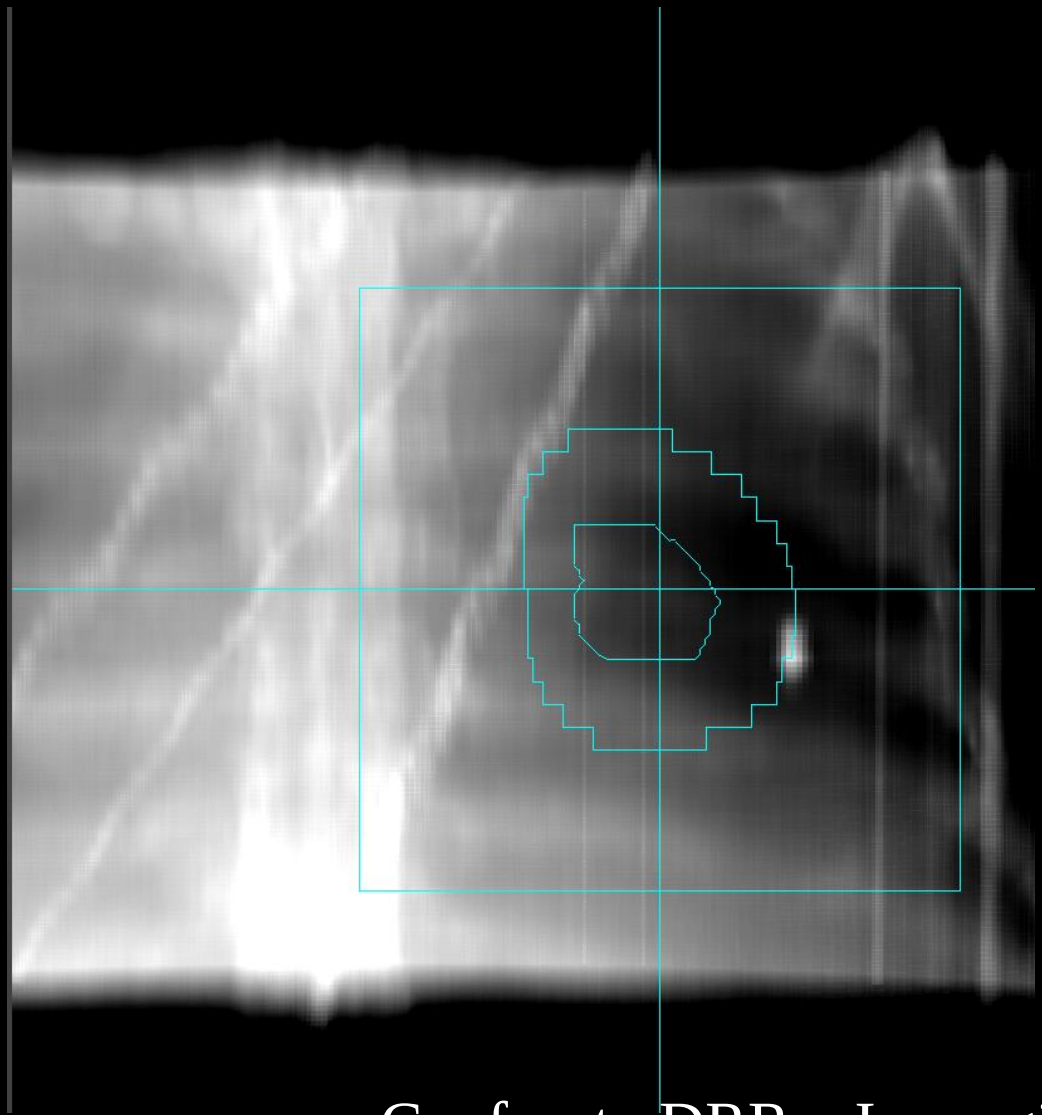
Accuratezza del trattamento

Immobilizzazione

TC di centraggio

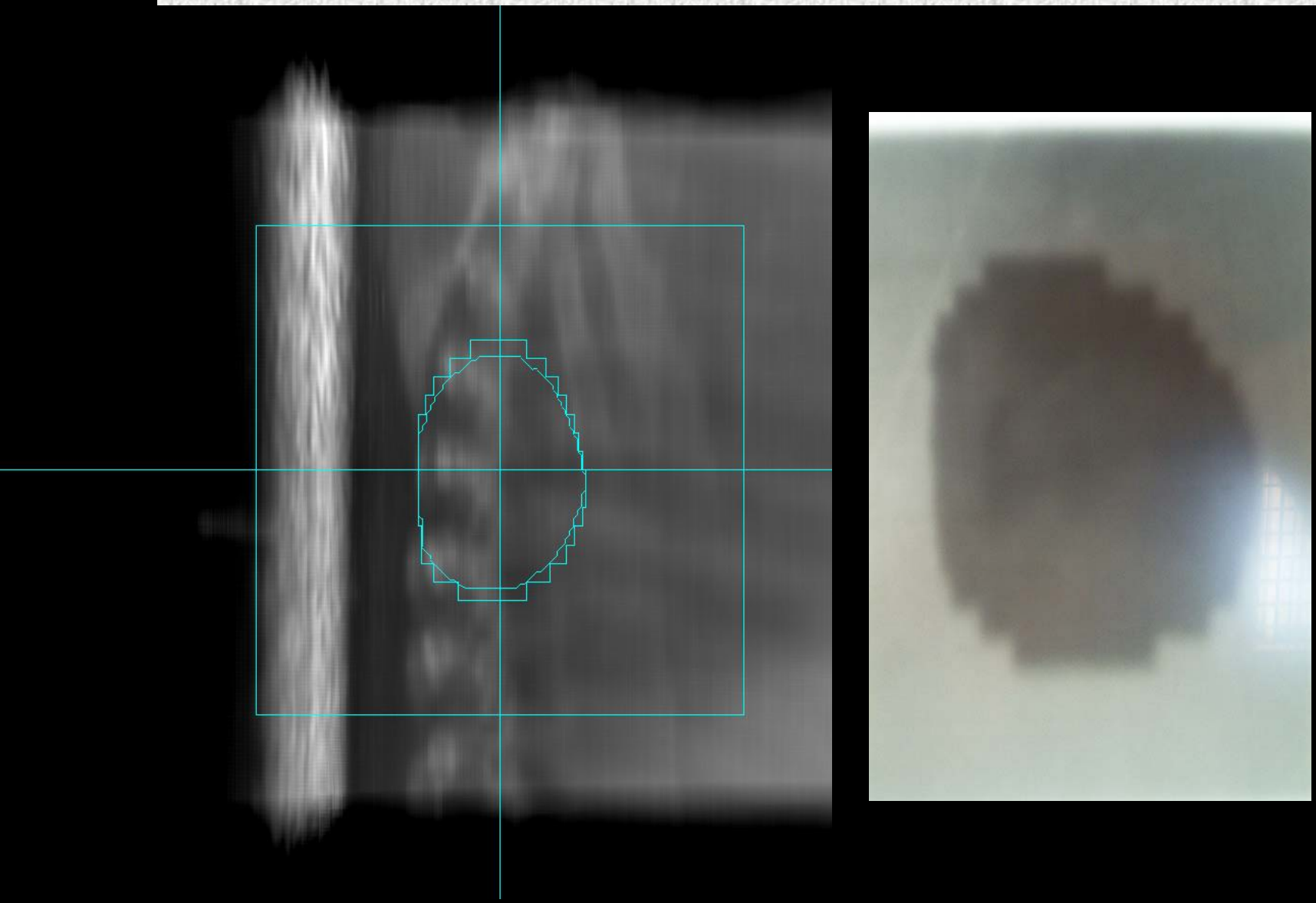
Treking ottico
Sistemi per regolare il respiro

ACCURATEZZA DEL TRATTAMENTO



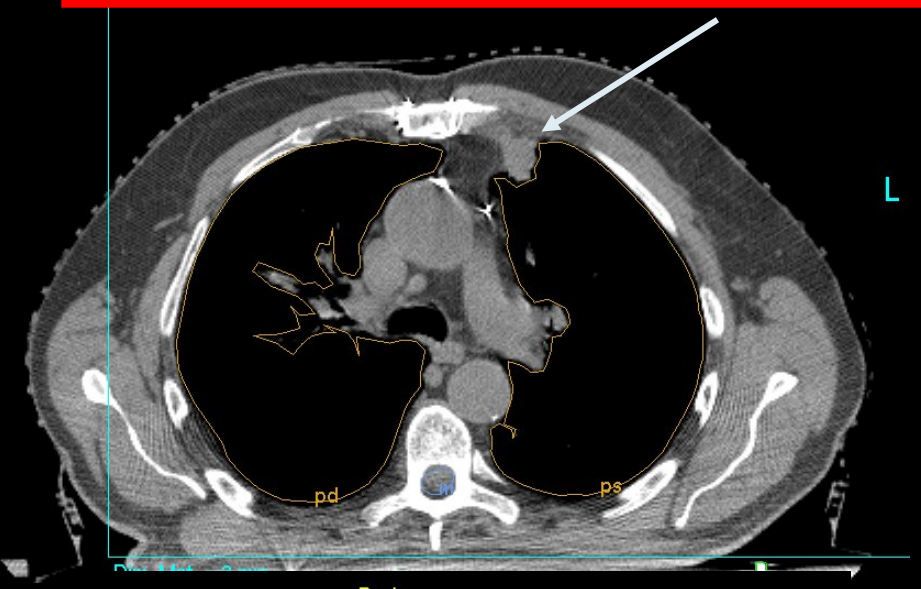
Confronto DRR – Immagine Portale (0°)

