Πρόγραμμα 14ης Εκπαιδευτικής Εβδομάδος
Ελλήνων Ειδικευομένων Ουρολόγων
18-22 Φεβρουαρίου 2019
Ξενοδοχείο Athens Marriott

1η Ημέρα - Δευτέρα 18 Φεβρουαρίου 2019

Καρκίνος του προστάτη και Συμπτώματα από το κατώτερο ουροποιητικό στους άνδρες

09:30 - 11:00 Θεραπεία εντοπισμένης νόσου

09.30-09.50	Ενεργή παρακολούθηση / **Ε. Φραγκιάδης**
09.50-10.10	Χειρουργική θεραπεία / **Μ. Καραβιτάκης**
10.10-10.30	Ακτινοβολία / **Ε. Μαραγκουδάκης**
10.30-10.50	Εστιασμένη θεραπεία / **Ι. Βαρκαράκης**
10:50-11:00	Ερωτήσεις - συζήτηση

Δεν υπάρχει σύγκρουση συμφερόντων

ΘΕΜΑΤΑ ΠΡΟΣ ΣΥΖΗΤΗΣΗ

1. 3D-CONFORMAL IMRT V-MAT RADID-ARC IGRT
2. ΣΤΕΡΕΟΤΑΚΤΙΚΗ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ (SBRT)
3. ΣΥΝΔΙΑΣΜΟΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ ΟΡΜΟΝΟΘΕΡΑΠΕΙΑΣ
4. ΠΡΟΣΤΑΤΕΚΤΟΜΗ Ή ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΣΕ ΑΣΘΕΝΕΙΣ ΜΕΓΑΛΟΥ ΚΙΝΔΥΝΟΥ
5. ΣΥΜΠΛΗΡΩΜΑΤΙΚΗ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΜΕΤΑ ΑΠΟ ΡΙΖΙΚΗ ΠΡΟΣΤΑΤΕΚΤΟΜΗ
6. ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΔΙΑΣΩΣΗΣ ΜΕΤΑ ΑΠΟ ΡΙΖΙΚΗ ΠΡΟΣΤΑΤΕΚΤΟΜΗ
7. ΒΙΟΧΗΜΙΚΗ ΥΠΟΤΡΟΠΗ ΜΕΤΑ ΤΗ ΠΡΟΣΤΑΤΕΚΤΟΜΗ ΚΑΙ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ

ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΣΕ ΑΣΘΕΝΕΙΣ ΜΙΚΡΟΥ ΚΙΝΔΥΝΟΥ

RISK STRATIFICATION AND STAGING WORKUP

Risk group	Clinical/pathologic features	Imaging[i,j]	Molecular testing of tumor	Germline testing	Initial therapy[p]
Very low[g]	• T1c AND • Gleason score ≤6/grade group 1 AND • PSA <10 ng/mL AND • Fewer than 3 prostate biopsy fragments/cores positive, ≤50% cancer in each fragment/core[n] AND • PSA density <0.15 ng/mL/g	Not indicated	Not indicated	Consider if strong family history[c]	See PROS-4
Low[g]	• T1-T2a AND • Gleason score ≤6/grade group 1 AND • PSA <10 ng/mL	Not indicated	Consider if life expectancy ≥10y[l]	Consider if strong family history[c]	See PROS-5
Favorable intermediate[g]	• T2b-T2c OR • Gleason score 3+4=7/grade group 2 OR • PSA 10–20 ng/mL AND • Percentage of positive biopsy cores <50%	• Bone imaging[k]: not recommended for staging • Pelvic ± abdominal imaging: recommended if nomogram predicts >10% probability of pelvic lymph node involvement	Consider if life expectancy ≥10y[l]	Consider if strong family history[c]	See PROS-6
Unfavorable intermediate[g]	• T2b-T2c OR • Gleason score 3+4=7/grade group 2 or Gleason score 4+3=7/grade group 3 OR • PSA 10–20 ng/mL	• Bone imaging[k]: recommended if T2 and PSA >10 ng/mL • Pelvic ± abdominal imaging: recommended if nomogram predicts >10% probability of pelvic lymph node involvement	Not routinely recommended	Consider if strong family history[c]	See PROS-7
High	• T3a OR • Gleason score 8/grade group 4 or Gleason score 4+5=9/grade group 5 OR • PSA >20 ng/mL	• Bone imaging[k]: recommended • Pelvic ± abdominal imaging: recommended if nomogram predicts >10% probability of pelvic lymph node involvement	Not routinely recommended	Consider[o]	See PROS-8[p]
Very high	• T3b-T4 OR • Primary Gleason pattern 5 OR • >4 cores with Gleason score 8–10/ grade group 4 or 5	• Bone imaging[k]: recommended • Pelvic ± abdominal imaging: recommended if nomogram predicts >10% probability of pelvic lymph node involvement	Not routinely recommended	Consider[o]	See PROS-8[p]
Regional	Any T, N1, M0	Already performed	Consider tumor testing for homologous recombination gene mutations and for microsatellite instability (MSI) or mismatch repair deficiency (dMMR)[m,n]	Consider[o]	See PROS-9
Metastatic	Any T, Any N, M1	Already performed	Consider tumor testing for homologous recombination gene mutations and for MSI or dMMR[m,n]	Consider[o]	See PROS-13

Clinically Localized Prostate Cancer: AUA/ASTRO/SUO Guideline. Part I: Risk Stratification, Shared Decision Making, and Care Options

Martin G. Sanda et al.

8. **Clinicians should recommend active surveillance as the preferable care option for most low risk localized prostate cancer patients. (Moderate Recommendation; Evidence Level: Grade B)**

9. **Clinicians may offer definitive treatment (i.e. radical prostatectomy or radiotherapy) to select low risk localized prostate cancer patients who may have a high probability of progression on active surveillance. (Conditional Recommendation; Evidence Level: Grade B)**

10. **Clinicians should not add androgen deprivation therapy (ADT) along with radiotherapy for low risk localized prostate cancer with the exception of reducing the size of the prostate for brachytherapy. (Strong Recommendation; Evidence Level: Grade B)**

Clinically Localized Prostate Cancer: AUA/ASTRO/SUO Guideline. Part II: Recommended Approaches and Details of Specific Care Options

Martin G. Sanda et al.

48.Clinicians should inform localized prostate cancer patients who are considering proton beam therapy that it offers no clinical advantage over other forms of definitive treatment. (Moderate Recommendation; Evidence Level: Grade C)

49. **Clinicians should inform localized prostate cancer patients considering brachytherapy that it has similar effects as EBRT with regard to erectile dysfunction and proctitis but can also exacerbate urinary obstructive symptoms. (Expert Opinion)**

Clinically Localized Prostate Cancer: AUA/ASTRO/SUO Guideline. Part II: Recommended Approaches and Details of Specific Care Options

Martin G. Sanda et al.

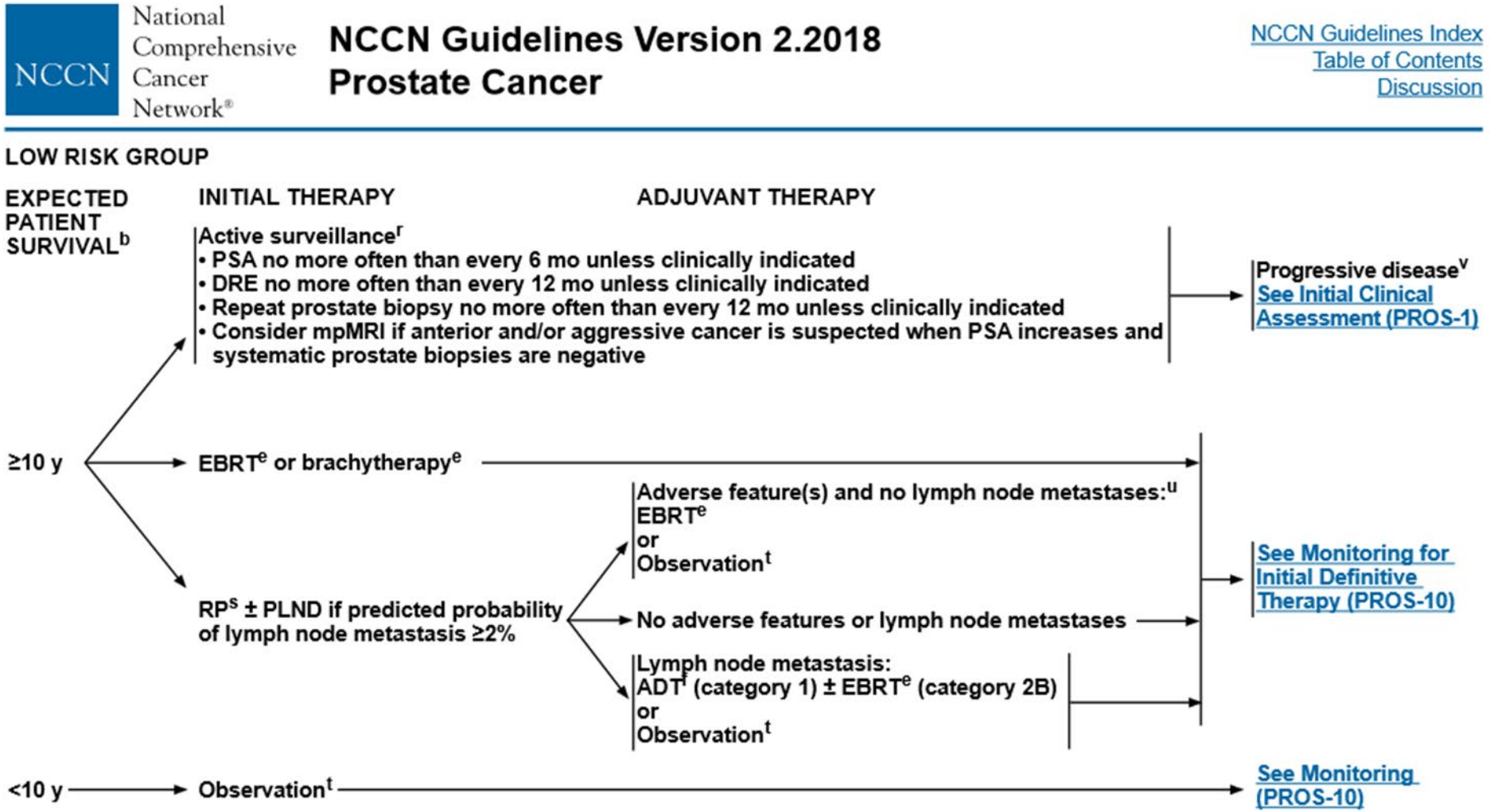
42. **Clinicians may offer single modality EBRT or brachytherapy for patients who elect radiotherapy for low risk localized prostate cancer. (Clinical Principle)**

45. **Clinicians should inform localized prostate cancer patients that use of ADT with radiation increases the likelihood and severity of adverse treatment-related events on sexual function in most men and can cause other systemic side effects. (Strong Recommendation; Evidence Level: Grade B)**

43. **Clinicians may offer EBRT or brachytherapy alone or in combination for favorable intermediate risk localized prostate cancer. (Clinical Principle)**

44. **Clinicians should offer 24-36 months of ADT as an adjunct to either EBRT alone or EBRT combined with brachytherapy to patients electing radiotherapy for high risk localized prostate cancer. (Strong Recommendation; Evidence Level: Grade A)**

ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΣΕ ΑΣΘΕΝΕΙΣ ΜΙΚΡΟΥ ΚΙΝΔΥΝΟΥ



ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΣΕ ΑΣΘΕΝΕΙΣ ΜΙΚΡΟΥ ΚΙΝΔΥΝΟΥ

PRINCIPLES OF RADIATION THERAPY

Table 1: Regimens that have shown acceptable efficacy and toxicity. The optimal regimen for an individual patient warrants evaluation of comorbid conditions, voiding symptoms, and toxicity of therapy. Additional fractionation schemes may be used as long as sound oncologic principles and appropriate estimate of BED are considered.

