CET Cancer Center
Oakland California

High Dose Rate (HDR) Brachytherapy
Gynecological Cancer

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Brachytherapy

Radiation is given directly to target

Gradient effect– relatively little dose to surrounding tissue

Intracavitary	**Interstitial**
Low Dose Rate	**High Dose Rate**

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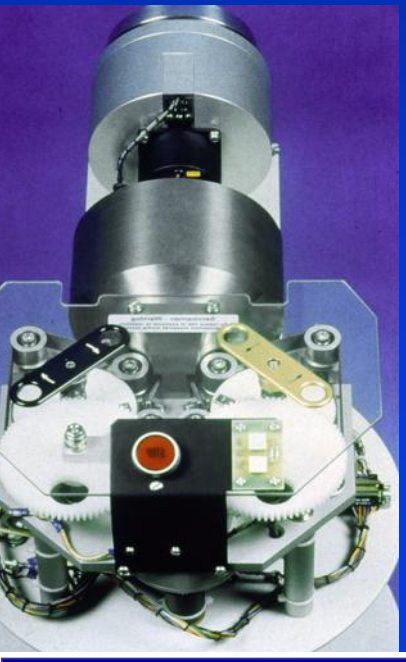
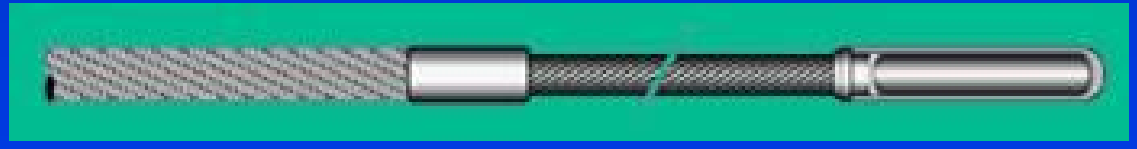
Robotic High Dose Rate (HDR) Brachytherapy

Source position x Time = Effective Source Strength

HDR is given in 1-2 sessions per day

Radiation is confined to patient





A Four Step Process

Applicator Placement

3 Dimensional Scan Imaging

Virtual Image Computer Dosimetry

High Dose Rate Robotic Treatment

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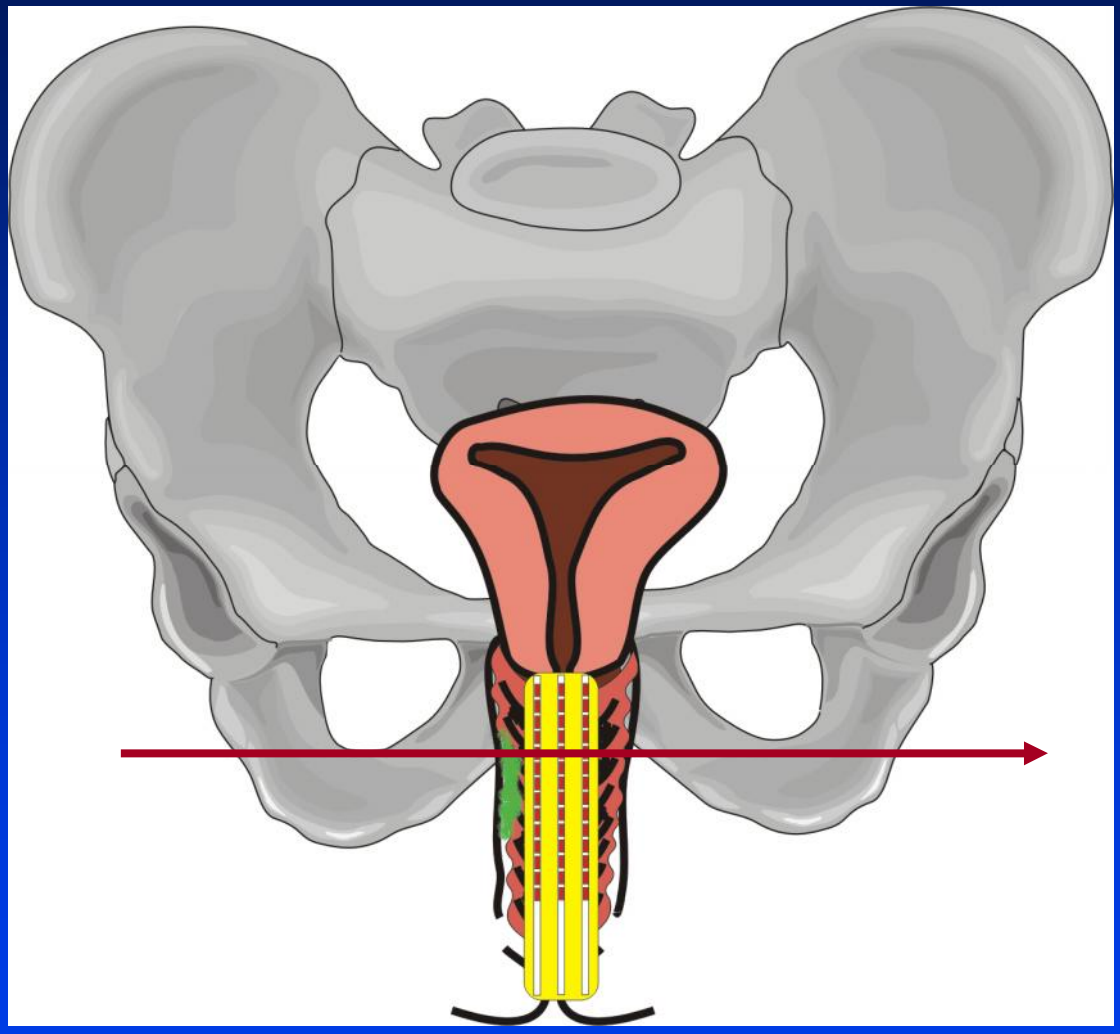
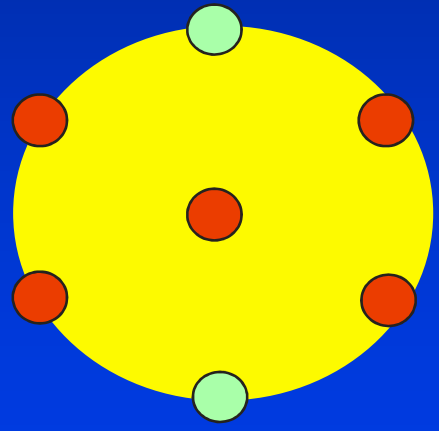
Intracavitary Multi-Channel Vaginal Cylinder