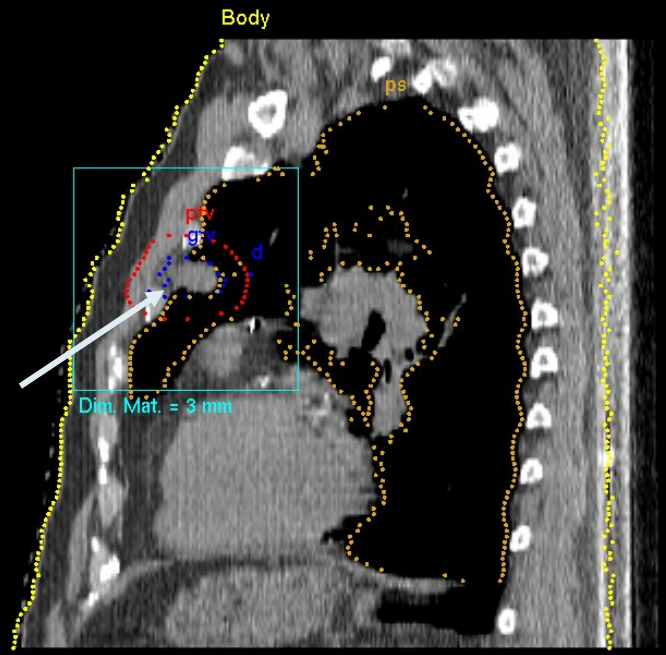
ACCURATEZZA DEL TRATTAMENTO



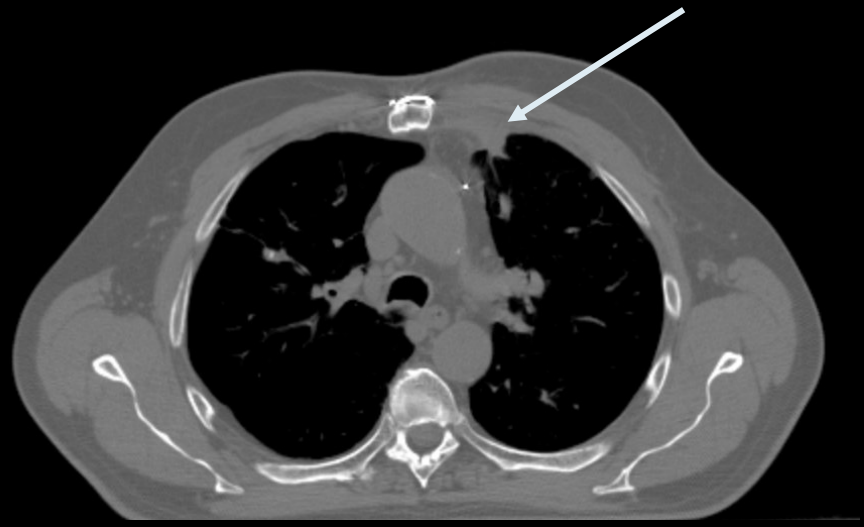
Confronto DRR – Immagine Portale (270°)