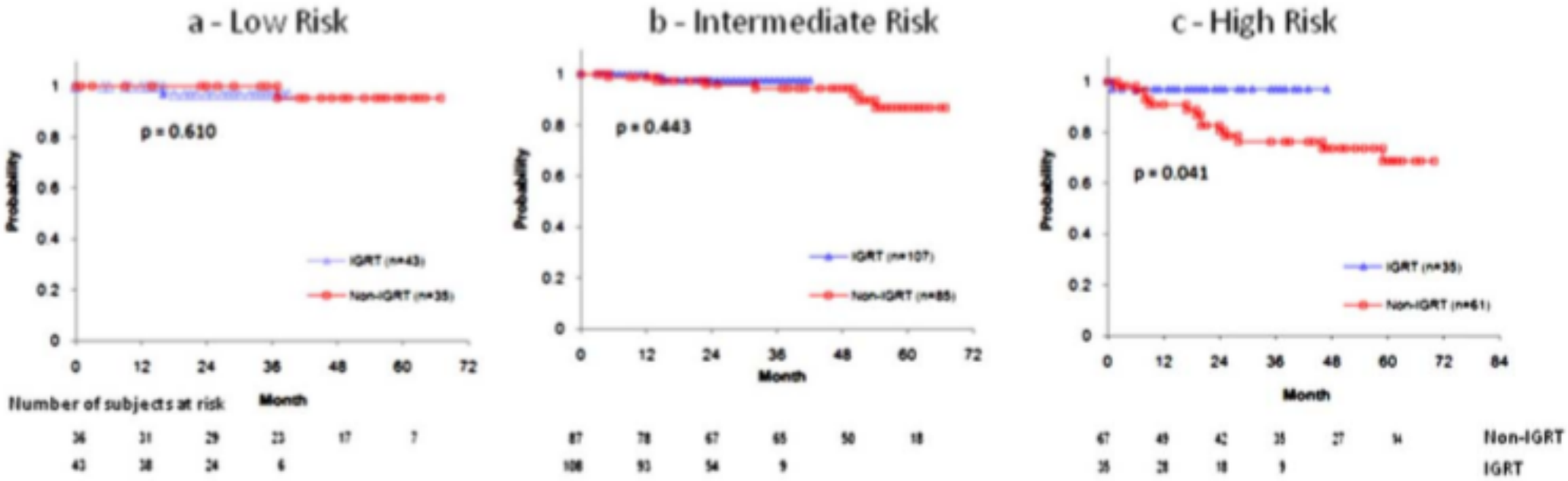
Regimen for Definitive Therapy	NCCN Risk Group (✓ indicates an appropriate regimen option if radiation therapy is given)					
	Very-Low[1]	Low[1]	Favorable or good prognostic[2] intermediate	Unfavorable, or poor prognostic[2], intermediate	High and Very-High[3]	Node Positive
Beam Therapies						
72 Gy to 80 Gy at 2 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
75.6 Gy to 81.0 Gy at 1.8 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
70.2 Gy at 2.7 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
70 Gy at 2.5 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
60 Gy at 3 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
51.6 Gy at 4.3 Gy per fraction	✓	✓	✓			
37 Gy at 7.4 Gy per fraction	✓	✓	✓			
40 Gy at 8 Gy per fraction	✓	✓	✓			
36.25 Gy at 7.25 Gy per fraction	✓	✓	✓			
Brachytherapy Monotherapy						
Iodine 125 implant at 145 Gy	✓	✓	✓			
Palladium 103 implant at 125 Gy	✓	✓	✓			
Cesium implant at 115 Gy	✓	✓	✓			
HDR 27 Gy at 13.5 Gy in 2 implants	✓	✓	✓			
HDR 38 Gy at 9.5 Gy BID in 2 implants	✓	✓	✓			
Combined EBRT and Brachytherapy (EBRT 45–50.4 Gy at 1.8–2.0 Gy/fx, unless otherwise noted)						
Iodine 125 implant at 110-115 Gy				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
Palladium 103 implant at 90-100 Gy				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
Cesium implant at 85 Gy				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
HDR 21.5 Gy at 10.75 Gy x 2				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
EBRT 37.5 Gy at 2.5 Gy + 12-15 Gy single HDR				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT

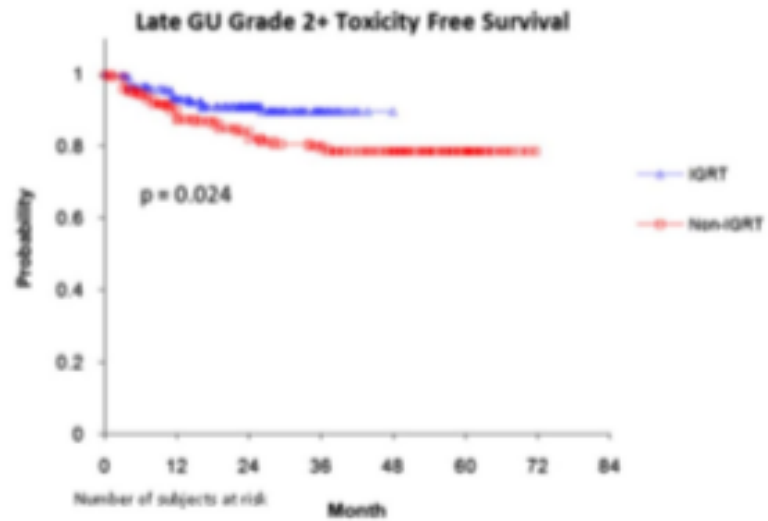
[1]Active surveillance should be strongly considered
[2]"Good" or "Poor" prognostic is not strictly defined. Predictive nomograms and/or molecular testing can be used to prognosticate PSA persistence/recurrence, prostate cancer specific mortality and metastasis free survival after definitive external beam radiation therapy. Although the prognostic value has been established, the predictive value of these tests remains unknown.
[3]Prophylactic nodal radiation may be considered if estimate of nodal metastasis is high.

Continued

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any patient with cancer is in a clinical trial. Participation in clinical trials is especially encouraged.

EBRT: Improving Outcomes
IMAGE GUIDANCE

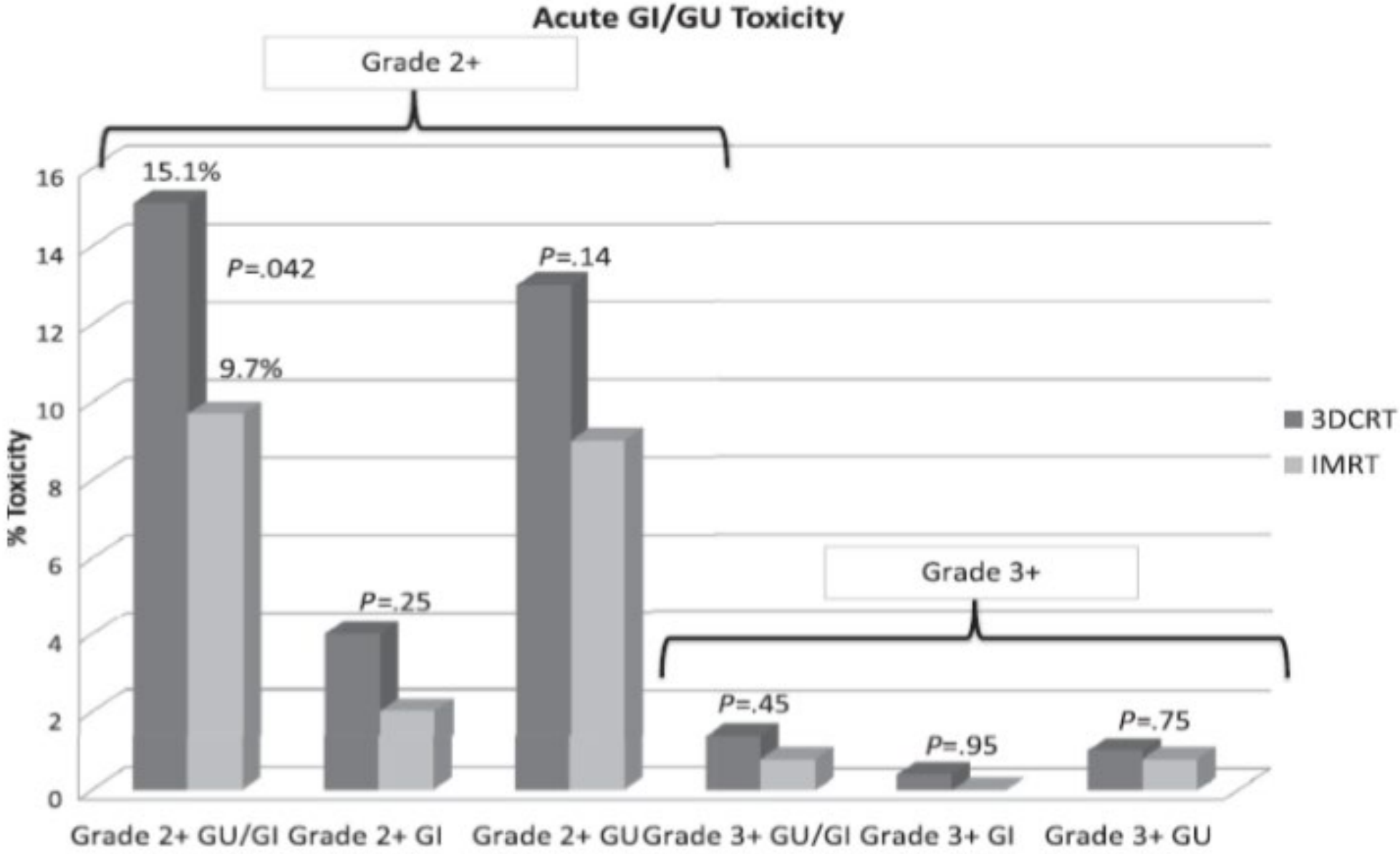




MSKCC: STARTED IGRT IN 2007
Less biochemical failures
Less toxicity (GU)

Zelefsky, IJROBP, 84, 125-129, 2012

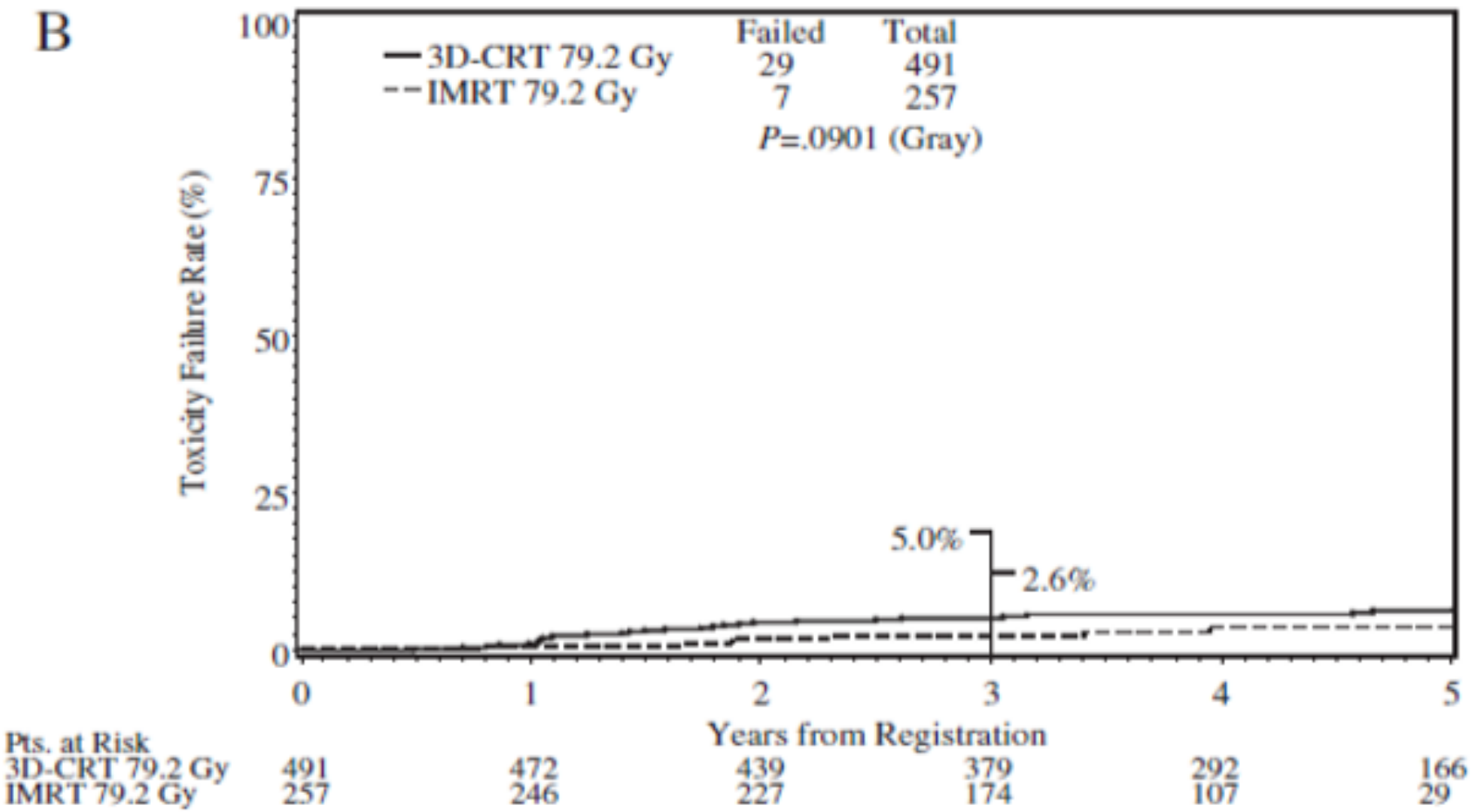
IMRT vs 3DRT: RTOG 0126 - Acute Toxicity



