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Overview clinica sul ruolo della IMRT: Addome – Pelvi

Filippo Alongi MD

Radiotherapy and Radiosurgery
Istituto Clinico Humanitas
Rozzano(Milan)

filippo.alongi@humanitas.it

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IMRT: is it really the best choice?

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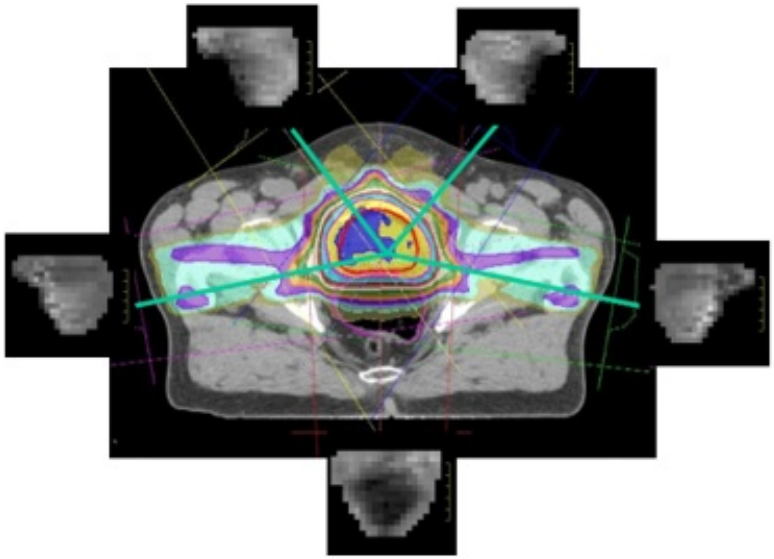
•IMRT represents one of the major technical innovations in modern radiation therapy (RT).

•IMRT is an advanced 3DCRT that uses nonuniform beam intensity to achieve superior dose distribution.[1],[2]

•Because of this new capability in manipulating the intensities of individual rays within each beam, IMRT allows greater control of dose distributions that, when combined with various image-guided techniques, may improve tumor control and reduce normal tissue toxicity



1. Group ICW. Int J Radiat Oncol Biol Phys 2001
2. Ezzell GA,, et al. Med Phys 2003

IMRT: is it really the best choice?

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•IMRT treatment plans are able to generate concave dose distributions and dose gradients with narrower margins around structures that are non-linear in shape than those allowed using traditional methods (1,2).

•This fact makes IMRT especially suitable for treating complex treatment volumes and avoiding close proximity organs at risk (OAR) that may be dose limiting (1).

•As a consequence, theoretically may provide benefits in terms of increased tumour control through escalated dose and reduced normal tissue complications through OAR sparing.

THE LANCET Oncology 2008;9:367-75.

Evidence behind use of intensity-modulated radiotherapy: a systematic review of comparative clinical studies

Liv Veldeman, Indira Madani, Frank Hulstaert, Gert De Meerleer, Marc Mareel, Wilfried De Neve

IMRT in pelvis: common opinions

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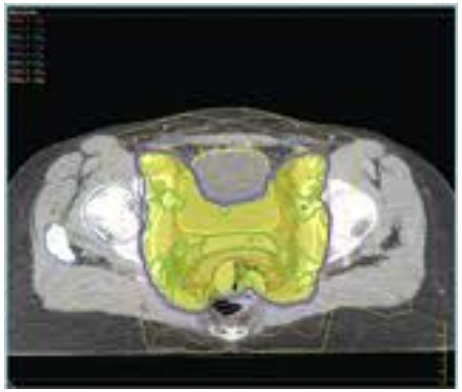

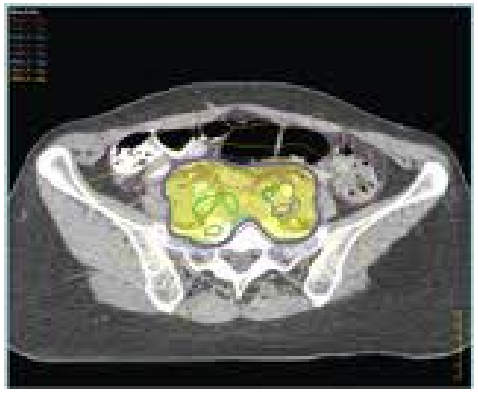

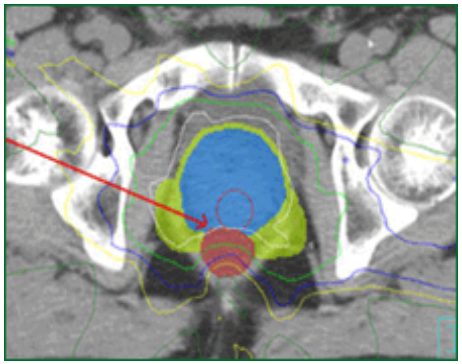

1.IMRT treatment plans are able to generate concave dose distributions

2.IMRT reduces late rectal toxicity in prostate cancer patients allowing safe dose escalation

Clinical Oncology 22 (2010) 643–657

Contents lists available at ScienceDirect

Clinical Oncology

journal homepage: www.elsevier.com/locate/clon

Overview

A Review of the Clinical Evidence for Intensity-modulated Radiotherapy

J. Staffurth on behalf of the Radiotherapy Development Board[1]

Cardiff University, Velindre Hospital, Whitchurch, Cardiff, UK

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IMRT for Pelvic tumours: Gynecologic

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- **Primary or postoperative radiotherapy for endometrial and consists of whole- irradiation, often followed or preceded by brachytherapy.**
- **The small bowel, bladder and rectum are the main organs at risk.**
- **Few comparative case series are evaluable:**

Study	Number of patients		Endpoint	IMRT group	Non-IMRT group	p	Strength of endpoint
	IMRT	Non-IMRT					
Mundt (2001)[56]	15	25	G2 acute GI toxic effects, %	53·4	96	0·001†	Cii
Mundt (2002)[55]	40	35	No or only infrequent antidiarrhoeal medication, %	73·3	20	0·001†	Cii
			G2 acute GI toxic effects, %	60	91	0·002†	Cii
			No or only infrequent antidiarrhoeal medication, %	75	34	0·001†	Cii
Mundt (2003)[57]	36	30	Chronic GI toxic effects, %	11·1	50·0	0·001†	Cii
Brixey (2002)[58]	36	88	≥G2 WBC toxic effects*, %	31·2	60	0·08	Cii
			≥G2 ANC toxic effects*, %	15·3	23·5	0·58	Cii
Chen (2007)[59]	33	35	≥G2 Haemoglobin toxic effects*, %	15·2	35·2	0·22	Cii
			1-year locoregional control, %	93	94	0·9606	D
			Acute GI toxic effects (G0/G1/G2/G3), %	64/12/24/0	20/23/57/0		Cii
			G1–G2 combined acute GI toxic effects, %	36	80	0·00012†	Cii
			Acute GU toxic effects (G0/G1/G2/G3), %	70/18/12/0	40/34/26/0		Cii
			G1–G2 combined acute GU toxic effects, %	30	60	0·022†	Cii
			Acute haematological toxic effects, %	NA	NA	0·724	Cii
			Chronic GI toxic effects, %	6	34	0·002†	Cii
			Chronic GU toxic effects, %	9	23	0·231	Cii

IMRT=intensity-modulated radiotherapy. G=grade. GI=gastrointestinal. Cii=quality of life in relation to treatment-induced toxic effects. WBC=white-blood-cell count. ANC=absolute neutrophil count. D=indirect surrogates including disease-free survival, progression-free survival, tumour response, local control, and locoregional control. GU=genitourinary. Strength of endpoint of each study was classified according to the modified Levels of Evidence for Human Studies of Cancer Complementary and Alternative Medicine PDQ. *Assessed in the subgroup of patients that received combined chemotherapy. †Statistitically significant.

THE LANCET Oncology 2008;9:367-75.

IMRT for Pelvic tumours: Gynecologic

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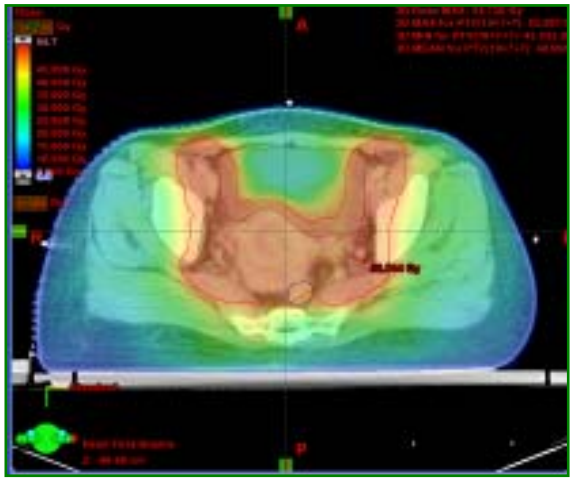
•Significantly lower rates of acute and chronic gastrointestinal toxic effects were noted in the IMRT groups.

•Brixey and co-workers suggested that haematological toxic effects might also be decreased by sparing with IMRT. Acute haematological toxic effects or chronic genitourinary toxic effects were not significantly different between the two groups.

•Thus, IMRT has the potential to decrease acute and late gastrointestinal and genitourinary toxic effects, but longer follow-up is needed to assess its effect on locoregional control.



Cervix Uteri

1. MundtAJ, et al., Gynecol Oncol 82 (2001), pp. 456–463.
2. Brixey, Int J Radiat Oncol Biol Phys 54 (2002),
3. Chen MF. Int J Radiat Oncol Biol Phys. 2007;67(5):1438-
4. Kidd EA,. Int J Radiat Oncol Biol Phys.

IMRT for Pelvic tumours: Gynecologic

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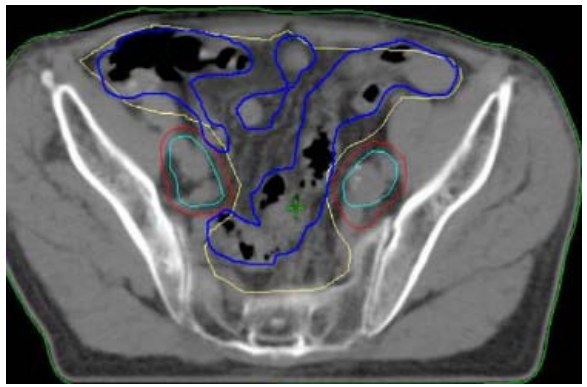
Evidence in Gynecologic IMRT:
TOXICITIES

- All cohort studies showed improvements in either acute or chronic toxicities(CANCER CARE ONTARIO REVIEW).

