

Impact of the use of 3-D image based brachytherapy on results

- GYNE-GEC-ESTRO recommendations
- Optimization / adaptation
- Use of DVH
- Comparison to ICRU / A points
- So far, MRI 3-D BT limited to few centers
- CT-Scan 3-D BT more widely used

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- GYNE-GEC-ESTRO recommendations
 - Feasible
 - Reproducible
 - Intercomparison possible
 - Delineation workshop

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- Organs at risk :
 - CT = MRI
 - 2 cc reliable
 - 0.1cc, 5cc, 10cc
 - DVH complication relationship?

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- Organs at risk
Organ wall /
outer organ
contouring?

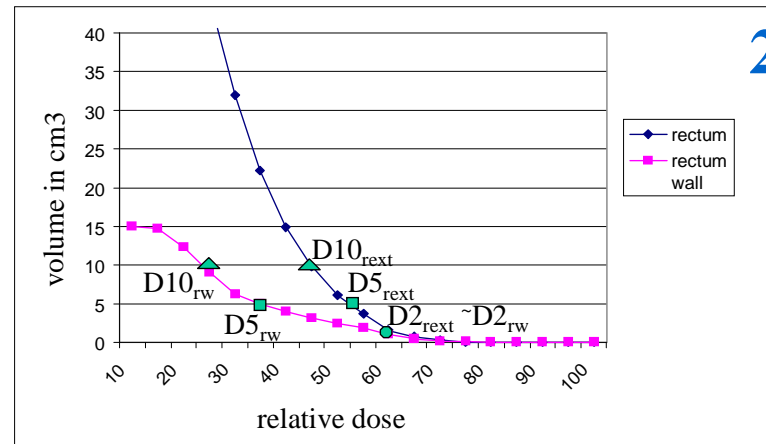
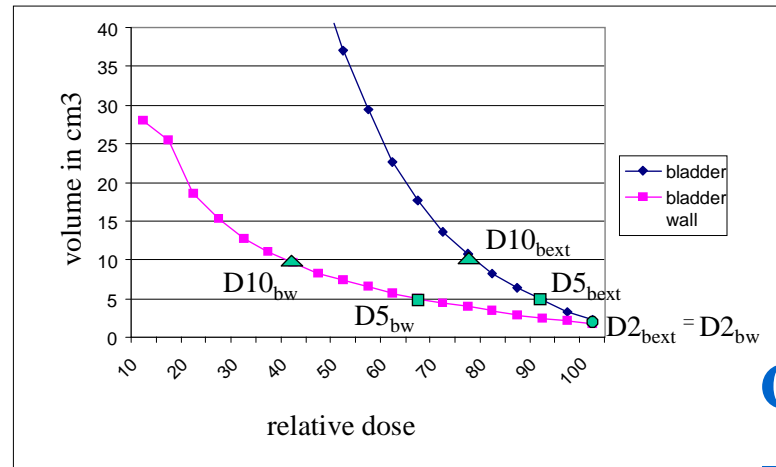