Int J Radiation Oncol Biol Phys, Vol. 87, No. 5, pp. 932–938, 2013

IMRT vs 3DRT: RTOG 0126 - Late GI Toxicity

Late Grade **3+** GI Toxicity



Int J Radiation Oncol Biol Phys, Vol. 87, No. 5, pp. 932–938, 2013

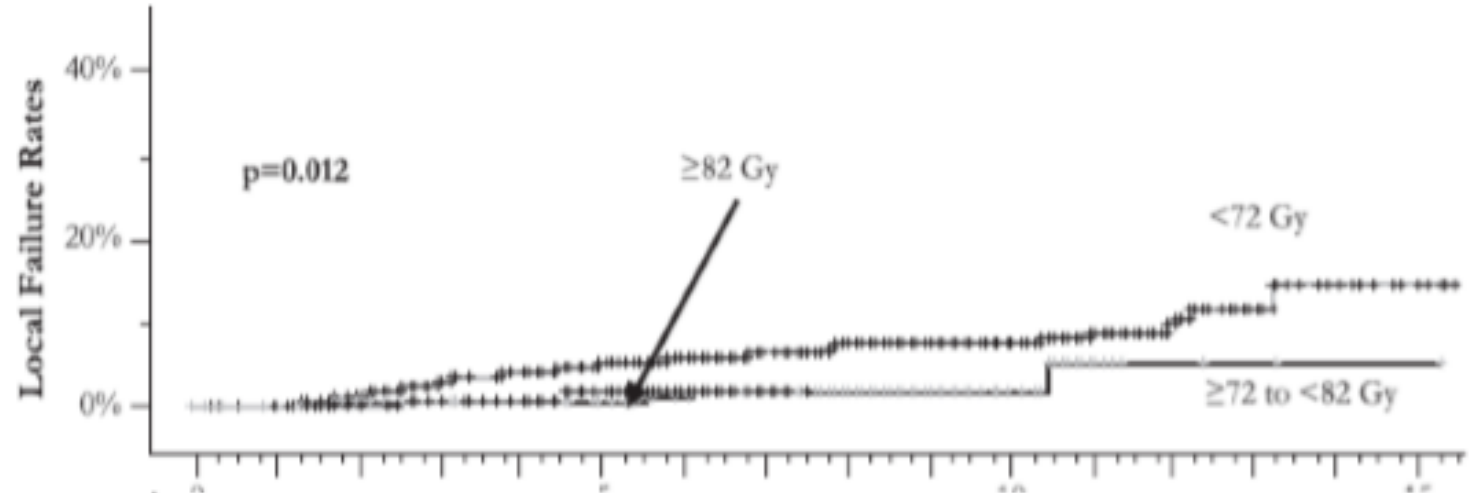
RT DOSE: Randomized Trials

MDACC Trial (Pollack):		**bNED**		
70 vs 78 Gy		50 vs 73%	at 10 years	p<0.01
MGH/LLUMC (Proton Trial):				
70 vs 79.2 Gy	Low risk	72 vs 93%	at 10 years	p<0.01
	Int risk	58 vs 70%		p=0.06
Dutch Multi-institutional Trial:				
68 vs 78 Gy (some ADT)		45 vs 56%	at 7 years	p=0.03
UK (MRC) Trial:				
64 vs 74 Gy (some ADT)		71 vs 60%	at 5 years	p<0.01

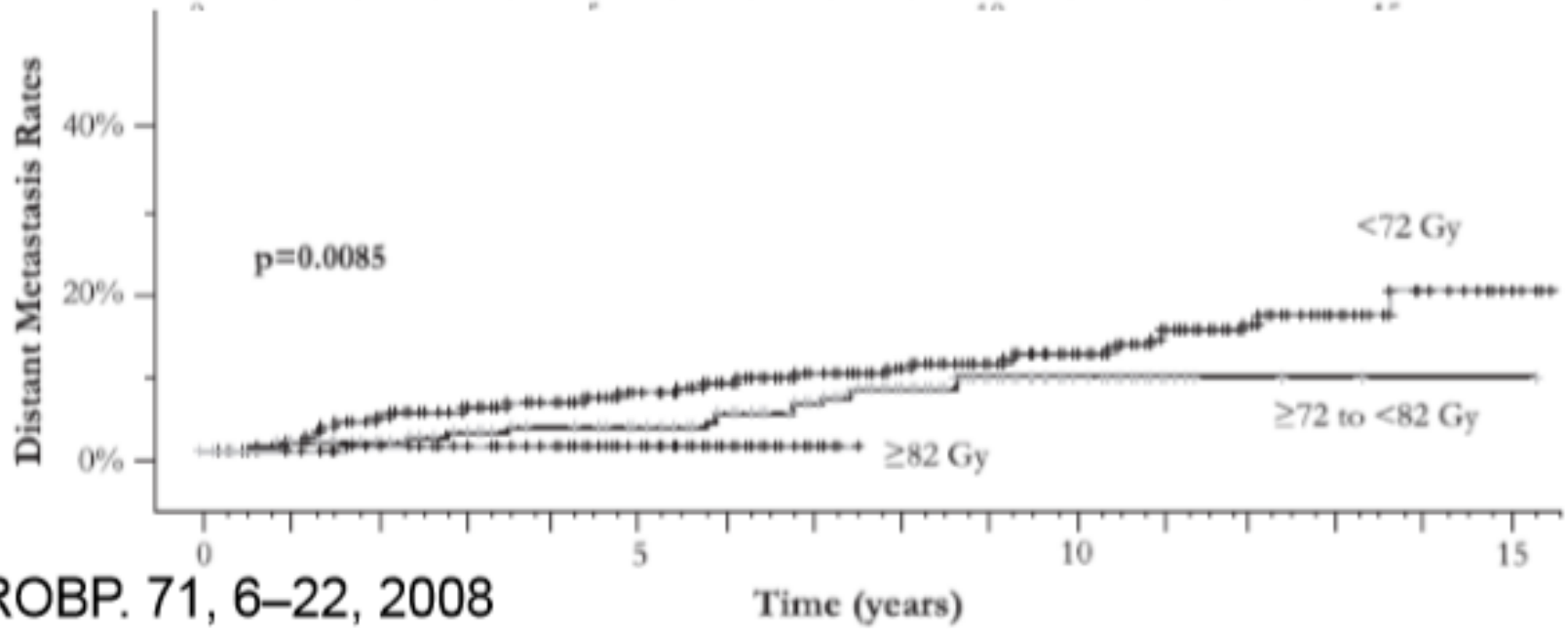
IMPACT OF INCREASED DOSE

919 Stage T1-T3N0M0 - RT alone - treated between 1986 and 2000

LOCAL FAILURE



DISTANT FAILURE



Kupelian et al. IJROBP. 71, 6–22, 2008

LOCALIZED PROSTATE CA: RT DOSE

ELSEVIER

Int. J. Radiation Oncology Biol. Phys., Vol. 46, No. 3, pp. 567–574, 2000

0360-3016/00/$–see front matter

PII S0360-3016(99)00455-1

CLINICAL INVESTIGATION **Prostate**

HIGHER THAN STANDARD RADIATION DOSES (≥72 GY) WITH OR WITHOUT ANDROGEN DEPRIVATION IN THE TREATMENT OF LOCALIZED PROSTATE CANCER

PATRICK A. KUPELIAN, M.D.,* DASARAHALLY S. MOHAN, M.D.,* JANICE LYONS, M.D.,* ERIC A. KLEIN, M.D.,† AND CHANDANA A. REDDY, M.S.*

Departments of *Radiation Oncology and †Urology, Cleveland Clinic Foundation, Cleveland, OH

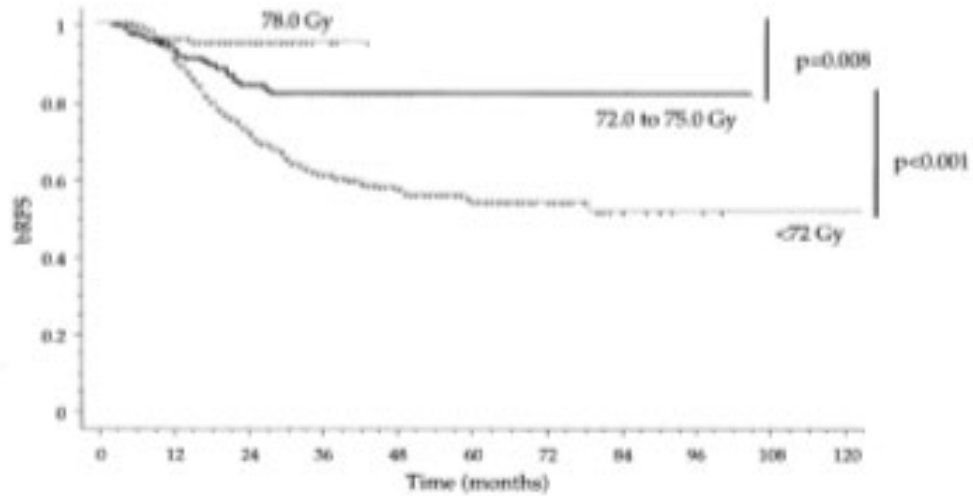


Fig. 4. bRFS by radiation dose grouped in three dose levels; <72 Gy, 72.0 to 75.0 Gy, and 78.0 Gy. Symbols represent censored events.

Need Better Local Therapy: Doses >80 Gy?

Prostate Biopsy: Local Failure Endpoint

Zelefsky et al., MSKCC

1989-1998: 220 RT patients biopsied at 3 years.
3 mos AD: 29% Median RT dose: 76 Gy (range: 65-81 Gy)

		Positive biopsies	
RT Dose	64.8 Gy	52%	p< 0.001
	70.2 Gy	34%	
	75.6 Gy	24%	
	81 Gy	9%	

	Positive biopsies	
No ADT	34%	p<0.001
ADT	11%	

NO IMAGE GUIDANCE:
GEOGRAPHIC MISS versus INSUFFICIENT DOSE?

SBRT for Prostate Cancer

Patrick Kupelian, M.D.
Professor and Vice Chair
University of California Los Angeles
Department of Radiation Oncology
pkupelian@mednet.ucla.edu

June 2014

UCLA UCLA

Planning and Delivering SBRT
IG – EBRT technique

Planning

PTV: 95% of PTV volume to get 95-110% of Rx dose.

SBRT: (8 Gy x 5)

OAR Dose Constraints:

Rectum	V50 (20 Gy) ≤ 50%
	V80 (32 Gy) ≤ 20%
	V90 (36 Gy) ≤ 10%
	V100 (40 Gy) ≤ 5%
Bladder	V50 (20 Gy) ≤ 40%
	V100 (40 Gy) ≤ 1.1%
Femurs	V40 (16 Gy) ≤ 5%
Small Bowel	V50 (20 Gy) < 1%

Delivery

Efficacy of SBRT

Multi-institutional pooled data; 8 institutions

1100 patients, ~ 3 yr median FU (6-72 mos)

335 cases with a >4 years follow-up (median 53 mos)

35-40 Gy in 4-5 fractions, ADT in14%

Risk groups:

Low:	639	59%
Intermediate:	326	30%
High:	124	11%

King et al, Radiother Oncol. 109:217-21, 2013

Subset with longer follow-up:

335 cases with >4 years follow-up (median: 53 months)

5-year bRFS rates:

Low risk:	97%
Intermediate-risk:	89%

UT Southwestern Protocol (R. Timmerman)

ASTRO 2013 Update. Abstract 2405

Median follow-up is 25.5 months

Dose groups: 9.0 Gy x 5 = 45 Gy
9.5 Gy x 5 = 47.5 Gy
10.0 Gy x 5 = 50 Gy

10% developped High Grade Rectal T (Grade 4)

Predictors of Gr4 rectal toxi

- Diabetes (trend p=0
- > 35% of rectal Gy (p=0.03)
- Volume of r receiving 50 Gy (p=0.01)

Gr4 t had > 3.5 cm^3 of rectal wall $\geq$ 50 Gy ($p < .0001$).
A ts with no rectal toxicity had < 3.5 cm^3 rectal wall at 50 Gy.

DO NOT treat with 50 Gy at 10 Gy per fraction

SBRT for Prostate Cancer May Result in More Complications

•Anna Azvolinsky, Mar 17, 2014, Prostate Cancer, Genitourinary Cancers, Radiation Oncology

Six months following treatment, **15.6% of patients treated with SBRT had a genitourinary toxicity compared with 12.6% of those treated with IMRT** (odds ratio [OR] = 1.29; ***P* = .009**).

At 24 months after treatment initiation, patients treated with SBRT had increased side effects, including **urethritis, urinary incontinence, and obstruction**.

Of patients treated **with SBRT, 43.9% had a genitourinary toxicity compared with 36.3% of those treated with IMRT (OR = 1.38; *P* = .001).**

The incidence of a fistula is a concern with SBRT, but the current study found no significant differences in the incidence using either technique.