- However three out of the four studies showed only small improvements. Either the toxicities reported were low (grade 2 or less) or the magnitude of difference between groups was quite small.

- The largest study (3) showed significant improvements in grade 3 toxicity rates for serious complications such as rectovaginal and vesiculovaginal fistula.



CONCLUSION 1:
If acute and chronic toxicities are the main outcomes of interest, IMRT should be considered over 3DCRT for women undergoing radiotherapy for gynecological cancer.

1.Beriwal S,. Int J Radiat Oncol Biol Phys. 2006;64(5):1395-400.
2. Chen MF,. Int J Radiat Oncol Biol Phys. 2007;67(5):1438-44.
3. Kidd EA. Int J Radiat Oncol Biol Phys.
4. Mundt AJ. Int J Radiat Oncol Biol Phys. 2002;52(5):1330-7.

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IMRT for Pelvic tumours: Gynecologic

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Evidence in Gynecologic IMRT:
OUTCOMES

- All cohort studies elegible gave a similar dose of radiation between comparison groups; therefore, an improvement in disease-related outcomes would not be expected.

- Two of the included studies (2,3) reported on disease-related outcomes, with one (3) of them detecting a statistically significant difference in favour of treatment with IMRT.

CONCLUSION 2:

If disease-related outcomes are the main outcomes of interest, there is insufficient evidence to recommend IMRT over 3DCRT for women undergoing radiotherapy for gynecologic cancers.

1.Beriwal S,. Int J Radiat Oncol Biol Phys. 2006;64(5):1395-400.
2. Chen MF,. Int J Radiat Oncol Biol Phys. 2007;67(5):1438-44.
3. Kidd EA. Int J Radiat Oncol Biol Phys.
4. Mundt AJ. Int J Radiat Oncol Biol Phys. 2002;52(5):1330-7.

IMRT for Pelvic tumours: Prostate

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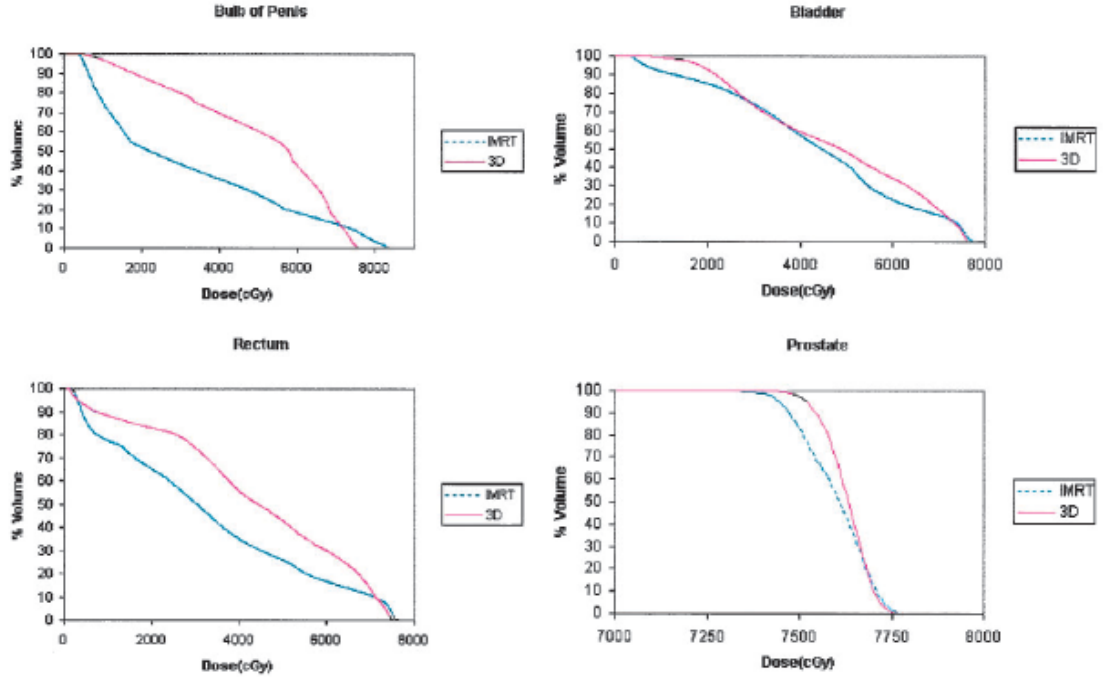
Inverse-planned IMRT has been shown to achieve dosimetric sparing of the rectum and the penile bulb during prostate ± seminal vesicle radiotherapy and also of the bowel and bladder during prostate and pelvic nodal radiotherapy(1→4)



…IS DOSIMETRIC SPARING REALLY EQUAL TO TOXICITY REDUCTION IN PROSTATE?

1. De Meerleer, *Int J Radiat Oncol Biol Phys* **47** (3) (2000), pp. 639–648
2. Nutting,, Int J Radiat Oncol Biol Phys 48 (3) (2000), pp. 649–656
3. Luxton,, Int J Radiat Oncol Biol Phys 59 (1) (2004), pp. 267–284
4. Ashman,, Int J Radiat Oncol Biol Phys 63 (3) (2005), pp. 765–771

IMRT for Pelvic tumours: Prostate

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Study	Number of patients (total dose/dose per fractions)		Endpoint	IMRT group	Non-IMRT group	p	Strength of endpoint
	IMRT	Non-IMRT					
Kupelian (2005)*	100 (70 Gy/2·5 Gy)	310 (78 Gy/2 Gy)	5-year bRFS*, %	85	78	NA	D
Kupelian (2002)*	166 (70 Gy/2·5 Gy)	116 (78 Gy/2 Gy)	30-months bRFS*, %	94	88	0·084	D
			Acute rectal toxic effects (G0/G1/G2), %	30/55/15	12/70/18	0·002†	CII
			Acute urinary toxicity	NA	NA	0·64	CII
			Late G3 rectal toxic effects, n	2	8	0·011†	CII
			Mean sexual summary scores (SD)‡	43 (25)	25 (22)	0·003†	CI
Vora (2007)*	145 (75·6 Gy/NA)	271 (68·4 Gy/NA)	5-year biochemical control, %	74·1*/84·6§	60·4*/74·4§	0·0001*/0·0326§†	D
Sanguinetti (2006)**	45 (76 Gy/2 Gy)	68 (76 Gy/2 Gy)	Mean G2 rectal toxic effects at 2 years (SD), %	6 (4)	21·2 (6)	0·06	CII
Zelefsky (2001)**	229 (81 Gy/NA)	871 (81 Gy/NA)	Late G2 rectal toxic effects, %	2	12	<0·01†	CII
			Late G3 rectal toxic effects, %	0·5	2	<0·01†	CII
			3-year late G2 rectal toxic effects, %	2	14	0·005†	CII
Zelefsky (2000)**	171 (81 Gy/NA)	61 (81 Gy/NA)	Late urinary toxic effects	NA	NA	0·32	CII
			Acute GI toxic effects G0/G1–G2, %	54/45	39/61	0·05/0·05	CII
			Acute GU toxic effects	NA	NA	NS	CII
			G2 and G3 rectal bleeding, %	2	10	<0·001†	CII
Jani, (2007)**	108 (NA/NA)	373 (NA/NA)	Late GU toxic effects	NA	NA	0·1	CII
			Acute GU toxic effects (G0/G1/G2/G3/G4), %	23/40/34/3/0	31/37/30/1/1	0·118	CII
Jani (2007)**	106 (76·0 Gy/NA)	355 (70·0 Gy/NA)	Acute GI toxic effects (G0/G1/G2/G3/G4), %	42/37/22/0/0	33/32/35/0/0	0·013†	CII
			Late GI toxic effects (G0/G1/G2/G3/G4), %	85/9/3/3/0	65/25/8/3/1	<0·001†	CII
Jani (2006)**	15 (76·4 Gy/NA)	34 (72·4 Gy/NA)	Late GU toxic effects	NA	NA	0·166	CII
			Acute GI toxic effects	NA	NA	0·637	CII
Namiki (2006)**	30 (78 Gy/NA)	110 (69·6 Gy/NA)	Acute GU toxic effects (G0/G1/G2/G3), %	13/67/20/0	15/24/59/3	<0·001†	CII
			Mean bowel function score (SD; at 3 months/at six months)¶	91·5 (10·5)/87·1 (16·7)	82·6 (16·2)/81·2 (18·4)	0·010/0·014†	CI
Kupelian (2002)**	52 (70 Gy/2·5 Gy)	76 (78 Gy/2 Gy)	Mean sexual function at 18 months (SD)¶	18·0 (21·6)	6·9 (13·2)	<0·05†	CI
			Late rectal toxic effects (G1/G2/G3), n	4/0/0	1/1/3	NA	
Su (2007)**	14 (75·2 Gy/NA)	34 (70·7 Gy/NA)	Rectal bleeding at 24 months, %	8	8	NA	CII
			Late GI toxic effects	NA	NA	0·412	CII

THE LANCET Oncology 2008;9:367-75.

To be continued…!

IMRT for Pelvic tumours: Prostate

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Two factors need to be taken into consideration in the treatment protocols of radiotherapy for localised prostate cancer:

- **A)evidence from RCTs exists regarding a dose-response relation above 68 Gy for local and biochemical control, the latter being a robust surrogate for disease control;[1], [2] [3]**
- **B) dose–volume–toxicity relations have been established for rectal bleeding and other gastrointestinal or genitourinary toxic effects.**
- **Hence, the rationale for using IMRT in prostate cancer is clear, in that dose escalation to the primary tumour can be achieved while securing safe dose–volume constraints to organs at risk.**

1. Peeters, J Clin Oncol 24 (2006), pp. 1990–1996.
2. Pollack Int J Radiat Oncol Biol Phys 53 (2002), pp. 1097–1105
3. Zietman, JAMA 294 (2005), pp. 1233–1239

IMRT for Pelvic tumours: Prostate

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Eleven reports (1-11), comprising a total of 4,559 patients and comparing 3DCRT with IMRT or one regimen of IMRT with another IMRT regimen in the treatment of localized prostate cancer, form the basis of this evidence-based review(CANCER CARE ONTARIO).

Of the 11 included papers, nine were retrospective cohort studies , and two were randomized controlled trials.