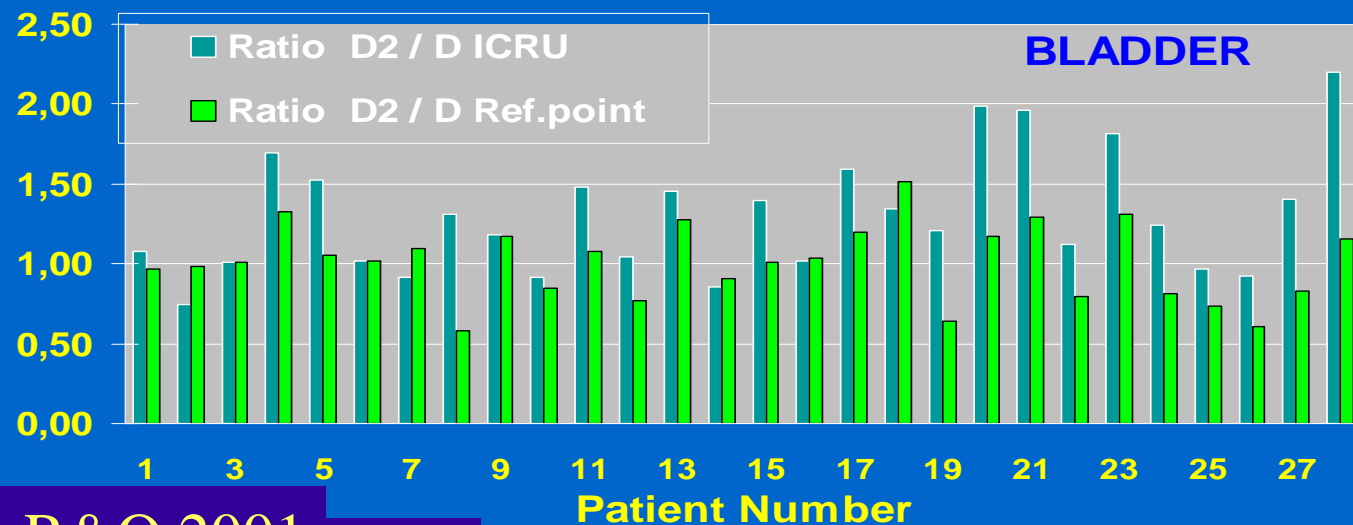
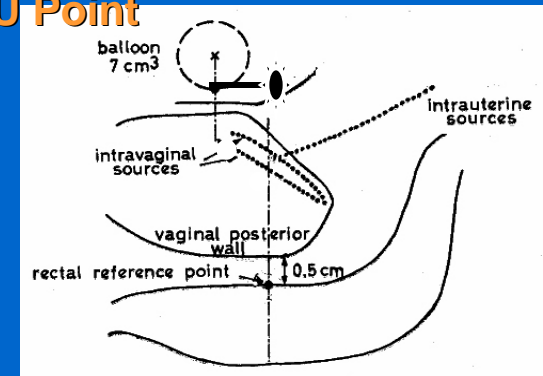
Fig.1

Cut off
-volume
2-3 cc

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- Organs at risk : **bladder**
 - Underestimation ICRU bladder point confirmation
 - Point 1.5 to 2 cm above the ICRU more reliable

