Associazione Italiana Radioterapia Oncologica
Lazio Abruzzo Molise

Incontro scientifico regionale di aggiornamento dell' AIRO

Martedì 17 Aprile 2012
Ore 17.00
Sede: Ospedale Sant'Andrea di Roma. Aula C piano 0.

RE-IRRADIATION OF RECTAL CANCER

Antonella Ciabattoni

A.C.O. S.Filippo Neri, Roma

PUB-MED

RECTAL CANCER RE-IRRADIATION: 17 LAVORI

12 PERTINENTI

2 SOLO "RECIDIVA RETTO E RT "

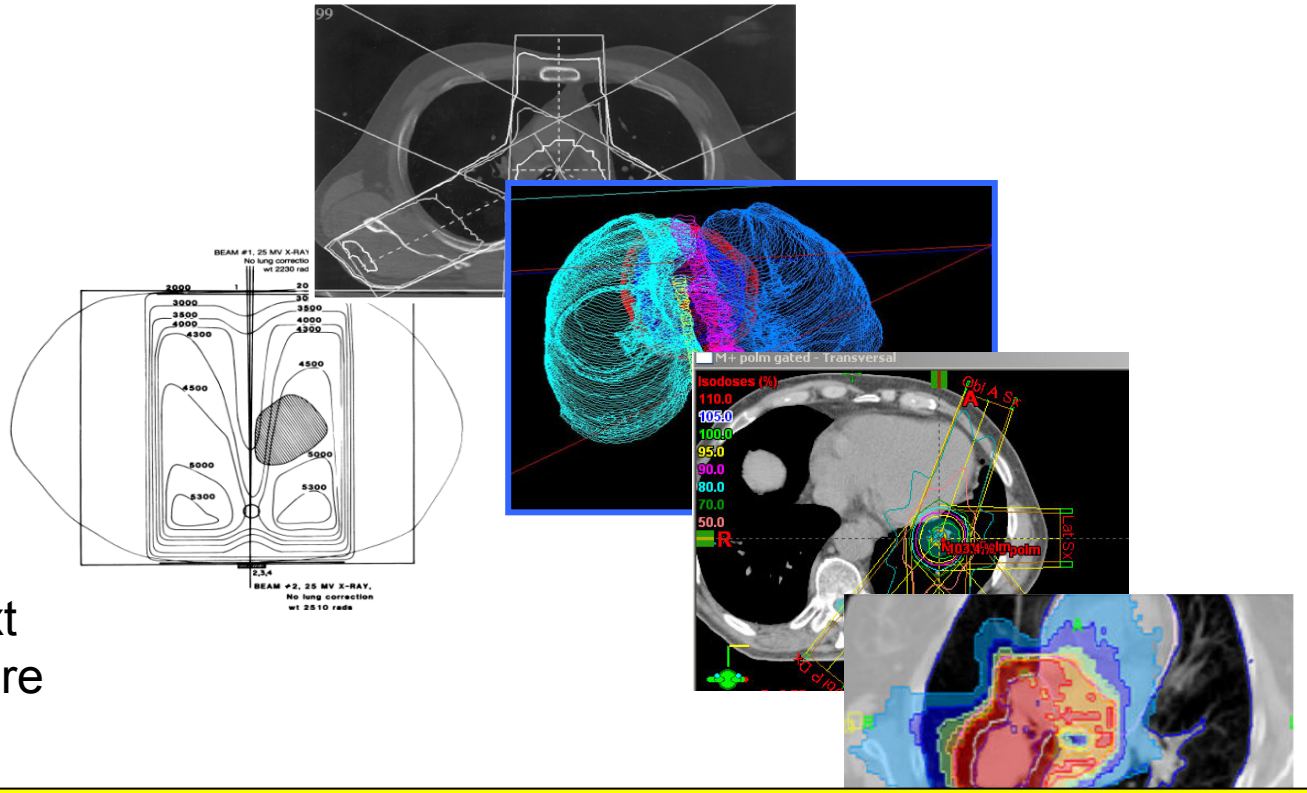
5 "TOLLERANZA RETTO DA RT PROSTATA"

COCHRANE:

0 REVIEWS (ONLY RECTAL NEOPLASMS)

- 3% to 32% of rectal carcinomas are expected to recur loc
  40% – 50 % of these cases occurring in the absence of M
- Mean time from primary surgery: 14-28 mths
- 25% of the local recurrences can be resected with curativ
- High post-operative morbidity and mortality rates
- 80% - 90% of those with local recurrence will die within 5

ROLE OF TECHNOLOGY IN RADIOTHERAPY

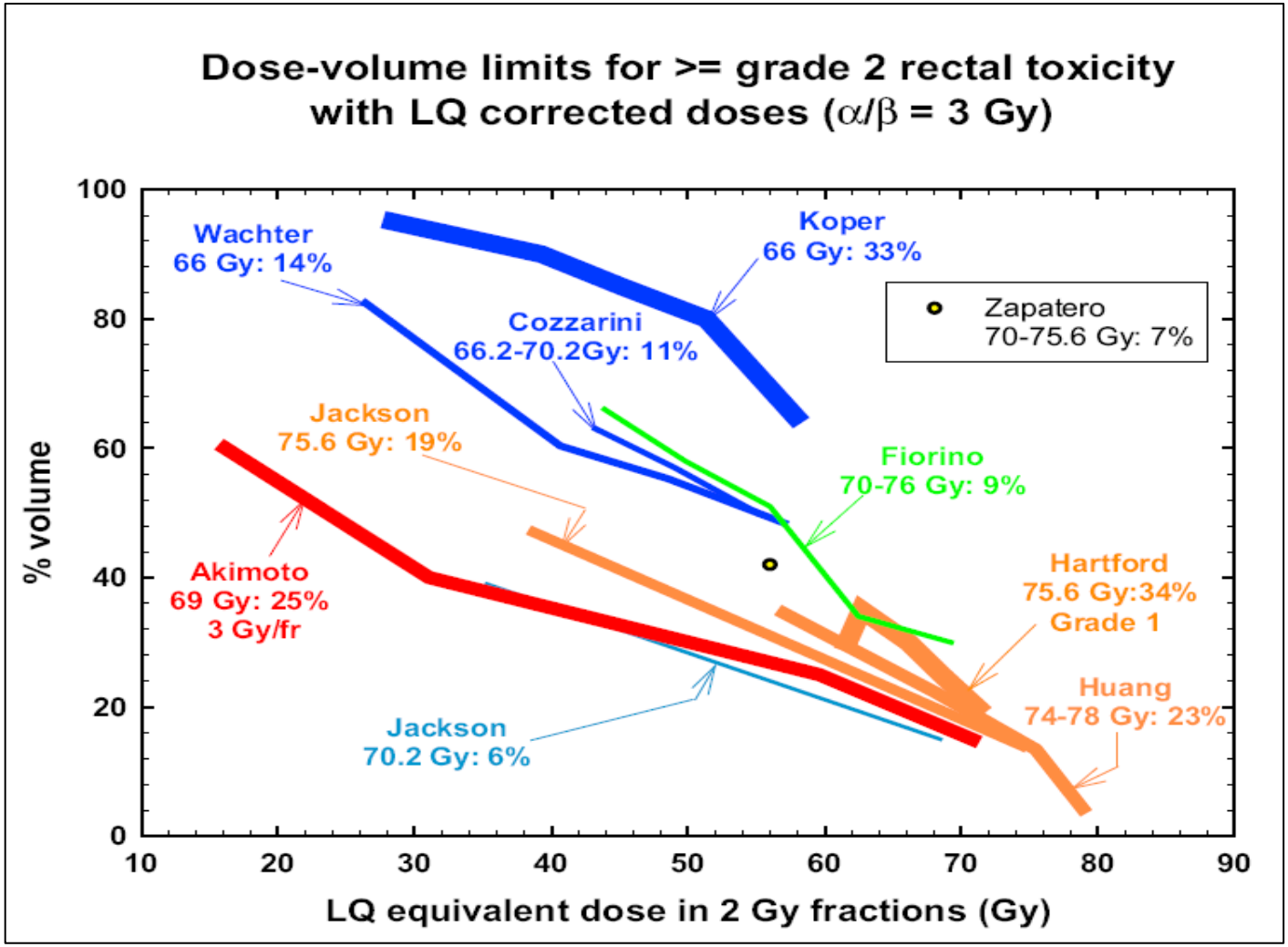


….Especially in the context of RE-IRRADIATION, where normal tissues and critical organs might receive high cumulative radiation d these developments new possibilities….

Not every treatment that is technically feasible and provides appealing dose distributions benefits our patients in the long run…..

“RE-IRRADIATION: NEW FRONTIERS”:

…..It is critically important, however, that the radiation oncologist is knowledgeable not only in terms of new developments in radiation technology, but also concerning radiobiology and clinical side effects of re-irradiation…



By courtesy of B.Jereczek

LOCAL RECURRENCE IN RECTAL CARCINOMA

Predictors

- Lymph node involvement
- Full thickness penetration of the muscular wall of the rectum

Goals of treatment for locally recurrent rectal cancer

- Cure
- Palliation

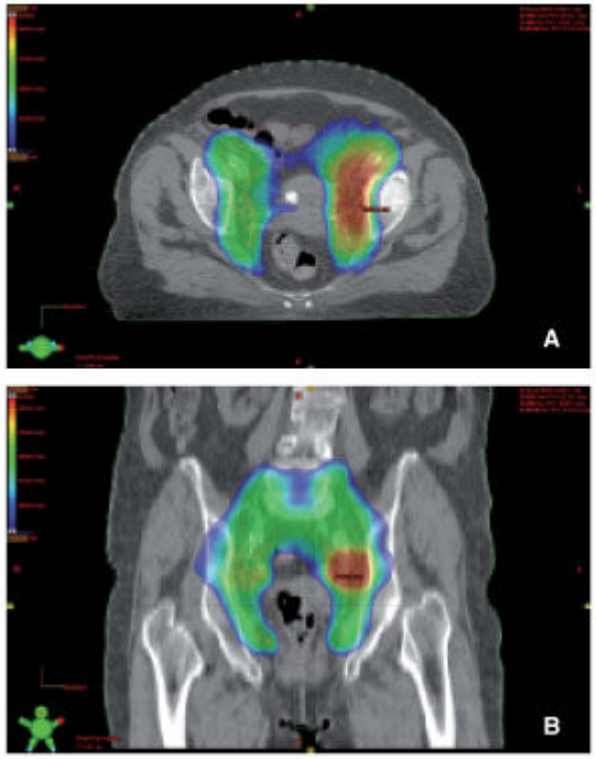
Issues for re-treatment decision

- Single-multiple sites of disease
- Treatment progression in other regions
- Life expectancy
- Performance status
- Acute and late toxicity
- Quality of life

“RE-IRRADIATION: NEW FRONTIERS”:

Reirradiation in Rectal Cancer

Although historically considered unsafe, reirradiation in the pelvis has been investigated **in selected patients** with LRRC and found to be **reasonably well tolerated and to provide symptomatic relief** in most patients.



