Bone metastases & Target Volume:

Is time for changing ?

D. Genovesi

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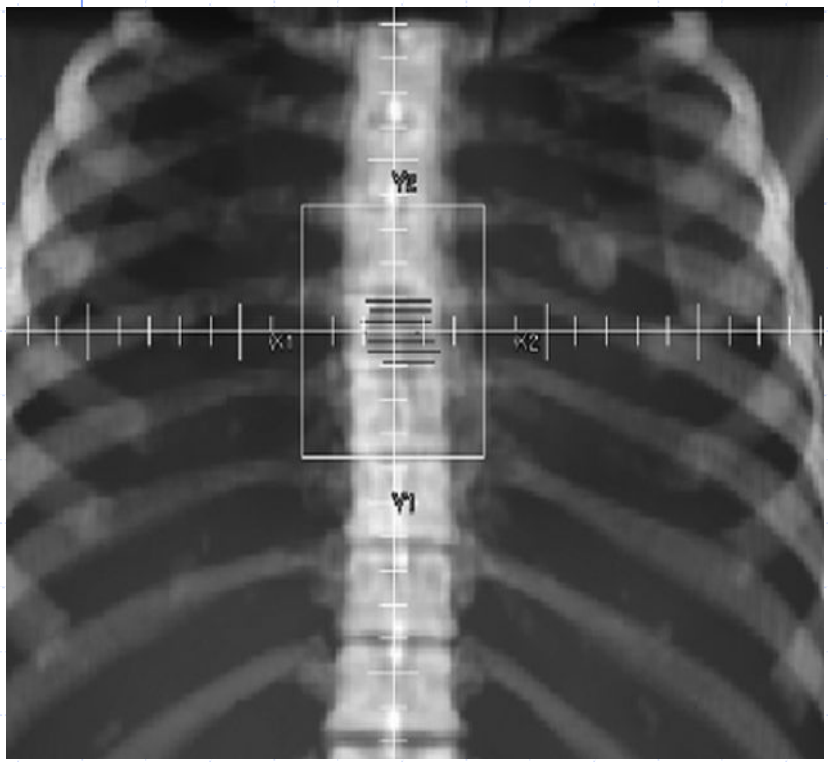
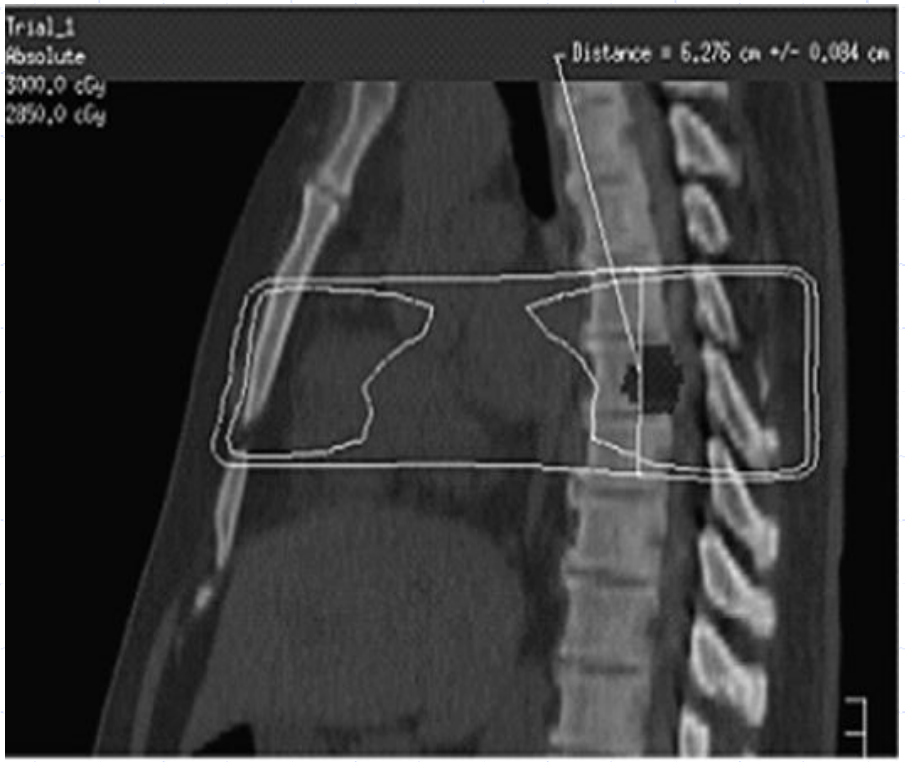
Bone Metastases & Target Volume