Alla diagnosi

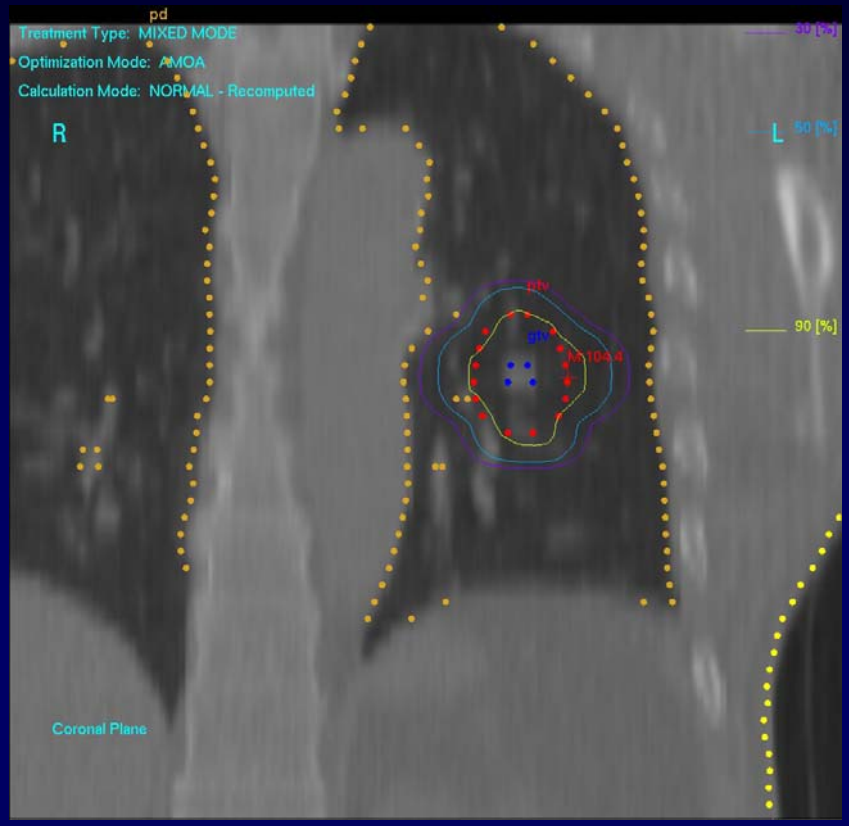




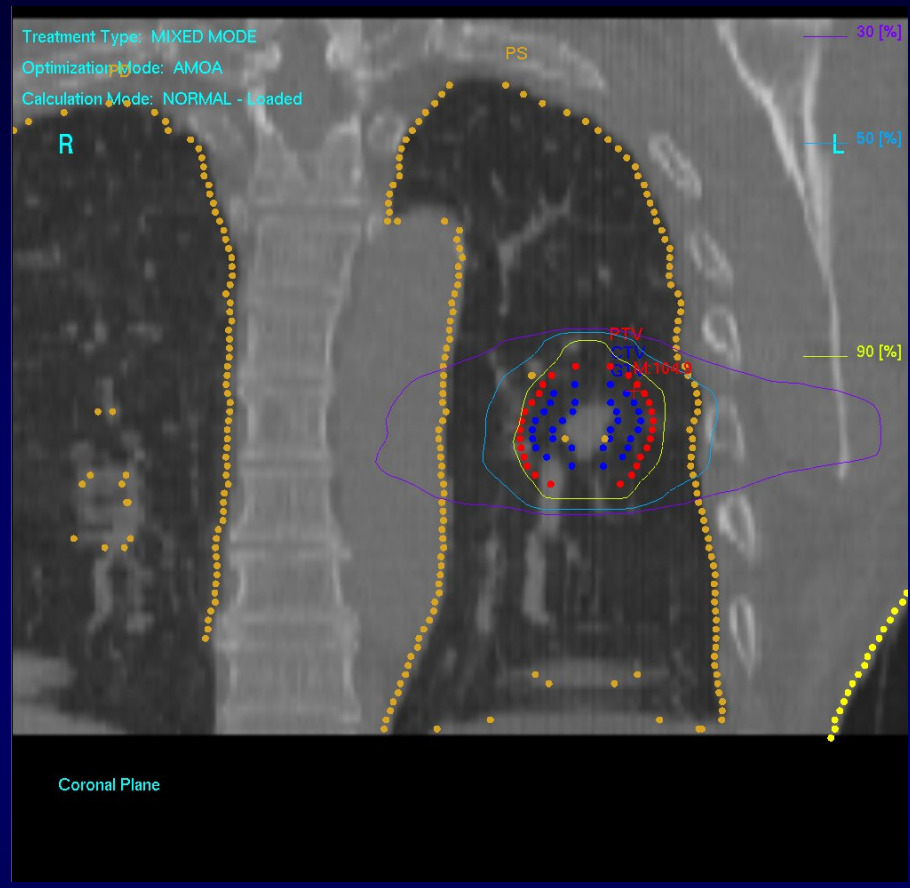
Dopo ESRT: 8 Gy x 5



Dopo ESRT (8 Gy x 5):
RP della lesione senza pneumopatia post-attinica

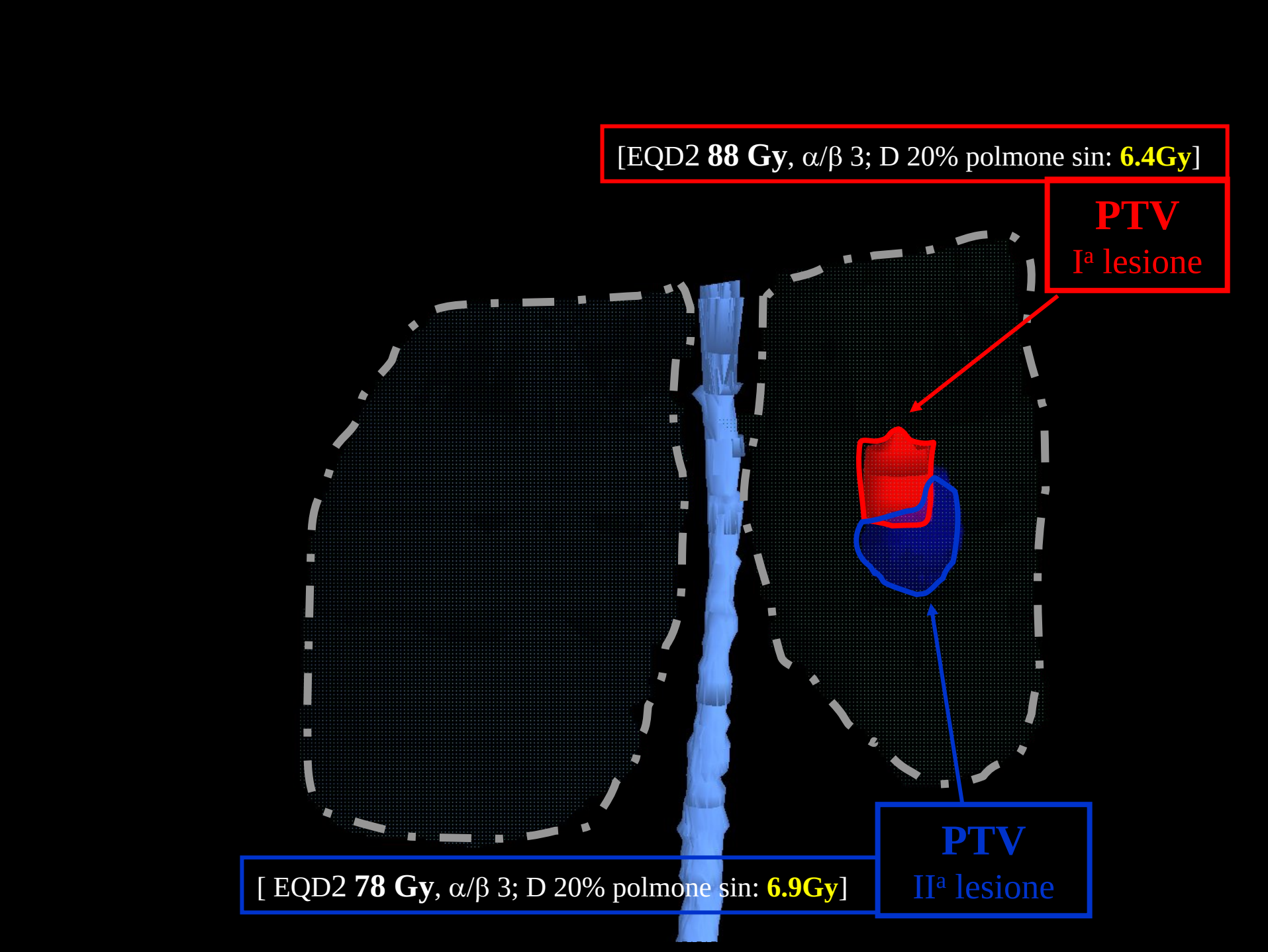


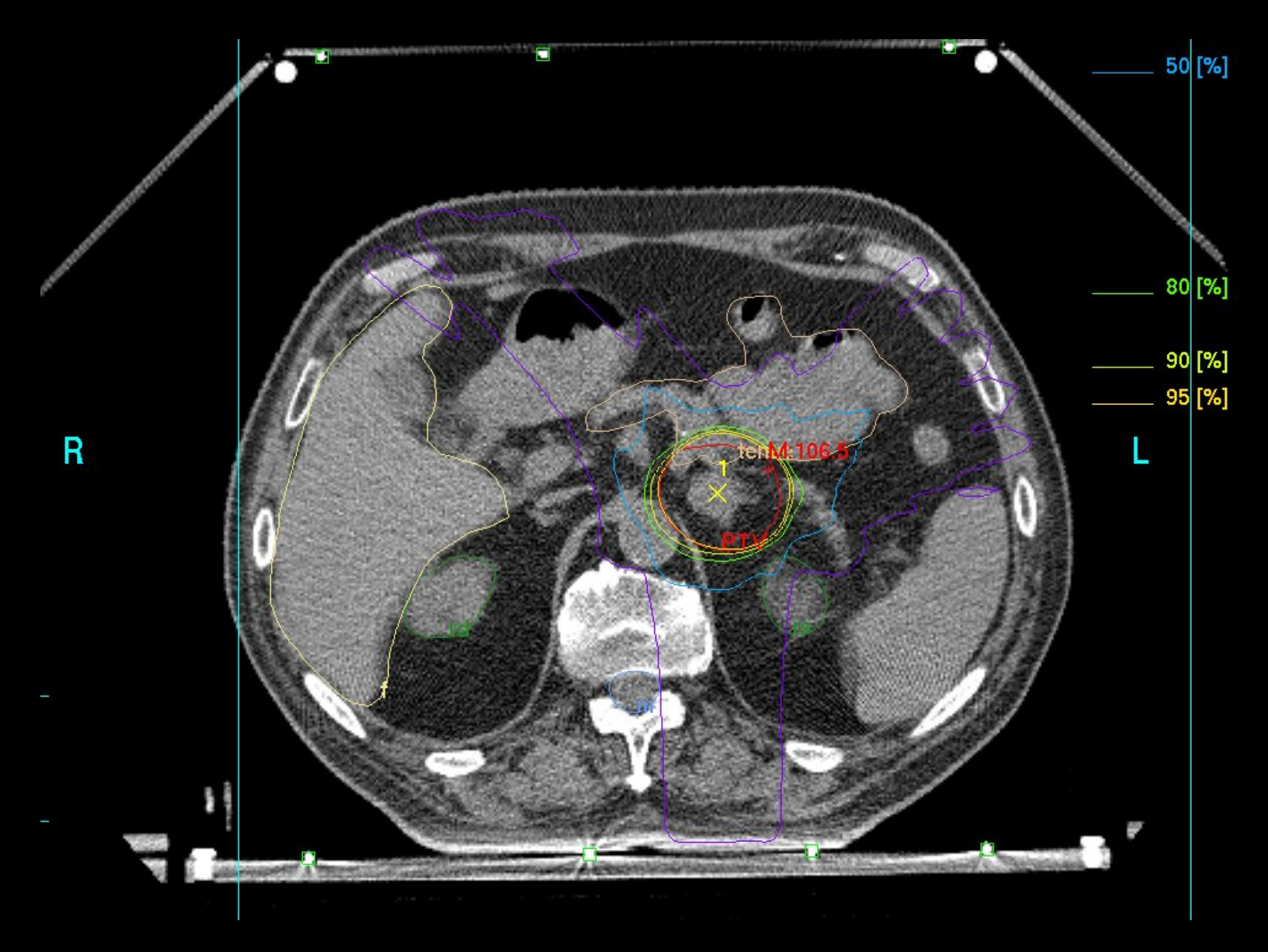
Metastasi unica di NSCLC:
FSRT 8 Gy x 5

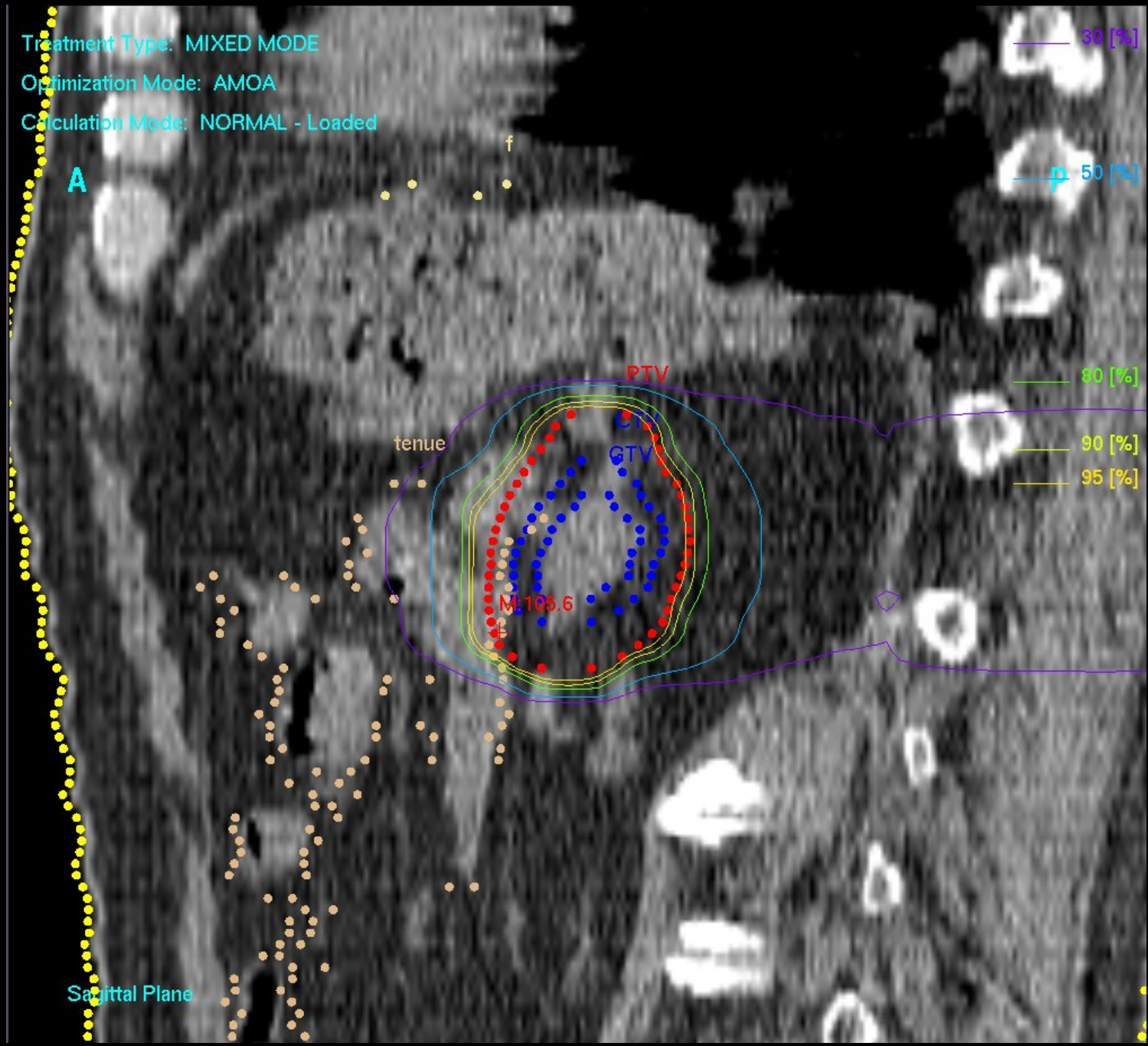


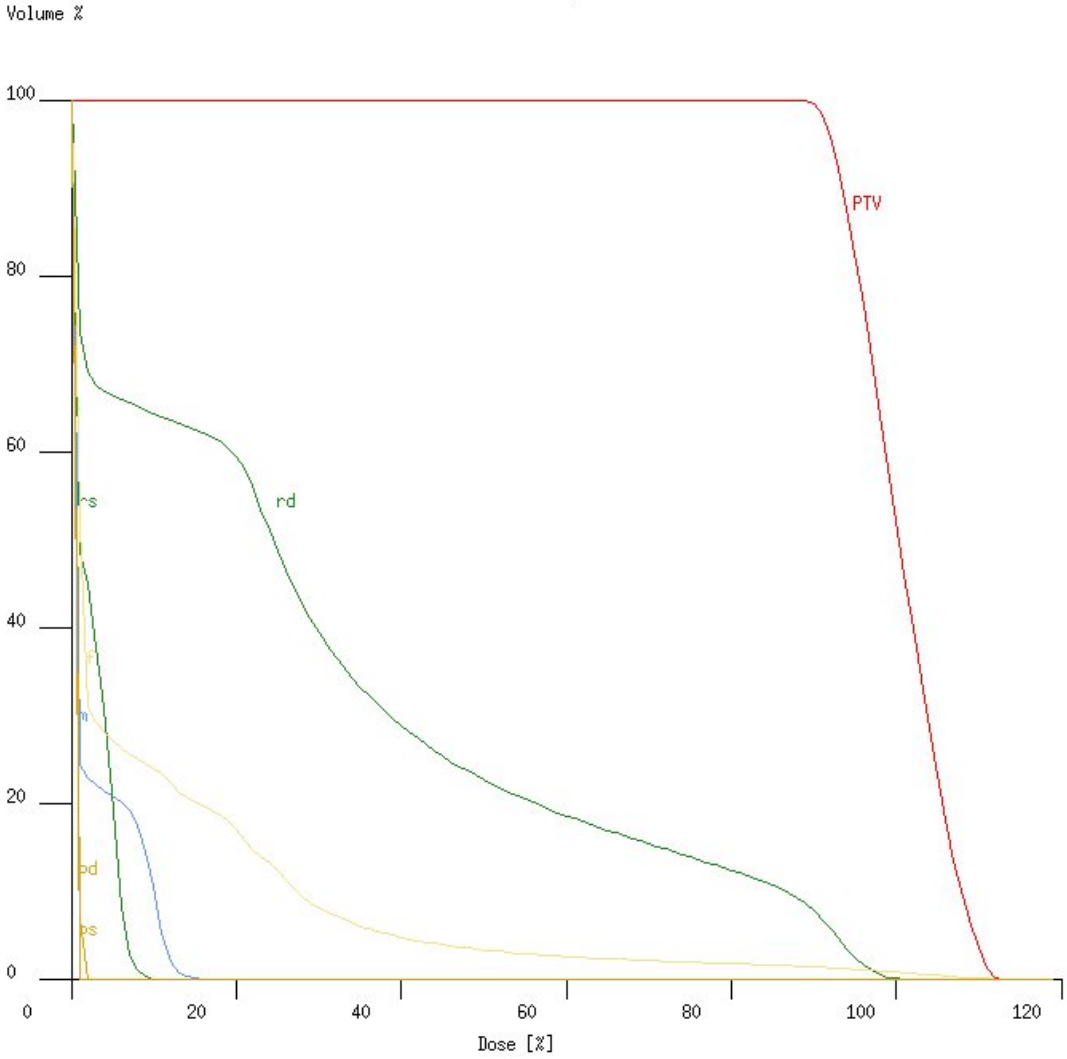
12 mesi dopo.

RC lesione irradiata.
II lesione: FSRT 10 Gy x 3


[EQD2 88 Gy, α/β 3; D 20% polmone sin: 6.4Gy]
PTV
Ia lesione
[EQD2 78 Gy, α/β 3; D 20% polmone sin: 6.9Gy]
PTV
IIa lesione