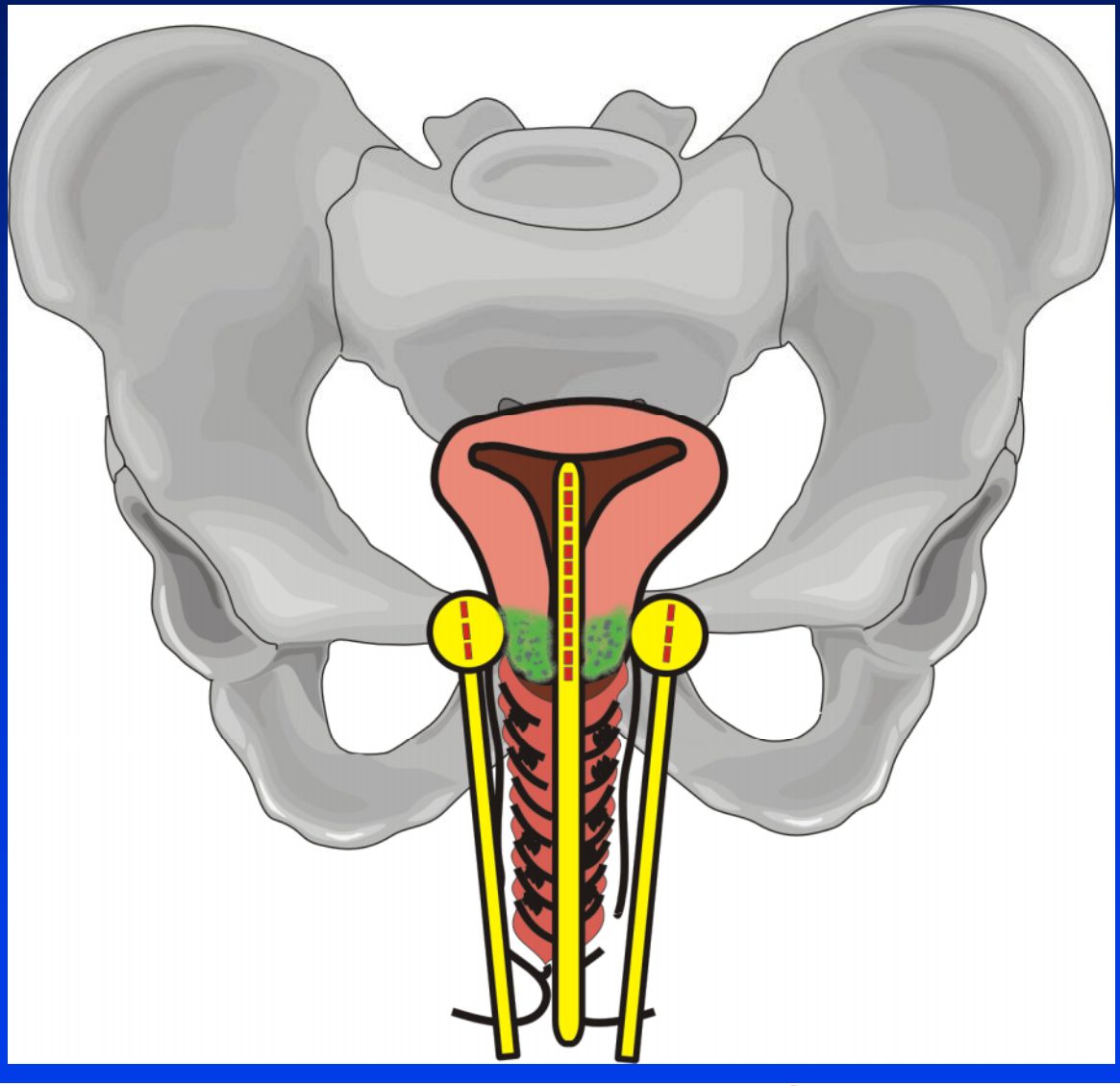
Decreases dose to bladder and rectum by 15%



Cylinder cross section

*IJROBP Vol. 44, No. 1, pp.211-219, 1999

Intracavitary Tandem and Ovoids



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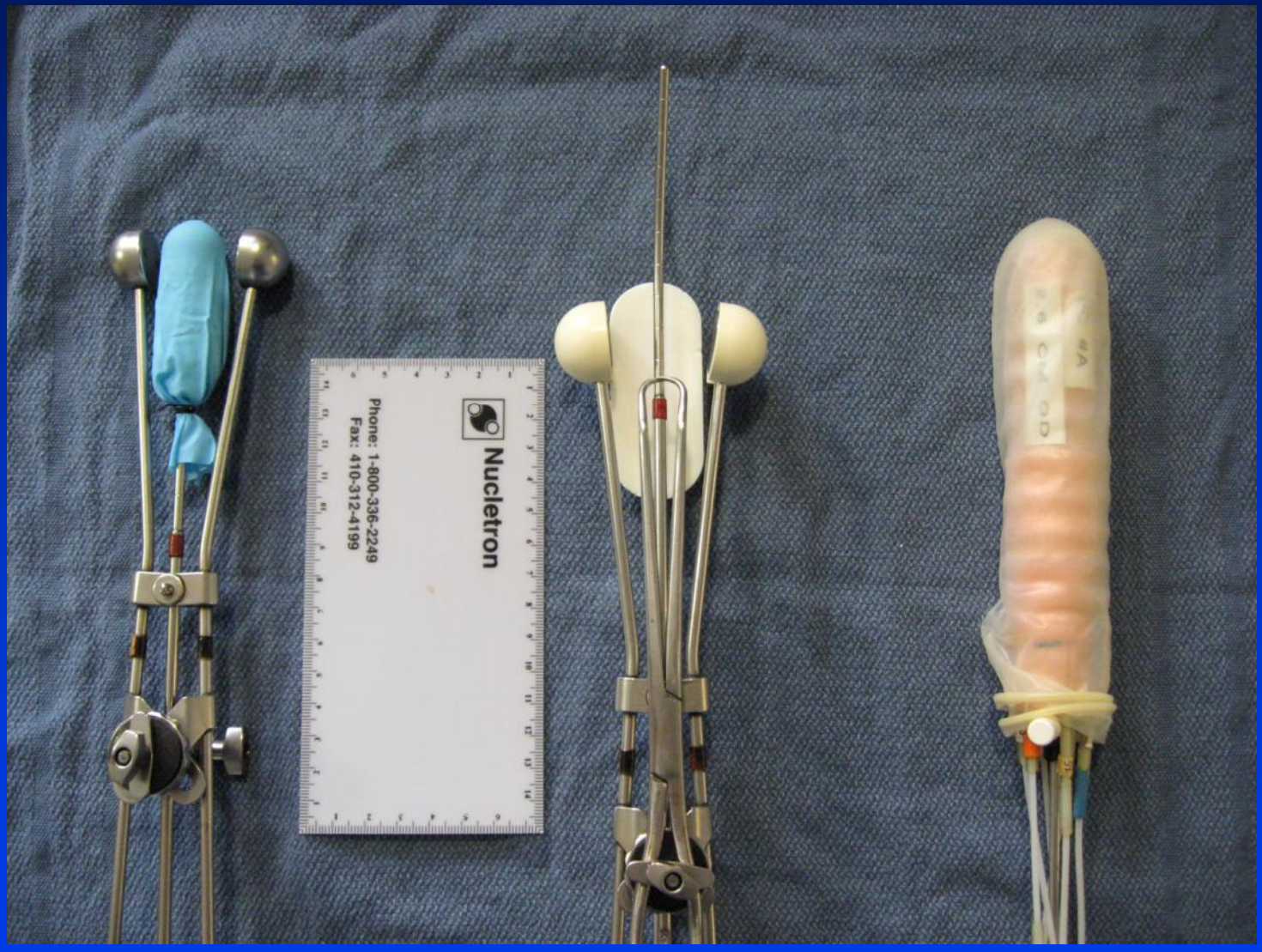
Various Example Devices