"Nihilism" towards Field size





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Int. J. Radiation Oncology Biol. Phys., Vol. 79, No. 4, pp. 965–976, 2011

0360-3016/$ - see front matter

doi:10.1016/j.ijrobp.2010.11.026

ASTRO GUIDELINE

PALLIATIVE RADIOTHERAPY FOR BONE METASTASES: AN ASTRO EVIDENCE-BASED GUIDELINE

Stephen Lutz, M.D.,* Lawrence Berk, M.D., Ph.D.,† Eric Chang, M.D.,‡
Edward Chow, M.B.B.S.,§ Carol Hahn, M.D.,¶
Peter Hoskin, M.D.,‖ David Howell, M.D.,# Andre Konski, M.D.,** Lisa Kachnic, M.D.,††
Simon Lo, M.B., Ch.B.,‡‡ Arjun Sahgal, M.D.,§§ Larry Silverman, M.D.,¶¶
Charles von Gunten, M.D., Ph.D., F.A.C.P.,‖‖ Ehud Mendel, M.D., F.A.C.S.,##
Andrew Vassil, M.D.,*** Deborah Watkins Bruner, R.N., Ph.D.,††† and William Hartsell, M.D.‡‡‡

JOURNAL OF PALLIATIVE MEDICINE
Volume 15, Number 5, 2012
Mary Ann Liebert, Inc.
DOI: 10.1089/jpm.2011.0512

Special Report

ACR Appropriateness Criteria® Non-Spine Bone Metastases

Expert Panel on Radiation Oncology–Bone Metastases: Stephen T. Lutz, M.D., M.S.,[1] Simon Shek-Man Lo, M.B., Ch.B.,[2] Eric L. Chang, M.D.,[3] Nicholas Galanopoulos, M.D.,[4] David D. Howell, M.D.,[5] Edward Y. Kim, M.D.,[6] Andre A. Konski, M.D.,[7] Neeta D. Pandit-Taskar, M.D.,[8] Samuel Ryu, M.D.,[9] Larry N. Silverman, M.D.,[10] Catherine Van Poznak, M.D.,[11] and Kristy L. Weber, M.D.[12]

JOURNAL OF PALLIATIVE MEDICINE
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DOI: 10.1089/jpm.2012.0376

Special Report

ACR Appropriateness Criteria® Spinal Bone Metastases

Expert Panel on Radiation Oncology–Bone Metastases: Simon Shek-Man Lo, MB, ChB,[1] Stephen T. Lutz, MD, MS,[2] Eric L. Chang, MD,[3] Nicholas Galanopoulos, MD,[4] David D. Howell, MD,[5] Edward Y. Kim, MD,[6] Andre A. Konski, MD,[7] Neeta D. Pandit-Taskar, MD,[8] Peter S. Rose, MD,[9] Samuel Ryu, MD,[10] Larry N. Silverman, MD,[11] Andrew E. Sloan, MD,[12] and Catherine Van Poznak, MD[13]

Notes on Volumes: really poor !!

Why ?