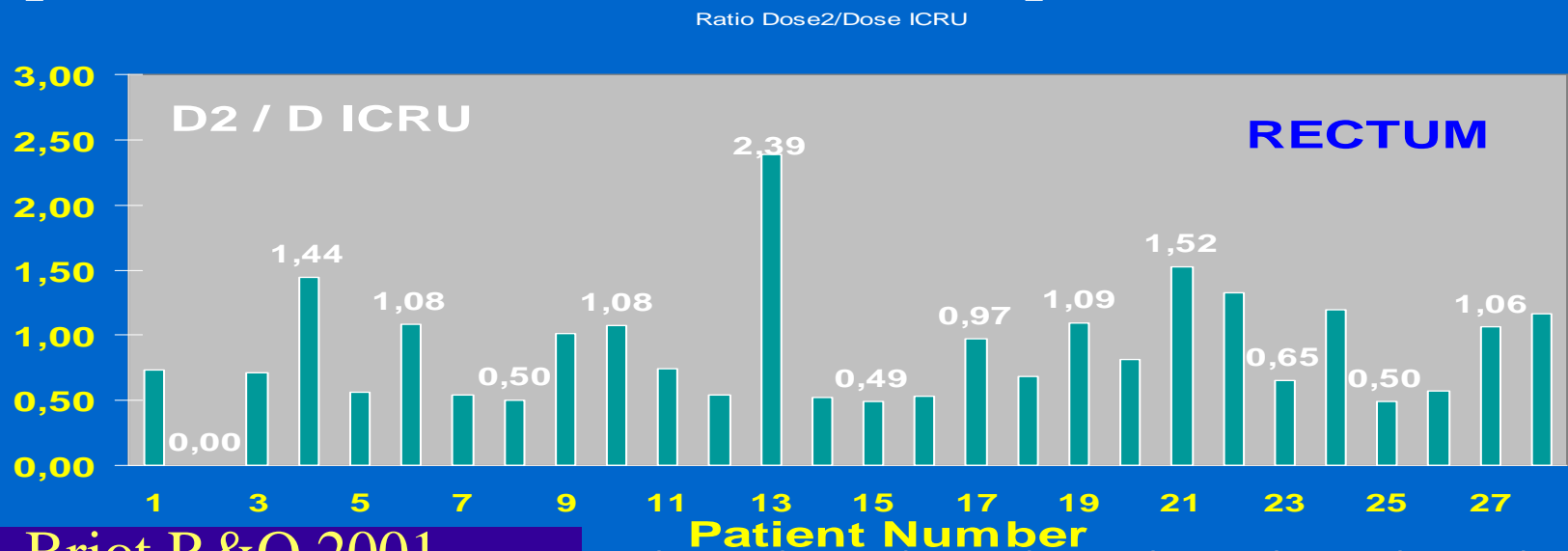
ICRU Point



Briot R&O 2001

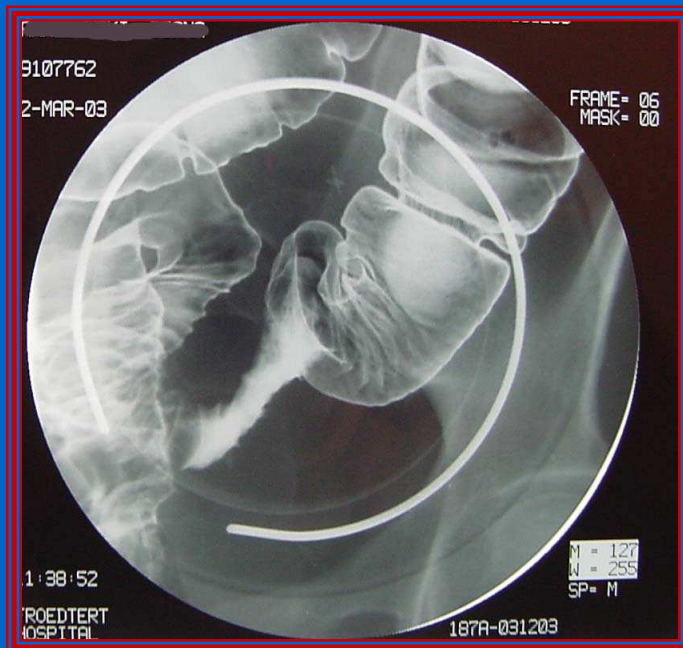
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- Organs at risk : **rectum**
- Broad range of the ratio D_2 / D_{ICRU}
 - large anatomical variation of the organ situation, as compared to the fixed reference ICRU point.



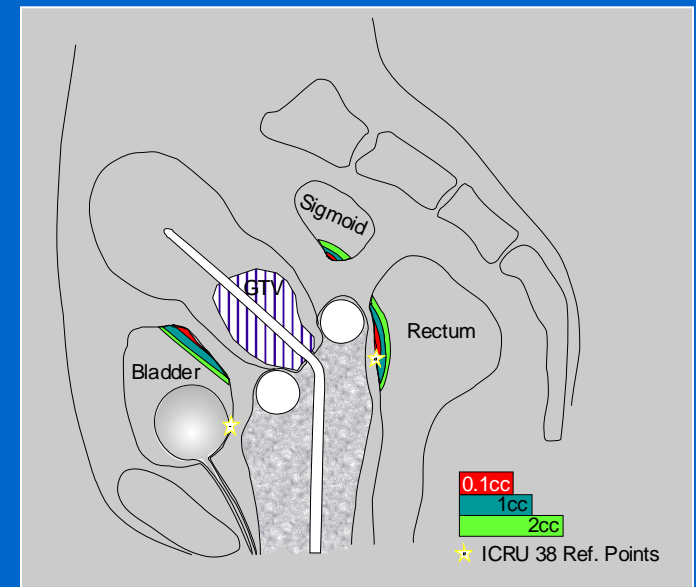
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- Organs at risk : sigmoid



Impact of the use of 3-D image based brachytherapy on results

- Organs at risk :
 - Spatial distribution of the area zone of the minimum dose to the most exposed tissue



Impact of the use of 3-D image based brachytherapy on results

- Dose-volume constraints (2cc) :
 - Bladder : 90-100 Gy
 - Rectum : 75 Gy
 - Sigmoid : 75 Gy