The average per-patient cost of SBRT was $13,645 compared with $21,023 for IMRT.

SBRT is still preferable to IMRT for both patients and **insurers**, as SBRT is more convenient and of shorter treatment duration, is less expensive overall compared with IMRT

ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΣΕ ΑΣΘΕΝΕΙΣ ΜΕΓΑΛΟΥ ΚΙΝΔΥΝΟΥ

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Low[g]	• T1-T2a AND • Gleason score ≤6/grade group 1 AND • PSA <10 ng/mL	Not indicated	Consider if life expectancy ≥10y[l]	Consider if strong family history[c]	See PROS-5
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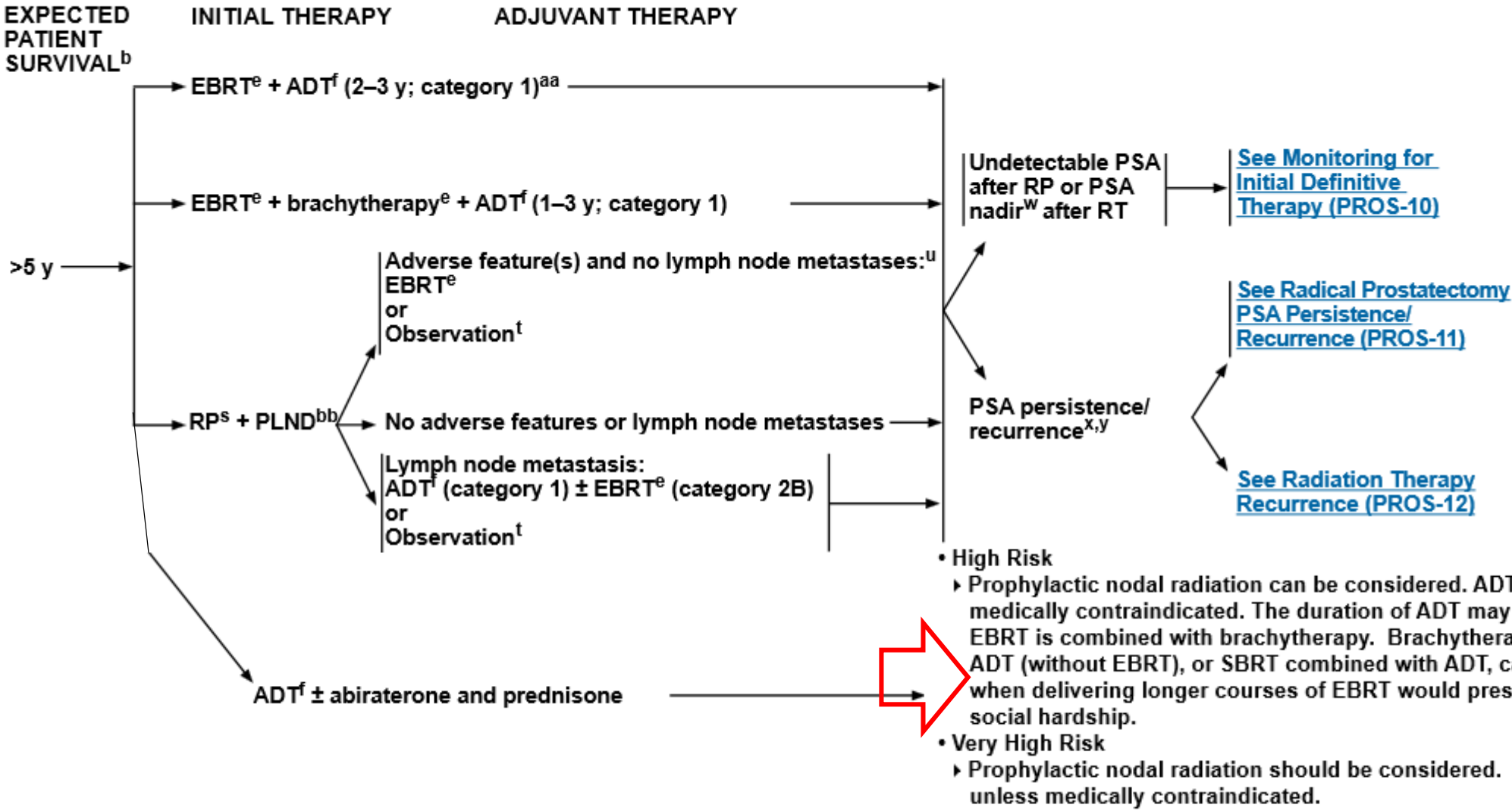
Unfavorable intermediate[g]	• T2b-T2c OR • Gleason score 3+4=7/grade group 2 or Gleason score 4+3=7/grade group 3 OR • PSA 10–20 ng/mL	• Bone imaging[k]: recommended if T2 and PSA >10 ng/mL • Pelvic ± abdominal imaging: recommended if nomogram predicts >10% probability of pelvic lymph node involvement	Not routinely recommended	Consider if strong family history[c]	See PROS-7
High	• T3a OR • Gleason score 8/grade group 4 or Gleason score 4+5=9/grade group 5 OR • PSA >20 ng/mL	• Bone imaging[k]: recommended • Pelvic ± abdominal imaging: recommended if nomogram predicts >10% probability of pelvic lymph node involvement	Not routinely recommended	Consider[o]	See PROS-8[p]
Very high	• T3b-T4 OR • Primary Gleason pattern 5 OR • >4 cores with Gleason score 8–10/ grade group 4 or 5	• Bone imaging[k]: recommended • Pelvic ± abdominal imaging: recommended if nomogram predicts >10% probability of pelvic lymph node involvement	Not routinely recommended	Consider[o]	See PROS-8[p]
Regional	Any T, N1, M0	Already performed	Consider tumor testing for homologous recombination gene mutations and for microsatellite instability (MSI) or mismatch repair deficiency (dMMR)[m,n]	Consider[o]	See PROS-9
Metastatic	Any T, Any N, M1	Already performed	Consider tumor testing for homologous recombination gene mutations and for MSI or dMMR[m,n]	Consider[o]	See PROS-13

HIGH OR VERY HIGH RISK GROUP



- High Risk
  - Prophylactic nodal radiation can be considered. ADT is required unless medically contraindicated. The duration of ADT may be reduced when EBRT is combined with brachytherapy. Brachytherapy combined with ADT (without EBRT), or SBRT combined with ADT, can be considered when delivering longer courses of EBRT would present a medical or social hardship.
- Very High Risk
  - Prophylactic nodal radiation should be considered. ADT is required unless medically contraindicated.

ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΣΕ ΑΣΘΕΝΕΙΣ ΜΕΓΑΛΟΥ ΚΙΝΔΥΝΟΥ

PRINCIPLES OF RADIATION THERAPY

Table 1: Regimens that have shown acceptable efficacy and toxicity. The optimal regimen for an individual patient warrants evaluation of comorbid conditions, voiding symptoms, and toxicity of therapy. Additional fractionation schemes may be used as long as sound oncologic principles and appropriate estimate of BED are considered.

	NCCN Risk Group (✓ indicates an appropriate regimen option if radiation therapy is given)					
Regimen for Definitive Therapy	**Very-Low[1]**	**Low[1]**	**Favorable or good prognostic[2] intermediate**	**Unfavorable, or poor prognostic[2], intermediate**	**High and Very-High[3]**	**Node Positive**
Beam Therapies						
72 Gy to 80 Gy at 2 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
75.6 Gy to 81.0 Gy at 1.8 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
70.2 Gy at 2.7 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
70 Gy at 2.5 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
60 Gy at 3 Gy per fraction	✓	✓	✓	✓ with 4-6 mo ADT	✓ with 2-3 y ADT	✓ with 2-3 y ADT
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37 Gy at 7.4 Gy per fraction	✓	✓	✓			
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Brachytherapy Monotherapy						
Iodine 125 implant at 145 Gy	✓	✓	✓			
Palladium 103 implant at 125 Gy	✓	✓	✓			
Cesium implant at 115 Gy	✓	✓	✓			
HDR 27 Gy at 13.5 Gy in 2 implants	✓	✓	✓			
HDR 38 Gy at 9.5 Gy BID in 2 implants	✓	✓	✓			
Combined EBRT and Brachytherapy (EBRT 45–50.4 Gy at 1.8–2.0 Gy/fx, unless otherwise noted)						
Iodine 125 implant at 110-115 Gy				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
Palladium 103 implant at 90-100 Gy				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
Cesium implant at 85 Gy				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
HDR 21.5 Gy at 10.75 Gy x 2				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT
EBRT 37.5 Gy at 2.5 Gy + 12-15 Gy single HDR				✓ ± 4 mo ADT	✓ with 1-3 y ADT	✓ with 1-3 y ADT

[1]Active surveillance should be strongly considered
[2]"Good" or "Poor" prognostic is not strictly defined. Predictive nomograms and/or molecular testing can be used to prognosticate PSA persistence/recurrence, prostate cancer specific mortality and metastasis free survival after definitive external beam radiation therapy. Although the prognostic value has been established, the predictive value of these tests remains unknown.
[3]Prophylactic nodal radiation may be considered if estimate of nodal metastasis is high.

Continued

Note: All recommendations are category 2A unless otherwise indicated.
Clinical Trials: NCCN believes that the best management of any patient with cancer is in a clinical trial. Participation in clinical trials is especially encouraged.

High-Risk Prostate Cancer: Role of Radical Prostatectomy and Radiation Therapy

Robert Qi Judd Moul

Division of Urology, Department of Surgery and Duke Cancer Institute, Duke University Medical Center, Durham, NC, USA

Table 2. Selected studies comparing prostate-specific mortality (PCSM) of combined radiation therapy (RT) and androgen deprivation therapy (ADT) with that of RT only

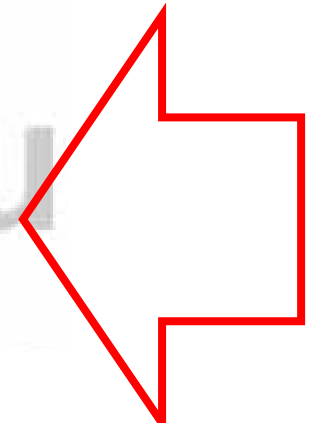
Study (year, type) [ref.]	High-risk definition	High-risk patients, total, n	High-risk patients per treatment, n	Length of ADT, months	Median follow-up, years	PCSM, %	Significance
Bolla et al. (2002, RCT) [45]	cT3/T4 N0/N1 M0 cT1/T2 and World Health Organization grade 3	415	RT + ADT = 207 RT = 208	36	5.5	RT + ADT = 6 RT = 21	p = 0.0001
Pilepich et al. (2005, RCT) [46]	cT3 positive regional lymph node	977	RT + ADT = 488 RT = 489	indefinite[a]	7.6 (all) 11 (survivors)	RT + ADT = 16 RT = 22	p = 0.0052
Granfors et al. (2006, RCT) [47]	locally advanced disease stratification for T and N stages	91	RT + ADT = 45 RT = 46	indefinite[b]	9.7 (all) 16.5 (survivors)	RT + ADT = 36 RT = 57	p = 0.03 (overall) p = 0.005 (N1 only)
Horwitz et al. (2008, RCT) [41]	cT2c–T4, N0, with PSA < 150 ng/ml	1,554	RT + short-term ADT (sADT) RT + long-term ADT (lADT)	4 28	11.31 11.27	RT + sADT = 16.1 RT + lADT = 11.3	p = 0.0042

[a]Continuous drug application.
[b]Orchiectomy.
RCT = Randomized controlled trial; PSA= prostate-specific antigen.