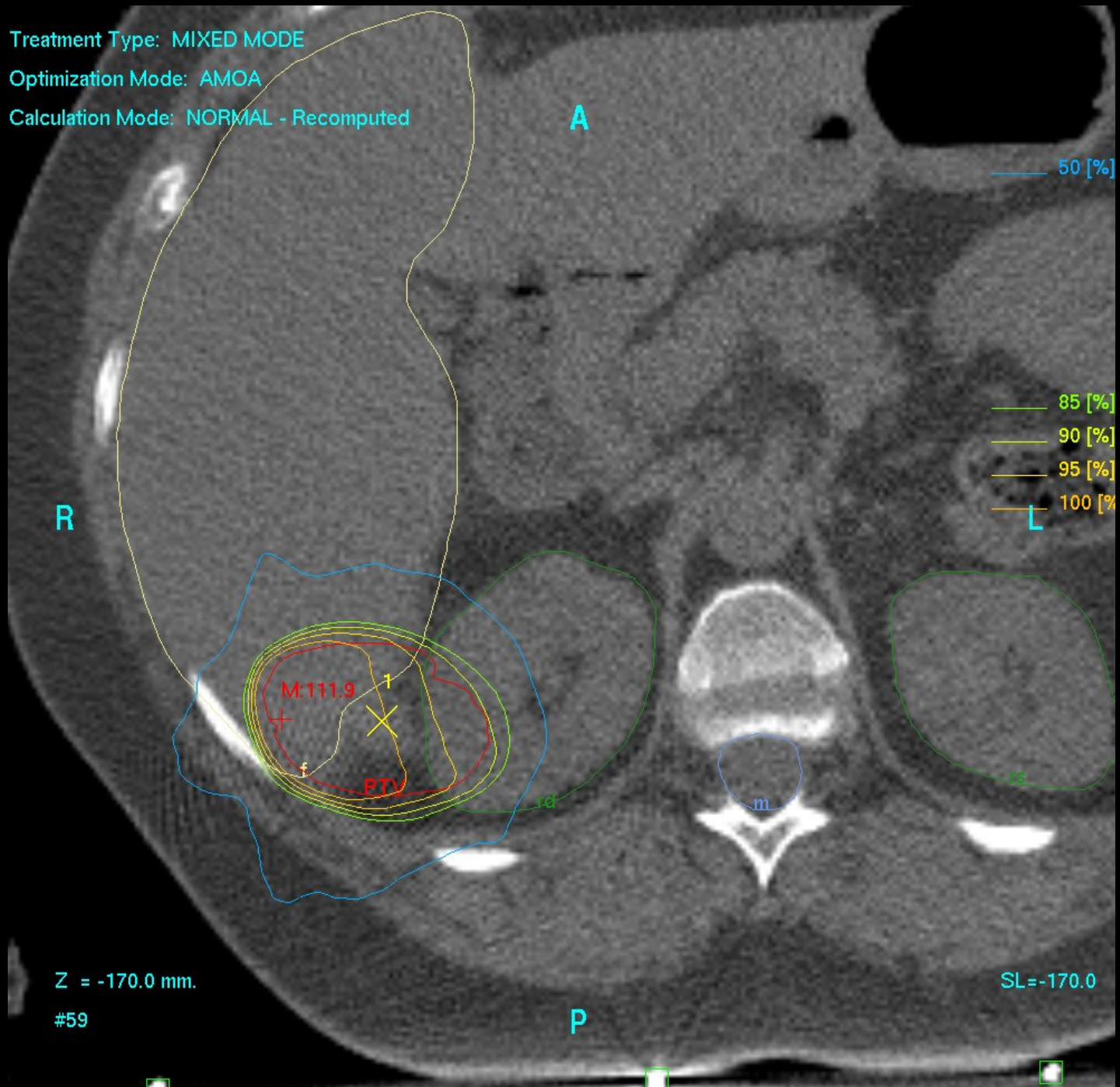

50 [%]
80 [%]
90 [%]
95 [%]
R
L
M:106.5
1
PTV

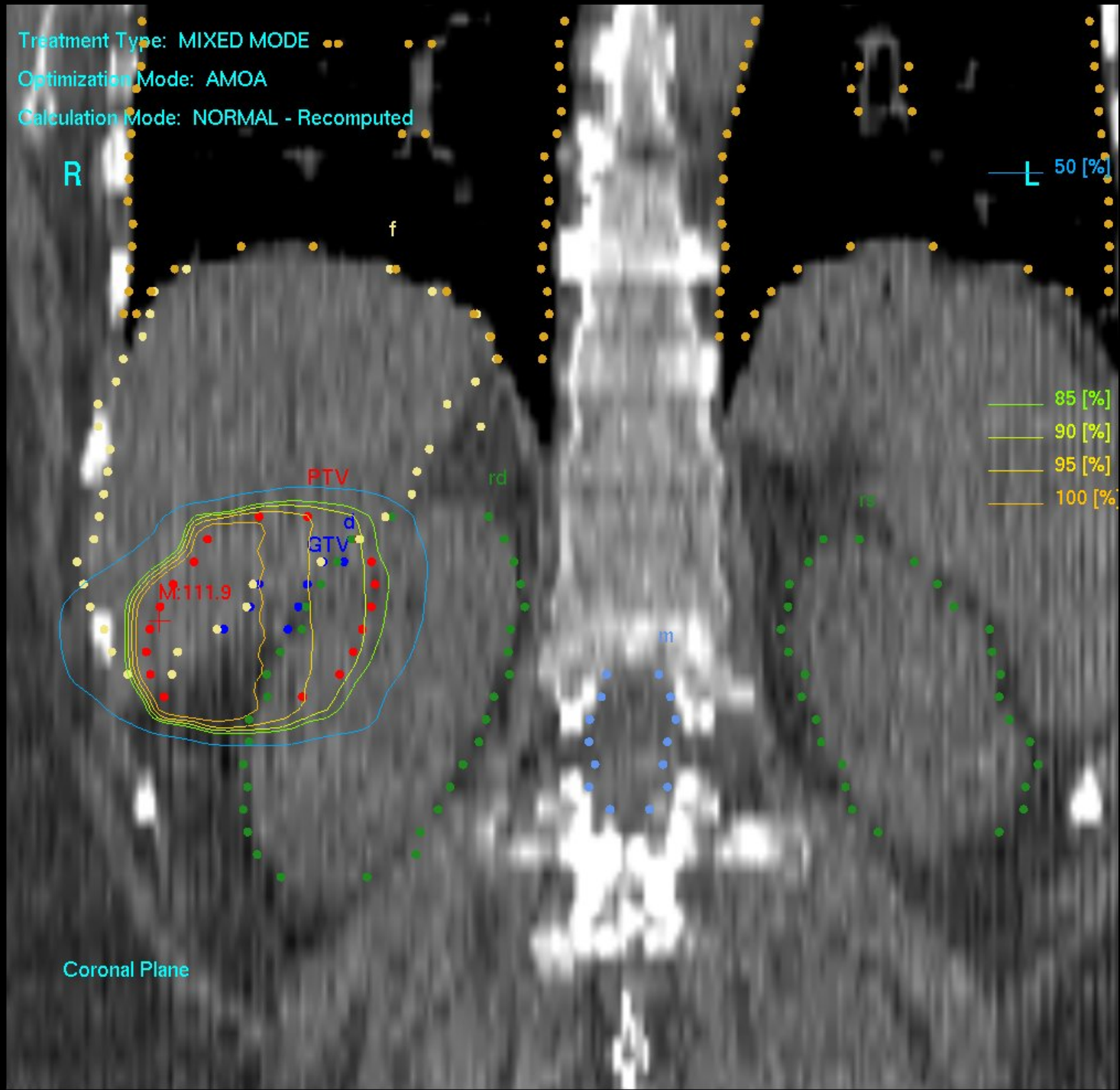

Treatment Type: MIXED MODE
Optimization Mode: AMOA
Calculation Mode: NORMAL - Loaded
A
f
30 [%]
50 [%]
PTV
CTV
GTV
tenue
80 [%]
90 [%]
95 [%]
M 105.6
Sagittal Plane



VOI	Vol. (cc)	Area	Dose (%) Max	Min	Avg.
PTV	39.8	101	112	88	100
m	67.8	3	15	0	2
rd	169.2	30	100	0	29
rs	182.2	2	9	0	1
f	2174.7	9	111	0	8
pd	905.0	1	1	0	0
ps	665.7	1	0	0	0