- Treatment field borders: based on anatomic landmarks
- Conventional fluoroscopy-based planning vs. 3D-based planning
- GTV/PTV concepts: less explicit in palliative setting
- Principles for CTV definition: not well established

Int. J. Radiation Oncology Biol. Phys., Vol. 80, No. 5, pp. 1498–1504, 2011

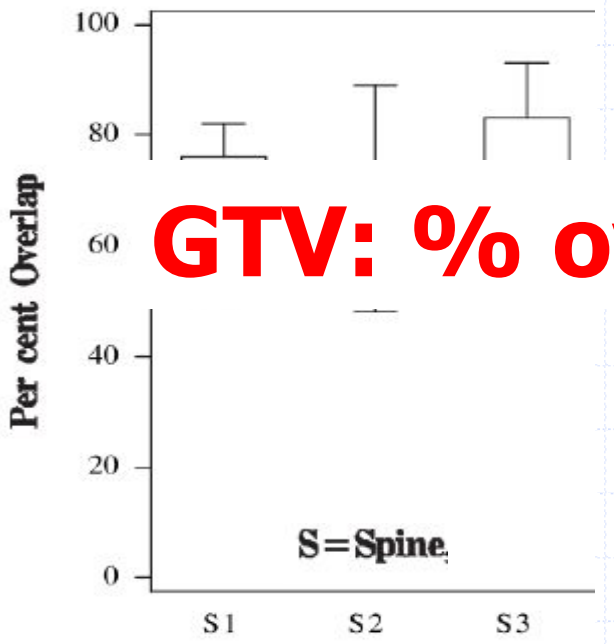
0360-3016/$–see front matter

doi:10.1016/j.ijrobp.2010.04.014

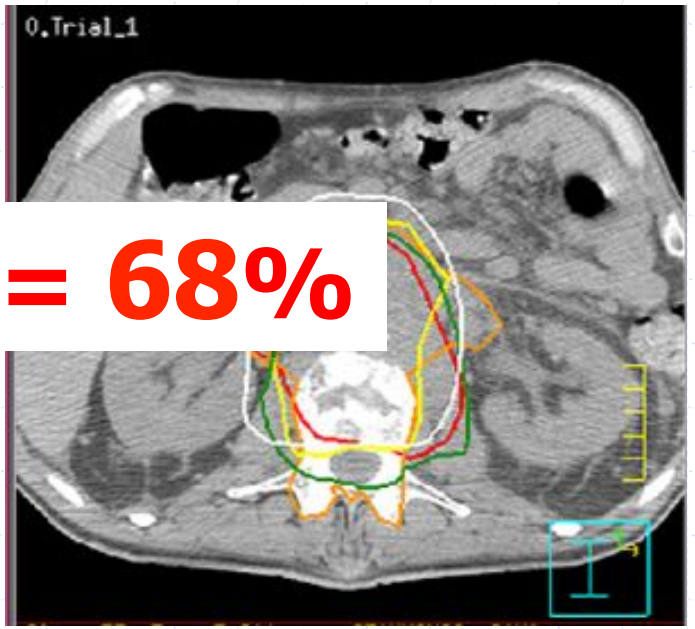
CLINICAL INVESTIGATION **Palliation**

QUANTIFYING INTEROBSERVER VARIATION IN TARGET DEFINITION IN PALLIATIVE RADIOTHERAPY

DANIEL GRABARZ, M.D.,*† TONY PANZARELLA, M.SC.,‡ ANDREA BEZJAK, M.D., M.SC., F.R.C.P.,†
MICHAEL MCLEAN, M.D., F.R.C.P.,† CHRISTINE ELDER, M.B.CH.B., F.R.A.N.Z.C.R.,†§
AND REBECCA K. S. WONG, M.B.CH.B., M.SC., F.R.C.P.†



GTV: % overlap = 68%



Bone Metastases & Target Volume: Can we change ?

When ?

- **Pts selection**
  - oligometastatic disease
  - high doses/step dose gradient
  - re-irradiation
  - life expectancy/primary tumor
- **Location**
  - Spinal bone metastases
  - Non-spinal bone metastases
- **RT Technique**: 3D-CRT; SBRT/IGRT; IMRT

Table 5. Summary of current data for spinal SBRT for spinal metastases reporting on specific histologic types