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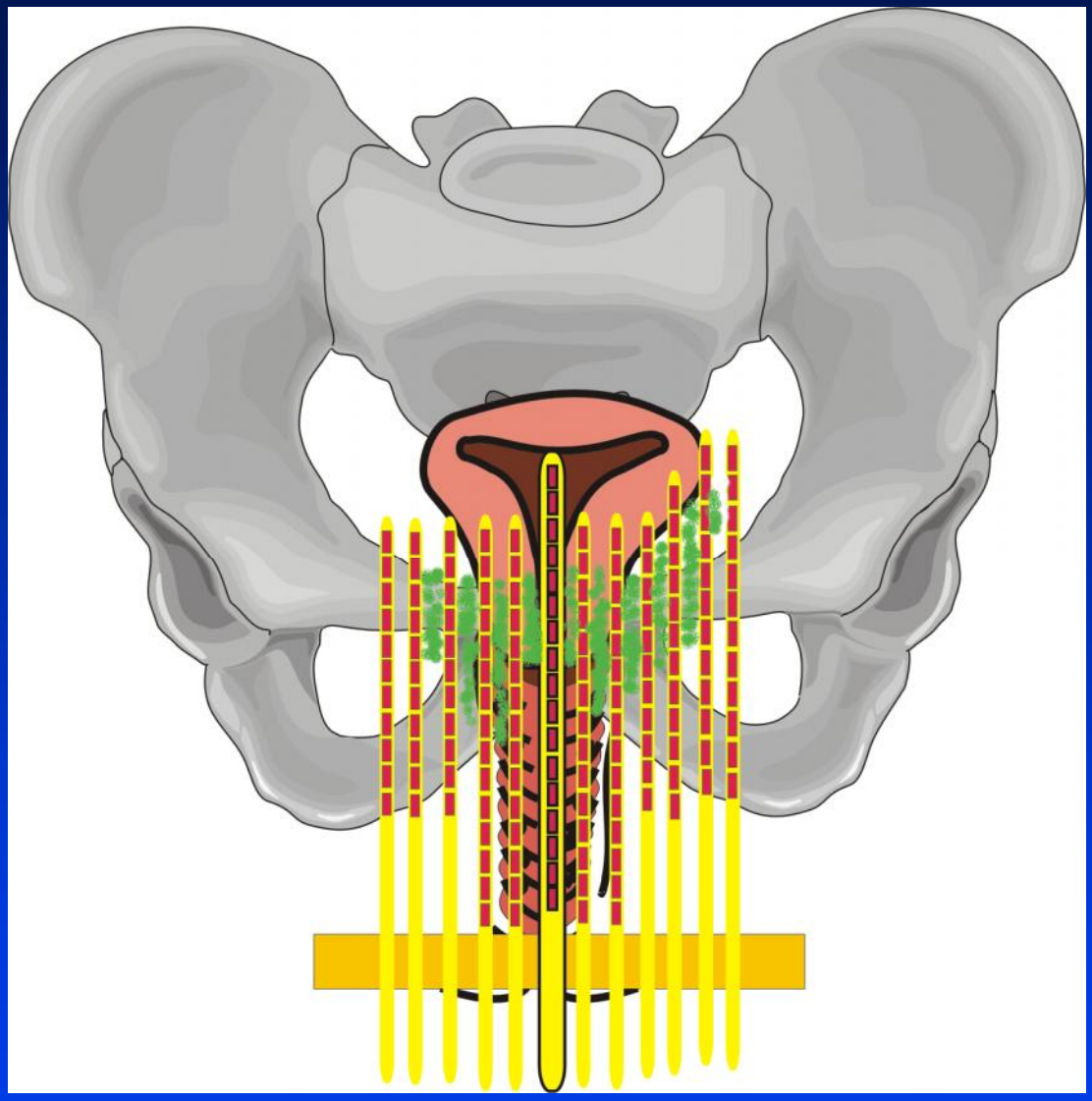

HDR Interstitial

Direct tissue access

Catheter scaffolding 'matrix'

Encompass extensive disease

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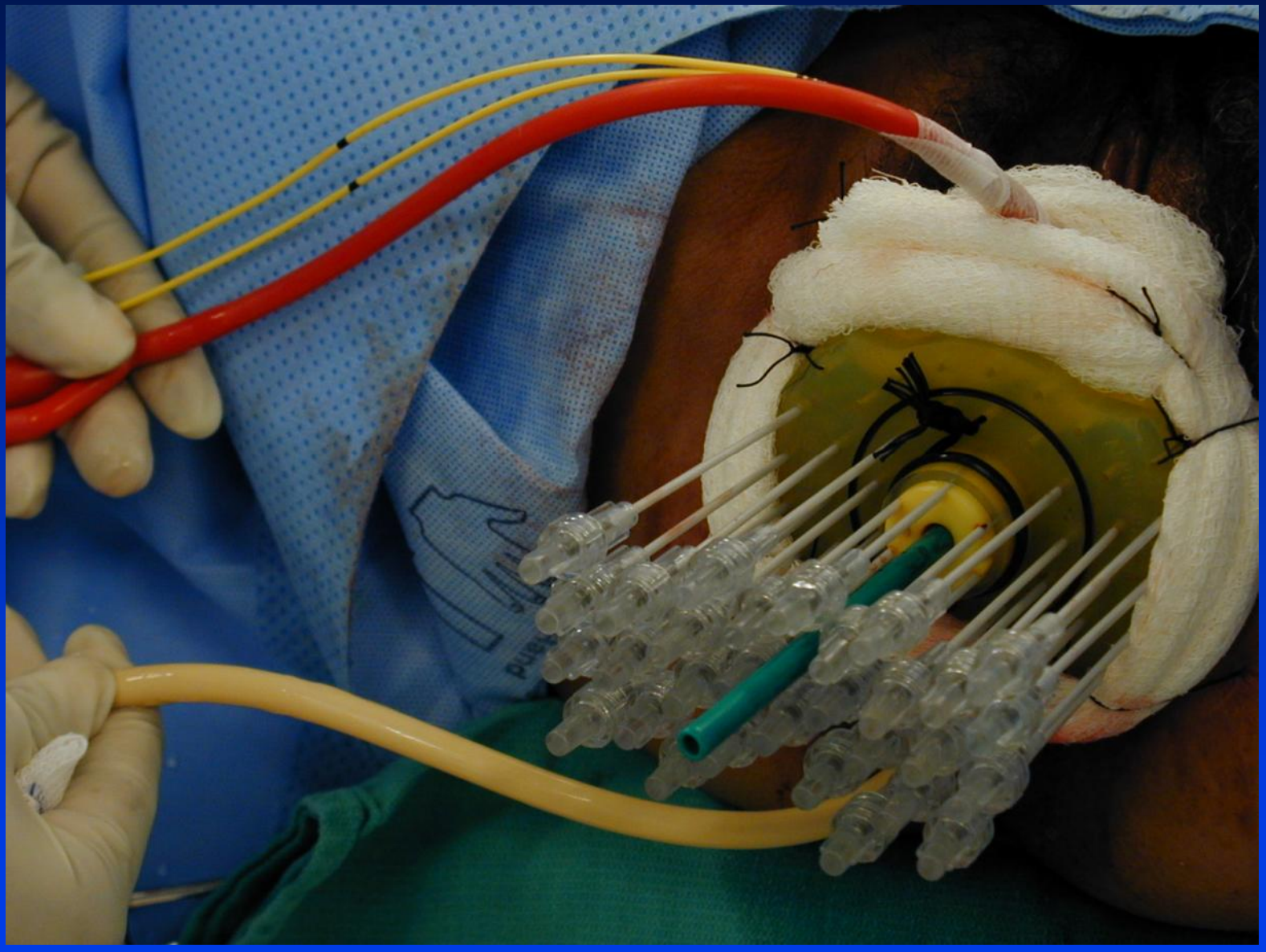