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1. .Al-Mamgani A,. Int J Radiat Oncol Biol Phys. 2009;73(3):685-91.
2. . Alongi F. Int J Radiat Oncol Biol Phys. 2008;72(1, Supplement 1):S293.
3. . Kirichenko AV.. Int J Radit Oncol Biol Phys. 2006;66(3, Supplement 1):S326.
4. . Kupelian PA. Cancer. 2002;8(1):62-6.
5. . Pollack A. Dosimetry Phys. 2006;64(2):518-26.
6. . Sanguineti G. Strahlenther Onkol. 2006;182(9):543-9.
7. . Vora SA. Int J Radiat Oncol Biol Phys. 2007;68(4):1053-8.
8. . Zelefsky MJ,. Radiother Oncol. 2000;55(3):241-9.
9. . Zelefsky MJ,. Int J Radiat Oncol Biol Phys. 2008;70(4):1124-9.
10. Lips I. Int J Radiat Oncol Biol Phys. 2007;69(3):656-61.
11. . Yoshimura K,. Prostate Cancer Prostatic Dis. 2007;10(3):288-92.

IMRT for Pelvic tumours: Prostate

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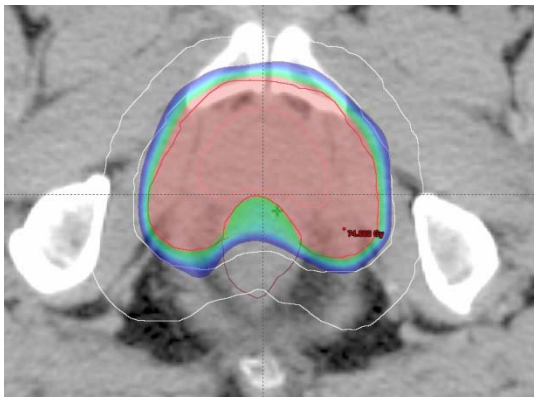
TOXICITY KEY EVIDENCES

- Where the radiation doses administered are similar, the available evidence suggests there is at a minimum no difference, and in many cases superiority, for IMRT compared with 3DCRT for the radical treatment of localized prostate cancer in terms of acute and late GI and GU side effects in the setting of dose escalated (>70Gy/2Gy fractions) radiotherapy (1-9).

- The single study (9) that did not show significant benefits associated with IMRT treatment (compared with 3DCRT) for acute rectal, acute GU, or late GU effects used lower doses in the 3DCRT group compared with the IMRT group (IMRT 81Gy versus compared with 66-81Gy 3DCRT).

CONCLUSION 1:
TOXICITY

IMRT is recommended over 3DCRT for the radical treatment of localized prostate cancer where an escalated radiation (>70Gy) dose is required



IMRT for Pelvic tumours: Prostate

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PROSTATE KEY EVIDENCES

CONCLUSION 2:
Doses ad schedules with IMRT

The benefits of using IMRT compared with 3DCRT have been demonstrated primarily where radiation doses in the range of 70-80Gy rather than conventional (1.8Gy - 2.0Gy) or mildly hypo-fractionated (≤2.5Gy/day) treatment schedules were used .

CONCLUSION 3:
OUTCOMES

Given the available evidence supporting dose escalation for improved disease control in prostate cancer, the documented dosimetric advantages for IMRT over 3DCRT, and the published clinical evidence supporting the improved toxicity profile of IMRT in this setting, IMRT rather than 3DCRT should be offered to eligible patients.

CONCLUSION 4:
IMRT, as a component of improved radiotherapy techniques, creates a window for dose escalation with lower gastrointestinal and genitourinary toxic effects and unchanged or better sexual function.

Prostate IMRT with Rapid Arc in ICH

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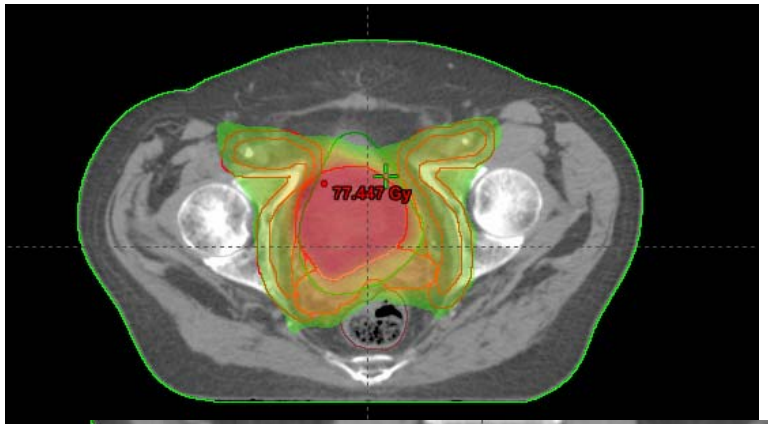
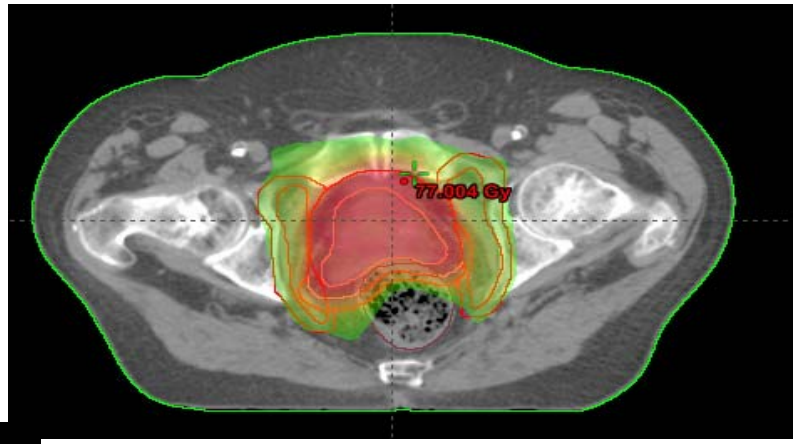
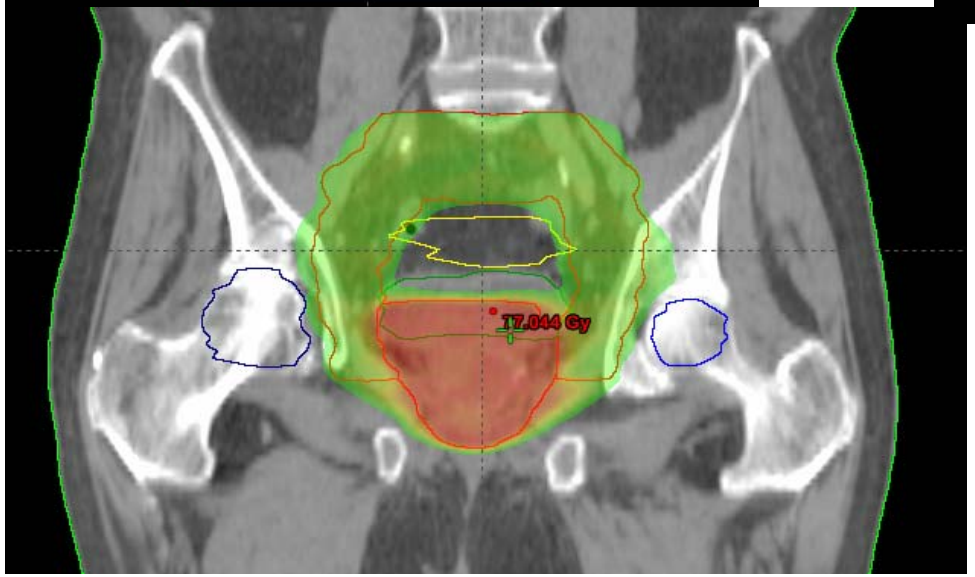
Pz 75 y. Prostate cancer: iPSA 48,5 ng/mL, GS di 4+5=9.
Neoadjuvant hormone therapy, after 3 months PSA pre-RT 6.8 ng/mL.
PSA after RT **0.95** ng/mL







- Prostate, seminal vescicole and N: 50.4Gy/28fr.
- Prostate and seminal vescicole: 61.6Gy/28fr.
- Prostate: 74.2Gy/28fr.

IMRT for Pelvic tumours: Prostate post-op

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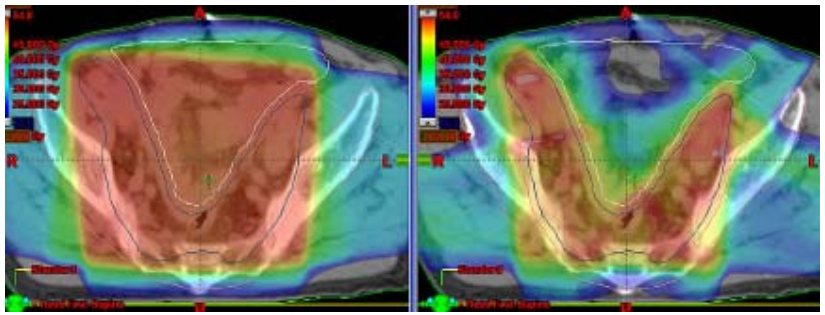

Pelvis comparison between
3DCRT vs IMRT

POST-OPERATIVE Evidences

The clinical impact of IMRT in post-op remains to be clarified, but IMRT seems to determine a reduction of acute toxicity in some series of patients (when the whole pelvis is treated).

Radiotherapy and Oncology 93 (2009) 207–212

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Prostate radiotherapy

IMRT significantly reduces acute toxicity of whole-pelvis irradiation in patients treated with post-operative adjuvant or salvage radiotherapy after radical prostatectomy

Filippo Alongi [a,b,c,*], Claudio Fiorino [d], Cesare Cozzarini [a], Sara Broggi [d], Lucia Perna [d], Giovanni Mauro Cattaneo [d], Riccardo Calandrino [d], Nadia Di Muzio [a]

[a] Department of Radiotherapy, Scientific Institute H San Raffaele, Milan, Italy; [b] I.B.F.M National Research Council (CNR), Italy; [c] L.A.T.O. HSR-G. Giglio, Cefalù, Italy; [d] Department of Medical Physics, Scientific Institute H San Raffaele, Milan, Italy

IMRT for Pelvic tumours: Prostate post-op

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POST-OPERATIVE Evidences

There is no evidence to support or refute offering IMRT rather than 3DCRT to patients in the postoperative setting.

However, it is reasonable to expect that the benefits of IMRT in reducing acute and late GU and GI toxicity might be also realized in the postoperative radiation and pelvic nodal radiation settings.