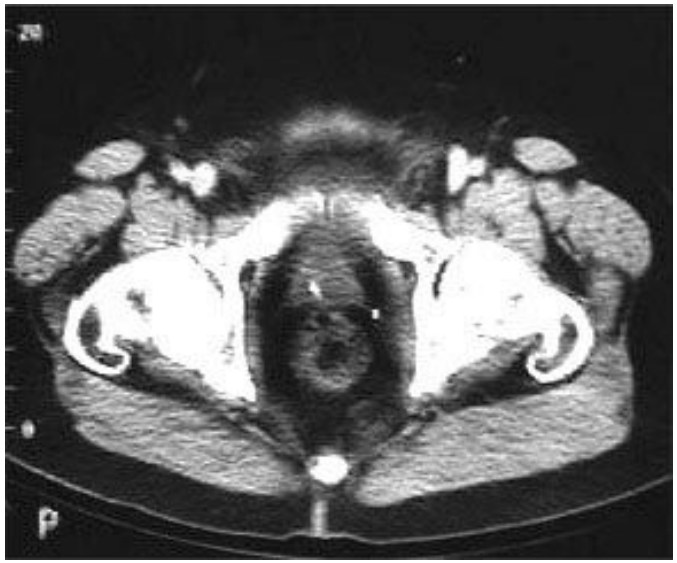
✓ **The whole pelvis is not treated, and small bowel and bladder are excluded from the reirradiation field.**

✓ **The use of hyperfractionated RT results in reduced late toxicity** in comparison to conventionally treated patients receiving once-daily irradiation.

V. Valentini, M. Massaccesi

Critical organs in rectal cancer RT

- Bowel: small bowel, colon, rectum, anal canal
- Urinary system: uretheres, urinary bladder, urethra
- Others: genitalia, bones, nerves, veins/arteries, muscles, bone marrow



RTOG
RADIATION THERAPY ONCOLOGY GROUP

Pergamon

Int. J. Radiation Oncology Biol. Phys., Vol. 31, No. 5, pp. 1341–1346, 1995

0360-3016/95 $9.50 + .00

0360-3016(95)00060-7

● *Editorial*

HE RADIATION THERAPY ONCOLOGY GROUP
EAN ORGANIZATION FOR RESEARCH AND
ENT OF CANCER (EORTC)

ANN STETZ, B.S.[2] AND THOMAS F. PAJAK, PH.D.[2]

Pergamon

Int. J. Radiation Oncology Biol. Phys., Vol. 31, No. 5, 1049–1091, 1995

0360-3016/95 $9.50 + .00

0360-3016(95)00075-5

LENT SOMA SCALES FOR ALL ANATOMIC SITES

National Cancer Institute — U.S. National Institutes of Health | www.cancer.gov

Common Terminology Criteria for Adverse Events CTC AE v3.0 (2006) o CTC AE v4.02 (2009)

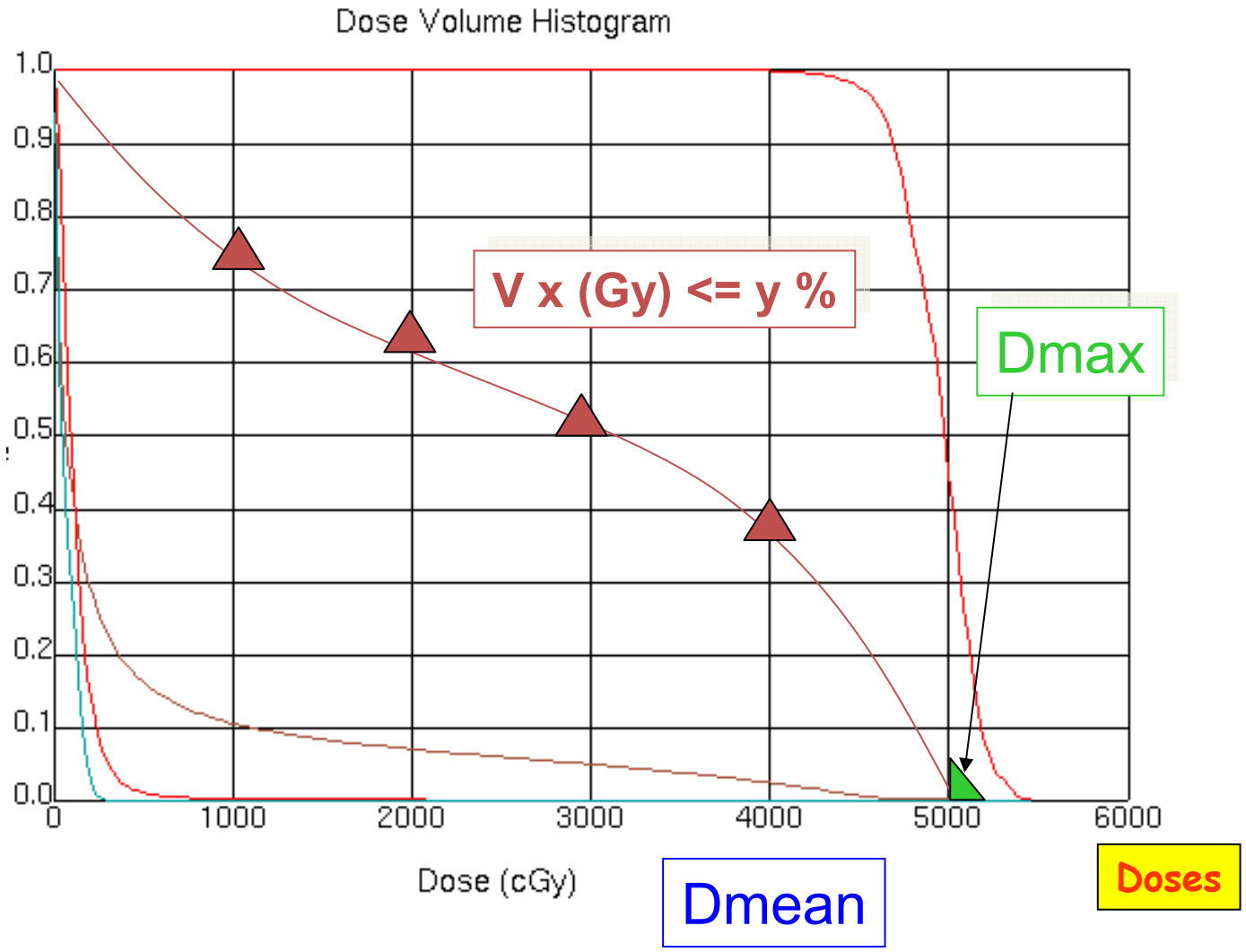
GASTROINTESTINAL

		Grade				
Adverse Event	**Short Name**	**1**	**2**	**3**	**4**	**5**
Ileus, GI (functional obstruction of bowel, i.e., neuroconstipation)	Ileus	Asymptomatic, radiographic findings only	Symptomatic; altered GI function (e.g., altered dietary habits); IV fluids indicated <24 hrs	Symptomatic and severely altered GI function; IV fluids, tube feeding, or TPN indicated ≥24 hrs	Life-threatening consequences	Death
REMARK: Ileus, GI is to be used for altered upper or lower GI function (e.g., delayed gastric or colonic emptying). ALSO CONSIDER: Constipation; Nausea; Obstruction, GI – *Select*; Vomiting.						
Incontinence, anal	Incontinence, anal	Occasional use of pads required	Daily use of pads required	Interfering with ADL; operative intervention indicated	Permanent bowel diversion indicated	Death
REMARK: Incontinence, anal is to be used for loss of sphincter control as sequelae of operative or therapeutic intervention.						
Leak (including anastomotic), GI – *Select*: – Biliary tree – Esophagus – Large bowel – Leak NOS – Pancreas – Pharynx – Rectum – Small bowel – Stoma – Stomach	Leak, GI – *Select*	Asymptomatic radiographic findings only	Symptomatic; medical intervention indicated	Symptomatic and interfering with GI function; invasive or endoscopic intervention indicated	Life-threatening consequences	Death
REMARK: Leak (including anasomotic), GI – *Select* is to be used for clinical signs/symptoms or radiographic confirmation of anastomotic or conduit leak (e.g., biliary, esophageal, intestinal, pancreatic, pharyngeal, rectal), but without development of fistula.						
Malabsorption	Malabsorption	—	Altered diet; oral therapies indicated (e.g., enzymes, medications, dietary supplements)	Inability to aliment adequately via GI tract (i.e., TPN indicated)	Life-threatening consequences	Death