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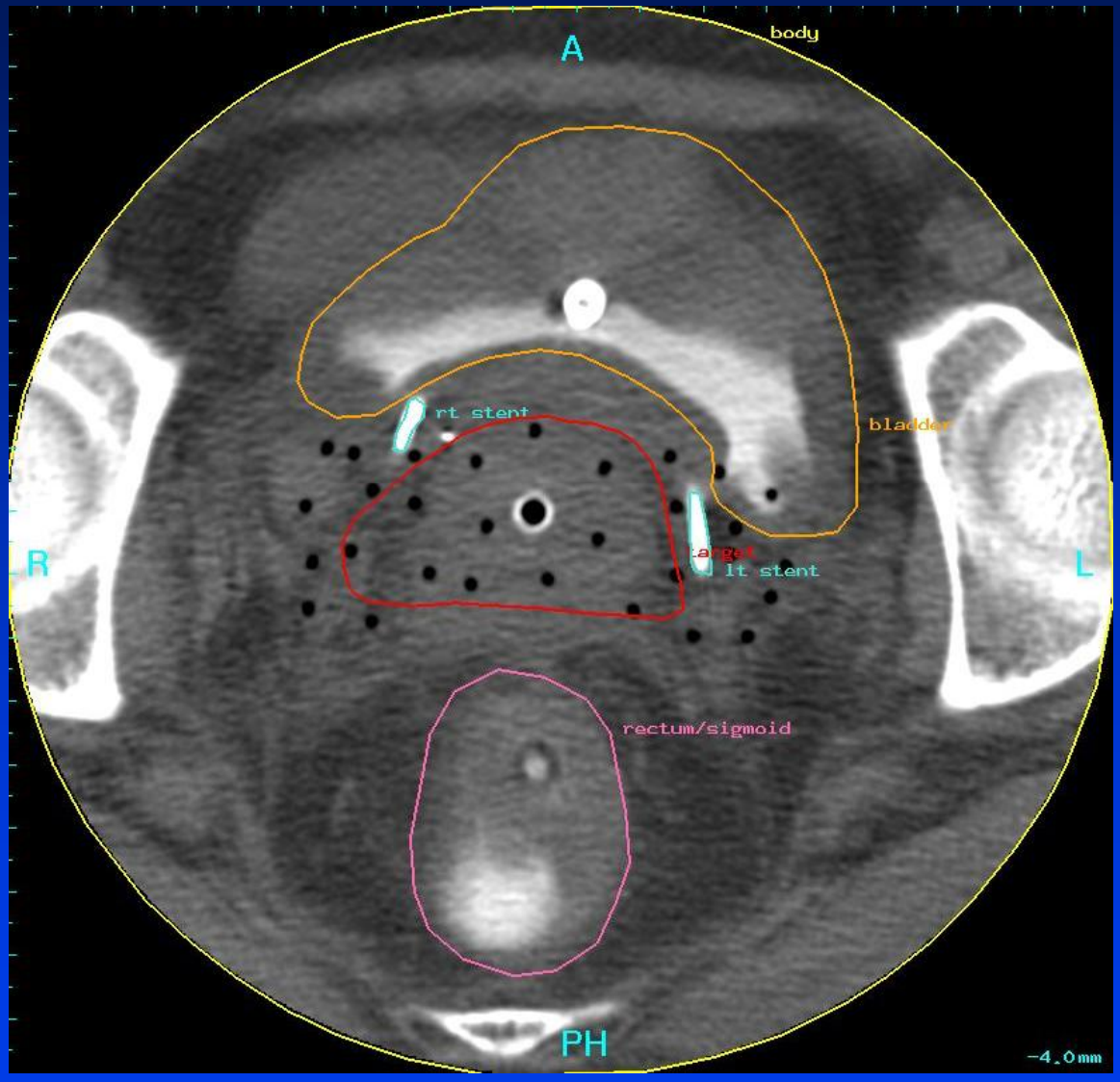
2 Scan 3D Image with Implant