Study	Patients (*n*), tumors (*n*), histologic type	Fractionation	Repeat treatment	Pain relief	CR	Local control/ definition	Investigator	Year	Reference
Cohort study	48, 55, renal cell	30 Gy/5 Fx; 24 Gy/3 Fx; 24 Gy/1 Fx	22 patients	52% of patients had durable response and were pain free at 12 mo	52% of patients had durable response and were pain free at 12 mo	43/55, 1-y FFP 82%/imaging	Nguyen	2009	69
Cohort study	NR, 93, renal cell	Mean maximum intratumor dose 20 Gy/1 Fx*	NR	94%	NR	87%/imaging	Gerszten	2007	57
Cohort study	NR, 83, breast	Mean maximum intratumor dose 20 Gy/1 Fx*	NR	96%	NR	100%/imaging	Gerszten	2007	57
Cohort study	NR, 80, lung	Mean maximum intratumor dose 20 Gy/1 Fx*	NR	93%	NR	100%/imaging	Gerszten	2007	57
Cohort study	NR, 38, melanoma	Mean maximum intratumor dose 20 Gy/1 Fx*	NR	96%	NR	75%/imaging	Gerszten	2007	57

DARREN S. KLISH,

Int. J. Radiation Oncology Biol. Phys., Vol. 81, No. 5, pp. 1495–1499, 2011

0360-3016/$ - see front matter

doi:10.1016/j.ijrobp.2010.07.2007

CLINICAL INVESTIGATION **Spine**

IRRADIATION OF SPINAL METASTASES: SHOULD WE CONTINUE TO INCLUDE ONE UNINVOLVED VERTEBRAL BODY ABOVE AND BELOW IN THE RADIATION FIELD?

- 58 pts; SBRS to only involved vertebral body
- 6 Gy/5fx; 9 Gy/3 fx; 18 Gy single fx
- CTV/MRI based

fractions of 9 Gy, or a single fraction of 18 Gy. On the basis of previous local patterns of failure analysis, clinical target volume contours currently include the entire involved vertebral body, pedicles, and posterior elements with a wide posterior bone margin. For

- Aim: % of failure in adjacent and distant spine
- median FUP: 18 ms
  7/58 (10.7%) failed at multiple adjacent levels
  2/58 (3%) failed at isolated solitary adjacent level

Int. J. Radiation Oncology Biol. Phys., Vol. 81, No. 5, pp. 1495–1499, 2011

0360-3016/$ - see front matter

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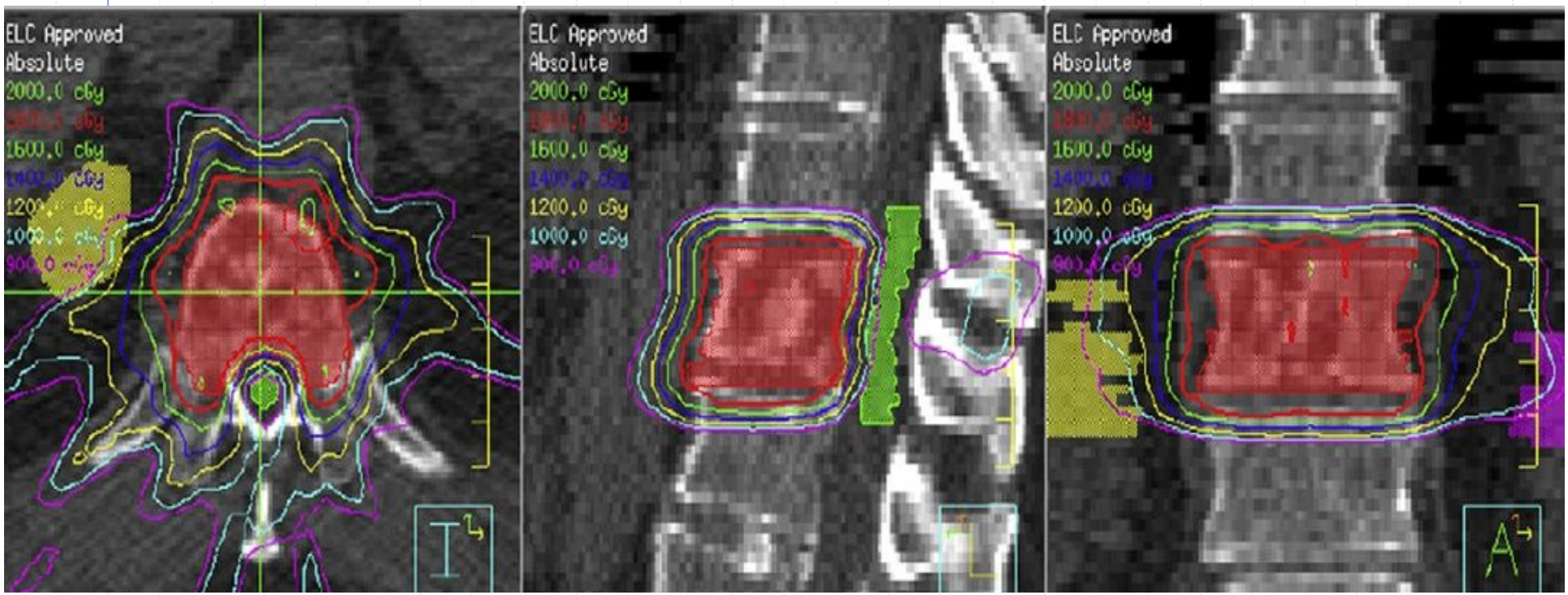
CLINICAL INVESTIGATION **Spine**