High Risk

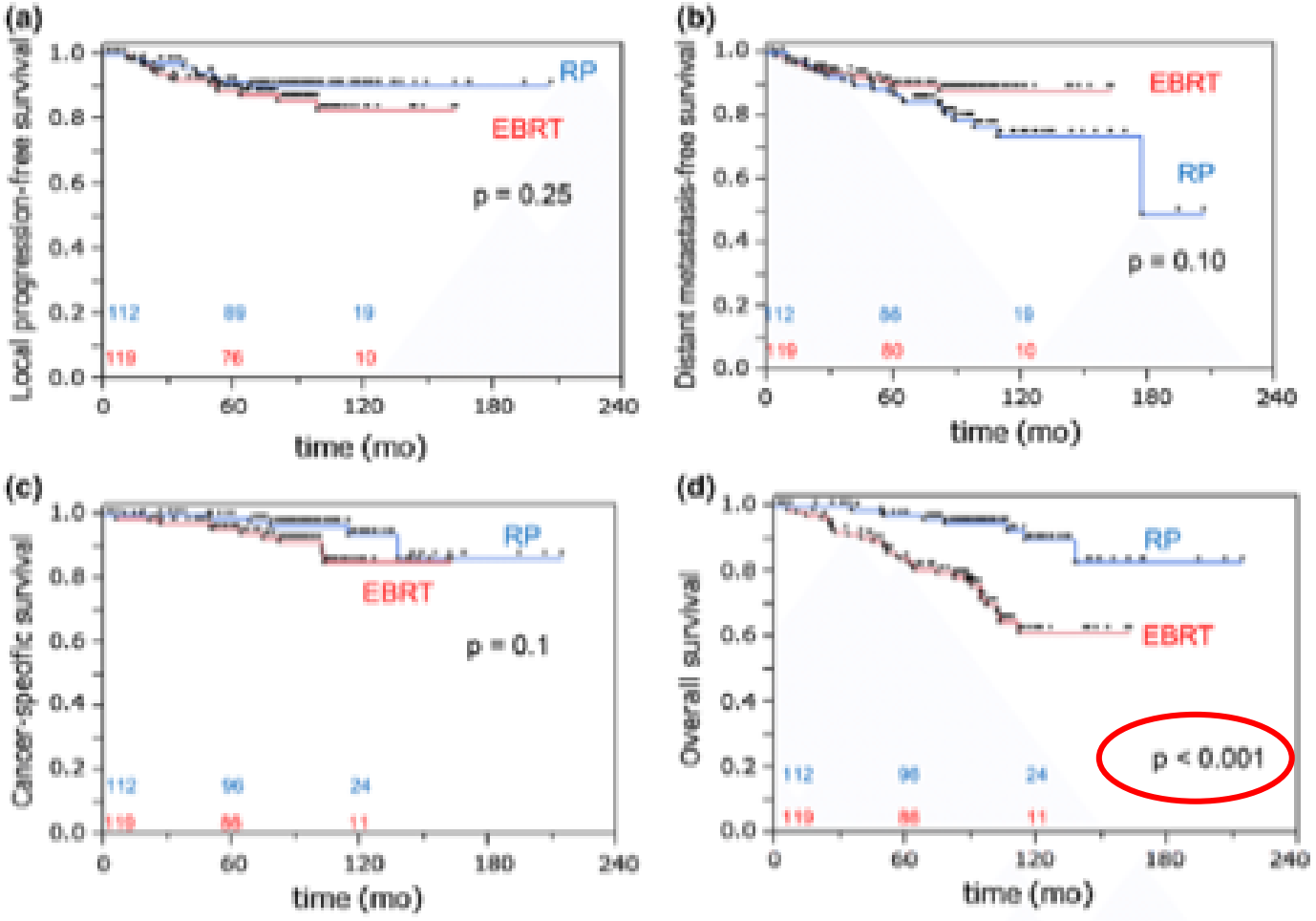
Men with prostate cancer that is clinical stage T3a, Gleason score 8 to 10/Gleason grade group 4-5, or PSA level greater than 20 ng/mL are categorized by the panel as high risk. Patients with multiple adverse factors may be shifted to the very high-risk category. The preferred treatment is EBRT in conjunction with 2 to 3 years of neoadjuvant/concurrent/adjuvant ADT (category 1); ADT alone is insufficient. In particular, patients with low-volume, high-grade tumor warrant aggressive local radiation combined with typically 2 or 3 years of neoadjuvant/concurrent/adjuvant ADT. Fit men in the high-risk group can consider 6 cycles of docetaxel without prednisone after EBRT is completed and while continuing ADT. The combination of EBRT and brachytherapy, with or without neoadjuvant/concurrent/adjuvant ADT, is another primary treatment option. However, the optimal duration of ADT in this setting remains unclear.

Radical prostatectomy with PLND remains an option because a subset of younger and healthier men in the high-risk group may benefit from operation.



Retrospective Comparison of External Beam Radiotherapy and Radical Prostatectomy in High-Risk, Clinically Localized Prostate

Arcangeli G, Strigari L, Arcangeli S, et al: Cancer. Int J Radiat Oncol 2009 Nov; 75(4): 975-982.



Kaplan-Meier local progression-free (a), distant metastasis free (b), cancer-specific (c) and overall (d) survival curves of patients with clinical T3 prostate cancer treated by radical prostatectomy (RP)

www.impactjournals.com/oncotarget/ Oncotarget, 2017, Vol. 8, (No. 45), pp: 79854-79863

Clinical Research Paper

Comparison on efficacy of radical prostatectomy versus external beam radiotherapy for the treatment of localized prostate cancer

Linyan Chen[1,*], Qingfang Li[1], Yexiao Wang[1], Yiwen Zhang[1,*] and Xuelei Ma[1]

[1] State Key Laboratory of Biotherapy and Cancer Center, West China Hospital, Sichuan University and Collaborative Innovation Center, Chengdu, PR China

Table 1: The main characteristics of included studies

Author& Publication Year	Country (study interval)	Radiation Modality	Radiation dose (Gy)	Study Size (RP VS BRRT)	Age (RP VS EBRT)	Adjuvant Therapies (RP VS EBRT)	Salvage Therapies (RP VS EBRT)	Follow-up (RP VS EBRT)	Outcome
Aizer 2009	USA (1997–2005)	3DCRT+IMRT (32%), IMRT (68%)	75.6	204 VS 352	57.4 VS 68.4	ADT: 3% VS 80%	-	46 mo VS 60 mo	BDFS
Hamdy 2016	UK (1999–2009)	3DCRT	74	553 VS 545	62	-	RP: 0% VS 0.5% RT: 3 % VS 0% ADT: 1% VS 3%	10 yr	OS, CSS
Kibel 2012	USA (1995–2005)	3DCRT, IMRT	74	6485 VS 2264	61 VS 70	ADT: NA VS 34%	-	67 mo	OS, CSS
Kim 2014	Korea (2001–2011)	3DCRT (79%), IMRT (21%)	76	549 VS 189	66 VS 71	ADT: 27% VS 69%	-	48.8 mo VS 48.7 mo	OS, CSS, BDFS
Merino 2013	Chile (1999–2010)	IMRT	76	993 VS 207	63 VS 70	ADT: 0% VS 42%	RT: 5% VS NA	91.7 mo VS 76 mo	OS, CSS, BDFS
Nguyen 2008	USA (1965–2002)	3DCRT	70.2	659 VS 288	NA	ADT: 0% VS 0%	-	5.6 yr	CSS
Shinohara 2013	Japan (2003–2006)	IMRT	75 (65%); 70 (35%)	48 VS 23	67 VS 69	ADT: 0% VS 0%	-	73 mo VS 65 mo	BDFS
Taguchi 2015	Japan (2005–2012)	3DCRT (6%), IMRT (94%)	76	569 VS 322	66 VS 70	ADT: 24% VS 69.3%	RP: 0% VS 0% RT: 5% VS 0% ADT: 12% VS 7%	53 mo VS 45 mo	OS, CSS, BDFS
Takizawa 2009	Japan (1998–2004)	3DCRT	70–71	86 VS 76	64.9 VS 71.1	ADT: 83% VS 92%	-	5 yr	BDFS
Yamamoto 2013	Japan (1994–2005)	3DCRT	70	112 VS 119	67 VS 72	ADT: 2% VS 21%	RP: 0% VS 0% RT: 5% VS 0% ADT: 31% VS 27%	93 mo VS 85 mo	OS, CSS
Yamamoto 2016	Japan (2007–2013)	3DCRT (35%), IMRT (64%)	70–78	71 VS 43	70 VS 73	ADT: 0% VS 100%	-	59.1 mo VS 54.5 mo	BDFS
Zelefsky2 010	USA (1993–2002)	IMRT	81 (79%); 86.4 (21%)	1318 VS 1062	60 VS 69	ADT: 1% VS 56%	RP: 0% VS 0.3% RT: 4% VS 0% ADT: 4% VS 8%	5.1 yr VS 5.0 yr	CSS

Abbreviations: RP: radical prostatectomy; EBRT: external beam radiotherapy; 3DCRT: three-dimensional conformal radiotherapy; IMRT: intensity-modulated radiation therapy; ADT: androgen deprivation therapy; OS: overall survival; CSS: cancer-specific survival; BDFS: biochemical disease-free survival; NA: not available.

www.impactjournals.com/oncotarget/ Oncotarget, 2017, Vol. 8, (No. 45), pp: 79854-79863

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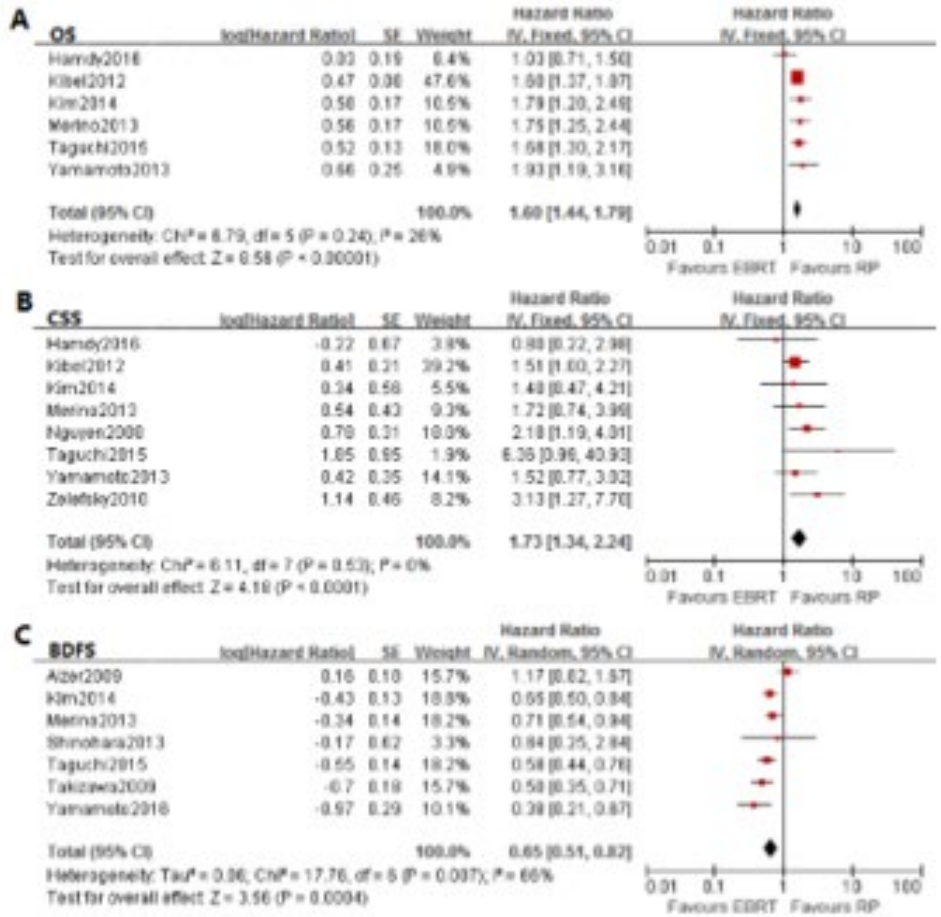

Figure 2: Forest plots of hazard ratio (HR) for overall survival (OS) (**A**), cancer-specific survival (CSS) (**B**), and biochemical disease-free survival (BDFS) (**C**).

www.impactjournals.com/oncotarget/ Oncotarget, 2017, Vol. 8, (No. 45), pp: 79854-79863