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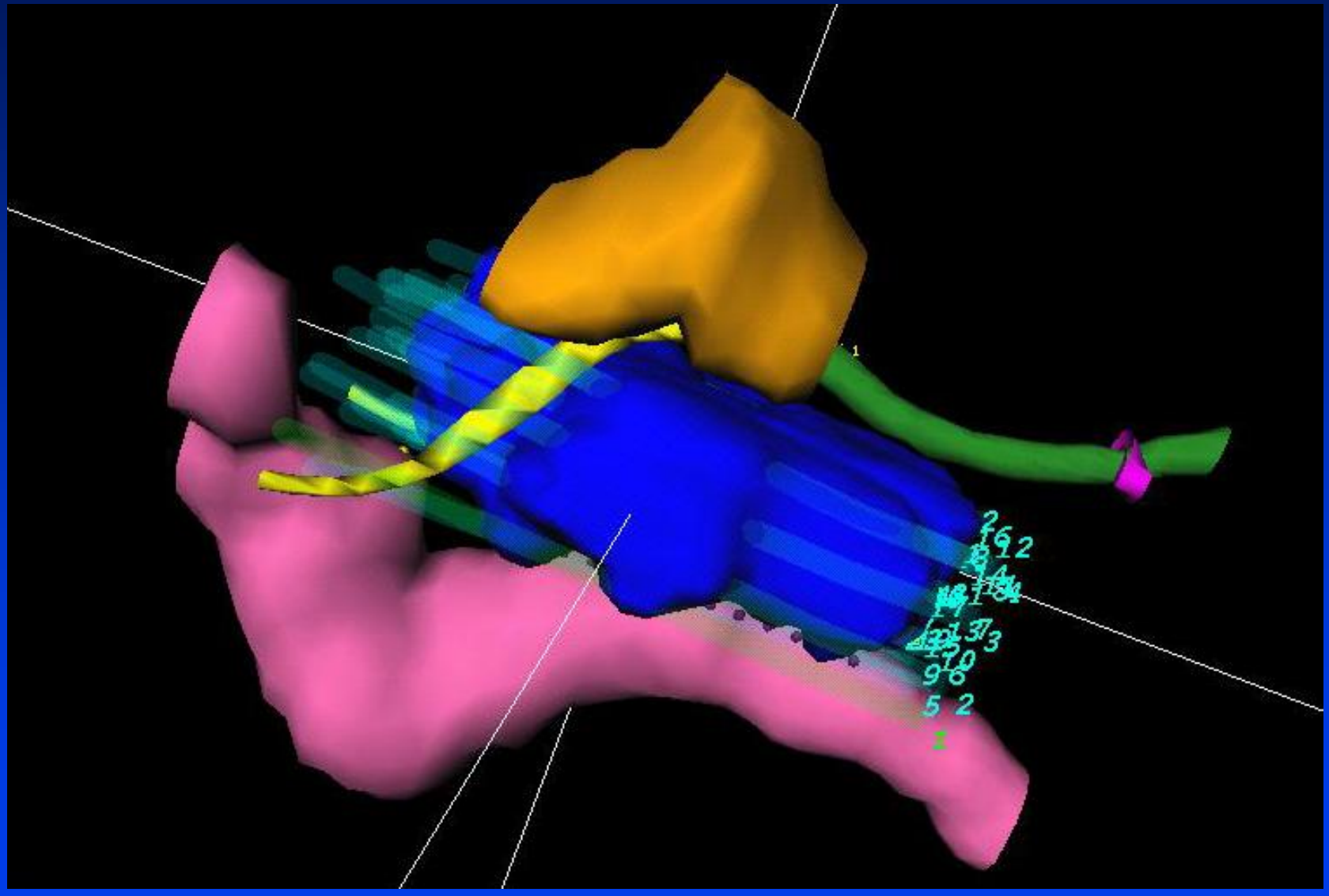
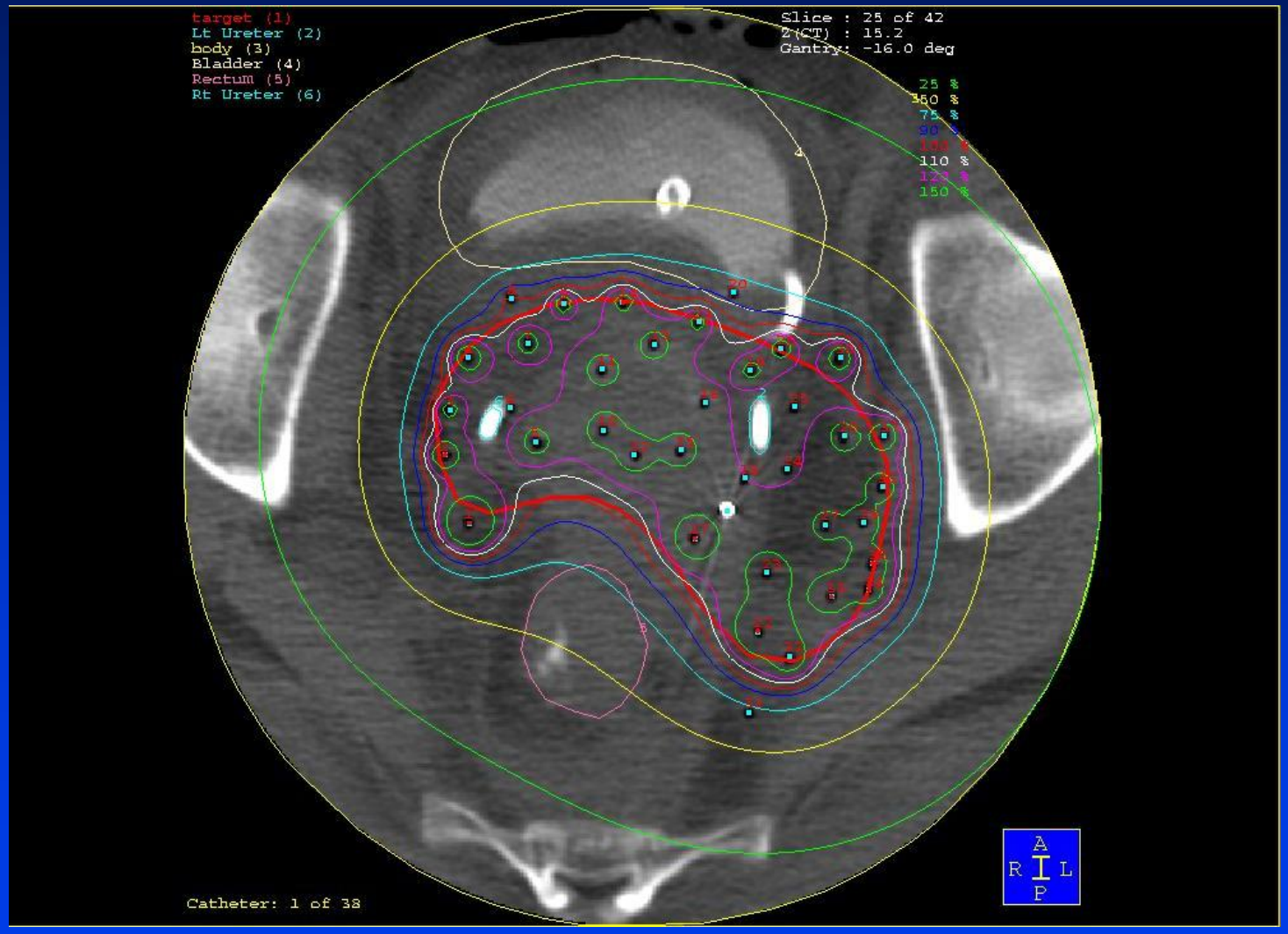
3) Virtual Image of Implant