Critical organs in rectal cancer RT

OARs

DVH



Doses

From “Emami paper” (1991) to

QUANTEC

Quantitative **E**stimates of **N**ormal **T**issue **E**ffects in **C**linic

GIOVANNA GAGLIARDI – Roma, Marzo 2009

Vol 76, issue 3, 1 March 2010

ELSEVIER

INTERNATIONAL JOURNAL OF

Radiation Oncology

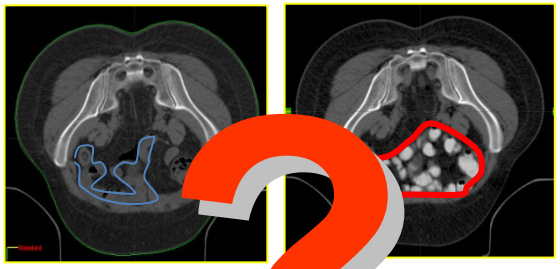
BIOLOGY • PHYSICS

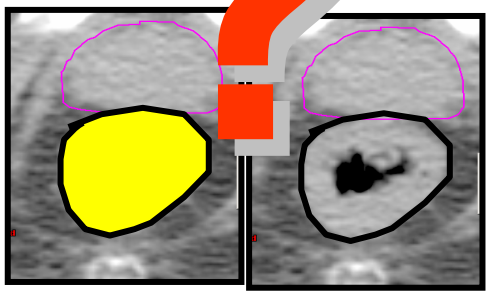
Official Journal of the American Society for Radiation Oncology

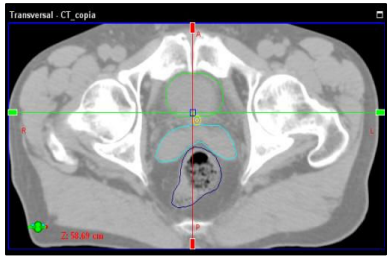
ASTRO

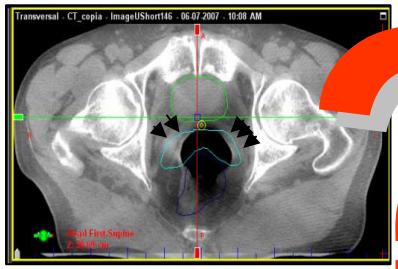
Critical organs in rectal cancer RT

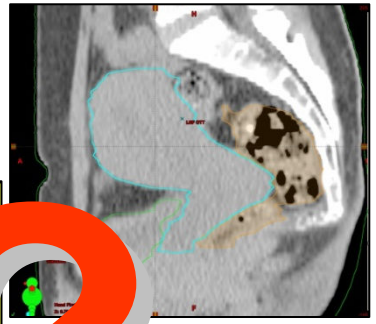
Target / OAR variability during the treatment….*reduce the accuracy of the planned dose distribution and the predictive value of the selected dose constraints….*