Clinical Research Paper

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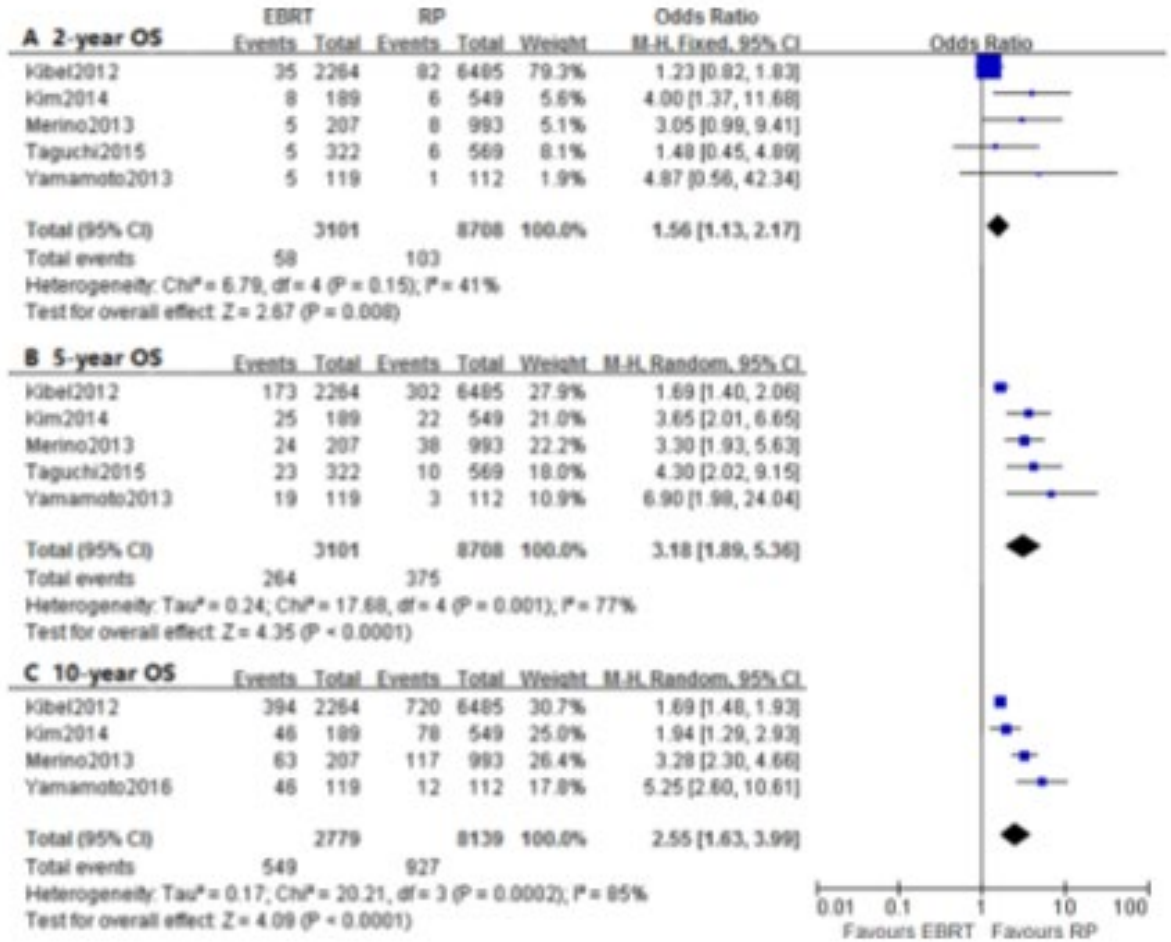
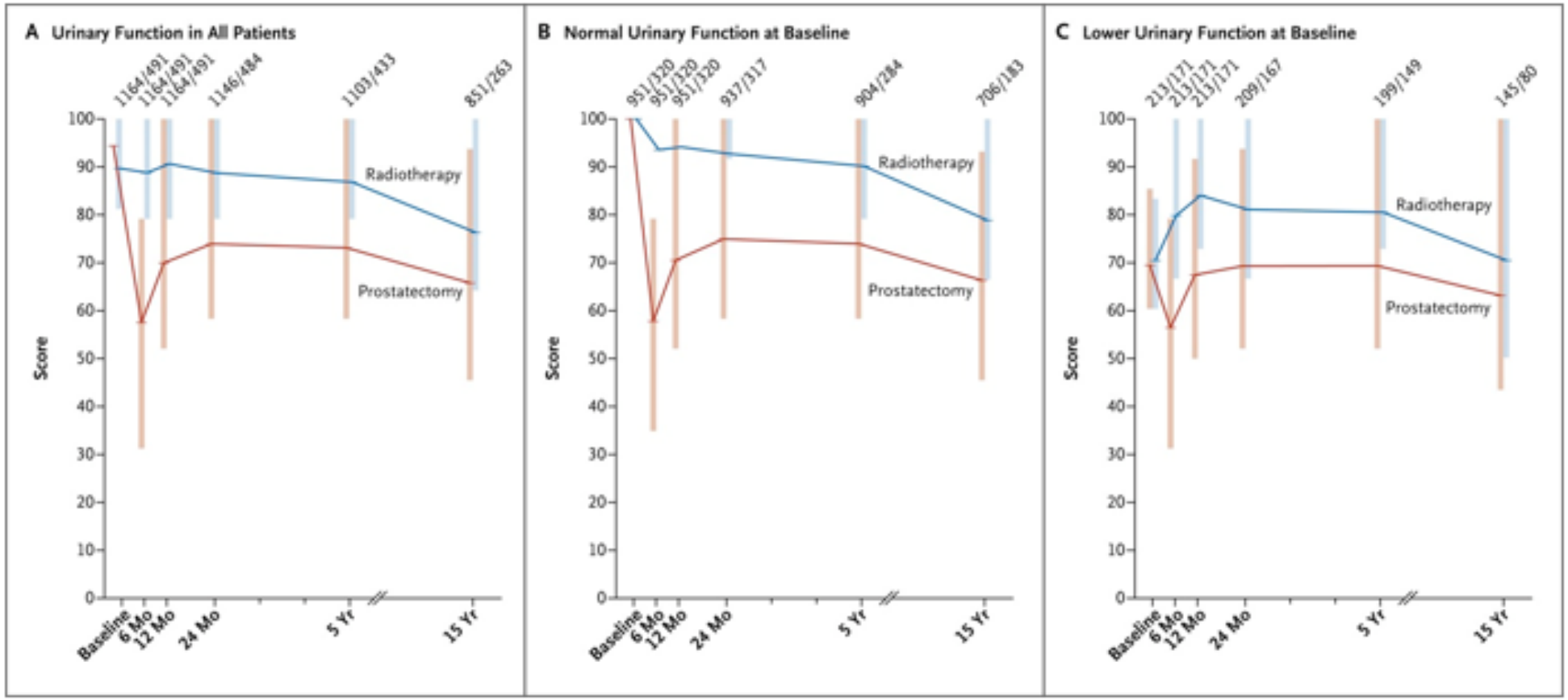


Figure 3: Forest plots of odd ratio (OR) for 2-year (**A**), 5-year (**B**) and 10-year (**C**) overall survival (OS).

N Engl J Med. 2013 Jan 31;368(5):436-45. doi: 10.1056/NEJMoa1209978.

Long-term functional outcomes after treatment for localized prostate cancer.

Resnick MJ[1], Koyama T, Fan KH, Albertsen PC, Goodman M, Hamilton AS, Hoffman RM, Potosky AL, Stanford JL, Stroup AM, Van Horn RL, Penson DF.



scores for urinary function in the overall cohort (Panel A), in a subgroup of men with normal urinary function at baseline (summary score, 100) (Panel B), and in a subgroup of men with lower urinary function at baseline (summary score, <100) (Panel C)

N Engl J Med. 2013 Jan 31;368(5):436-45. doi: 10.1056/NEJMoa1209978.

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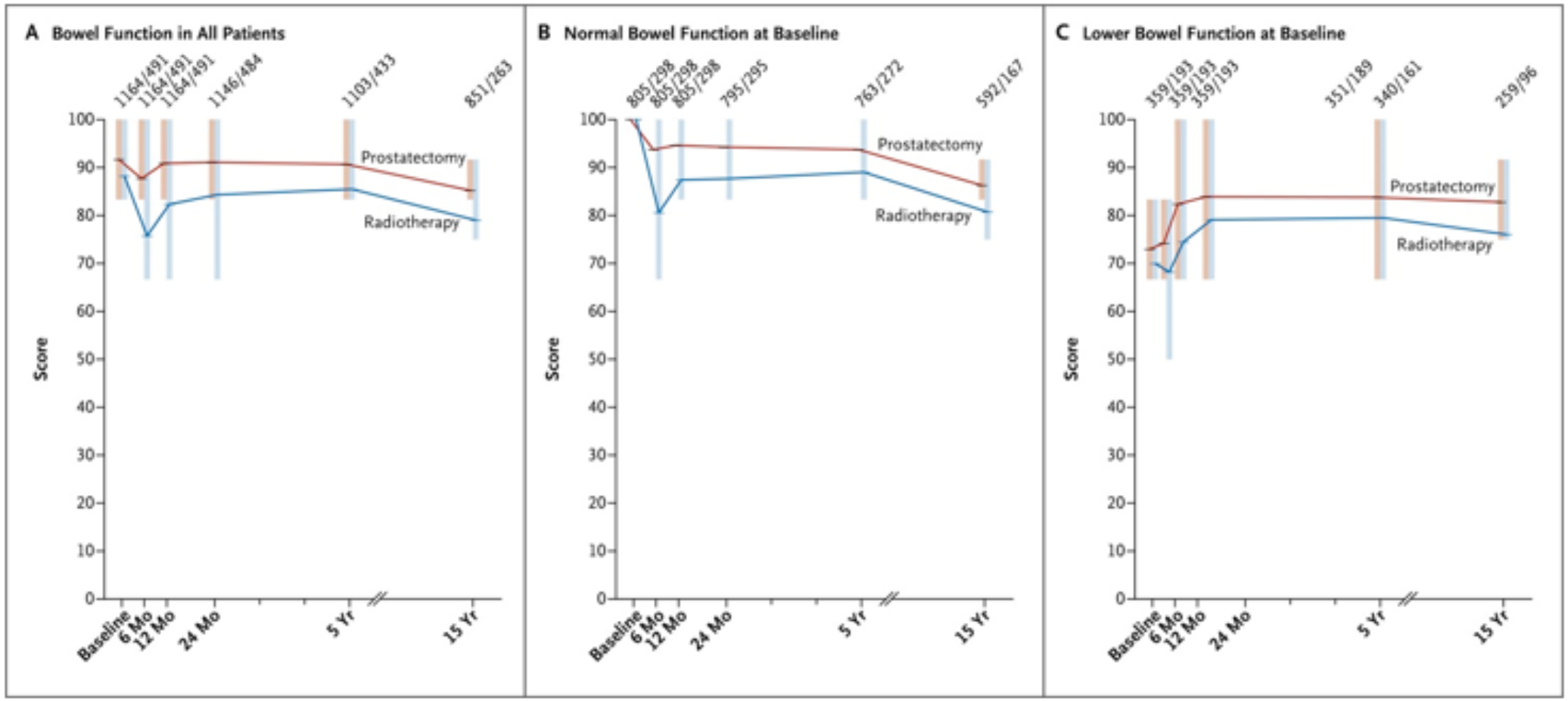

bowel function in the overall cohort (Panel A), in a subgroup of men with normal bowel function at baseline (summary score, 100) (Panel B), and in a subgroup of men with lower bowel function at baseline (summary score, <100) (Panel C).

N Engl J Med. 2013 Jan 31;368(5):436-45. doi: 10.1056/NEJMoa1209978.

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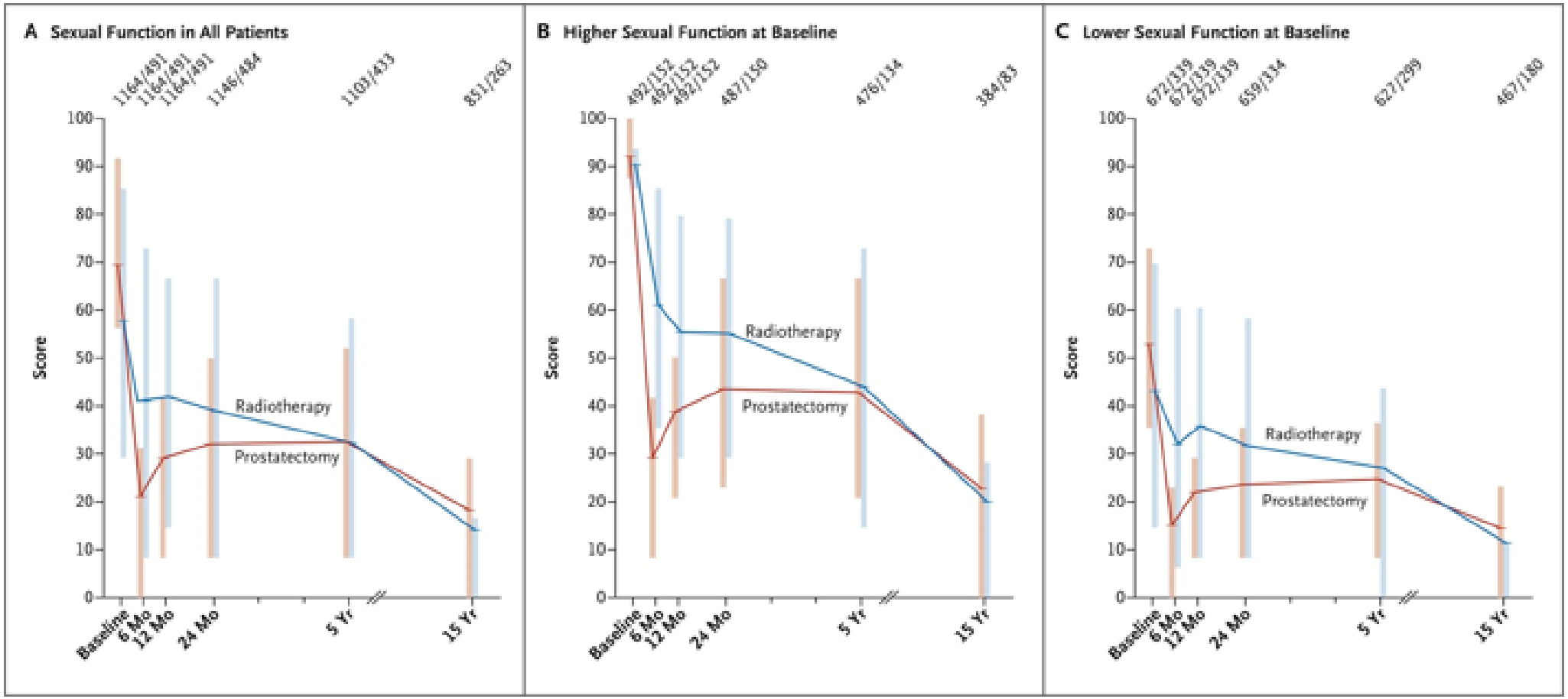


sexual function in the overall cohort (Panel A), in a subgroup of men with higher sexual function at baseline (summary score, greater than or equal to 80) (Panel B), and in a subgroup of men with lower sexual function at baseline (summary score, <80) (Panel C).