For this reason, IMRT may be considered a viable treatment option as determined by the Precautionary Principle (1), which states that it is ethical to recommend a treatment with little known harm over one with greater expected harm prior to scientific proof of the difference in harm being established.

1. Andorno R. The Precautionary Principle: A new legal standard for a technological age. J Int Biotechnol Law. 2004;1(1):8

CONCLUSION 1:
PROSTATE POSTOPERATIVE

In the setting of postoperative radiotherapy, there are currently insufficient data to recommend IMRT over 3DCRT.

Prostate: post-operative setting in ICH

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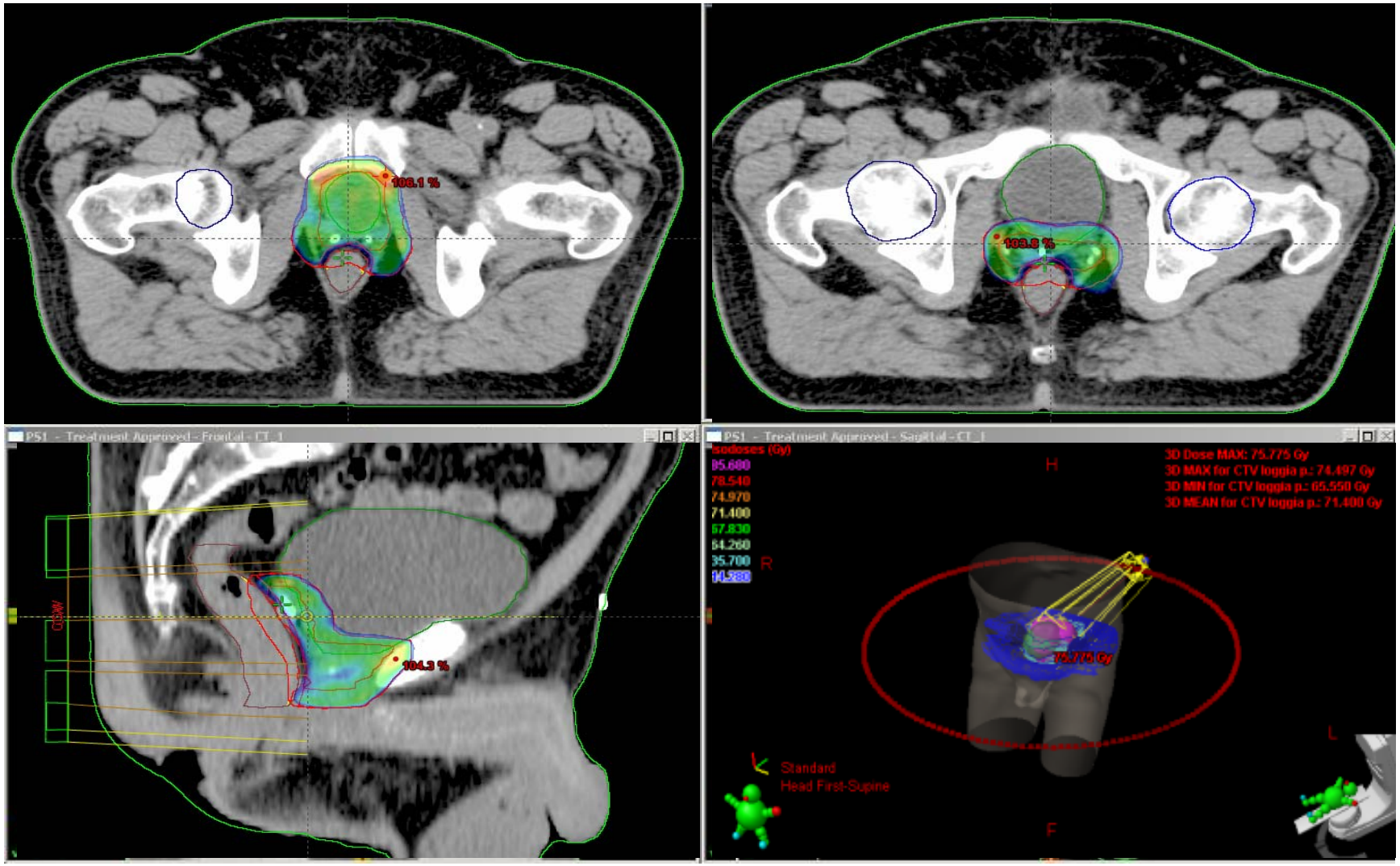
Moderate Hypofractionation to prostatic fossa : 70Gy in 28 fractions



IMRT for pelvic tumours: Anal Cancer

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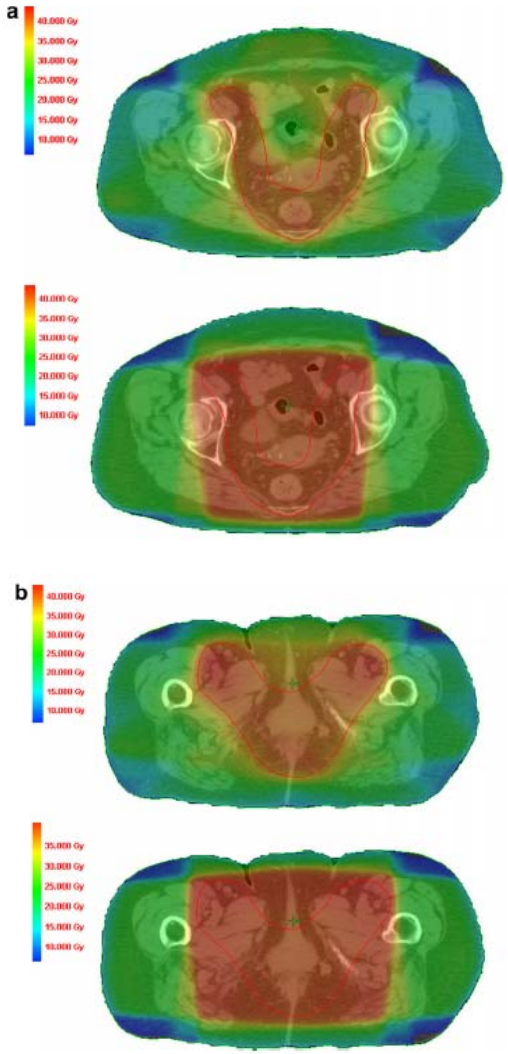
Evidences

IMRT has been shown to reduce the amount of dose inhomogeneity and can also reduce bone marrow irradiation.

One comparative study of 59 patients with anal cancer receiving chemoradiation was identified. The IMRT cohort had less acute diarrhoea and skin/mucosal toxicity, with less unplanned treatment delays [1].



Radiotherapy and Oncology 87 (2008) 383–390
www.thegreenjournal.com

Anal cancer

The effect of intensity-modulated radiotherapy and high dose rate brachytherapy on acute and late radiotherapy-related adverse events following chemoradiotherapy of anal cancer

Kauko Saarilahti*, Päivi Arponen, Leila Vaalavirta, Mikko Tenhunen

Department of Oncology, Helsinki University Central Hospital, Finland

Anal canal with RA in ICH

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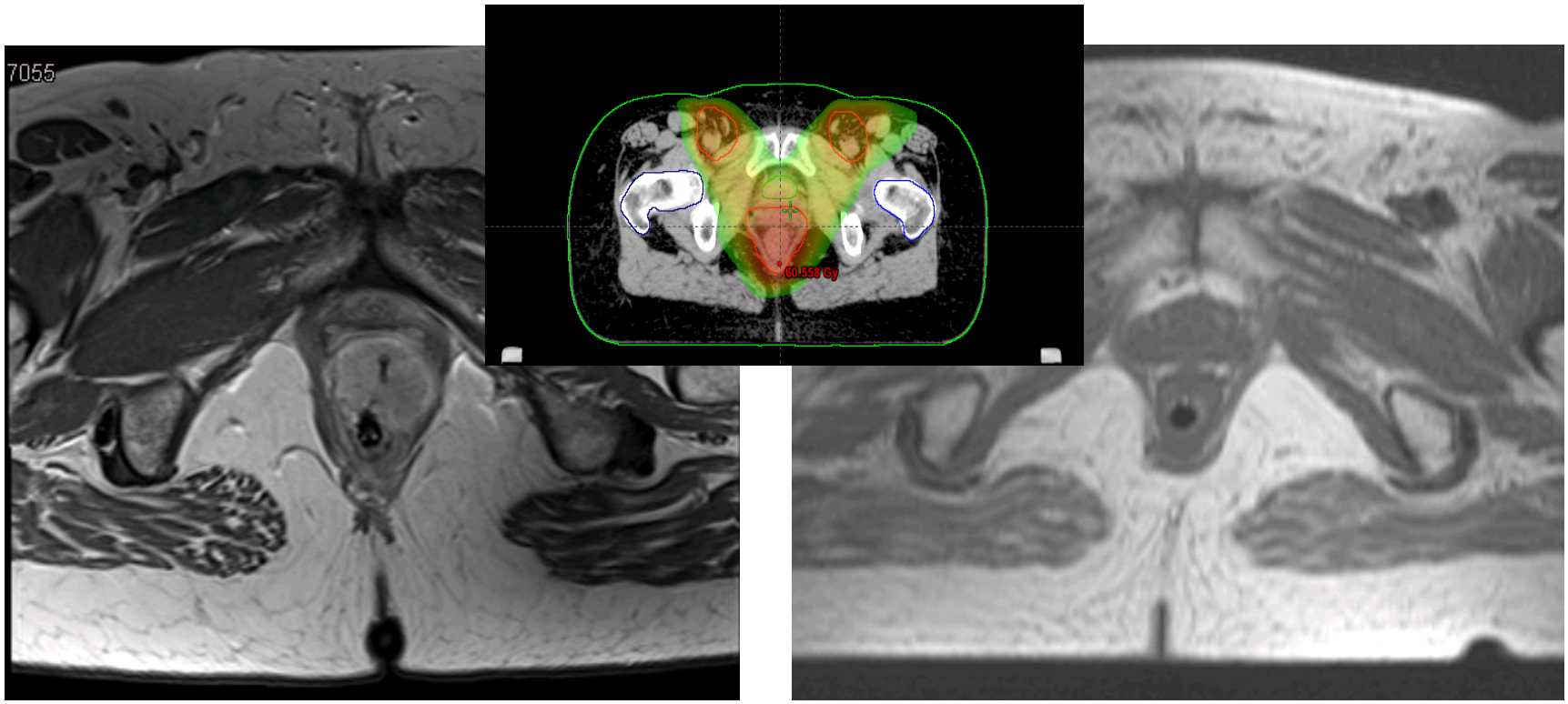
Pz. 51 y. Canal anal cancer. Concomitant CT (5FU) – RT: [T and N: 49.5 Gy (1.5 Gy/fr); only T 59.4 Gy (1.8 Gy/fr)/33 fr.]