IRRADIATION OF SPINAL METASTASES: SHOULD WE CONTINUE TO INCLUDE ONE UNINVOLVED VERTEBRAL BODY ABOVE AND BELOW IN THE RADIATION FIELD?

DARREN S. KLISH, M.D., M.P.H.,* PATRICIA GROSSMAN, R.N.,† PAMELA K. ALLEN, PH.D.,†
LAURENCE D. RHINES, M.D.,‡ AND ERIC L. CHANG, M.D.†



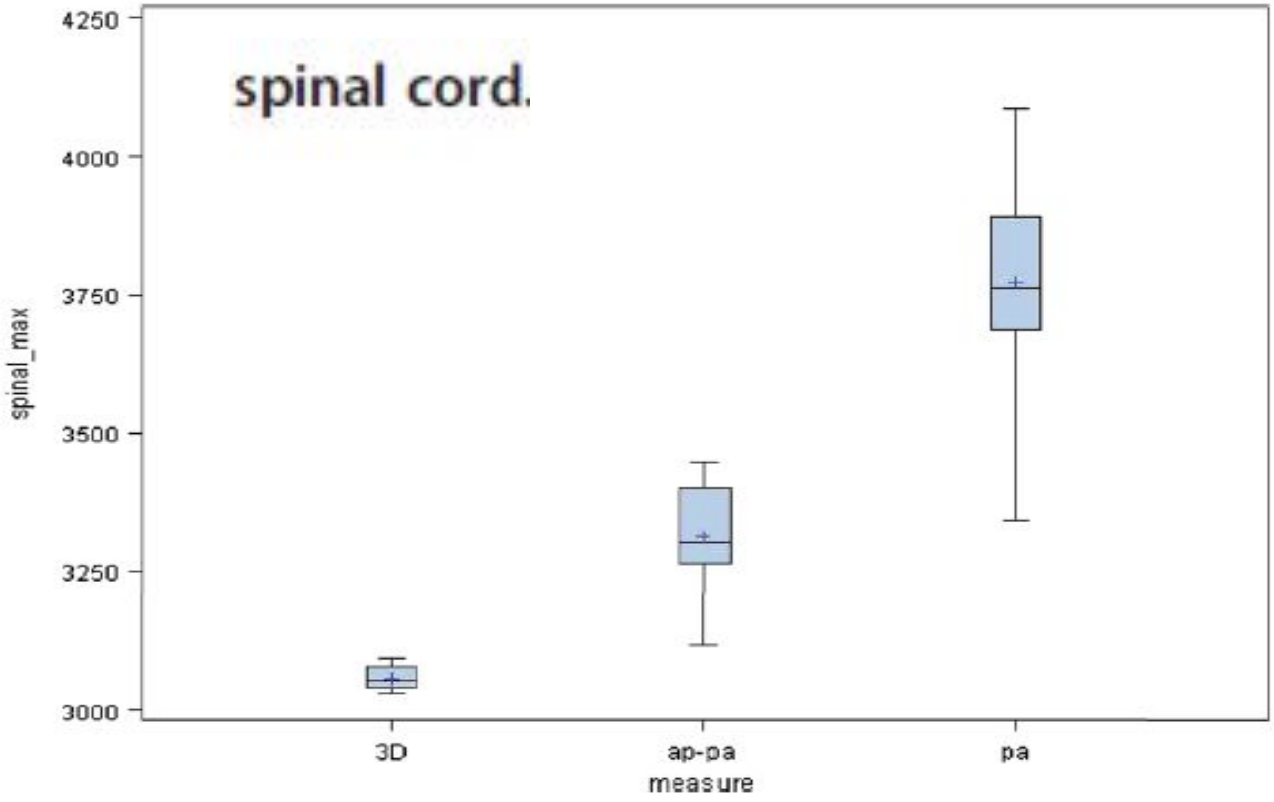
Soyfer *et al. Radiation Oncology* 2013, **8**:34
http://www.ro-journal.com/content/8/1/34