3) Another Patient with CT Dosimetry



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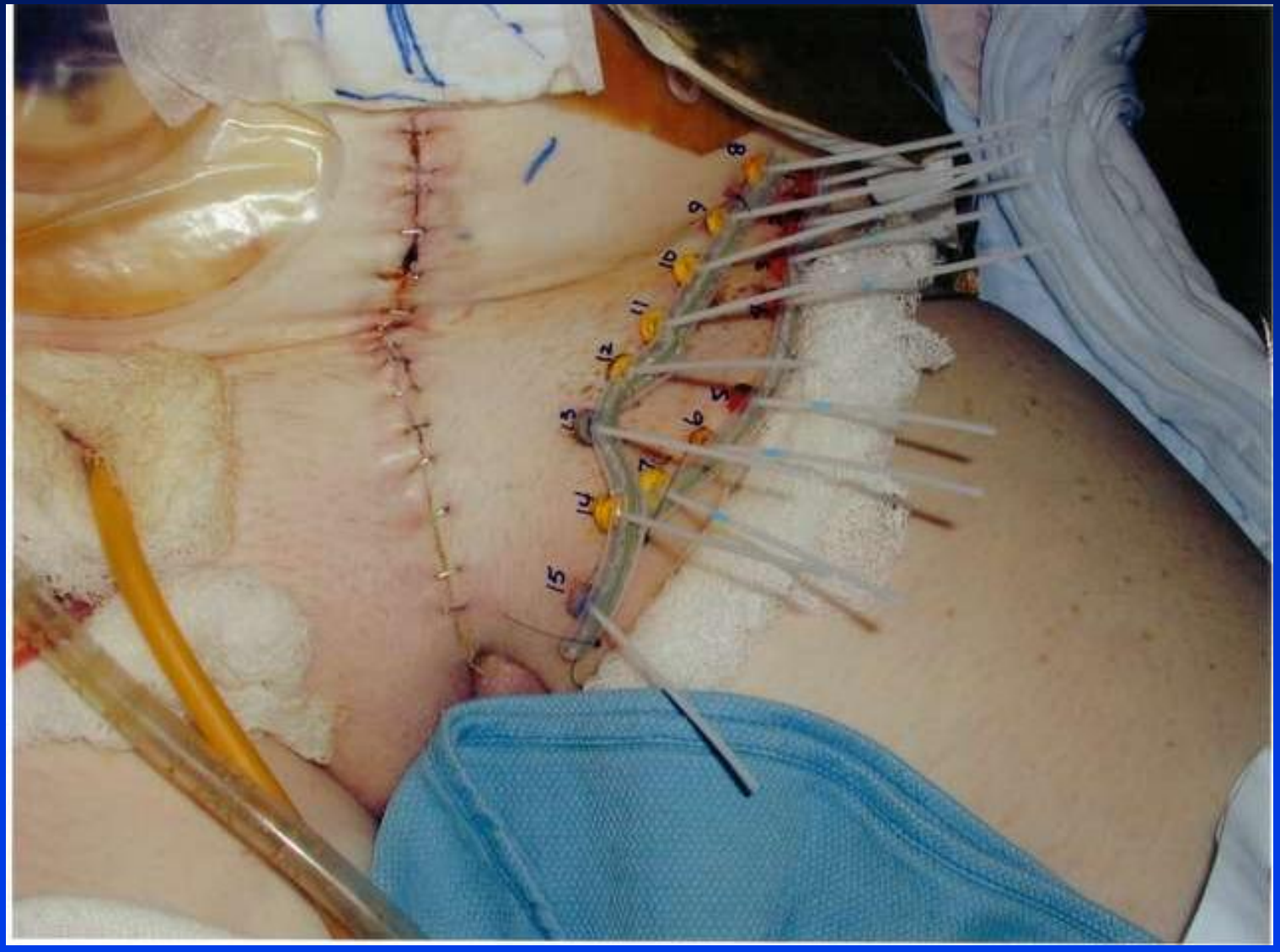
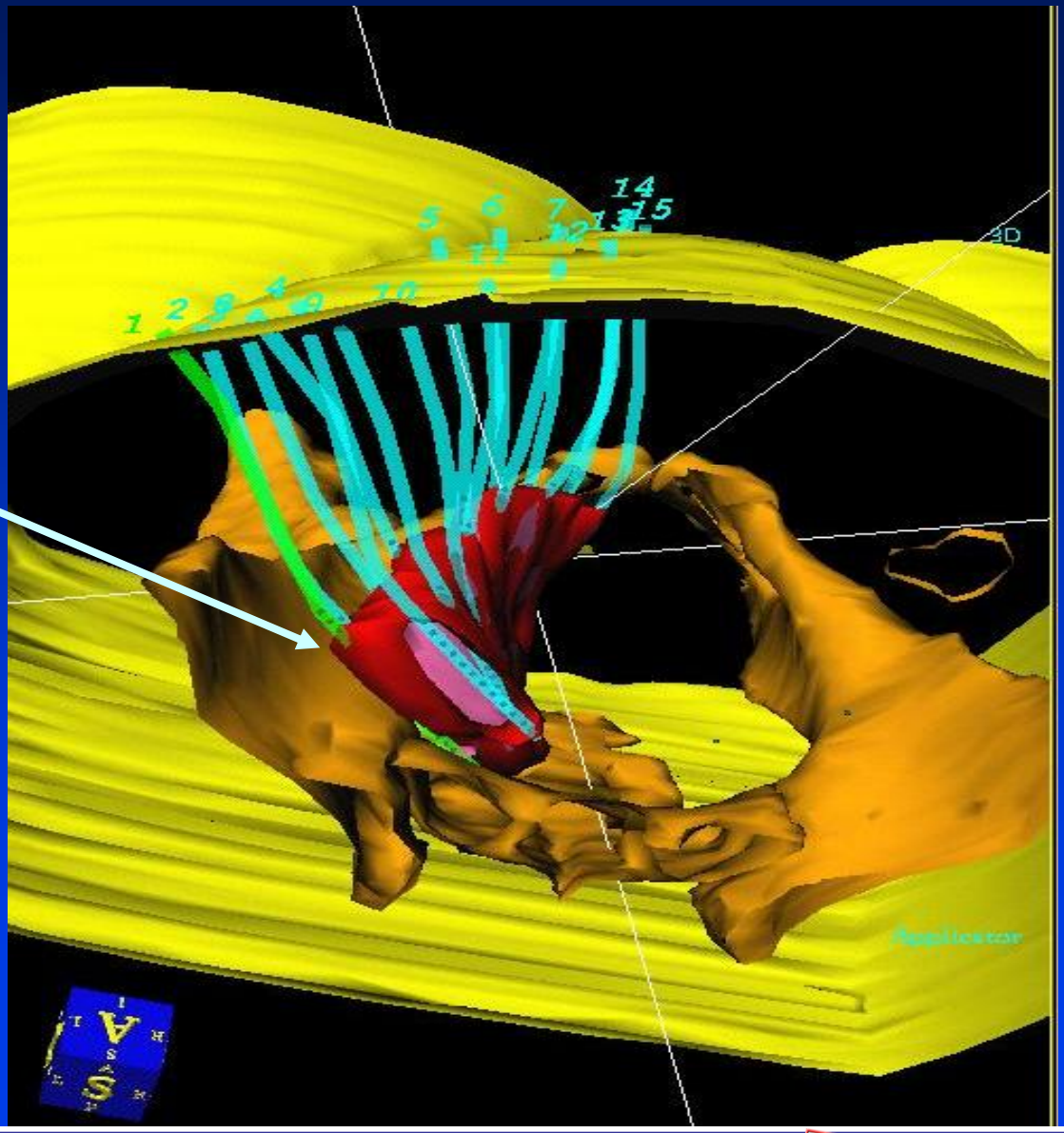
Recurrent Pelvic Sidewall Cervix Cancer



3) Virtual Image viewed from above

Left Pelvic Sidewall



4) HDR Treatment Delivery

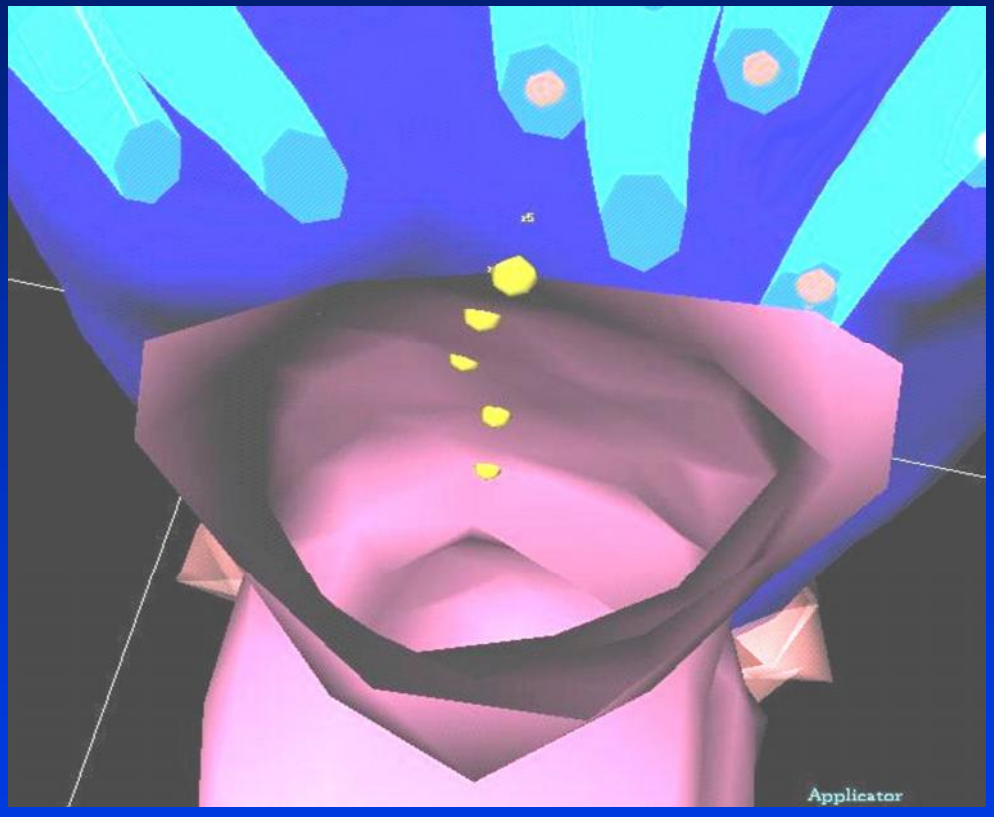
4 HDR Treatment Delivery

CET Protocol Gynecologic Cancer

External Beam Radiation Therapy		
Small Tumors	**Large Tumors**	**Metastatic**
36 Gy	**39.6 Gy**	**45-50 Gy**
50.4 Gy minimum to pelvic lymph nodes		
HDR Brachytherapy 5.5 - 6.0 Gy **5-6 sessions** **(1 or 2 implants 1 week apart)**		