MRI : RC at 2 months

IMRT for Abdominal tumours

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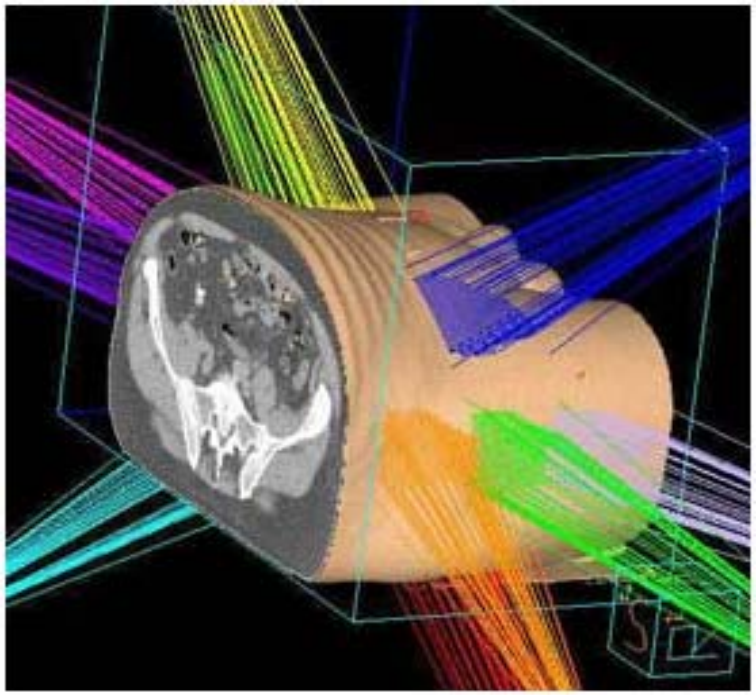
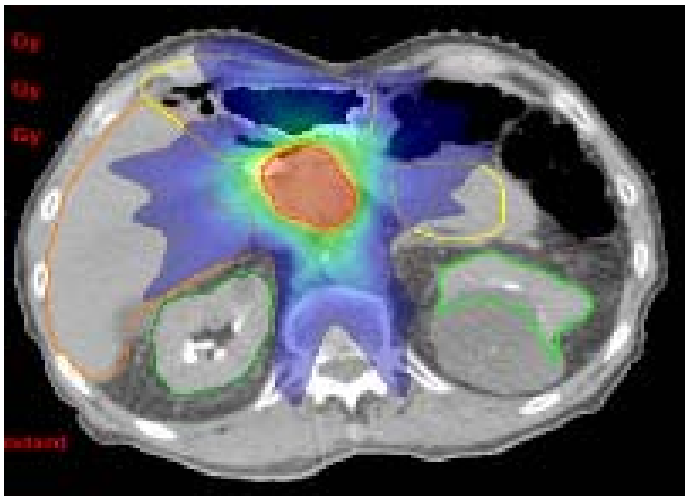
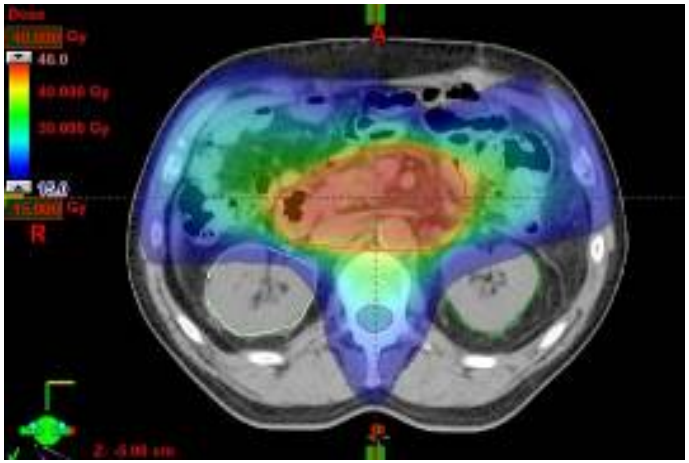
Assumption:
IMRT in ABDOMEN TARGET can be useful in minimizing dose to kidneys and small bowel.





PANCREAS IN ICH with RAPIDARC



IMRT for ABDOMINAL LESIONS

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Abdomen Evidences

Evidence from 19 non-comparative dosimetric and outcome studies has suggested that IMRT is an option for esophageal, gastric, bile duct, pancreatic, cancers.

These studies seems to demonstrate that IMRT can reduce radiation dose to OAR, while managing to deliver the prescribed radiation dose to target volumes.

For this reason, IMRT may be considered a viable treatment option, as it is ethical to recommend a treatment with little known harm over one with greater expected harm prior to scientific proof of the difference in harm being established(1).

1. Andorno R. The Precautionary Principle: A new legal standard for a technological age. J Int Biotechnol Law. 2004;1(1):8
2.Veldeman L,. Lancet Oncol. 2008;9(4):367-75.
3.Galvin JM,. Int J Radiat Oncol Biol Phys. 2004;58(5):1616-34

cancer care ontario | action cancer ontario
program in evidence-based care | programme de soins fondé sur des preuves

CONCLUSION 1:
GASTROINTESTINAL

…However, to date there are insufficient clinical outcome study data comparing IMRT with 3DCRT in the treatment of GI cancers.

IMRT for ABDOMINAL LESIONS: Pancreas

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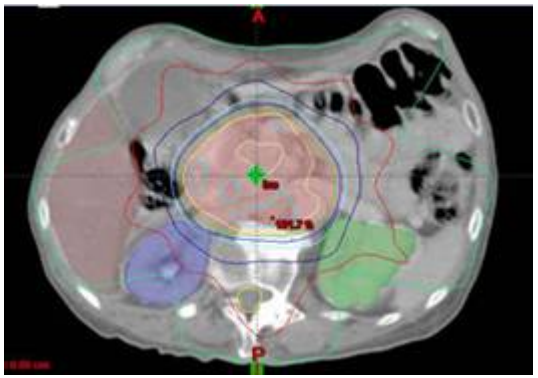
Abdomen Evidences

The pancreas is located in one of the most complex anatomical sites in terms of the number and proximity of organs at risk with the lowest radiation-dose tolerance—ie, the liver, kidneys, spinal cord, and small bowel.

Pancreatic cancer is radioresistant. Therefore, IMRT seems a suitable technique to decrease toxic effects and test dose escalation in a setting of concurrent chemotherapy.

However,3 non-comparative case series showed evidence for the feasibility of an IMRT dose escalation to 55–60 Gy in combination with chemotherapy for pancreatic cancer.[1], [2] and [3]



1. YR Bai,World J Gastroenterol 9 (2003), pp. 2561–2564
2. E Ben-Josef, Int J Radiat Oncol Biol Phys 59 (2004), pp. 454–459
3. MT Milano, Int J Radiat Oncol Biol Phys 59 (2004), pp. 445–453

IMRT for ABDOMINAL LESIONS: Pancreas

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Research Article

Phase I Study of Concomitant Gemcitabine and IMRT for Patients with Unresectable Adenocarcinoma of the Pancreatic Head

Christopher H. Crane,[*,1] *John A. Antolak,*[2] *Isaac I. Rosen,*[2] *Kenneth M. Forster,*[2] *Douglas B. Evans,*[4] *Nora A. Janjan,*[1] *Chusilp Charnsangavej,*[6] *Peter W.T. Pisters,*[4] *Renato Lenzi,*[3] *Micheal A. Papagikos,*[1] *and Robert A. Wolff*[3]

Departments of [1]*Radiation Oncology,* [2]*Radiation Physics,* [3]*Gastrointestinal Medical Oncology,* [4]*Surgical Oncology,* [5]*Experimental Radiation Oncology, and* [6]*Diagnostic Radiology, Pancreatic Tumor Study Group, The University of Texas M.D. Anderson Cancer Center, Houston, TX, USA*

Abstract

Purpose: We hypothesized that dynamic intensity-modulated radiotherapy (IMRT) would protect normal tissues enough to allow the escalation of either the gemcitabine or radiotherapy dose in unresectable pancreatic cancer patients.

Abdomen Evidences: HIGH VOLUMES, HIGH TOXICITY, EXPECIALLY WITH CHEMO!

In the study by Crane and co-workers, the delivery of a high-fraction dose of 3·0 Gy to the whole large volume in combination with gemcitabine chemotherapy resulted in dose-limiting (ie, myelosuppression and upper gastrointestinal toxicity) toxic effects in all five patients, two of whom received lower gemcitabine doses than the other three. Four patients needed hospital admission for supportive care, and the fifth died of an unrelated cause shortly after completing the treatment. The trial was subsequently closed due to excessive toxic effects.