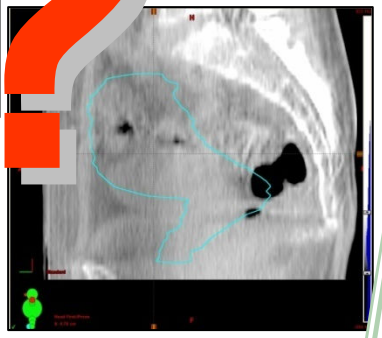


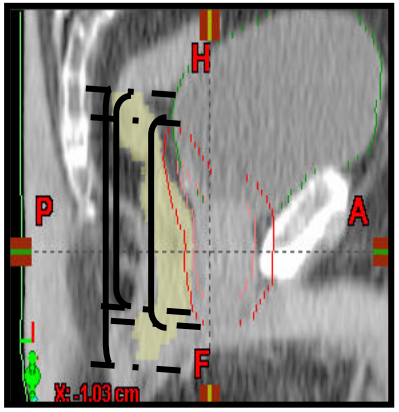






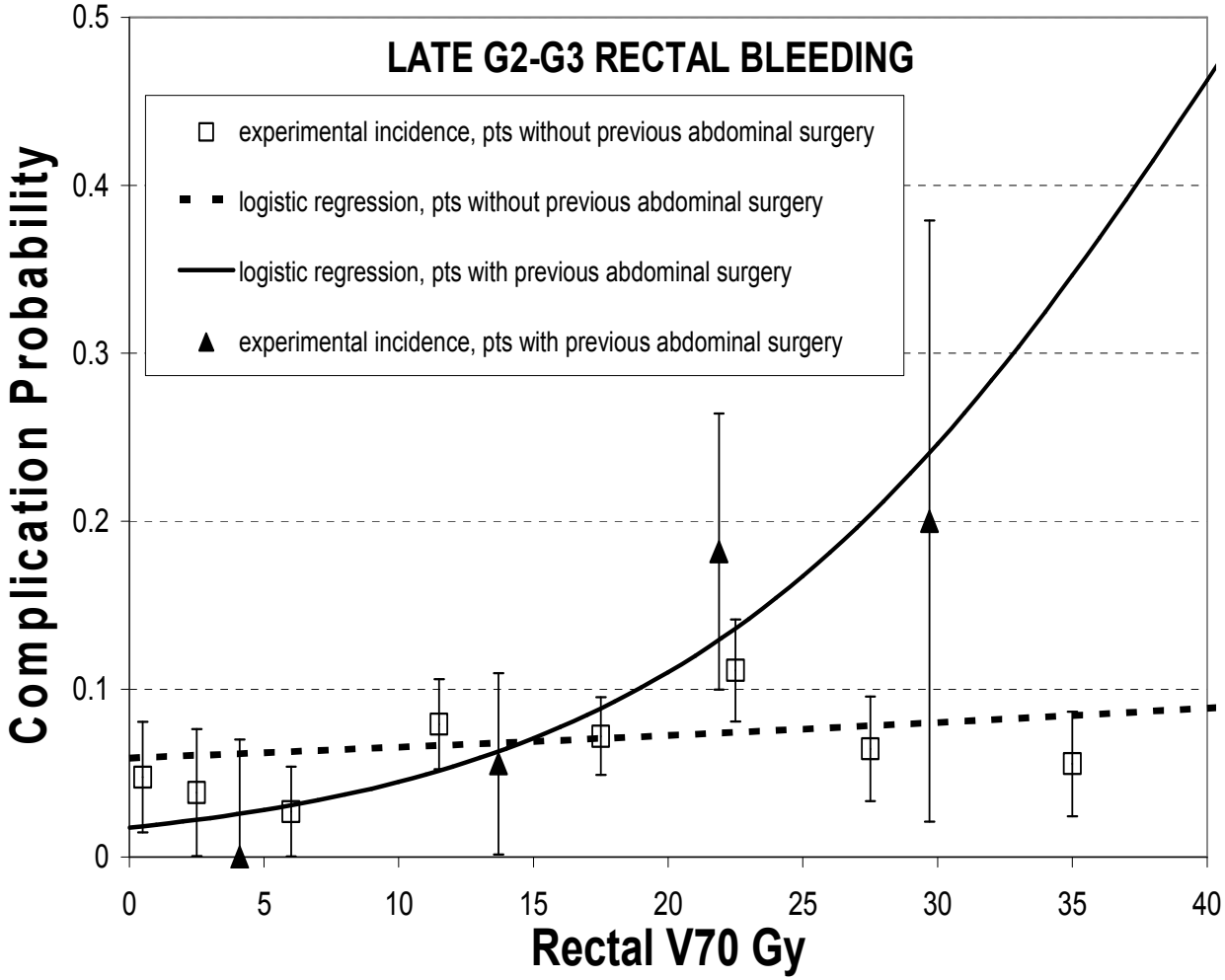


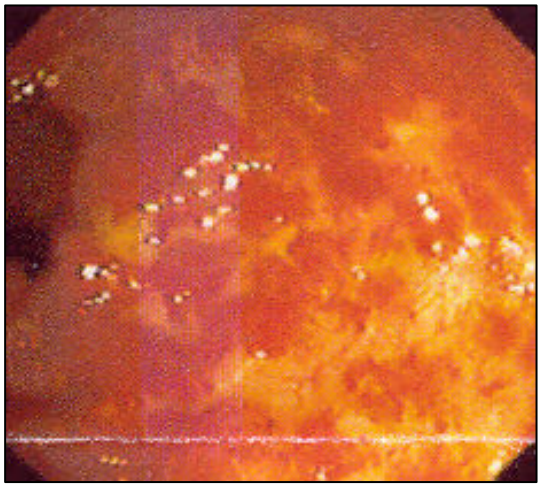




TUMOR COVERAGE
VS
NORMAL TISSUE
RISK

Surgery is the most important predictor in rectal bleeding





Fiorino et al. 2008, Fellin et al 2009

Int. J. Radiation Oncology Biol. Phys., Vol. 64, No. 5, pp. 1295–1298, 2006

0360-3016/06/$–see front matter

ELSEVIER

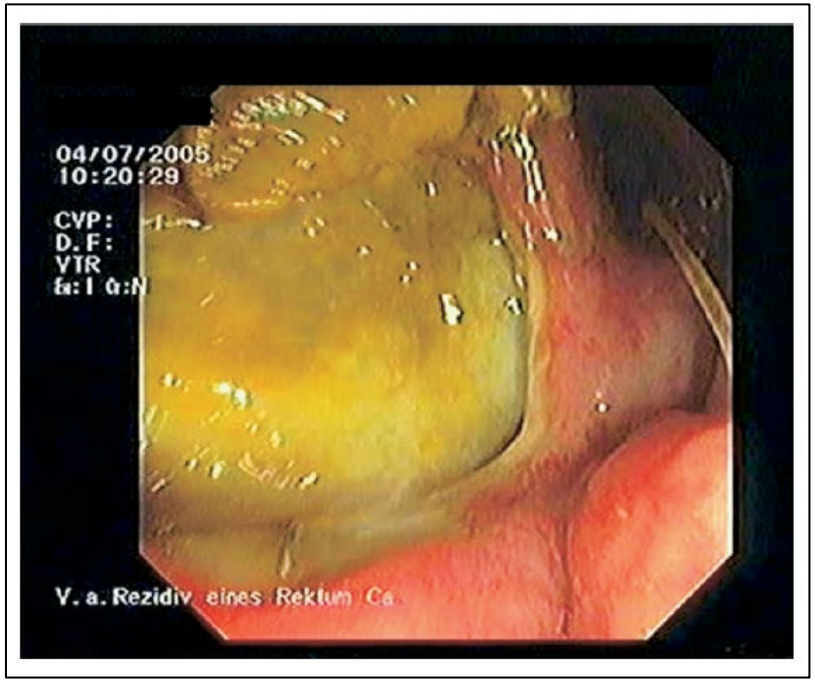
doi:10.1016/j.ijrobp.2005.12.004

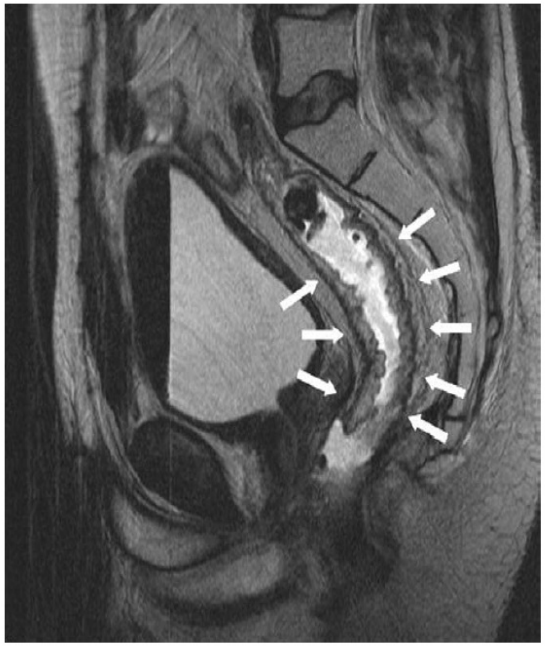
RAPID COMMUNICATION

INCREASED RISK OF ISCHEMIC BOWEL COMPLICATIONS DURING TREATMENT WITH BEVACIZUMAB AFTER PELVIC IRRADIATION: REPORT OF THREE CASES

FLORIAN LORDICK, M.D.,* HANS GEINITZ, M.D.,† JOERG THEISEN, M.D.,‡ ANDREAS SENDLER, M.D.,‡ AND MARIO SARBIA, M.D.§

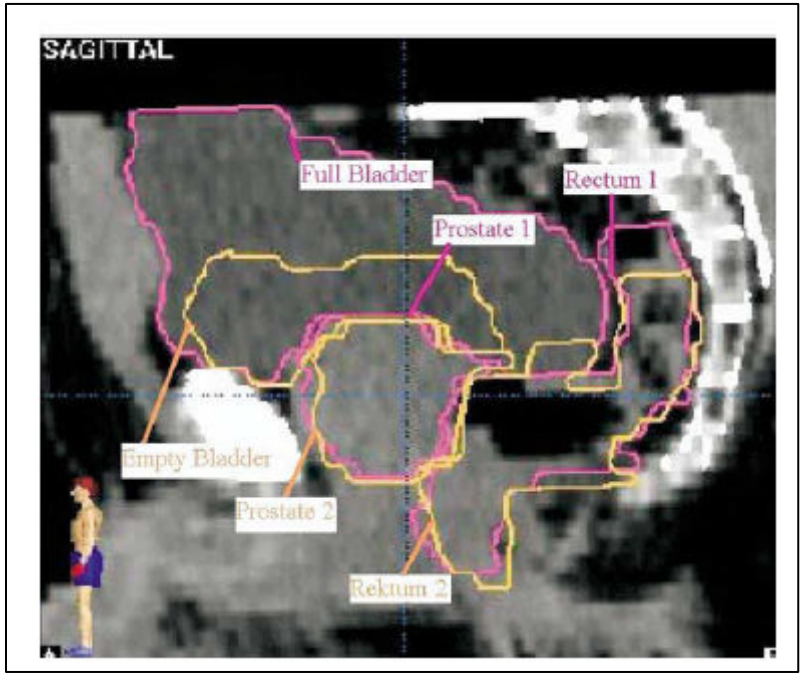
*Third Department of Internal Medicine (Hematology/Medical Oncology) and Departments of †Radiation Oncology, ‡Surgery, and §Pathology, Klinikum Rechts der Isar, Technical University of Munich, Munich, Germany





RECTAL CANCER: RE-IRRADIATION

- TIMES
- DOSE and FRACTIONATION
- TECHNIQUE
- INTEGRATION TO RT



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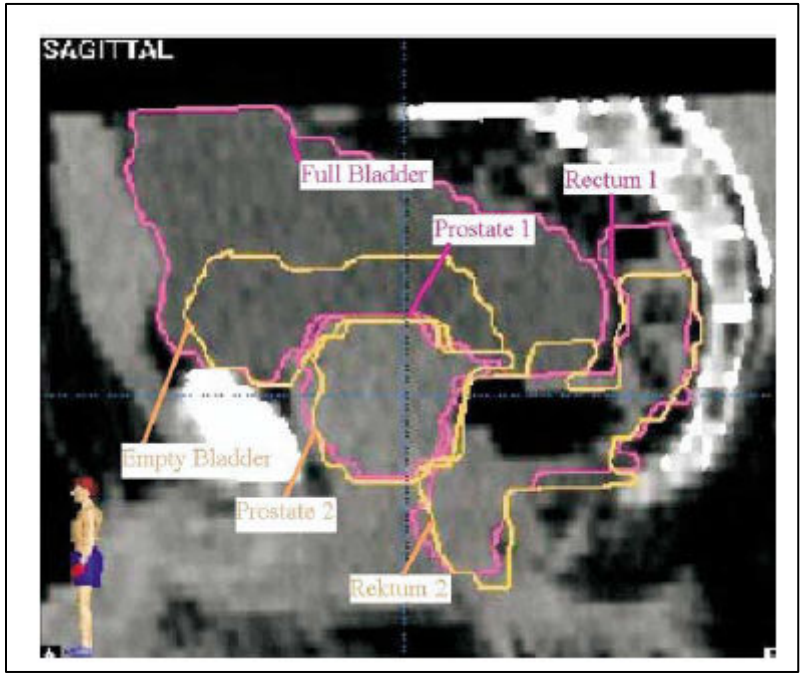

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Medical Dosimetry, Vol. 21, No. 2, pp. 79–82, 1996

0958-3947/96 $15.00 + .00

SSDI 0958-3947(95)02049-7

A THREE-DIMENSIONAL APPROACH FOR RE-IRRADIATION OF RECURRENT COLORECTAL ADENOCARCINOMA

BARBARA WATSON, C.M.D., JOHN M. ROBERTSON, M.D., LON MARSH, C.M.D., MARY K. MARTEL, PH.D., and THEODORE LAWRENCE, M.D.
Department of Radiation Oncology, University of Michigan Medical Center, Ann Arbor, Michigan 48109

3 pts, 55,8 Gy/1,8
3DCRT

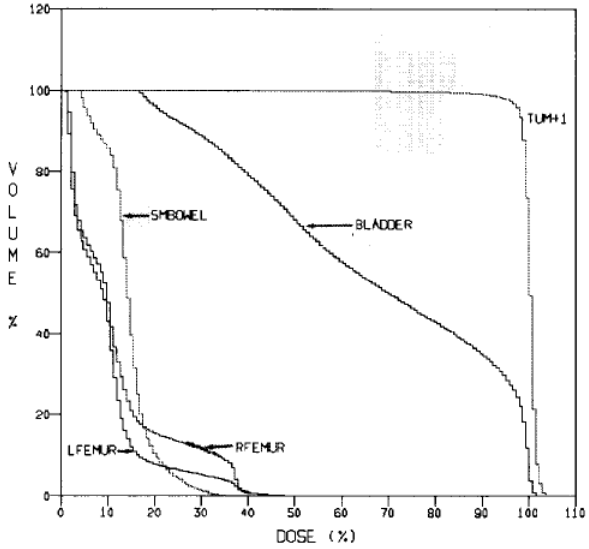
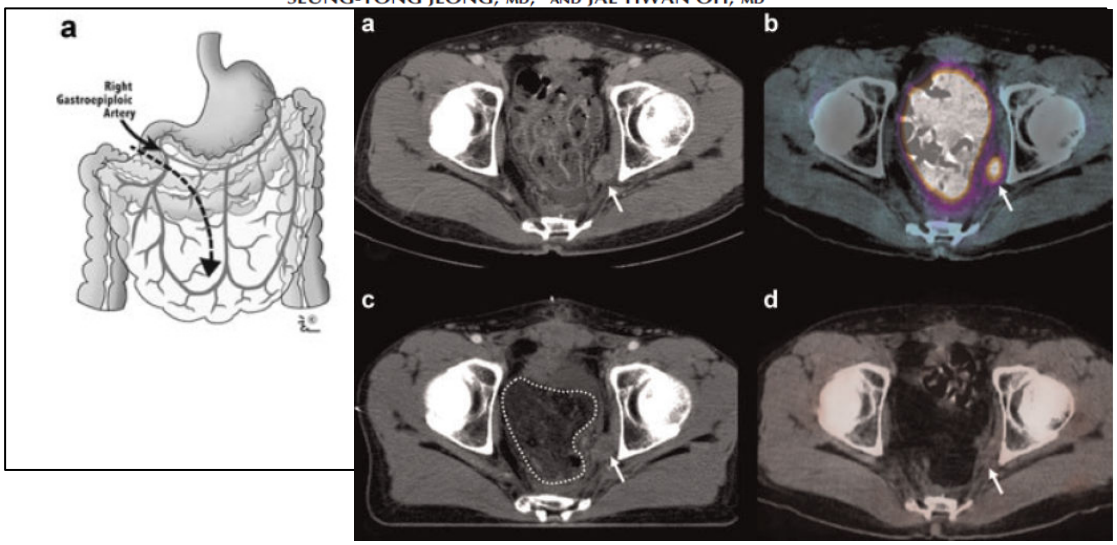


Fig. 7. Dose volume histogram for pelvic structures.