Adjuvant radiotherapy (ART) is defined as the administration of RT to post-prostatectomy

patients at a higher risk of recurrence

because of adverse pathological features prior to evidence of disease recurrence (i.e., with an undetectable PSA). There is no evidence that addresses the timing of the first PSA test post-prostatectomy to determine a patient's disease status; in the Panel's clinical experience the first PSA generally should be obtained two to three months post-RP.

ART is usually administered within four to six months following RP.
Generally, RT is initiated after the return of acceptable urinary control.

As sexual function can require one to two years before a full return of function is observed, return of erections is not a requirement before initiation of adjuvant radiation.

Physicians should offer adjuvant radiotherapy to patients with adverse pathologic findings at prostatectomy including

seminal vesicle invasion,
positive surgical margins, or
extraprostatic extension

because of demonstrated reductions

in biochemical recurrence,
local recurrence and
clinical progression.
(Standard; Evidence Strength: Grade A)

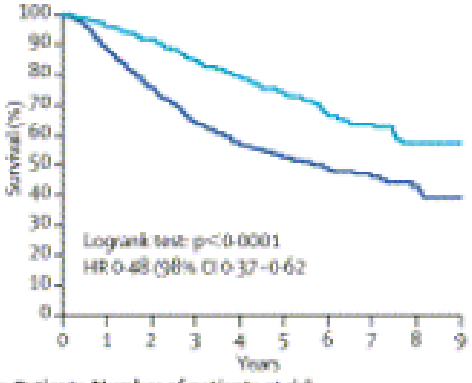
development of a PSA recurrence after surgery is associated with a higher risk of development of

metastatic prostate cancer or
death from the disease.

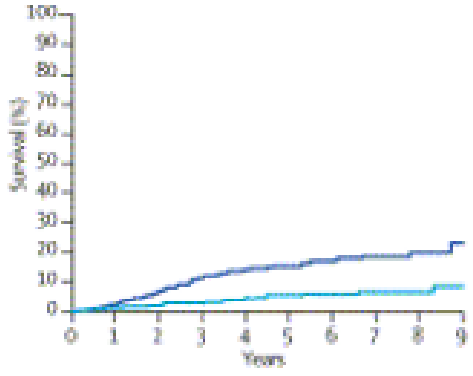
Congruent with this clinical principle, physicians should regularly monitor PSA after radical prostatectomy to enable
early administration of salvage therapies
if appropriate. (Clinical Principle)

effectiveness of radiotherapy for PSA recurrence is greatest when
given at lower levels of PSA. (Clinical Principle)

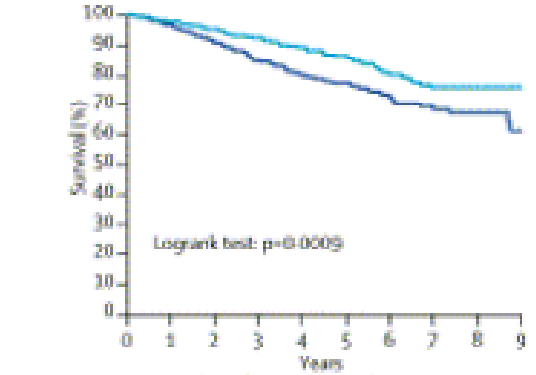
Postoperative radiotherapy after radical prostatectomy: a randomised controlled trial (EORTC trial 22911) Prof Michel Bolla, MD



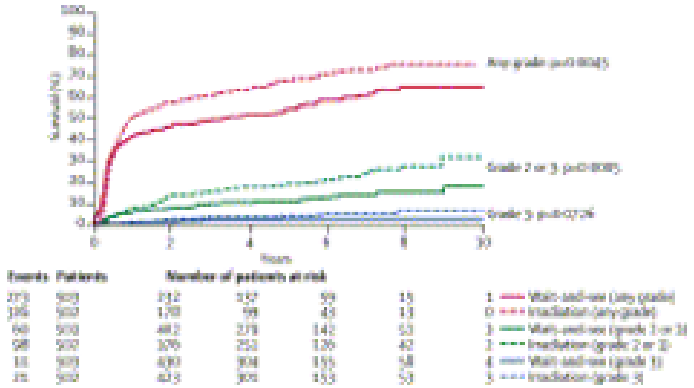
biochemical progression-free survival was significantly improved in the irradiated group (74·0%, *vs* 52·6%, p<0·0001).



severe toxic toxicity (grade 3 or higher) were rare



locoregional failure was significantly lower in the irradiated group (p<0·0001)



Adjuvant radiotherapy for pathologically advanced prostate cancer: a randomized clinical trial. Thompson IM, Tangen CM, Paradelo J, et al. JAMA 2006;296:2329-35.

data from the SWOG 8794/PR-2 trial indicated only short-term toxicity with early adjuvant radiotherapy, which was well tolerated.

Grade 1 or 2 gastrointestinal toxicity at 6 weeks occurred in **59%** of patients in the radiotherapy group versus **7%** in the observation group **(p < 0.001),** but at 5 years, there was no difference **11% v. 19%,** (p = 0.16).

Similarly, genitourinary toxicity occurring at 6 weeks was 37% versus 18% **(p = 0.004)** and at 5 years, there was no difference **23% v. 18%,** (p = 0.55).

ΣΥΜΠΛΗΡΩΜΑΤΙΚΗ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑ ΜΕΤΑ ΑΠΌ ΠΡΟΣΤΑΤΕΚΤΟΜΗ

	bRFS	**LRR**	**HTFS**	**ClinR**	**MetR**	**OS**
SWOG 8794	SS	8-22 p<0,01	84-66 SS	P=0,054	71-61 SS	74-66 SS
EORTC 22911	SS	8,4-17,3 SS	21,8-47,5 SS	?	NS	NS
ARO 96-02	SS					
META ANALYSIS	HR:0,48 p<0,00001					

EEM

Salvage radiotherapy (SRT) is defined as the administration of RT to the prostatic bed and possibly to the surrounding tissues, including lymph nodes,

in the patient with a PSA recurrence

after surgery but no evidence of distant metastatic disease. Biochemical (PSA) recurrence after surgery is defined as a detectable PSA level ≥ 0.2 ng/mL with a second confirmatory level ≥ 0.2 ng/mL

EUROPEAN UROLOGY 65 (2014) 1034–1043

available at www.sciencedirect.com
journal homepage: www.europeanurology.com

European Association of Urology

Platinum Priority – Collaborative Review – Prostate Cancer

Editorial by Christopher C. Parker and Matthew R. Sydes on pp. 1044–1045 of this issue

Early Salvage Radiotherapy Following Radical Prostatectomy

David Pfister[a,], Michel Bolla[b], Alberto Briganti[c], Peter Carroll[d], Cesare Cozzarini[e], Steven Joniau[f], Hein van Poppel[f], Mack Roach[g], Andrew Stephenson[h], Thomas Wiegel[i], Michael J. Zelefsky[j]*

Early salvage RT after RP is an effective treatment, with favourable outcomes for patients with pre-RT PSA levels <0.5 ng/ml,
but only retrospective data from heterogeneously designed studies are available to support our notion at this point.

Table 1 – Ongoing prospective trials on salvage radiation therapy (RT), early salvage RT, and adjuvant RT and hormone treatment

Trial	Design	Arms	Pts	Intention	Dosage, Gy	Primary end points	Secondary end points
RADICALS RT	International, multicentre, open-labelled, randomised, controlled	Adjuvant vs Deferred RT (PSA failure)	1150	RT	66 Gy in 33 fractions 52.5 in 20 fractions	Freedom from distant disease PCa mortality	PCa-specific survival Freedom from treatment failure Clinical PFS OS Nonprotocol hormone therapy Treatment toxicity Patient-reported outcomes
RADICALS HD	International, multicentre, open-labelled, randomised, controlled	No hormones, short-term ADT (6 mo) vs long-term ADT (24 mo)	2000	Hormones	66 Gy in 33 fractions	PCa-specific survival	Freedom from distant metastases (any distant metastases or PCa-specific death) Freedom from treatment failure Clinical PFS OS Nonprotocol hormone therapy Treatment toxicity Patient-reported outcomes
GETUG-17	Multicentre, open-labelled, randomised, controlled	Adjuvant RT vs early salvage RT (PSA >0.2 ng/ml)	718	RT and hormones (6 mo)	66 Gy in 33 fractions	PFS (clinical or biochemical)	OS Metastasis-free survival Toxicity QoL Functional results in patients >75 yr of age
RAVES	Multicentre, open-labelled, randomised, controlled	Adjuvant RT vs early salvage RT (PSA >0.2 ng/ml)	470	RT Noninferiority of early salvage RT	64 Gy in 32 fractions	PFS QoL	Toxicity OS PCa-specific survival Time to local failure Time to distant failure Time to ADT
EORTC 22043-30041	Multicentre, open-labelled, randomised, controlled	Adjuvant RT vs early salvage RT (0.1< PSA <0.5 ng/ml) plus ADT	600	RT and hormones	64–74 Gy	bRFS	Toxicity, early/late Clinical PFS OS Distant metastasis-free survival QoL

RADICALS – Radiotherapy and Androgen Deprivation in Combination After Local Surgery; RT – radiation therapy; PSA – prostate-specific antigen; PCa – prostate cancer; PFS – progression-free survival; OS – overall survival; ADT – androgen-deprivation therapy; QoL – quality of life; RAVES – Radiotherapy Adjuvant vs Early Salvage; EORTC – European Organisation for Research and Treatment of Cancer; bRFS – biochemical recurrence-free survival.

Early Salvage Radiotherapy Following Radical Prostatectomy

June 2014 European Urology 65(6):1034–1043

David Pfister, Michel Bolla, Alberto Briganti, Michael J. Zelefsky

Evidence synthesis Patients treated with

- **early salvage RT have a significantly improved biochemical recurrence-free survival (BRFS) rate**

compared with those receiving salvage RT initiated after PSA values are >0.5 ng/ml. Similarly, within the cohort of patients with pre-RT PSA values <0.5 ng/ml, improved BRFS rates were noted among those with

- **lower rather than higher pre-RT PSA levels**. It is possible that

- **higher RT dose levels and the use of adjunctive androgen-deprivation therapy improve biochemical control outcomes**

in the salvage setting. Conclusions Based on a literature review, improved 5-yr BRFS rates are observed for patients who receive early salvage RT compared with patients treated with salvage RT with a pre-RT PSA value >0.5 ng/ml. Whether the routine application of early salvage RT in patients with initially undetectable PSA levels will be associated with demonstrable clinical benefit awaits the results of ongoing prospective trials.

REVIEWS IN UROLOGY®
MEDREVIEWS

Rev Urol. 2002 Spring; 4(2): 87–89.

PMCID: PMC1475975
PMID: 16985660

Radiation Therapy After Radical Prostatectomy: Strike Early, Strike Hard! The Case for Adjuvant Radiation Therapy

Dov Kadmon, MD

Main Points

•Over 90% of patients whose tumors are confined to the prostate have 5-year disease-free survival; patients with positive surgical margins have a 28%–49% incidence of biochemical failure within 5 years of surgery.

•**Most patients whose cancer recurs within 2 years of surgery and whose serum prostate-specific antigen (PSA) rises rapidly develop clinical metastases**, with or without local recurrences.

•**Patients whose serum PSA becomes detectable more than 2 years after surgery and who display a slow PSA rise present predominantly with local recurrences**.

•Radiotherapy given when patients develop palpable local recurrences is rarely, if ever, effective; when "salvage" radiotherapy is given because of a detectable serum PSA

the lower the serum PSA level before radiotherapy, the better the outcome.

A Phase III trial to investigate the timing of radiotherapy for prostate cancer with high-risk features: background and rationale of the Radiotherapy – Adjuvant Versus Early Salvage (RAVES) trial

Maria Pearse, Carol Fraser-Browne , Ian D. Davis , Gillian M. Duchesne , Richard Fisher

early salvage radiotherapy (SRT) is not inferior to 'standard' treatment with adjuvant RT (ART) with respect to biochemical failure in patients with pT3 disease and/or positive surgical margins (SMs) after radical prostatectomy (RP).

International collaborations have developed, including a planned meta-analysis to be undertaken with the UK Medical Research Council/National Cancer Institute of Canada Clinical Trials Group RADICALS (Radiotherapy and Androgen Deprivation In Combination with Local Surgery) trial and an innovative psycho-oncology sub-study to investigate a patient decision aid resource.