Pancreas with RA in ICH

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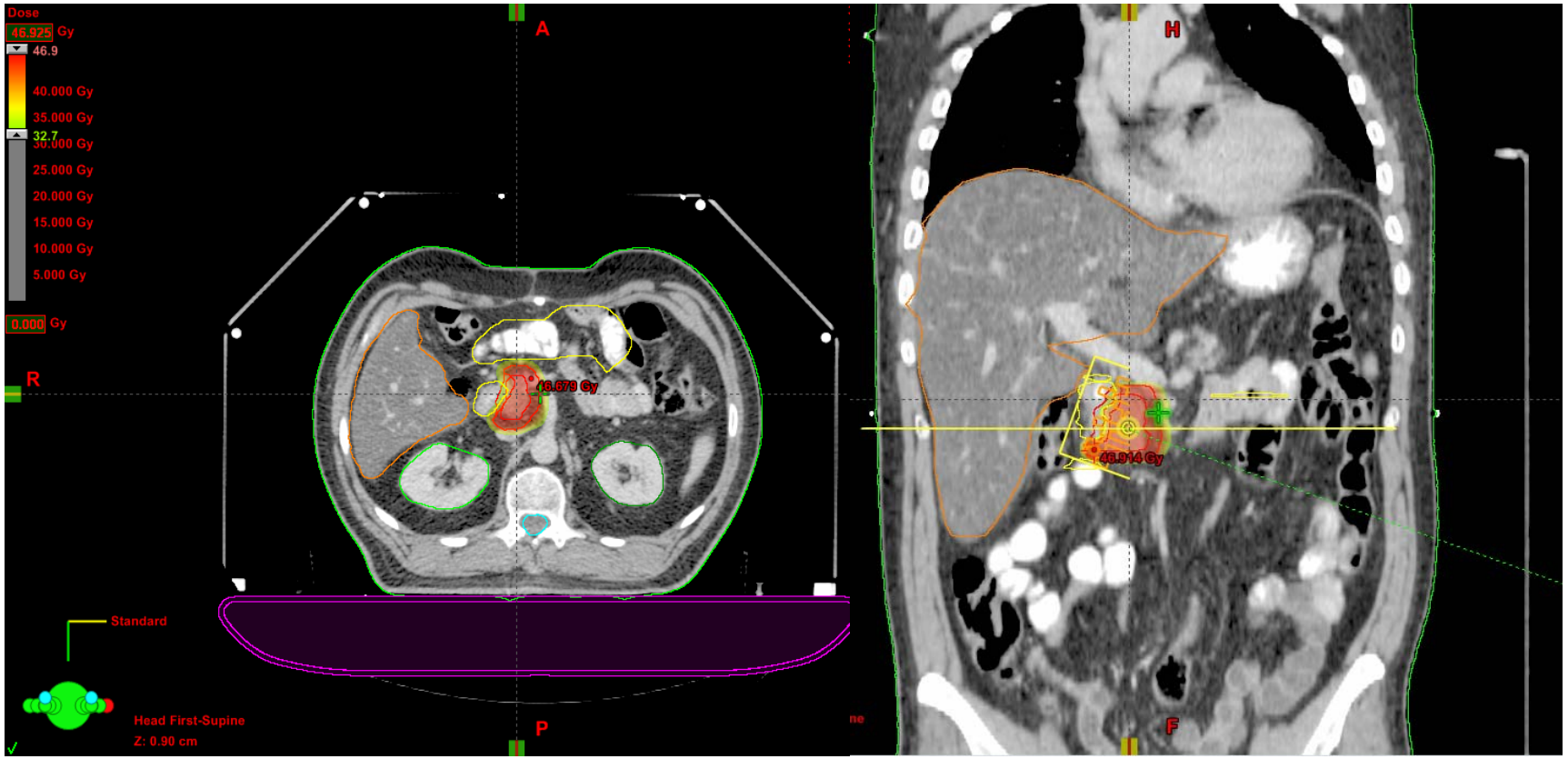
Pz 56 y. Pancreatic adenoca unresectable;
GEM + FOLFIRI and RT (45Gy/6fr.) -> Surgery.



IMRT for ABDOMINAL LESIONS: Liver

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Liver: NO Evidences

No evidence was obtained on liver cancer(1,2).

Earlier clinical data from small studies have reported lower treatment toxicities but have not been sufficient to suggest either superiority or inferiority of local tumour control within the target volumes.

IMRT be considered for those patients with GI cancers where 3DCRT cannot adequately protect OAR (OAR management is site specific).

1. 2.Veldeman L,. Lancet Oncol. 2008;9(4):367-75.
2. 3.Galvin JM,. Int J Radiat Oncol Biol Phys. 2004;58(5):1616-34

CONCLUSION 1:

To date there are insufficient clinical outcome study data comparing IMRT with 3DCRT in the treatment of GI cancers such as Liver cancer.

Liver Metastases in ICH

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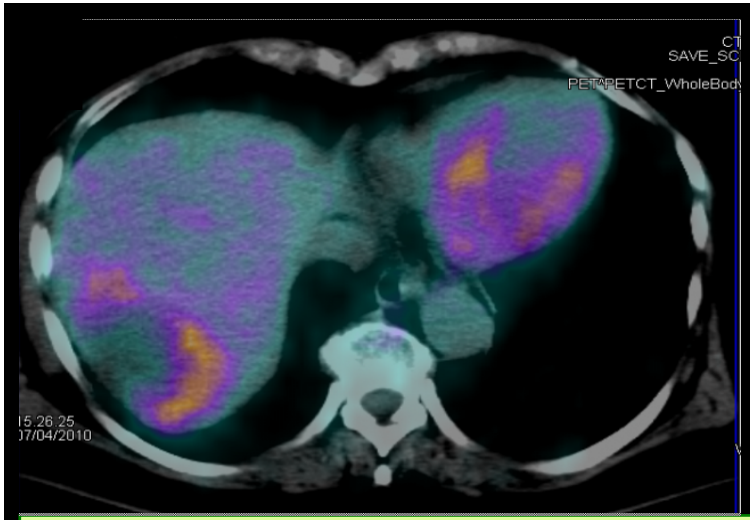
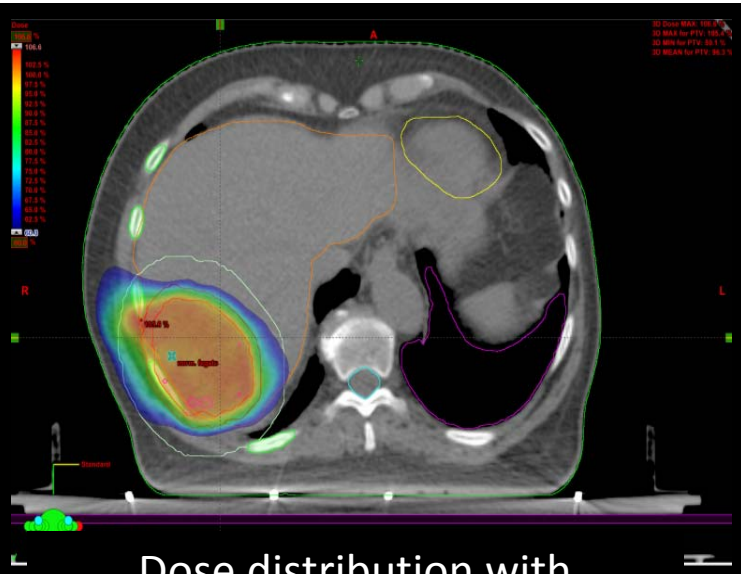
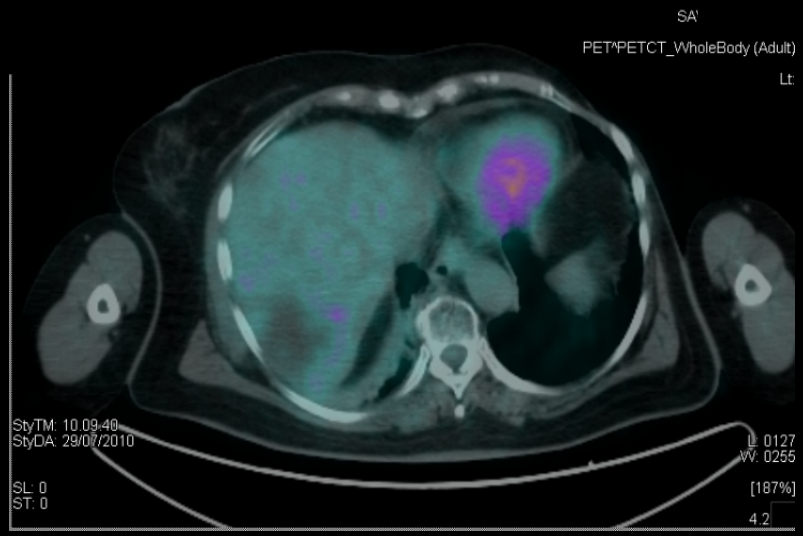


Pz. 77y. Liver Met from colon cancer.



Dose distribution with RAPIDARC



CT@ 3 months: RC

Abdominal lesions in ICH

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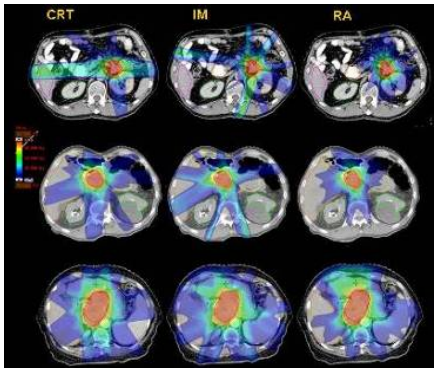
Abdomen:LN mts

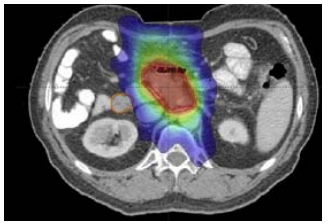
CRITICAL APPRAISAL OF VOLUMETRIC MODULATED ARC THERAPY IN STEREOTACTIC BODY RADIATION THERAPY FOR METASTASES TO ABDOMINAL LYMPH NODES

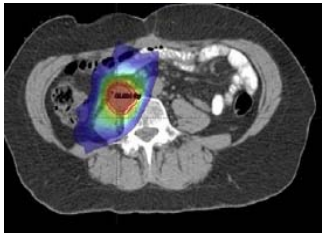
Mario Bignardi, M.D.,* Luca Cozzi, Ph.D.,† Antonella Fogliata, M.Sc.,† Paola Lattuada, M.Sc.,* Pietro Mancosu, M.Sc.,* Piera Navarria, M.D.,* Gaetano Urso, M.Sc.,* Sabrina Vigorito, M.Sc.,* and Marta Scorsetti, M.D.*



CLINICAL OUTCOME OF HYPOFRACTIONATED STEREOTACTIC RADIOTHERAPY FOR ABDOMINAL LYMPH NODE METASTASES

Mario Bignardi, M.D.,* Piera Navarria, M.D.,* Pietro Mancosu, M.Sc.,* Luca Cozzi, Ph.D.,† Antonella Fogliata, M.Sc.,† Angelo Tozzi, M.D.,* Simona Castiglioni, M.D.,* Carlo Carnaghi, M.D.,† Maria Chiara Tronconi, M.D.,† Armando Santoro, M.D.,† and Marta Scorsetti, M.D.*