(*) VOI partially outside dose grid
(#) VOI could be outside image volume


Treatment Type: MIXED MODE
Optimization Mode: AMOA
Calculation Mode: NORMAL - Recomputed
A
50 [%]
85 [%]
90 [%]
95 [%]
100 [%
R
L
M:111.9
1
f
PTV
rd
m
rs
Z = -170.0 mm.
#59
P
SL=-170.0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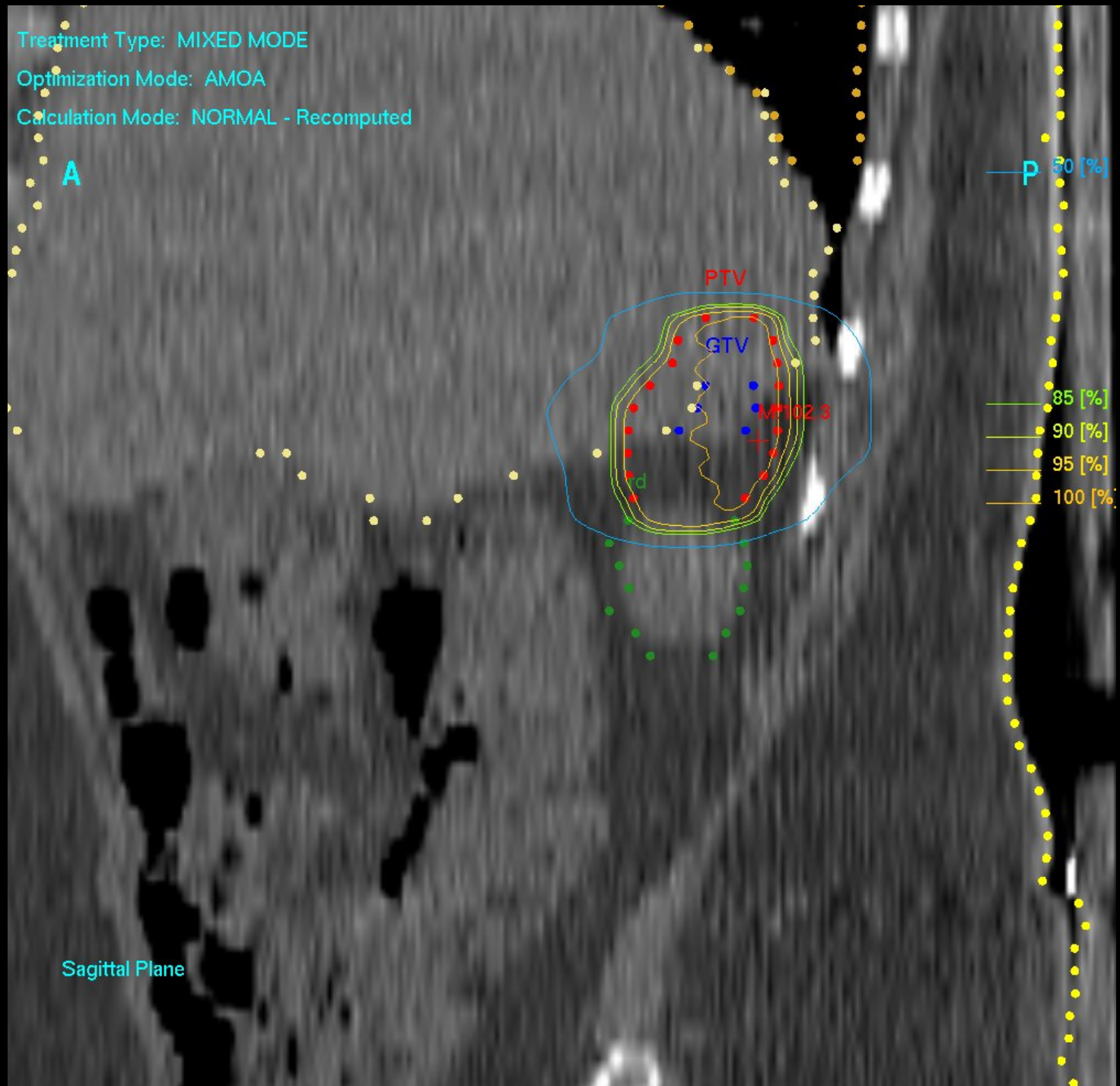
Optimization Mode: AMOA
Calculation Mode: NORMAL - Recomputed
R
L
50 [%]
f
85 [%]
90 [%]
95 [%]
100 [%]
PTV
GTV
M:111.9
rd
rs
m