3 Dimensional Dosimetry

Normal Tissue



Transluminal View Rectum

Dose Constraints

Anterior rectum: 75 %

Posterior bladder and urethra: 80%

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Applicator Selection

Intracavitary (T&O, Vaginal cylinders etc.)

- Small lesion, good response to EBRT, adequate anatomy
- If applicator fits

Interstitial (Template etc.)

- Bulky disease, parametria or vaginal involvement
- Anatomy not suitable for intracavitary

Cervical Cancer
Radiation and Chemotherapy

Chemotherapy
- Cisplatinum weekly
- Not given during HDR

Acute ChemoRadiation Toxicity
- Hypokalemia
- Dehydration
- Pancytopenia

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Previously Untreated Cervix
5 Year Results 204 Pts 1991-1999

FIGO Stage		Pathology		Scan	
IB_1	36 (18%)	Squam	82%	Nx	4%
IB_2	45 (22%)	Adeno	12%	N0	85%
II2a	21 (10%)	AdenoSq	6%	N1	11 %
II2b	59 (29%)				
IIIa	12 (6%)	BT Method IC = 36% IS = 64%			
IIIb	24 (12%)	Hysterectomies 14.5%			
IVa	7 (3%)	Chemotherapy 16%			

Median age 55

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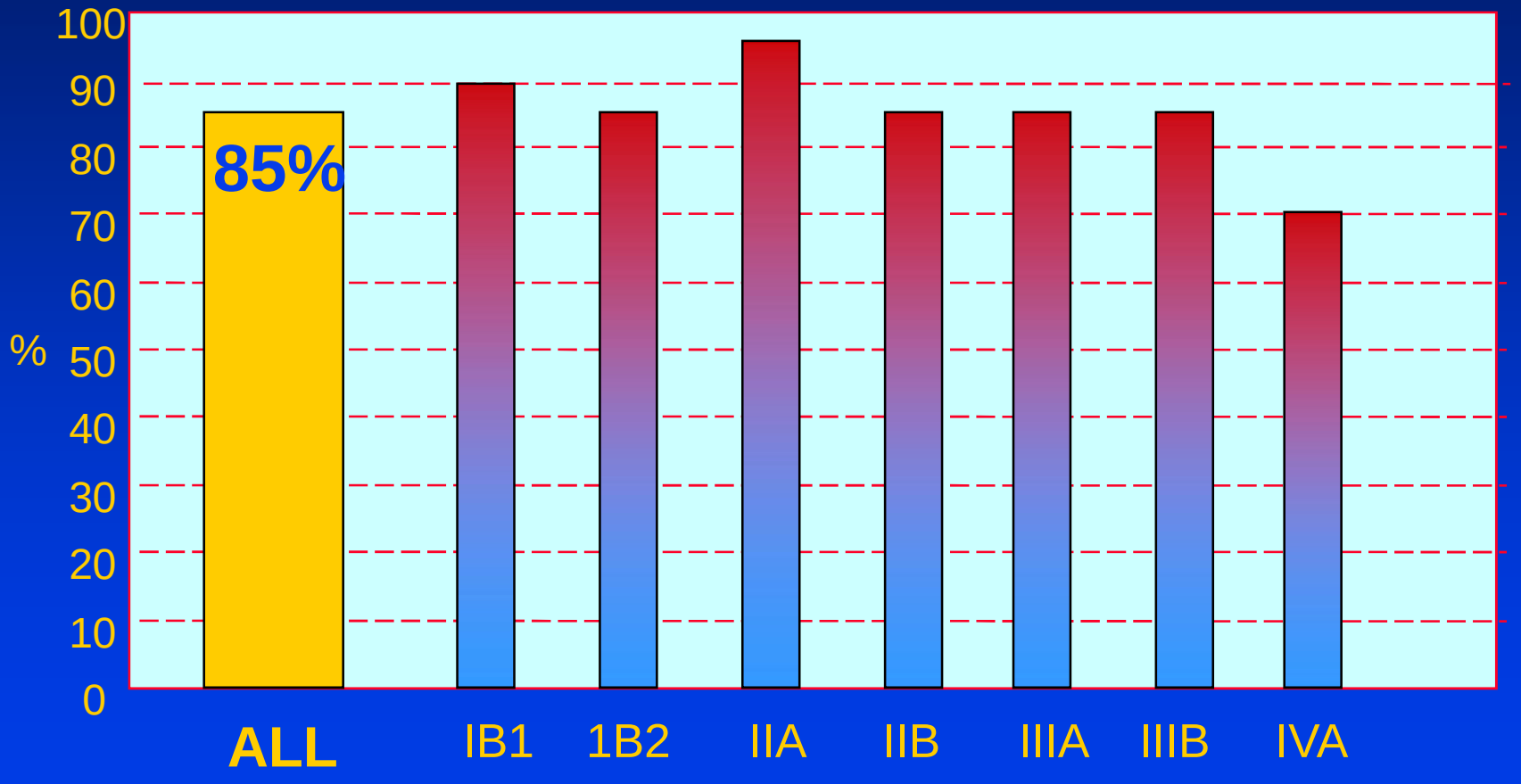
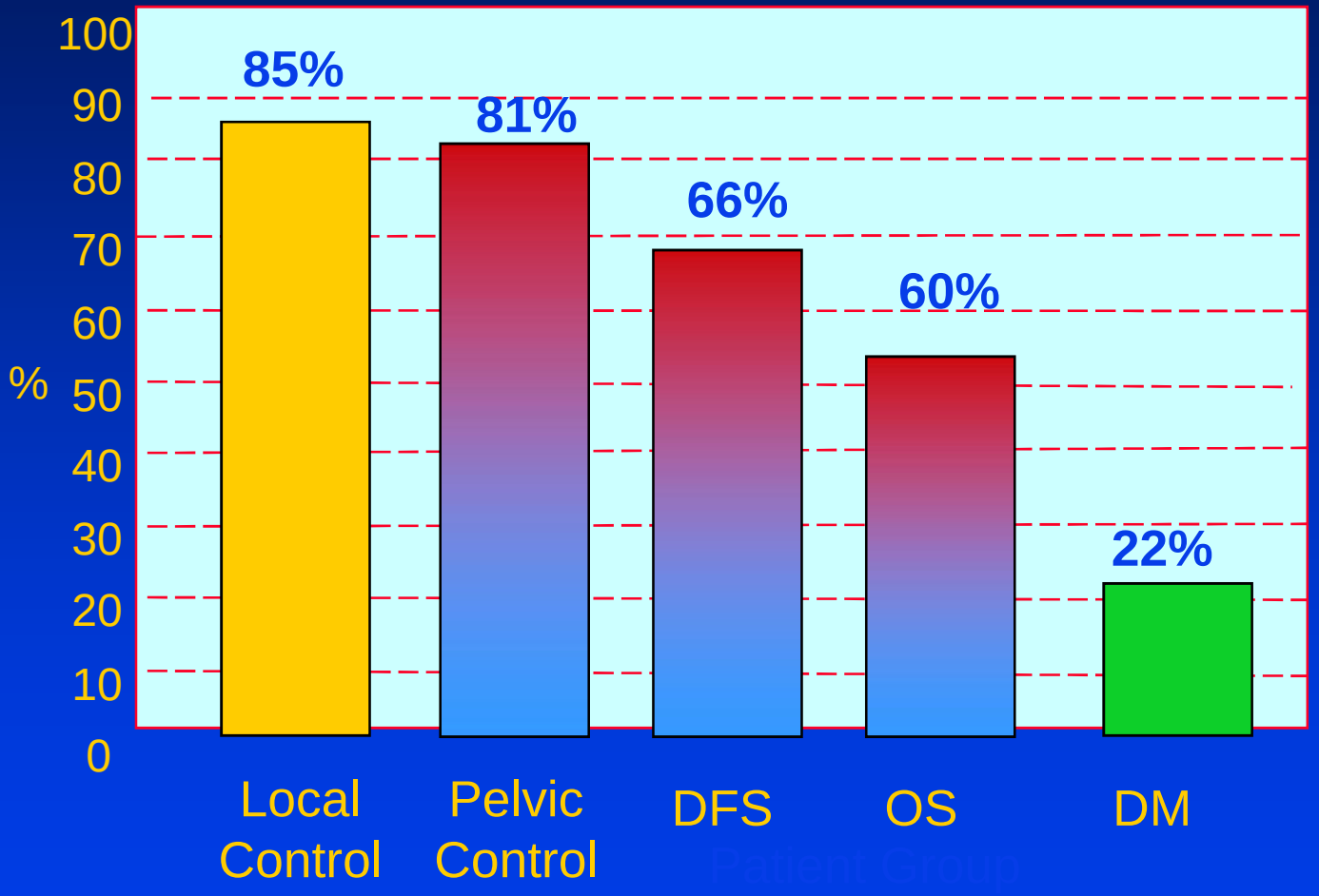
5 Year Results Cervix Cancer
Local Control by Stage