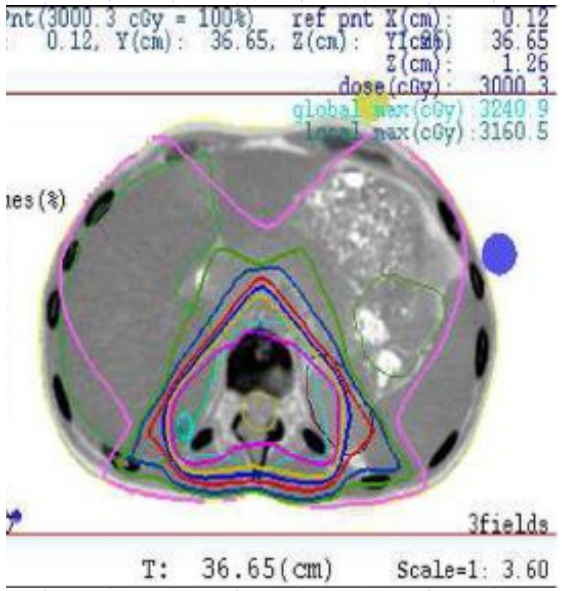
RADIATION ONCOLOGY

METHODOLOGY Open Access

The advantage of 3D conformal treatment of lumbar spine metastases in comparison to traditional PA or AP-PA techniques: restoring an intermediate niche of therapeutic sophistication

Viacheslav Soyfer*, Benjamin W Corn, Natan Shtraus, Dan Schifter and Haim Tempelhof





Bone Metastases & Target Volume: Can we change ?

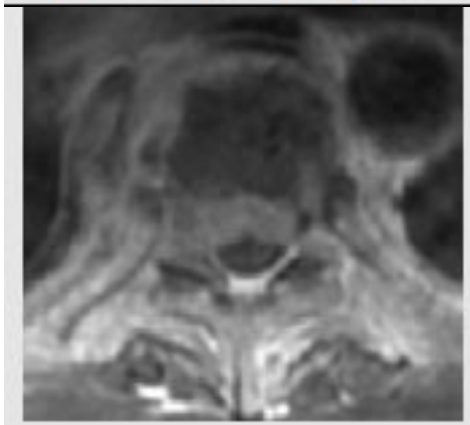
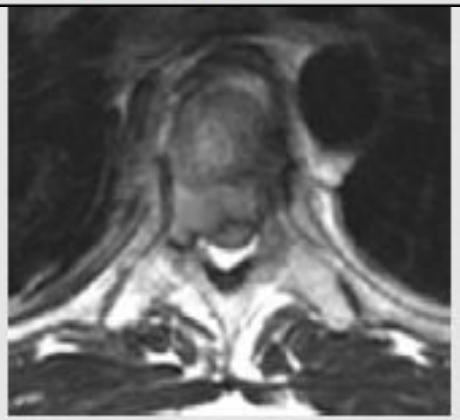
How ?