Coronal Plane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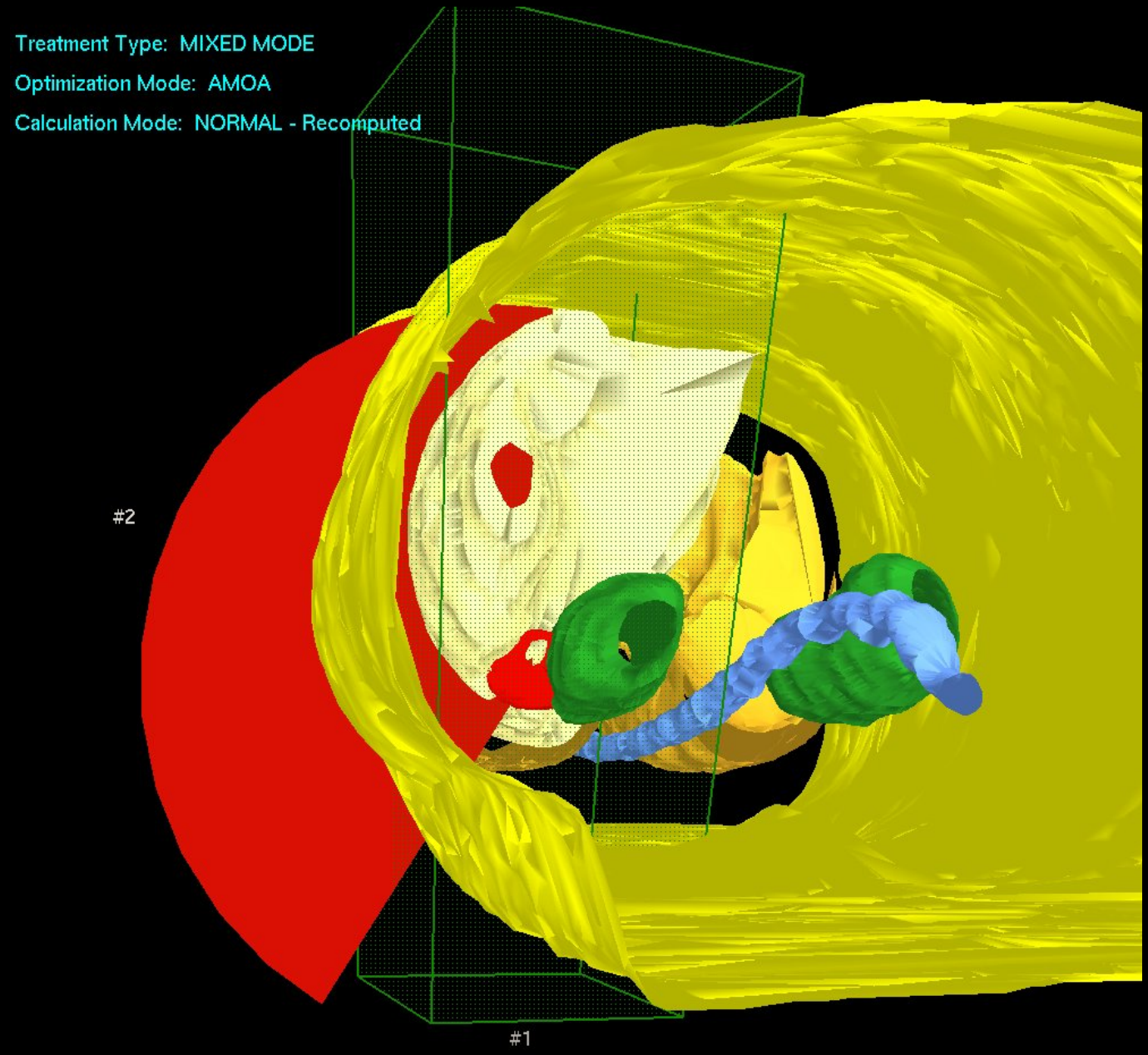
Optimization Mode: AMOA
Calculation Mode: NORMAL - Recomputed
A
P
50 [%]
PTV
GTV
MP102.3
85 [%]
90 [%]
95 [%]
100 [%]
Sagittal Plane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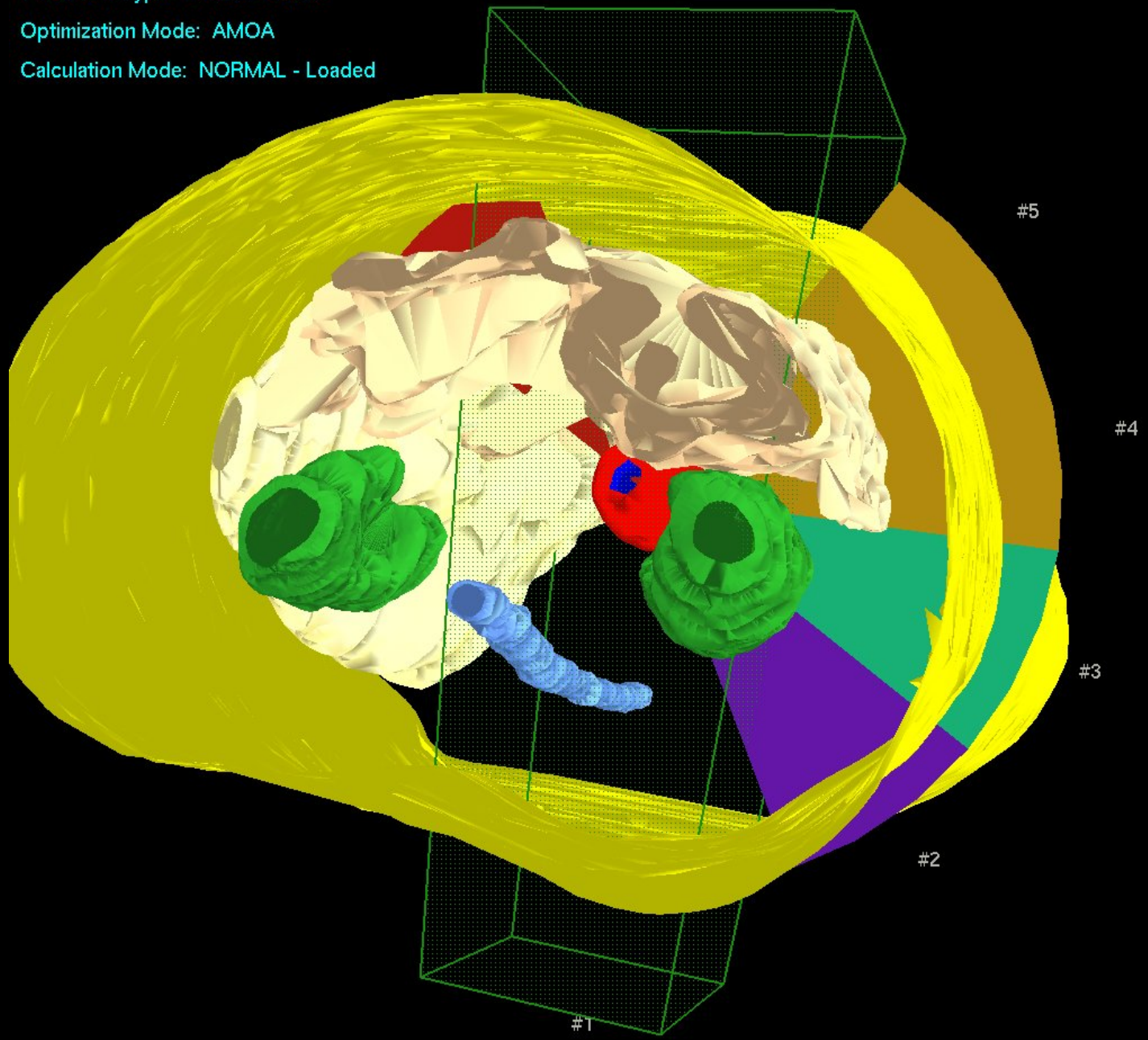
Calculation Mode: NORMAL - Recomputed
#2
#1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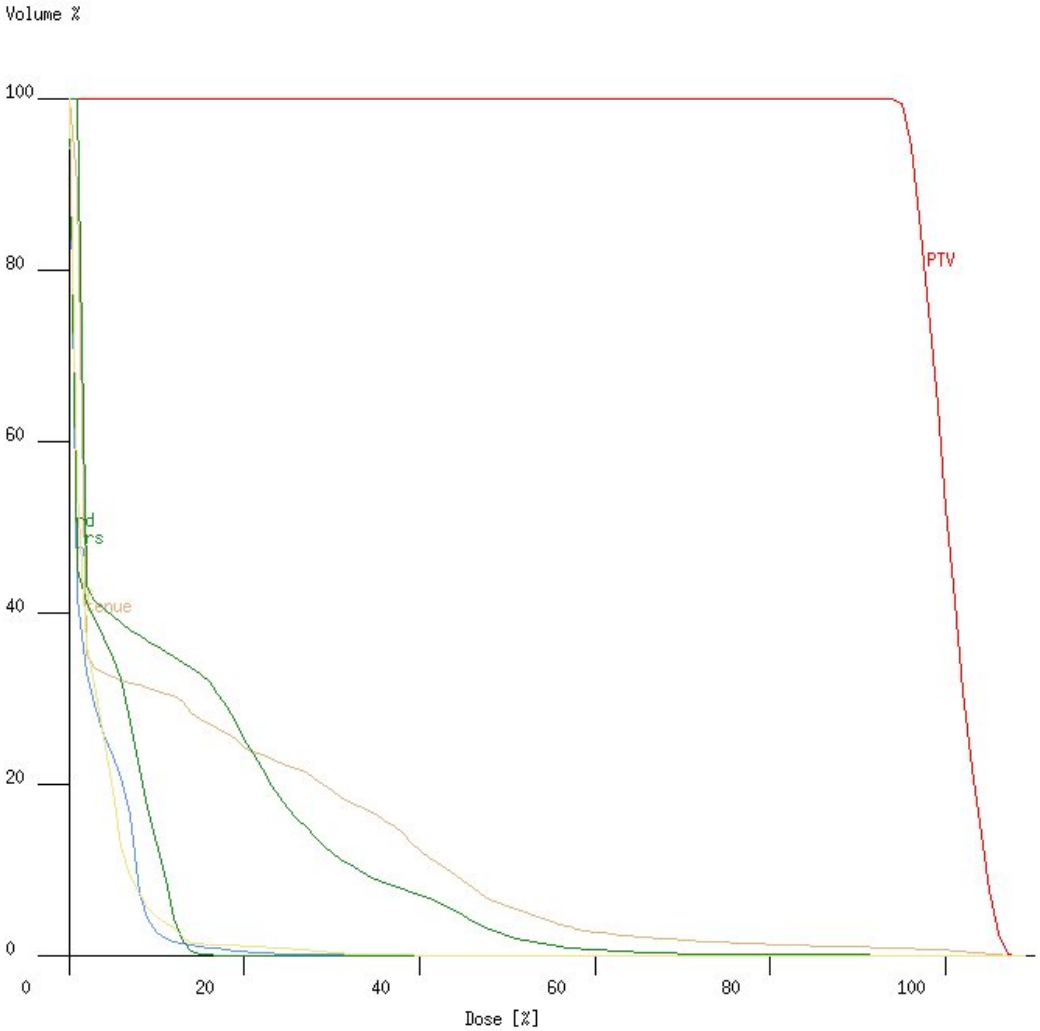
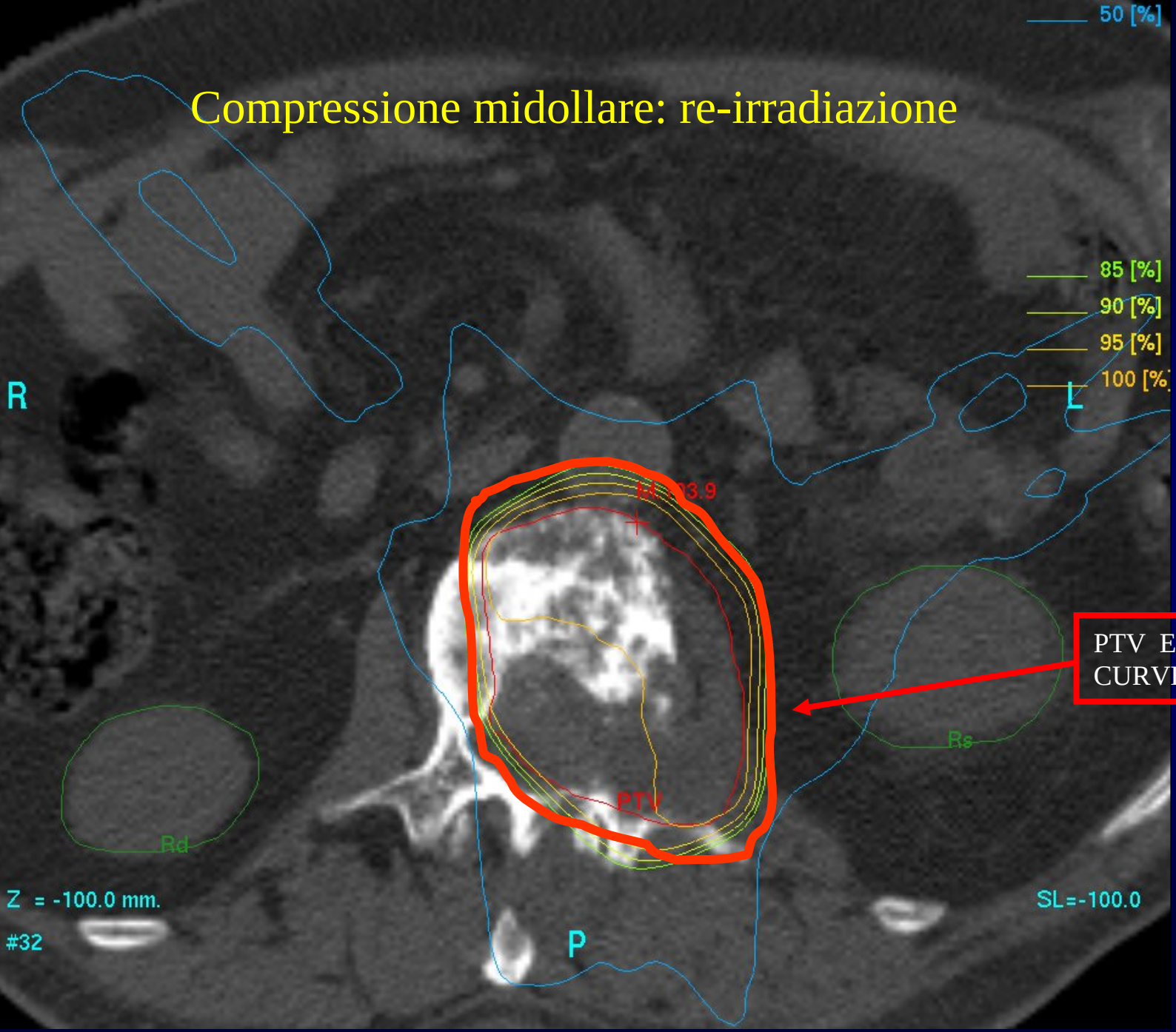
#5
#4
#3
#2
#1