CET Cervix 5 Year Results



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Chronic Morbidity Cervix

Total Bladder and Rectal = 11/204 (5%)

Site	Grade 3	Grade 4
Bladder	3	2
Rectal	5	1
Gyn	5	0

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Previously Untreated Vagina Cancer

8 Year Results 53 Patients 1991-2001

FIGO		Pathology		CT Scan	
I	11%	Squamous	78%	Nx	9%
II	76%	Adeno	20%	N0	78 %
III	11%	AdenoSq	2%	N1	13 %
IVa	2%	Chemotherapy	15%		
Intracavitary 15%		Interstitial 85%			

Median age 64

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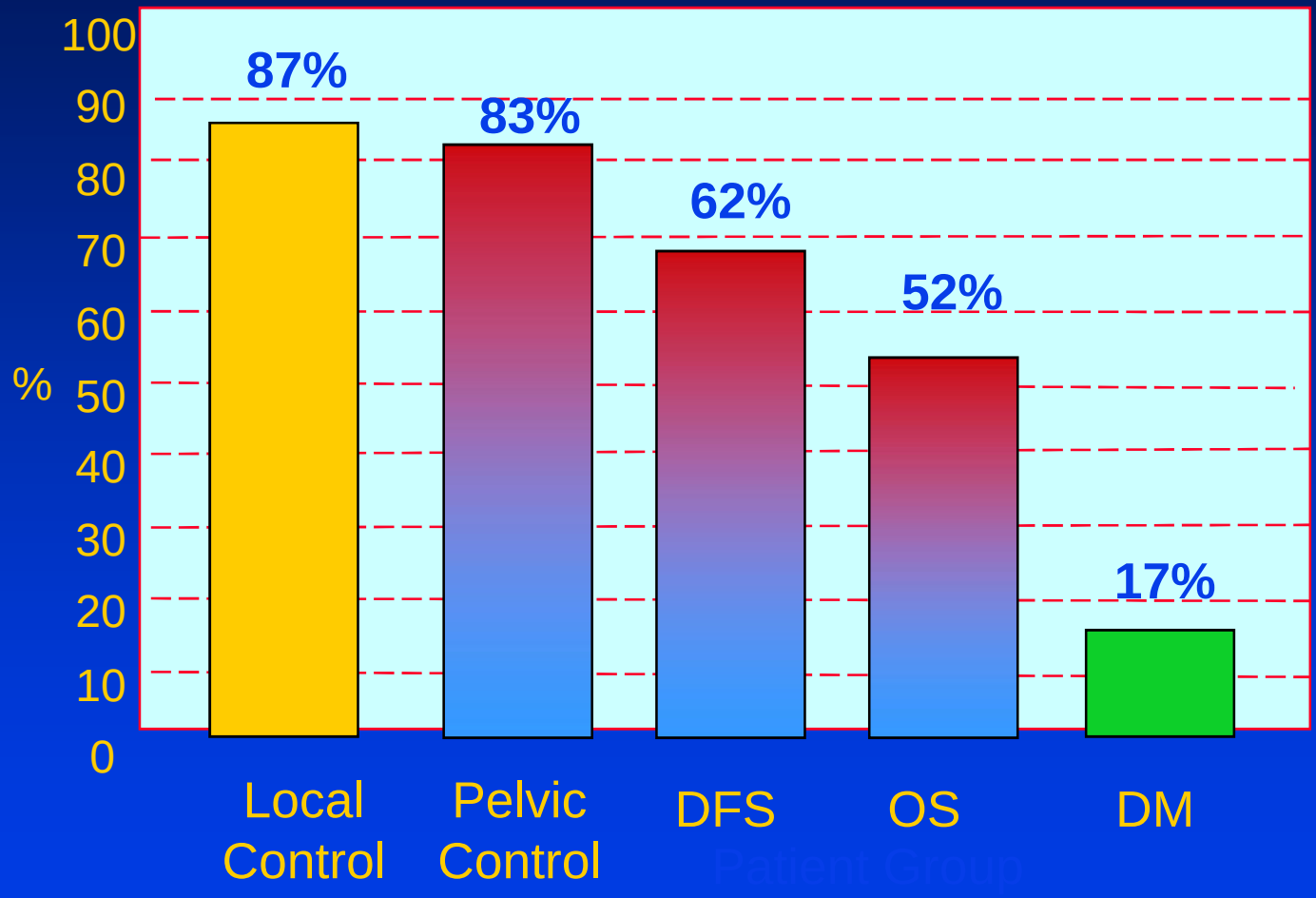
CET Vagina 5 Year Results



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Chronic Morbidity Vagina Ca

Total Bladder and Rectal = 4/53 (7.5%)

Site	Grade 3	Grade 4
Bladder	0	1
Rectal	0	3
GYN	4	0

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Thank You.

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