Journal of Surgical Oncology 2010;102:789–795

The Role of Omental Flap Transposition in Patients With Locoregional Recurrent Rectal Cancer Treated With Reirradiation

TAE HYUN KIM, MD,[1] DAE YONG KIM, MD,[1]* KYUNG HAE JUNG, MD,[2] YONG SANG HONG, MD,[2] SUN YOUNG KIM, MD,[1] JI WON PARK, MD,[1] SEOK-BYUNG LIM, MD,[3] HYO SEONG CHOI, MD,[1] SEUNG-YONG JEONG, MD,[4] AND JAE HWAN OH, MD[1]



12 pts
55,8 - 72 Gy /1,8 + concurrent CT
34,5 mths FUP
3 ys OS 50.9%, DFS 31.3%, LC 54.6%
Tox:
2 complications of rectal stump disruption
one bowel obstruction

Original article

Recurrent rectal cancer. The pre-irradiated primary tumour: can more radiotherapy be given?

B. Glimelius*

*Department of Oncology, Radiology and Clinical Immunology, University Hospital, Uppsala, Sweden and Department of Oncology and Pathology, Karolinska Institute, Stockholm, Sweden

Received 1 October 2002; accepted 1 December 2002

Colorectal Disease, 5, 501–503

Conclusions

The clinical experience of re-irradiating patients with locally recurrent rectal cancer is limited, although many individual radiotherapists remember successfully treated patients. Generally, however, results are poor. After a conventional pre- or postoperative dose corresponding to 50 Gy in five weeks, or 25 Gy in one week, re-irradiation appears to be possible for short-term palliation and potentially for cure if surgical resectability is possible. A dose of 30 Gy in 3 weeks is likely to be safe, even with chemotherapy, if the small bowel can be excluded from the field. Doses up to about 40 Gy can be tried to limited volumes. If the possibility for IORT (or brachytherapy) exists in a patient where surgery is possible, this could be offered despite a lack of scientific evidence. Depending upon the extent of residual disease, a dose of 15–20 Gy would seem to be acceptable. However, it is not known whether external radiotherapy is of additional value.

LRRC: CLINICAL RE-IRRADIATION TRIALS

Table 5. Clinical reirradiation trials. bid: twice a day; CI: continuous infusion; CT: chemotherapy; FA: folinic acid; 5-FU: 5-fluorouracil; HT: hyperthermia; RCT: radiochemotherapy; reRT: reirradiation alone; TTP: time to progression.

Therapy	Trial	Patients (n)	Pain control	Toxicity grade 3 or 4	Resectability after treatment	Median survival	Dose
reRT + CT	Lingareddy et al. 1997 [13]	52	65%	Acute 3: 31% Acute 4: 0% Late 3: 23% Late 4: 10%	0/52	12 months	30.6 Gy (à 1.2 Gy bid or 2 Gy daily) + 5-FU CI (200–300 mg/m²) + boost 6–20 Gy in 38% of patients
	Mohiuddin et al. 2002 [14]	103	55%	Acute 3: 22% Acute 4: 6% Late: 21.4%	34/103	26 months • nonresected 14 months • resected 44 months	34.8 Gy (à 1.2 Gy bid or 2 Gy daily) + 5-FU CI (200–300 mg/m²)
	Valentini et al. 2006 [25]	59	83%	Acute 3: 5.1% Acute 4: 0% Late: 11.7%	30/59	42 months	30 Gy (à 1.2 Gy bid) + boost 10.8 Gy + 5-FU CI (225 mg/m²) + adjuvant raltitrexed 3 mg/m² every 3 weeks/5 cycles
reRT + HT	Gonzalez Gonzalez et al. 1995 [6]	27	No data	No data	No data	11 months	32 Gy (à 4 Gy)
	Juffermans et al. 2003 [10]	54	72%	No grade 3–4	No data	6 months of palliation	28–32 Gy (à 4 Gy) + 1 HT/week
reRT + CT + HT	Milani et al. 2008	24	70%	Acute 3: 12.5% Acute 4: 0% Late: 4.2%	0/24	27 months	39.6 Gy (à 1.8 Gy) + 2 HT/week + 5-FU CI (350 mg/m²)
CT + HT → reRCT	Hildebrandt et al. 2004 [8]	9[a]	89%	Acute 3: 33% Late: no data	2/9	Not reached (TTP = 7 months)	Oxaliplatin 43 mg/m² + HT 1/week + 5-FU 2.6 g/m² CI for 6 weeks + 500 mg/m² FA

[a] 4/9 patients had consolidating reirradiation + chemotherapy

ELSEVIER

Int. J. Radiation Oncology Biol. Phys., Vol. 38, No. 4, pp. 785–790, 1997

0360-3016/97 $17.00 + .00

PII S0360-3016(97)00058-8

● *Clinical Investigation*

PALLIATIVE REIRRADIATION FOR RECURRENT RECTAL CANCER

VASUDHA LINGAREDDY, M.D.,* NEELOFUR R. AHMAD, M.D.* AND
MOHAMMED MOHIUDDIN, M.D.†

1987-1993:
52 LRRC
Previous RT
30,6/1,8 o BID

Table 5. Efficacy of reirradiation in palliation of symptoms

	No. of patients	Complete response	Partial response	Median duration	Palliated until death
Bleeding	15	100%	N/A	10 months	80%
Pain	40	65%	28%	9 months	33%
Mass effect	25	24%	64%	8 months	20%

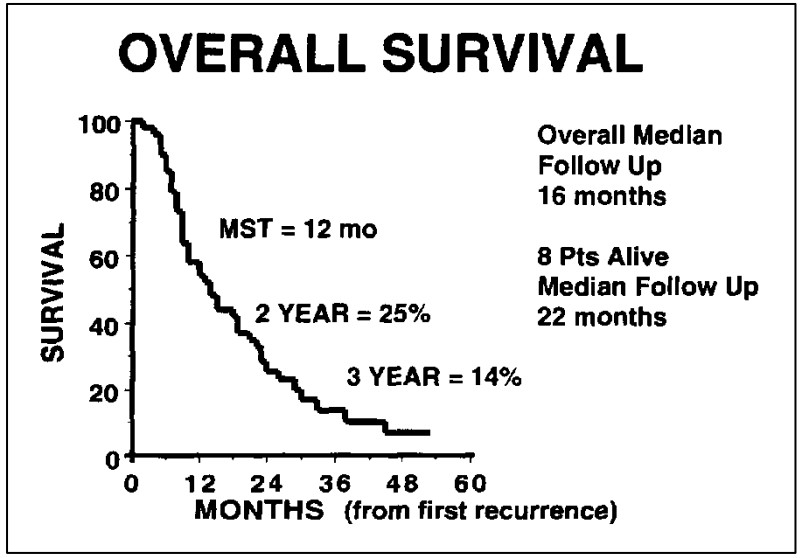


Table 7. Multivariate analysis of factors influencing survival following reirradiation

Factor	*p*-Value	Odds ratio	95% Confidence interval
KPS	<0.003	2.986	1.465–6.086
Initial stage	<0.04	0.484	0.246–0.950
Disease-free interval	NS		
Reirradiation dose	NS		
Total cumulative dose	NS		

Long-Term Results of Recurrent Rectal Carc

CANCER Septem

Mohammed Mohiuddin, M.D.[1,2]
Gerald Marks, M.D.[3]
John Marks, M.D.[3]

1987-2000:
103 LRRC
Previous RT

PTV:
PRE-SACRAL REGION
and
MACROSCOPIC
TUMOR + 2-4 cm
margin

RE

1.2 Gy bid
1.8 Gy daily

5-FU (200 -

+ SURGICAL

TABLE 6
Univariate Analysis of Factors Influencing Survival

Factor	*P* value
Gender	
Males	NS
Females	
KPS	
> 70	< 0.0005
< 70	
Age	
< 65	NS
> 65	
Initial stage	
< II	< 0.06
> II	
RT technique	
Single daily fraction	NS
Twice per day	
Disease-free interval (mos)	
< 24	NS
> 24	
Reirradiation dose (Gy)	
< 30.6	< 0.01
> 30.6	
Total cumulative dose (Gy)	
< 84.4	NS
> 84.4	
Surgery	0.001

KPS: Karnofsky performance score.