GTV delineation: crucial !!

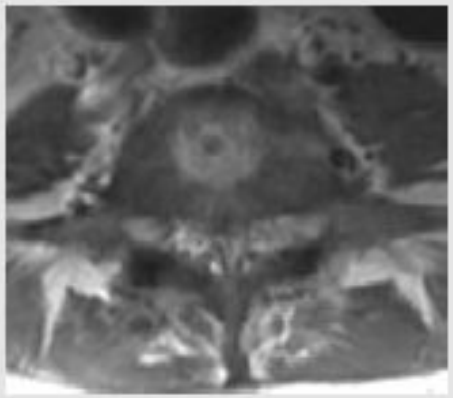
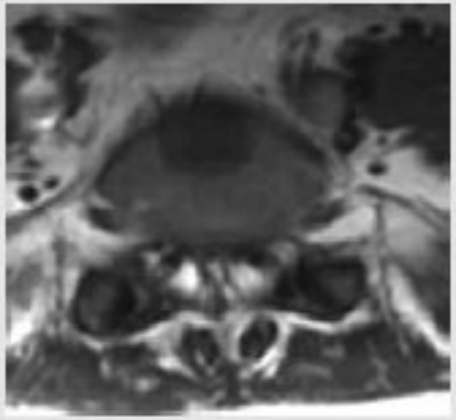
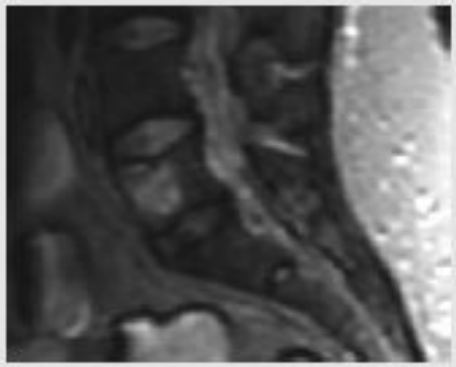
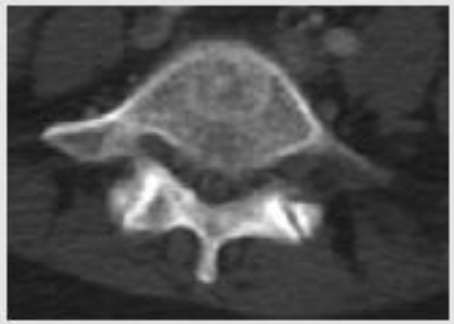
by

- **Planning Imaging MRI/PET based**
- **Delivery Imaging: cone-beam CT/IGRT**

MRI axial T1 post | MRI axial T2 | MRI sagittal | CT

Case 3: T6-8 lesion with T6 collapse deformity, ventral epidural disease, moderate spinal canal compromise, mild spinal cord displacement, extension to the bilateral neural foramina, and paraspinal extension

Case 1: L5 lesion limited to the anterior VB with no epidural extension

CME ASTRO

Volume 83 • Number 5 • 2012

International Journal of Radiation Oncology biology • physics

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Clinical Investigation: Central Nervous System Tumor

International Spine Radiosurgery Consortium Consensus Guidelines for Target Volume Definition in Spinal Stereotactic Radiosurgery

Brett W. Cox, MD,*,[1] Daniel E. Spratt, MD,*,[1] Michael Lovelock, PhD,† Mark H. Bilsky, MD,‡ Eric Lis, MD,§ Samuel Ryu, MD,‖ Jason Sheehan, MD,¶ Peter C. Gerszten, MD, MPH,** Eric Chang, MD,†† Iris Gibbs, MD,‡‡ Scott Soltys, MD,‡‡ Arjun Sahgal, MD,§§ Joe Deasy, PhD,† John Flickinger, MD,‖‖ Mubina Quader, PhD,‖‖ Stefan Mindea, MD,¶¶ and Yoshiya Yamada, MD‡‡