SBRT by RapidArc in abdominal TARGETS

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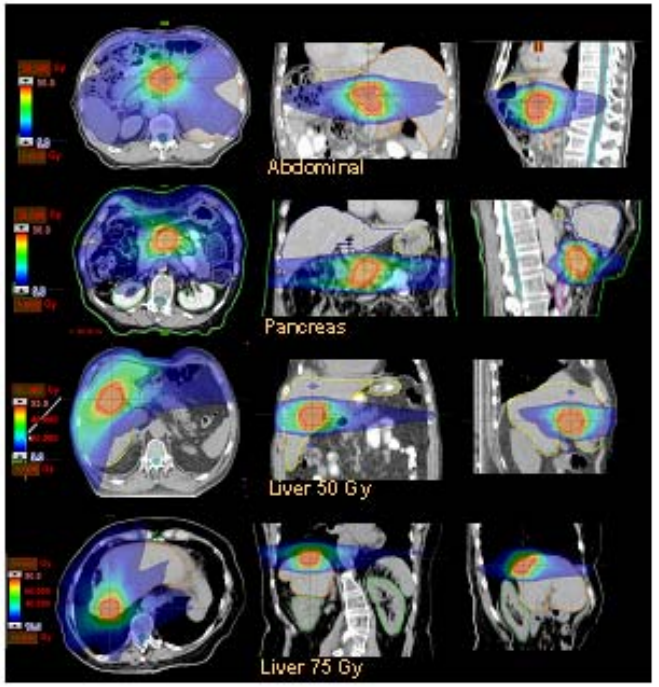

Stereotactic body radiation therapy for abdominal targets using volumetric intensity modulated arc therapy with RapidArc: feasibility and clinical preliminary results

Marta Scorsetti,1 Mario Bignardi M,1 Filippo Alongi,1 Antonella Fogliata c,2 Pietro Mancosu 1 Piera Navarria,1 Simona Castiglioni,1 Sara Pentimalli,1 Angelo Tozzi MD,1 Luca Cozzi,2

1 IRCCS Istituto Clinico Humanitas, Rozzano (Milano), Italy
2 Oncology Institute of Southern Switzerland, Bellinzona, Switzerland

Abdominal lesions in ICH

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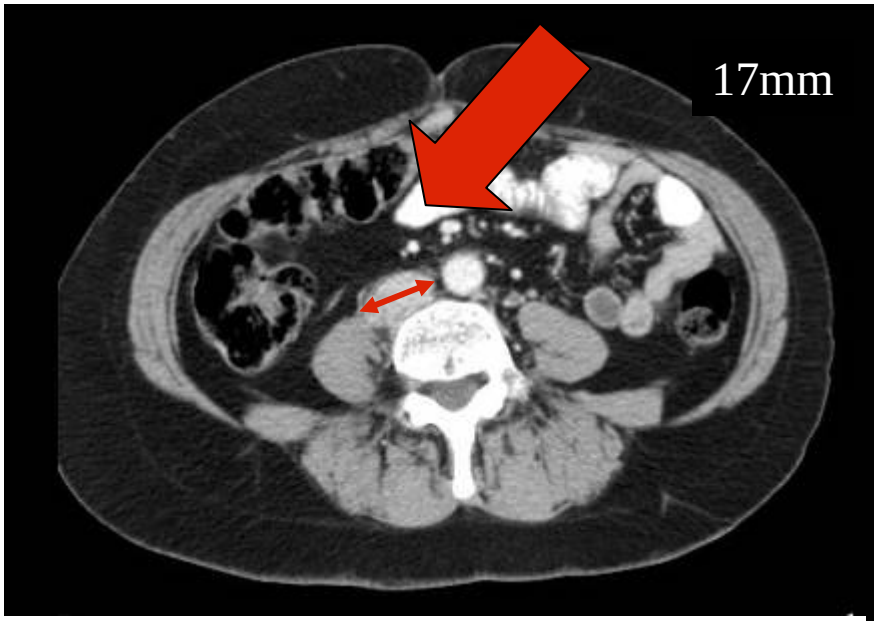
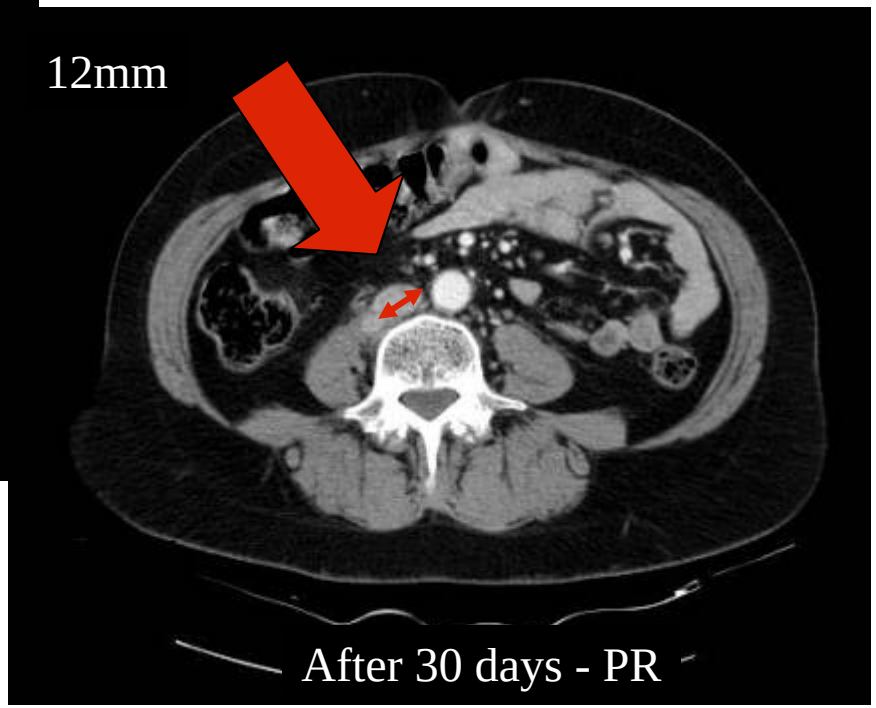
Pz. 66 y, M+ from colon cancer





Abdominal lesions in ICH

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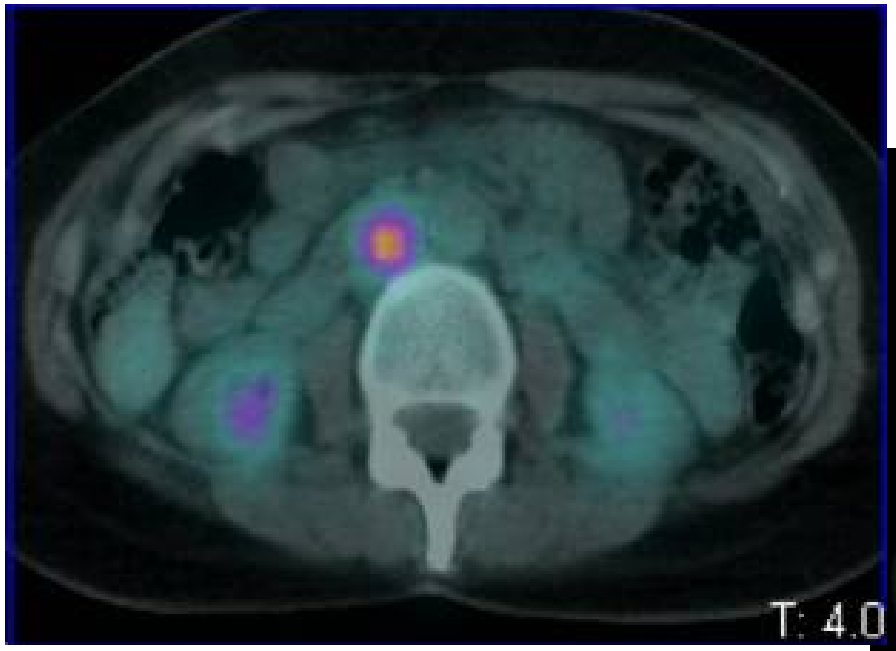
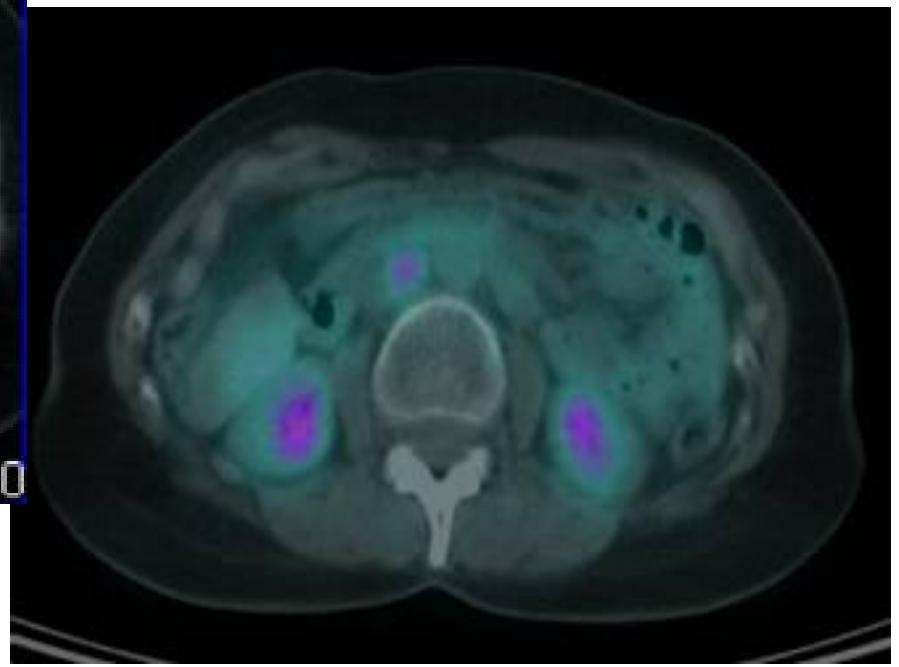
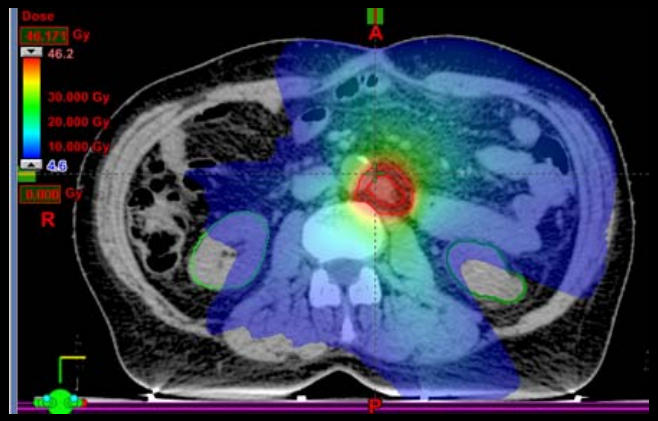
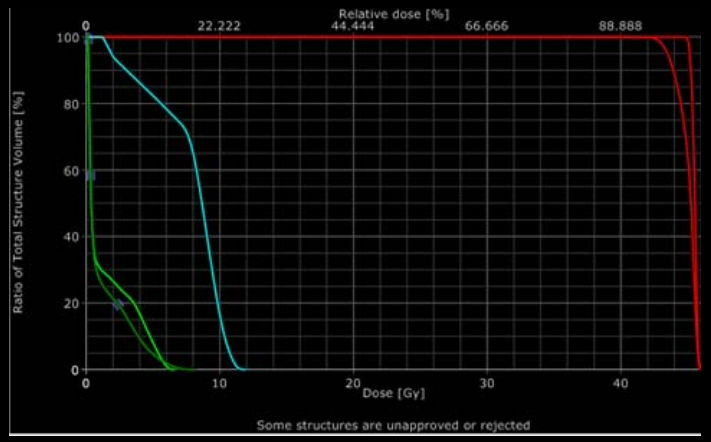
Paracaval lymph-node → RC at 6 months