Long-Term Results of Reirradiation for Patients with Recurrent Rectal Carcinoma

Mohammed Mohiuddin, M.D.[1,2]
Gerald Marks, M.D.[3]
John Marks, M.D.[3]

BACKGROUND. The current study was conducted to assess the long-term results of reirradiation in patients with recurrent rectal carcinoma.
METHODS. One hundred and three patients with recurrent adenocarcinoma of the

CONCLUSION

TABLE 7
Dose Recommendations

Interval to reirradiation (mos)	Reirradiation dose (Gy)	Cumulative dose (Gy)
3–12	35	85
12–24	40–45	95–100
24–36	45–50	100–105
> 36	50–55	105–115

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Int. J. Radiation Oncology Biol. Phys., Vol. 64, No. 4, pp. 1129–1139, 2006

0360-3016/06/$–see front matter

doi:10.1016/j.ijrobp.2005.09.017

PREOPERATIVE HYPERFRACTIONATED CHEMORADIATION FOR LOCALLY RECURRENT RECTAL CANCER IN PATIENTS PREVIOUSLY IRRADIATED TO THE PELVIS: A MULTICENTRIC PHASE II STUDY

VINCENZO VALENTINI, M.D.,* ALESSIO G. MORGANTI, M.D.,* M. ANTONIETTA GAMBACORTA, M.D.,* MOHAMMED MOHIUDDIN, M.D.,† G. BATTISTA DOGLIETTO, M.D.,‡ CLAUDIO COCO, M.D.,‡ ANTONINO DE PAOLI, M.D.,§ CARLO ROSSI, M.D.,‖ ANNAMARIA DI RUSSO, M.D.,¶ FRANCESCA VALVO, M.D.,¶ GIAMPAOLO BOLZICCO, M.D.,# AND MAURIZIO DALLA PALMA, M.D.,** ON BEHALF OF THE "STUDY GROUP FOR THERAPIES OF RECTAL MALIGNANCIES" (STORM)

59 pts, 12 Deps
PTV2: GTV + 4-cm margin (30 Gy/1.2 Gy BID)
PTV1 (boost with the same fractionation) to GTV plus a 2-cm margin (10.8 Gy)

5-FU, c.i., 7 days per week
Surgery 6 to 8 weeks
Adj CT (Raltitrexed) x 5 cycles

Table 8. Acute toxicity (chemoradiation)

Grade	0	1	2	3	4
Hematologic	53 (89.8%)	5 (8.5%)	1 (1.7%)	0 (0.0%)	0 (0.0%)
Skin	57 (96.6%)	2 (3.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Gastrointestinal	29 (49.2%)	14 (23.7)	13 (22.0%)	3 (5.1%)	0 (0.0%)
Urologic	49 (83.0%)	7 (11.9%)	3 (5.1%)	0 (0.0%)	0 (0.0%)

Table 9. Late toxicity

Toxicity	*n* %
Skin fibrosis	2
Male impotence	2
Urinary incontinence	1
Small bowel obstruction*	1
Dysuria	1

* Requiring surgery.

Table 11. Actuarial survival

	Median (months)	1-year (%)	3-year (%)	5-year (%)
Local control	20	76.3	46.6	38.8
Distant metastases–free survival	42	87.4	67.2	42.0
Disease-free survival	15.5	65.7	29.2	29.2
Overall survival	42	87.5	58.9	39.3

CONCLUSION: 5-ys actuarial SVV: 39.3% (66.8% in R0, 22.3% in R+ or not operated.
R0 significantly influenced LC, DFS and OS.
LC and DFS were significantly correlated with the interval between primary surgery and LR.

ELSEVIER

Int. J. Radiation Oncology Biol. Phys., Vol. 77, No. 1, pp. 60–65, 2010

0360-3016/10/$–see front matter

doi:10.1016/j.ijrobp.2009.04.056

CLINICAL INVESTIGATION **Rectum**

HYPERFRACTIONATED ACCELERATED RADIOTHERAPY FOR RECTAL CANCER IN PATIENTS WITH PRIOR PELVIC IRRADIATION

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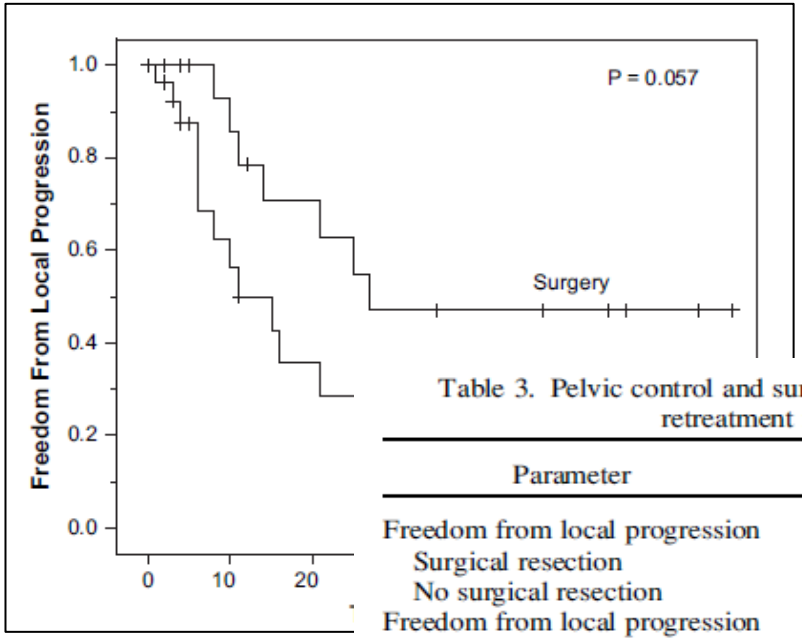
50 patients retreated with hyperfractionated accelerated RT for primary (n = 2) or recurrent (n = 48) ADK
RT: 150-cGy fr twice/d, total dose 39 Gy (n = 47) if >1 year or 30 Gy (n = 3) if <1 year
Concurrent CT to 48 patients. 18 patients underwent surgical resection



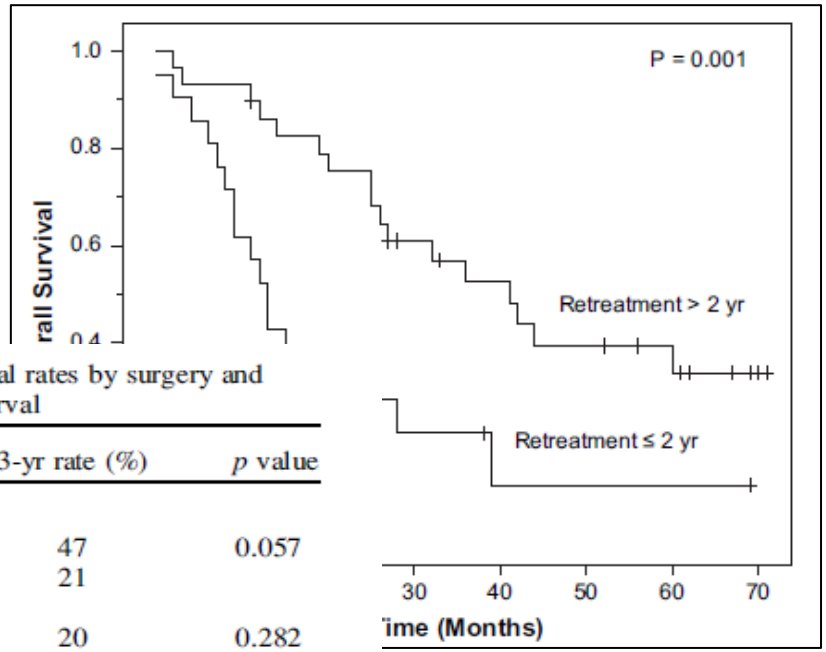


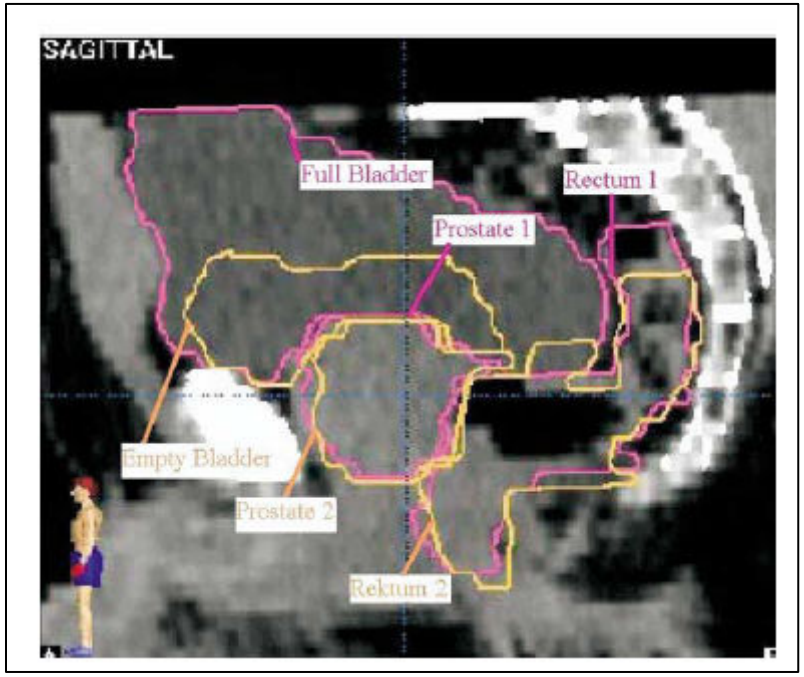
Table 3. Pelvic control and survival rates by surgery and retreatment interval

Parameter	3-yr rate (%)	*p* value
Freedom from local progression		
Surgical resection	47	0.057
No surgical resection	21	
Freedom from local progression		
Retreatment ≤2 y	20	0.282
Retreatment >2 y	38	
Overall Survival		
Surgical resection	66	0.003*
No surgical resection	27	
Overall survival		
Retreatment ≤2 yr	21	0.001*
Retreatment >2 yr	53	

* *p* value of <0.05.