Impact of the use of 3-D image based brachytherapy on results

- At the IGR
 - Since 2000, 175 patients MRI-based BT
 - Limited optimization
 - LDR cesium-based
 - PDR since 2004

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Correlation between the treated volume, the GTV and the CTV at the time of BT and histopathological findings

	RD	CR
GTV (cc)	6 (0-30)	4 (0-9)
CTV (cc)	82 (47-153)	62 (17-91)
Treated volume	166 (122-234)	213 (142-345)
% GTV in ref. isodose	85 (44-100)	99 (98-100)
% CTV in ref. isodose	77 (58-99)	91 (66-99)

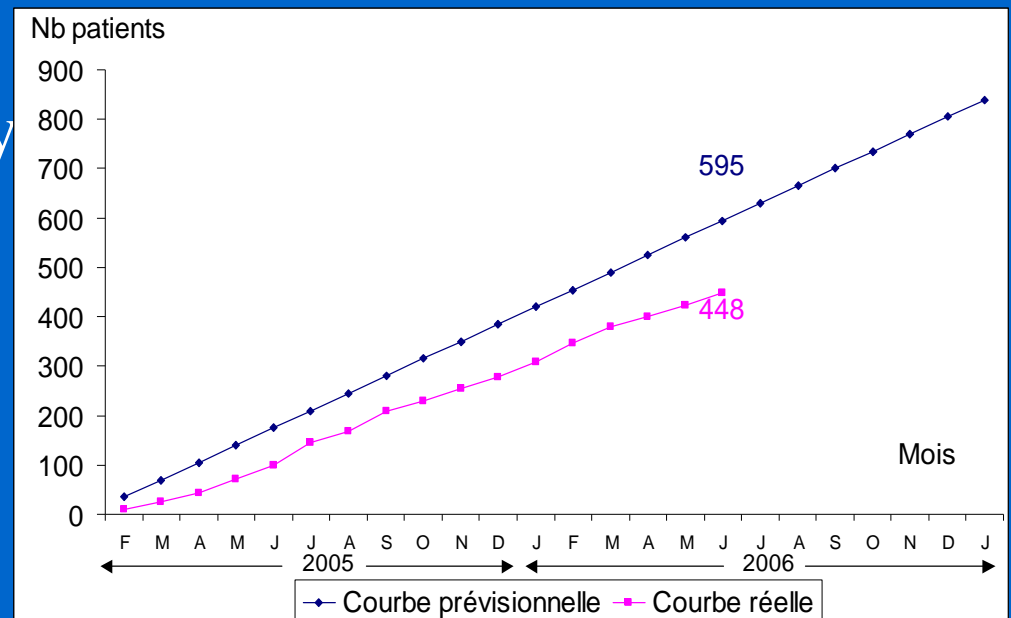
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- **Economics : costs**

Clinical French programme :

3-D image based dosimetry using PDR

compared to
« Standard » X-ray dosimetry
multicenter (20)
complication assessment
economical assessment



Responsible : Didier Peiffert

Impact of the use of 3-D image based brachytherapy on results

- Vienna experience :
 - MRI assisted 3D HDR BT
 - 1998-2003 145 patients stage IB-IVA
 - definitive radiotherapy +/- chemotherapy
 - since 2001, HR CTV concept, OAR, HDV integrated

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	Overall 1998-2003		Period 1 1998-2000		Period 2 2001-2003	
	%	n events/n total	%	n events/n total	%	n events/n total
PFS true pelvis	85	19/145	81	12/73	89	7/72
2-5 cm	98	1/67	100	0/33	95	1/34
>5cm	74	18/78	64	12/40	83	6/38
PFS	63	47/145	61	26/73	66	21/72
2-5 cm	81	10/67	83	5/33	79	5/64
>5cm	49	37/78	43	21/40	55	16/38
OS	57	57/145	51	34/73	63	23/72
2-5 cm	77	13/67	81	6/33	72	7/64
>5cm	40	44/78	28	28/40	55	16/38

Pötter, in press R&O 2006

Impact of the use of 3-D image based brachytherapy on results

- Future:
 - More clinical experience
 - Prospective assessment of both local control and complications
 - CTV definition relevance
 - DVH : best criteria?
 - OAR constraints?