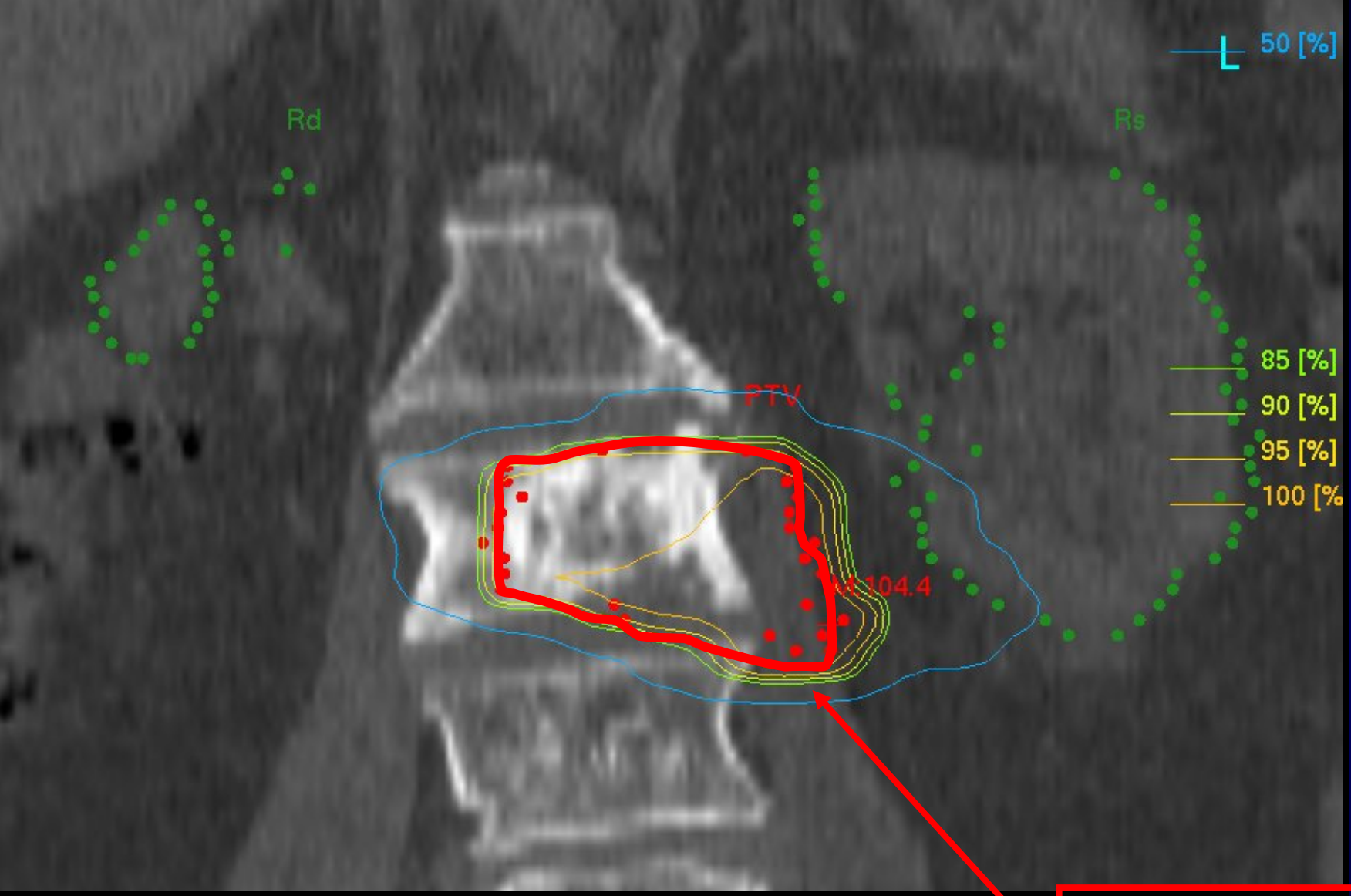


VOI	Vol. (cc)	Area	Dose (%) Max	Min	Avg.
PTV	62.9	100	107	91	99
m	41.0	3	31	0	2
tenue	645.5	13	106	0	12
rd	161.8	4	16	0	3
rs	164.0	11	91	0	10
f	1710.0	3	39	0	2

Compressione midollare: re-irradiazione

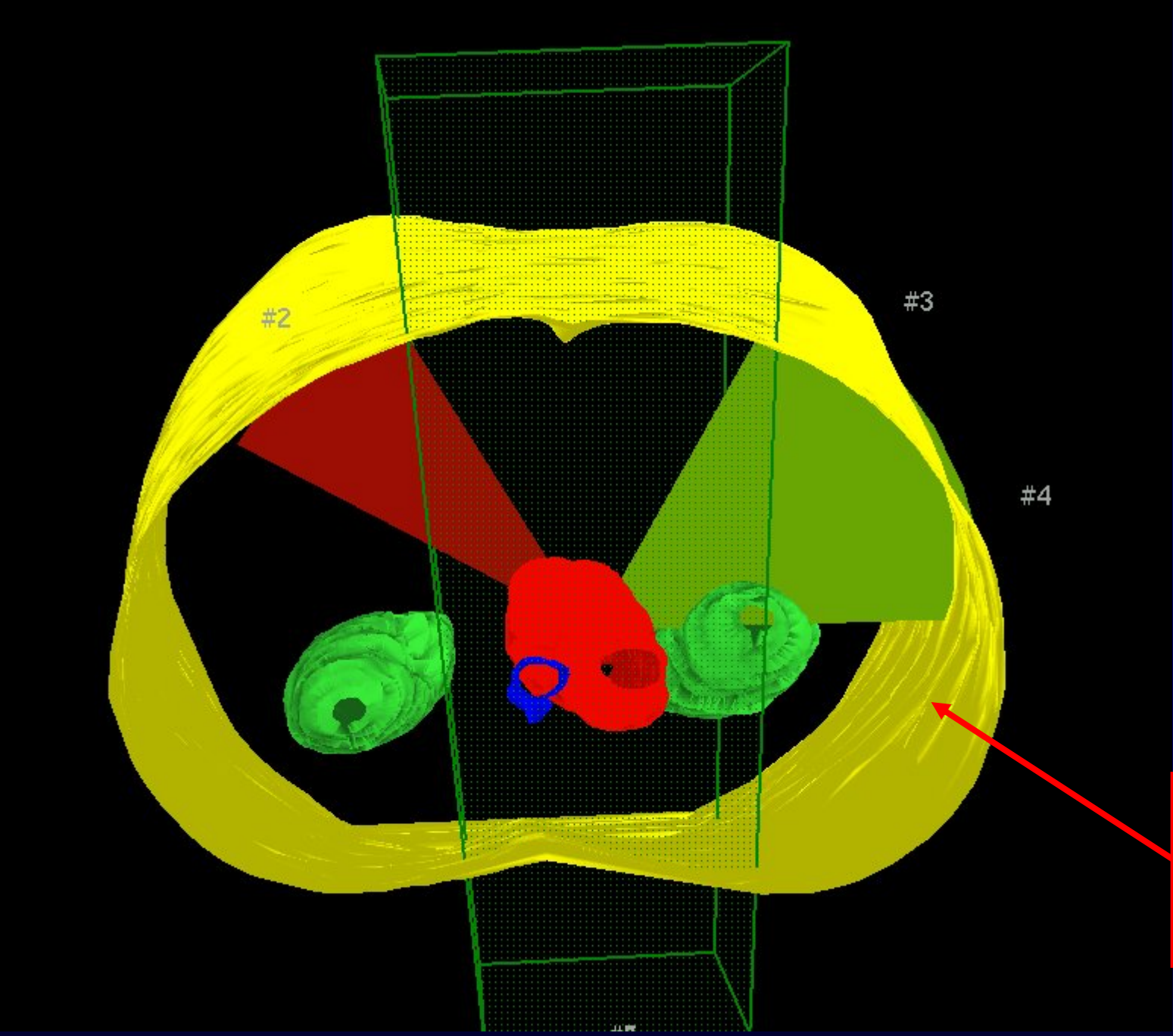


PTV E DISTRIBUZIONE CURVE DI ISODOSE



IL VOLUME BERSAGLIO E' PERFETTAMENTE COMPRESO NELL'ISODOSE DI RIFERIMENTO DEL 90%

IL VOLUME BERSAGLIO E' PERFETTAMENTE COMPRESO NELL'ISODOSE DI RIFERIMENTO DEL 90%



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