RECTAL CANCER: RE-IRRADIATION

- TIMES
- DOSE and FRACTIONATION
- TECHNIQUE
- INTEGRATION TO RT



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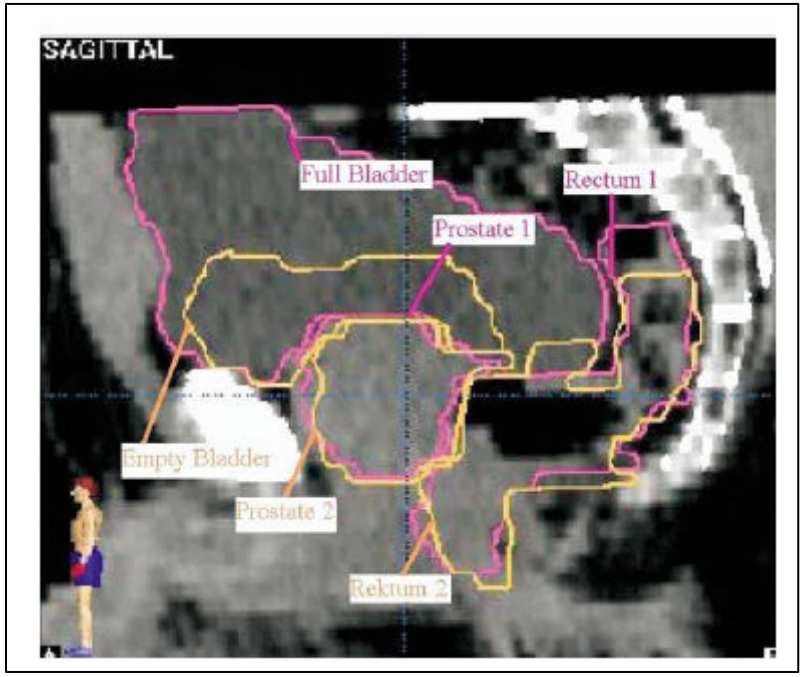
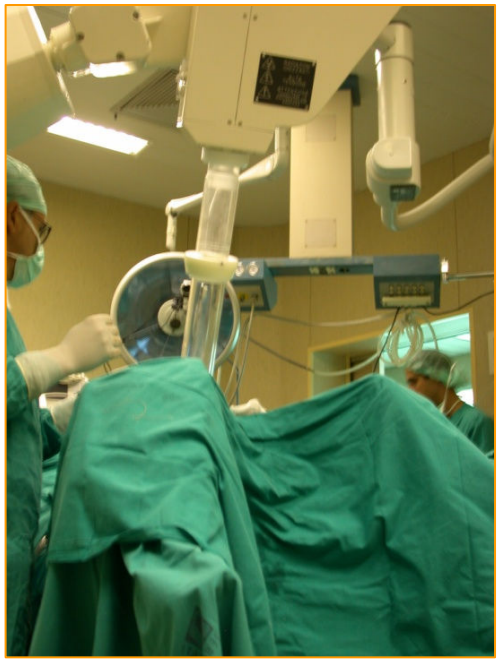


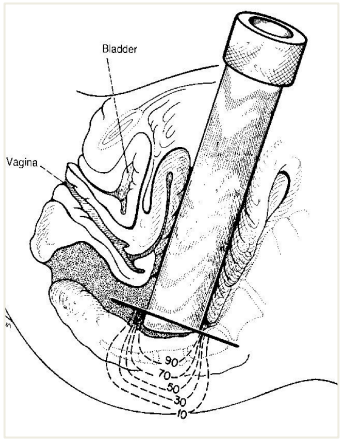
INTRAOPERATIVE RADIOTHERAPY

Rationale: Increases total dose in a restricted area avoiding irradiation of radiosensitive normal structures and related morbility



Facilities

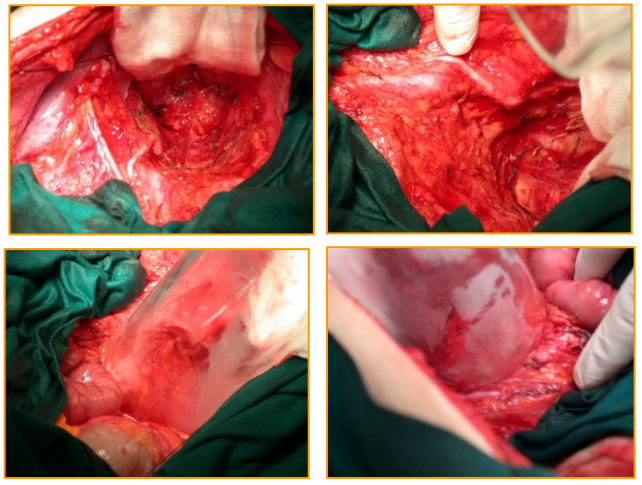
- The best target volume definition (direct vision and surgical mobilization)
- Total treatment time reduction
- Comparable acute and late toxicity



Limits

Anatomic site unable to irradiation

- Anterior-anastomotic risk areas
- Lateral wall in male pelvis



Radiation tolerance of OAR with single dose

- Urether: 20 Gy (56 % stenosis → stent)
- Presacral Nerves: 15 Gy (20% neuropatic symptoms)

LRRC: PALLIATIVE RESECTION ± IORT

Table 5. Locally advanced recurrent colorectal cancer: Survival and disease relapse with palliative resection ± IOERT, various series

Series	No. of patients	Survival			Local relapse* (%)	Distant relapse* (%)
		Median (mo.)	3-yr (%)	5-yr (%)		
Suzuki *et al*, (5)						
Palliative resection alone	12	14	8	0	–	–
IOERT	42	30	43	19	40	60
No IOERT	64	17	18	7	93	54
Frykholm *et al.* (16) (no IOERT)†						
Prior preop EBRT	37	7	–	0	86	66
Prior postop EBRT	40	5	–	0	95	70
Gunderson *et al.* (24), IOERT, no prior EBRT	123	28	39	20	25	64
Haddock *et al.* prior EBRT	51	23	28	12	55	71

Abbreviations: IOERT = intraoperative electron irradiation; EBRT = external beam irradiation.

* Local and distant disease relapse figures are 3-yr actuarial, with the exception of the Frykholm series, in which they are crude absolute.

† 26/106 (25%) previously irradiated.

‡ 49% of preop group and 38% of postop group had distant metastases at the time of local recurrence.

Int. J. Radiation Oncology Biol. Phys., Vol. 49, No. 5, pp. 1267–1274, 2001

0360-3016/01/$–see front matter

PII S0360-3016(00)01528-5

CLINICAL INVESTIGATION **Large Bowel**

INTRAOPERATIVE IRRADIATION FOR LOCALLY RECURRENT COLORECTAL CANCER IN PREVIOUSLY IRRADIATED PATIENTS

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STEPHEN S. CHA, M.S.,‡ RICHARD M. DEVINE, M.D.,† ROGER R. DOZOIS, M.D.,† AND
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51 previously irradiated pts with LRRC, no DM, treated with surgical resection and IORT ± ERT. An attempt was made to achieve R0-R1.
Median IORT dose 20 Gy (range, 10–30 Gy).
37 pts received pre- or postoperative ERT (5 to 50.4 Gy).
20 received 5-FU ± leucovorin during ERT.
3 received additional cycles of 5-fluorouracil ± leucovorin.
Median FUP 21 mths

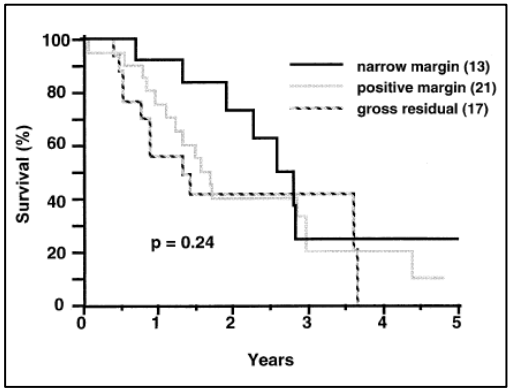


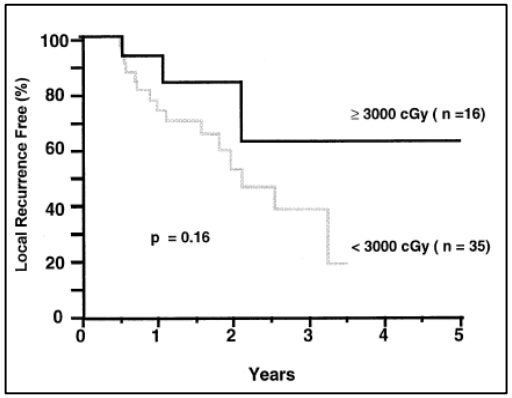
Table 3. Kaplan-Meier survival and disease control estimates

Endpoint	Median (mo)	2-yr	3-yr	5-yr
Survival	23	48%	28%	12%
Disease-free survival	13.5	22%	13%	13%
Central failure	12*	26%	36%	47%
Local failure	13*	39%	55%	66%
Distant failure	11*	56%	71%	76%

* Median time to progression among patients who experienced local or distant progression.

Table 4. Toxicities: treatment or tumor-related

Gastrointestinal	
Fistula	2 (4)
Obstruction	8 (16)
Wound, soft tissue	
Abscess	7 (14)
Wound	12 (24)
Neurologic	
Peripheral	16 (32)
Genitourinary	
Ureter	7 (14)
Bladder	6 (12)



Reirradiation, surgery and IORT for recurrent rectal cancer in previously irradiated patients

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Alexander M.M. Eggermont[a], Johannes H.W. de Wilt[a,*]

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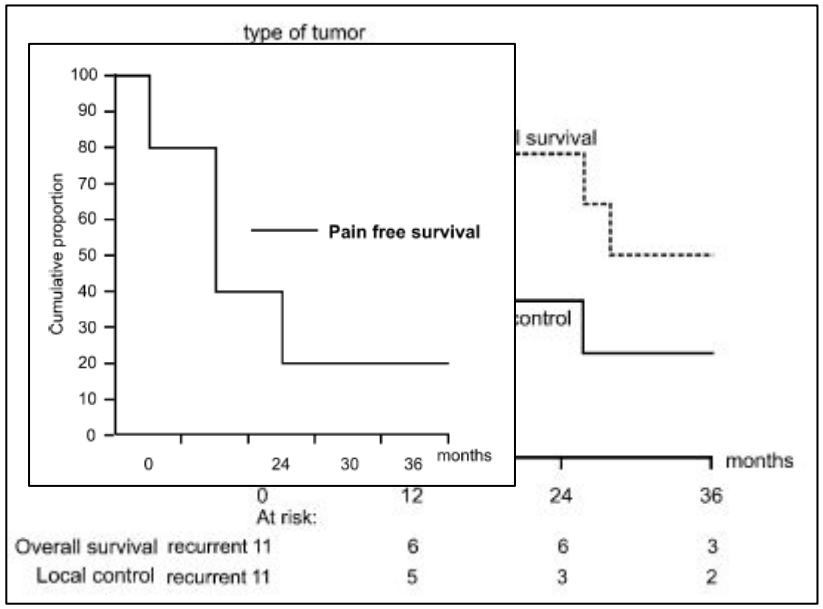
Radiotherapy and Oncology 87 (2008) 357–360
www.thegreenjournal.com



11 previously irradiated patients with LRRC were treated with preoperative RT (median dose 30 Gy/1,8-2) on whole pelvis, surgery and IORT (10-12,5 Gy) . Median interval between primary surgery and date of recurrence was 22 months (range 9–117).