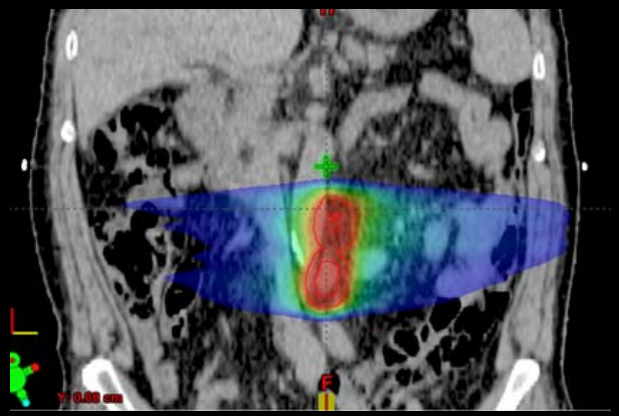


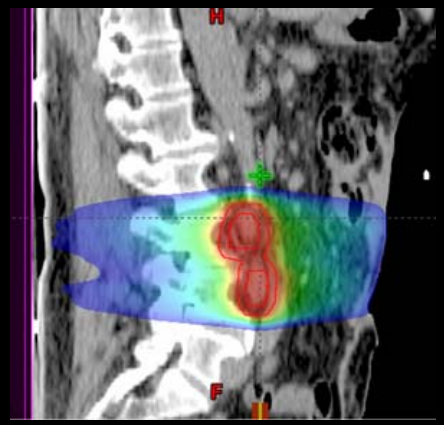
SBRT with TB: 7.5Gyx6;10FFF;DR 2400





1 isoc, 1 arcs
Jaws tracking
MU: 1697
BOT: 60 s





Kidneys mean dose = 1.5 Gy
Spine: max dose = 7.5 Gy

SBRT with TB : 7.5Gyx6;10FFF;DR 2400

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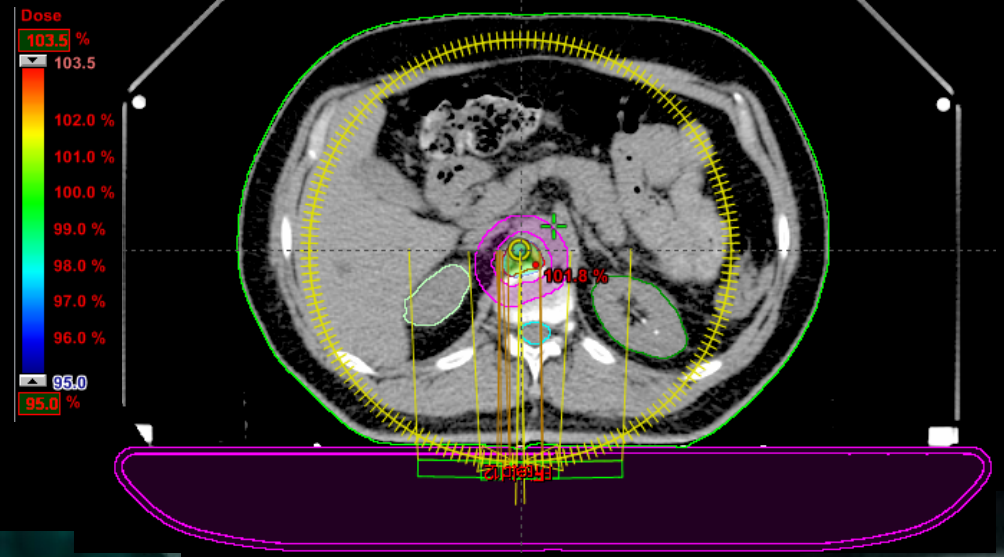
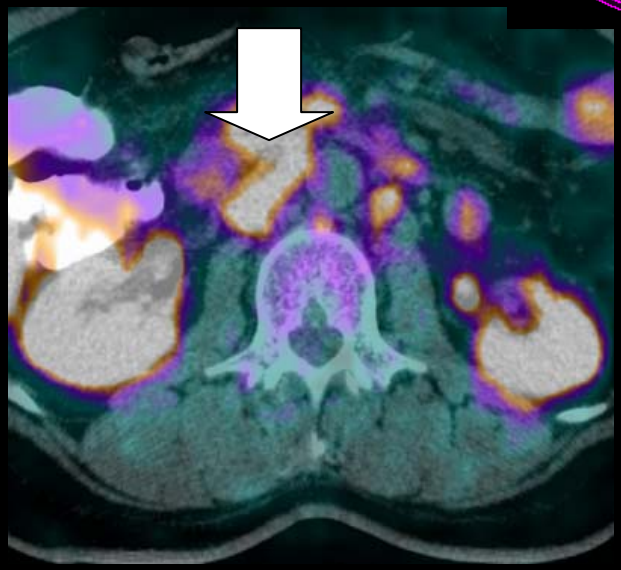
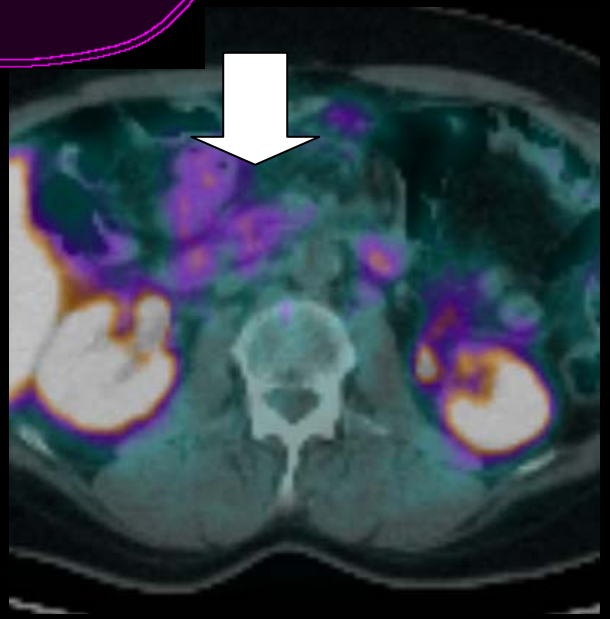
RapidArc treatment by means of TrueBeam





11-C-choline PET/TC



PSA pre SBRT: 17,4ng/mL

PSA post SBRT: 1,02ng/mL

IMRT for Abdomen & pelvis @ ICH: RapidArc experience

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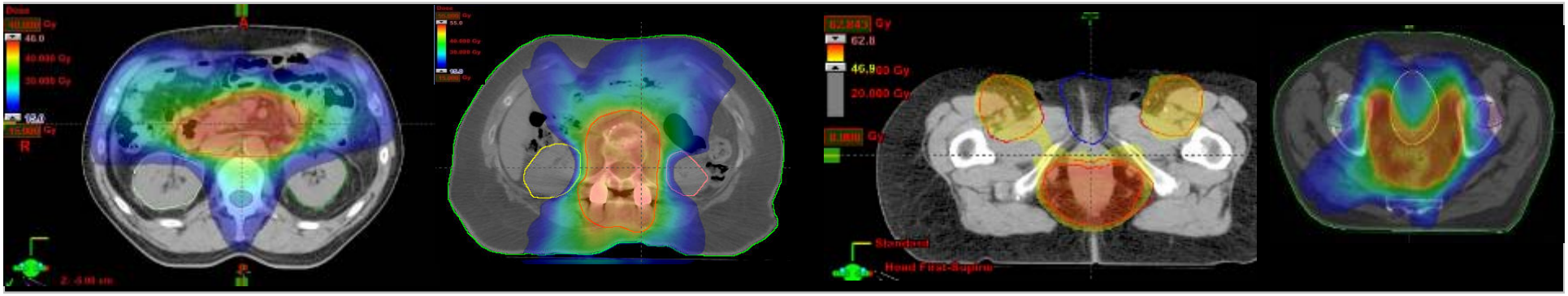
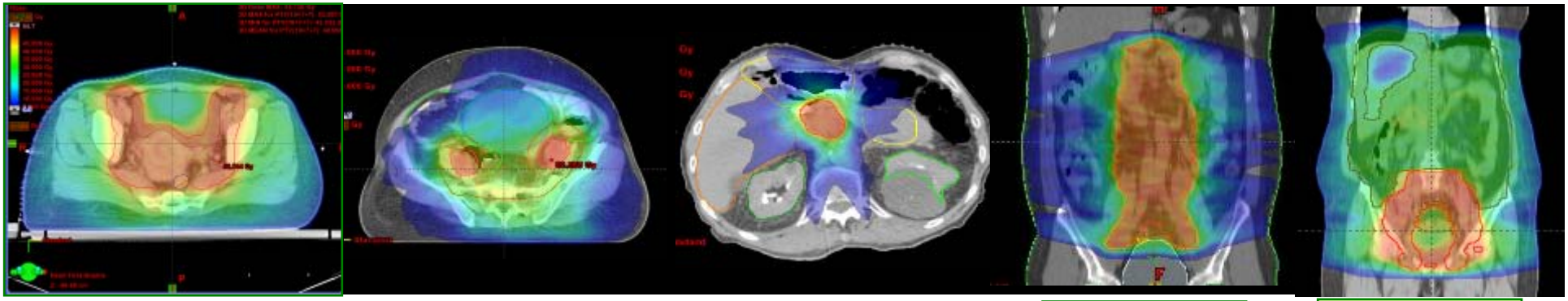


Pancreas | Chordoma | Anal Canal | Prostate



Cervix Uteri | Multiple pelvic nodes | Abdominal Mets | Seminoma | Whole Abdominal Irradiation

THANK YOU!!!!!