Table 4 Summary of contouring guidelines for GTV, CTV, and PTV in spinal stereotactic radiosurgery

Target volume	Guidelines
GTV	This is the first report defining consensus target volume definitions for spinal radiosurgery. These recommendations should serve as a foundation for future refinements in radiosurgery target volume delineation and underscore the need for consensus target definitions in future spinal radiosurgery protocols.
CTV	• Should contain entire GTV and CTV
PTV	

body,
along
ysician

Volume 84 • Number 2 • 2012

International Journal of Radiation Oncology biology • physics

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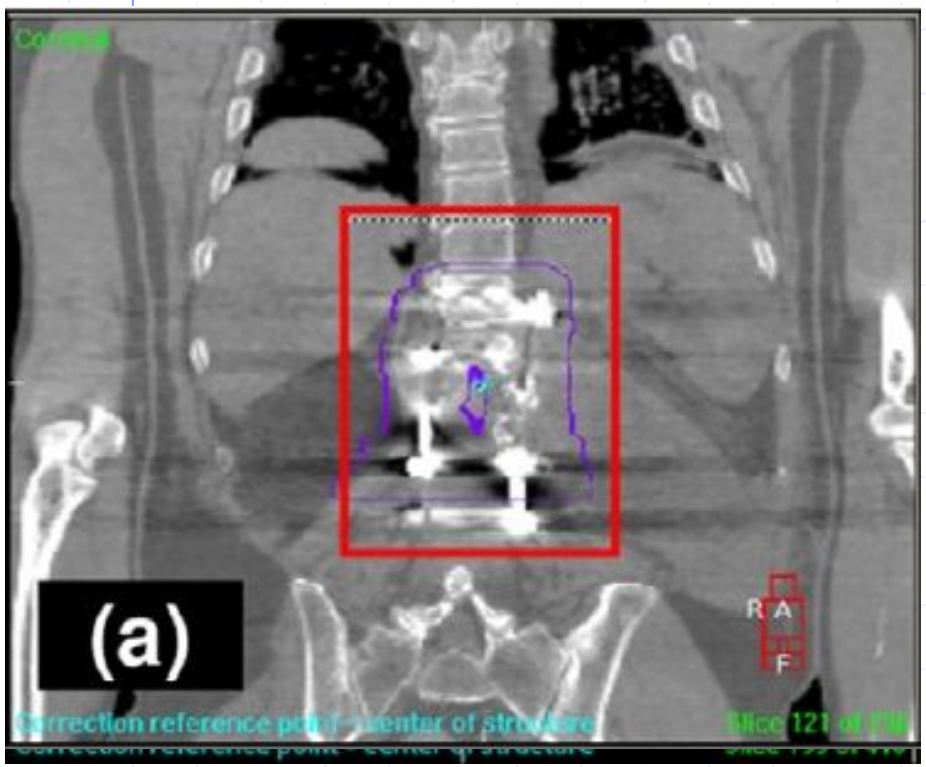
Physics Contribution

Impact of Immobilization on Intrafraction Motion for Spine Stereotactic Body Radiotherapy Using Cone Beam Computed Tomography

Winnie Li, B.Sc., R.T.T.,*,† Arjun Sahgal, M.D.,*,† Matthew Foote, M.D.,* Barbara-Ann Millar, M.D.,*,† David A. Jaffray, Ph.D.,*,† and Daniel Letourneau, Ph.D.*,†



Conclusions: *where is possible to change*

- **3D-CRT based treatment: mandatory**
- **Oligometastatic disease**
- **Higher BED/Step dose gradient; Re-irradiation**
- **Spinal bone metastases**
- **SBRT/IGRT; IMRT**
- **Imaging (MRI/PET) for GTV delineation**
- **Potentially involved field can be extended to other bone sites (e.g.: long bone lesions = MRI-GTV +2 cm margin)**
- **Benefits of involved field for bone mets: to be studied:**
  - ***outcome (pain relief & quality of life)***
  - ***acute and late toxicity***
  - ***patterns of failure***