This treatment was related with high morbidity, a short pain-free survival (5 months) and poor local control (3 ys: 27%), although some patients have long-term distant control and survival.

Considering the morbidity, the short pain-free survival, moderate local control and poor survival the question arises if re-irradiation and surgery are the best option for LRRC patients

Reirradiation and Hyperthermia in Rectal Carcinoma

A Retrospective Study on Palliative Effect

CANCER October 15, 2003 / Volume 98 / Number 8

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Patrick E. J. Hanssens, M.D.[2]
Wim L. J. van Putten, M.Sc.[3]
Gerard C. van Rhoon, Ph.D.[1]
Jacoba van der Zee, M.D., Ph.D.[1]

[1] Department of Radiation Oncology, Hyperthermia Unit, Erasmus MC–Daniel den Hoed Cancer Center, Rotterdam, The Netherlands.

54 patients with unresectable previously irradiated LRRC and pain
Previous RT: 25–70 Gy
Median interval RT1-RT2 : 22 mths (range, 4–97 mths)
Dose: 8 x 4 Gy (RT1 < 55 Gy) or 6/7 x 4 Gy (RT1 > 55 Gy), 2 fr/wk
CTV: Macroscopic rec. + 1 cm, 3D
3 or 4 hyperthermia treatments once weekly
Median FUP: 10 mths (1-36)

RESULTS:
No severe late toxicity (> G3)
Complete palliation in 9 patients (17%) and
a good palliative effect in 30 patients (56%) with median duration of 6 months.
Prognostic value of interval RT1-RT2

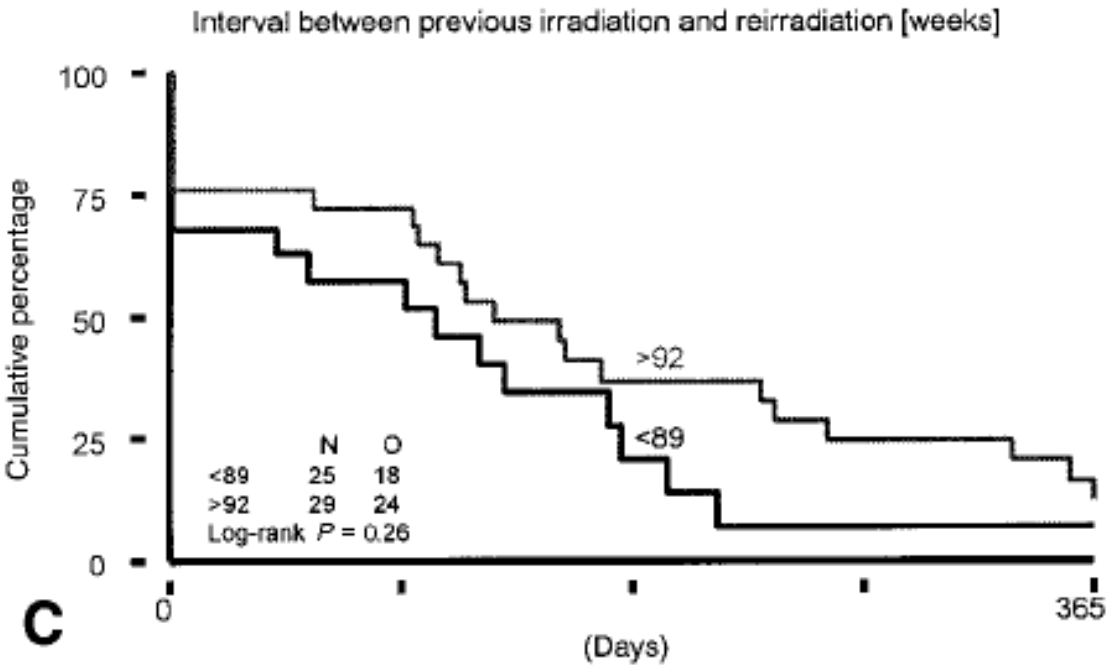

FIGURE 1. Prognostic factors for the palliative effect and for duration of the palliative effect.

Jpn J Clin Oncol 2008;38(10)695–700
doi:10.1093/jjco/hyn083

Stereotactic Body Radiation Therapy in Patients with Pelvic Recurrence from Rectal Carcinoma

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23 LRRC, presacral in 7 pts and the pelvic wall in 16
SBRT dose 39 Gy (30 - 51 Gy) in 3 fr
Median FUP: 31 months.
Results: 4-ys OS 24.9% and LC 74.3%.
No prognostic factor was found to affect patient survival or local progression.
One patient developed a severe radiation-related toxicity, but recovered completely after treatment.

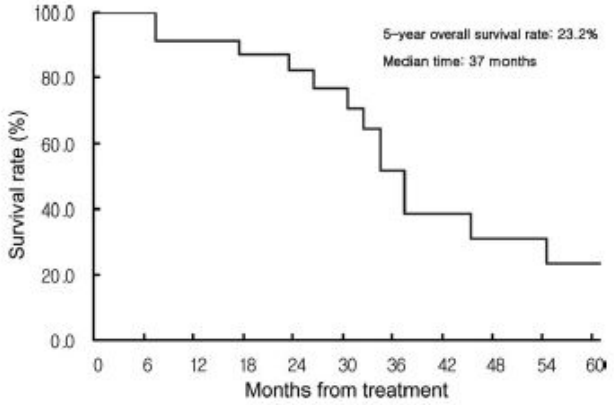


Figure 1. The 5-year overall survival rate and median time.

Table 1
Biologically equivalent doses to fractionation given with 2 Gy per fraction in three most commonly use schedules of preoperative radiotherapy for rectal cancer

	Biologically equivalent doses to fractionation given with 2 Gy per fraction (Gy)[a]		
	25 Gy in five fractions of 5 Gy	45 Gy in 25 fractions of 1.8 Gy	50.4 Gy in 28 fractions of 1.8 Gy
Tumour control, α/β = 5 Gy [23], time correction [8][b]	35.7	28.1	30.4
Late damage, α/β = 3 Gy	40.0	43.2	48.4

[a] Biologically equivalent doses (2 Gy per fraction) = nd (d + α/β/2 Gy + α/β), where n = number of fractions, d = dose (Gy) per fraction.
[b] Biologically equivalent doses (2 Gy per fraction) with time correction = biologically equivalent doses (2 Gy per fraction) − 0.6 Gy (T − 7); where T = overall treatment time in days. In this formula it was assumed that 0.6 Gy is lost per day due to the tumour clonogen repopulation starting after 7 days from the beginning of radiation [8].

EPERIENZA SFN 2009-2011

7 pts ri-trattati su pelvi per rec K retto, 5 RTE, 2 IORT

Median FUP: 23,2 mths (12- 32) PALLIATIVE INTENTION

Gender	**M: 3 F:4**
Age	Median: 79,8 (53-94)
KPS	≥ 70
Initial Stage	4 cT3N+, 1 cT4N0, 2 cT4N+
Histology	ADK
Previous RT	3 RT/CT (50,4 Gy/28+ 5FU), 4 RT (25 Gy/5)
Previous surgery	2 no surgery, 1 TEM, 3 APR, 1 Hartman resectiion
Time to recurrence	10 mths (6-22)
Dose	2 pts IORT 12 Gy (R1), 4 pts 24Gy/8, 1 pt 25 Gy/5
Pain relief (no or mild drugs)	6,4 mths (3-12)
OS	10,4 (6-15)

Guideline Summary NGC-6982

American College of Radiology
ACR Appropriateness Criteria®

RECURRENT RECTAL CANCER

Guideline Title

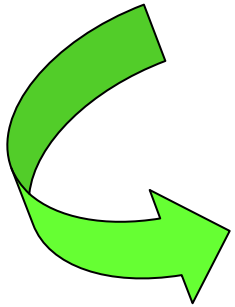
ACR Appropriateness Criteria® recurrent rectal cancer.

Bibliographic Source(s)

Konski AA, Herman J, Suh WW, Blackstock AW, Mohiuddin M, Poggi MM, Regine WF, Rich TA, Cosman BC, Saltz L, Expert Panel on Radiation Oncology-Rectal/Anal Cancer. ACR Appropriateness Criteria® recurrent rectal cancer. [online publication]. Reston (VA): American College of Radiology (ACR); 2008. 7 p. [30 references]

Objective(s)

To evaluate the appropriateness of treatment procedures for recurrent rectal cancer.



CONCLUSION:
Recent data show that reirradiation with 30 Gy is safe, even in combination with chemotherapy.
But, radiation for a recurrence at doses < 45 Gy is related with a significantly shorter survival compared to patients who received > 45 Gy.
Use of small radiation fields, exclusion of bowel and bladder, use of hyperfractionated radiation doses up to 40 Gy are recommended.
Acute and late toxicity are not prohibitive if proper attention is paid to both radiation technique and surgical technique..

Date of origin 1998
Last review 2011

Take home message….

- Pts selected for re-irradiation: LRRC alone or with metastatic cancer when suffering from intractable pain and/or bleeding
- They should have KPS ≥70% and no prior history of bowel obstruction
- The optimal reirradiation dose and the best technique has yet to be determined: PALLIATION or CURE

- The final dose decisions depends on:
  - ✓ initial radiation dose
  - ✓ the amount of small bowel in the treatment field
  - ✓ the distance in time to recurrence (1 yr)
  - ✓ the volume previously treated
- Every effort should be made to limit the dose to the bowel or bladder
- Every effort should be made to obtain an R0 resection