On the current evidence available, it
remains unclear if ART is equivalent or superior to observation with early SRT.

Predicting the outcome of salvage radiation therapy for recurrent prostate cancer after radical prostatectomy:

Stephenson AJ, Scardino PT, Kattan MW, Pisansky TM, Slawin KM, Klein EA, Anscher MS, Michalski JM, Sandler HM, Lin DW, Forman JD, Zelefsky MJ, Kestin LL, Roehrborn CG, Catton CN, DeWeese TL, Liauw SL, Valicenti RK, Kuban DA, Pollack A, *Glickman Urological Institute, Cleveland Clinic Foundation, Cleveland, OH*

The 6-year progression-free probability was 32% (95% CI, 28% to 35%) overall.

Significant variables in the model were:

PSA level before SRT (P < .001),
prostatectomy Gleason grade (P < .001),
PSA doubling time (P < .001),
surgical margins (P < .001),
androgen-deprivation therapy before or during SRT (P < .001),
lymph node metastasis (P = .019).

Conclusion

Nearly half of patients with recurrent prostate cancer after radical prostatectomy have a long-term **PSA response to SRT when treatment is administered at the earliest sign of recurrence**.

Αξιολόγηση κινδύνου

Genomic Classifier Identifies Men With Adverse Pathology After Radical Prostatectomy Who Benefit From Adjuvant Radiation Therapy

Robert B. Den, Kasra Yousefi, Edouard J. Trabulsi, Firas Abdollah, Voleak Choeurng, Felix Y. Feng, Adam P. Dicker, Costas D. Lallas, Leonard G. Gomella, Elai Davicioni, and R. Jeffrey Karnes

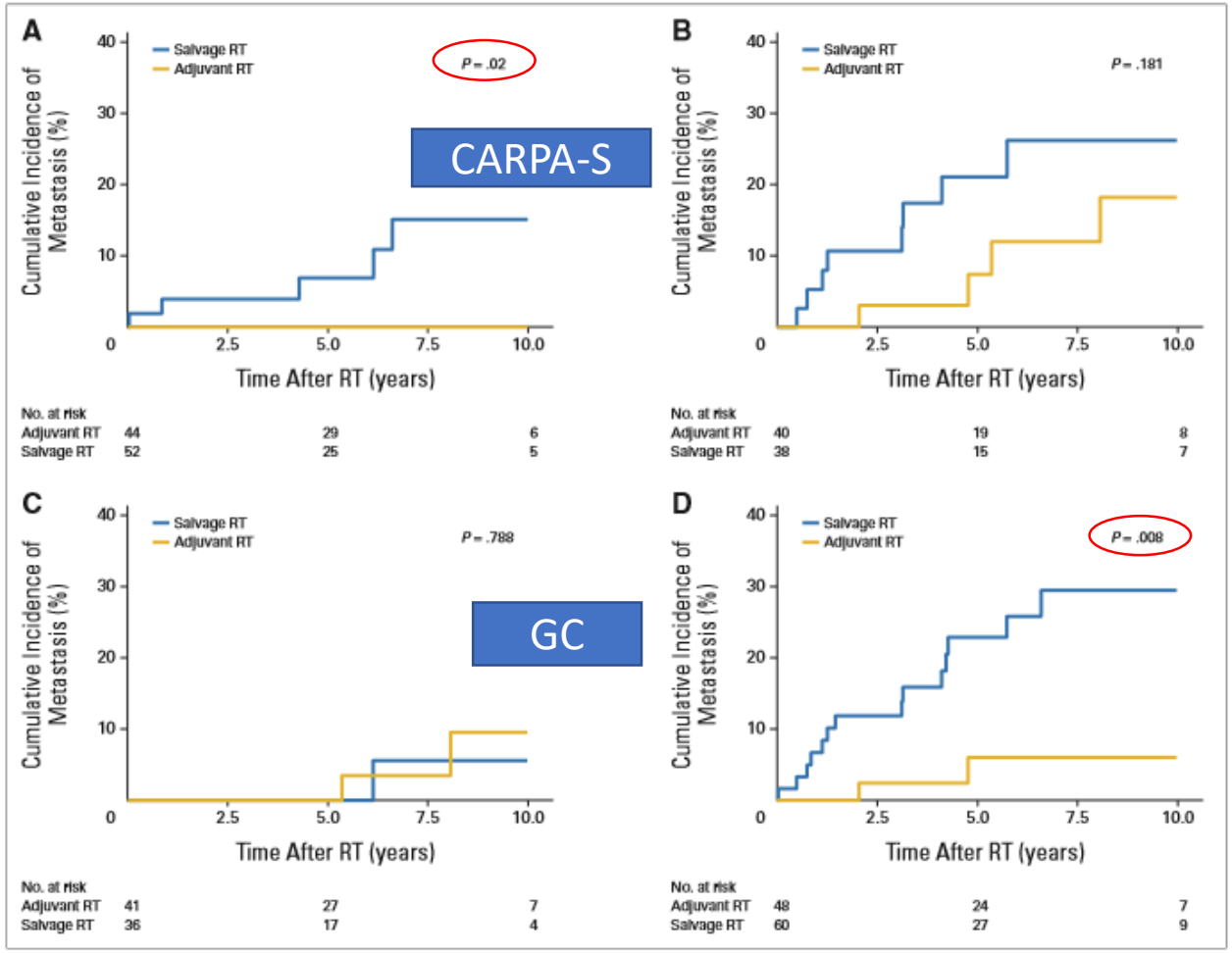


Fig 3. Cumulative incidence curves to evaluate benefit from adjuvant radiotherapy (RT) versus salvage RT stratified by (A and B) Cancer of the Prostate Risk Assessment Postsurgical (CAPRA-S) score and (C and D) genomic classifier (GC).

ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

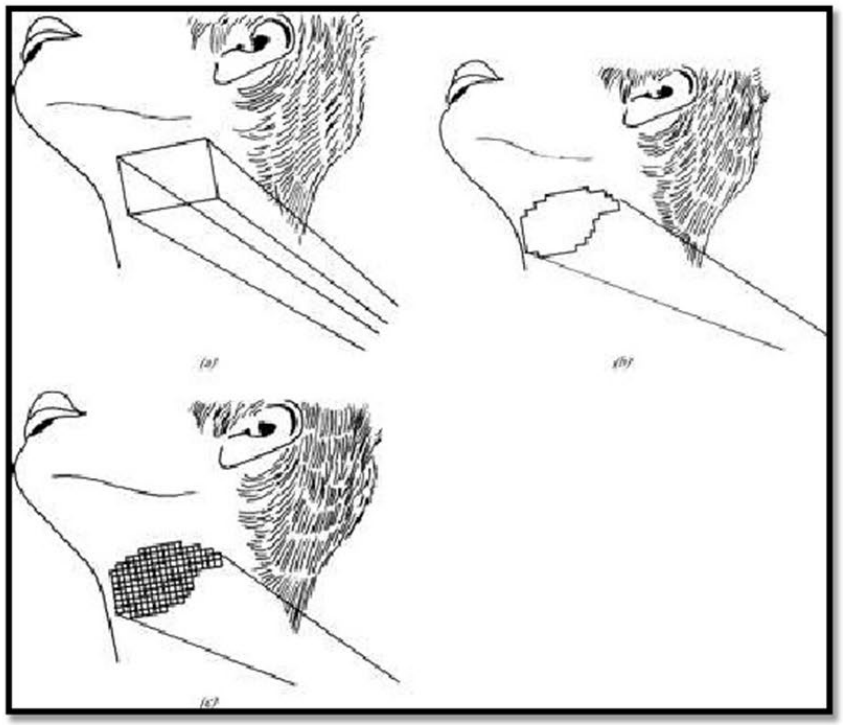
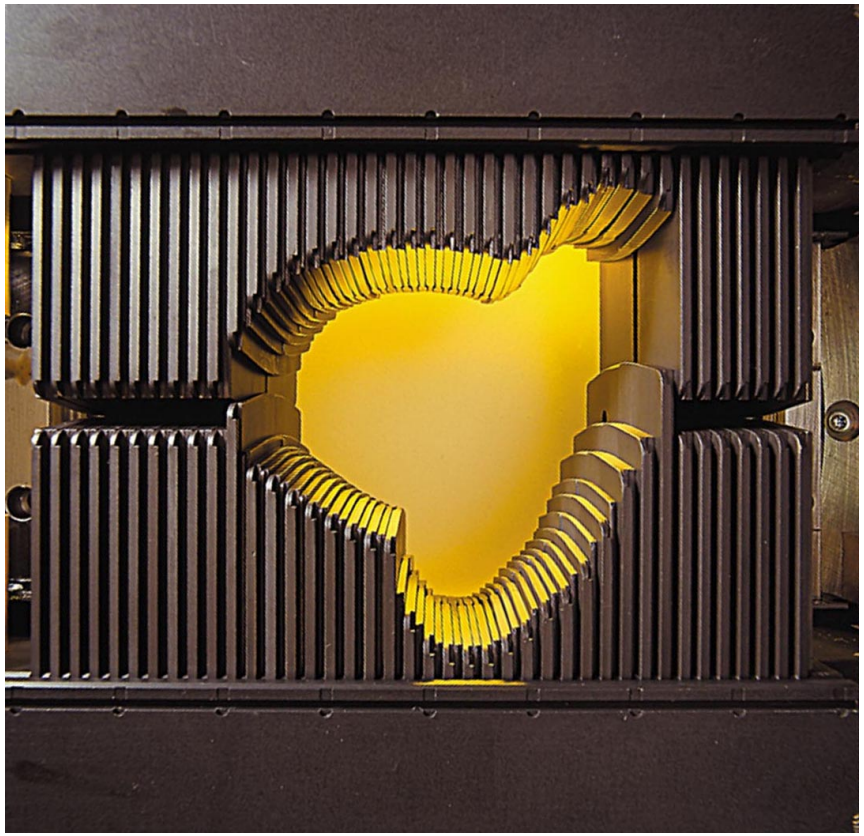
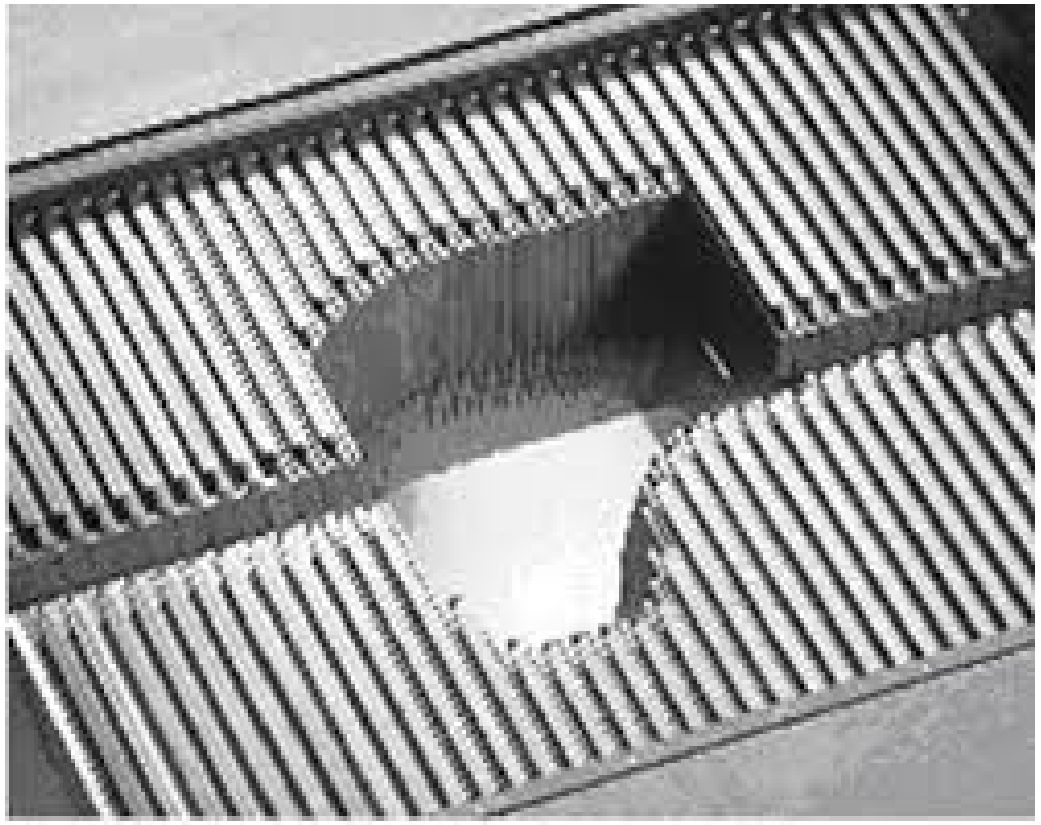


Figure: differences between
(a) conventional radiotherapy,
(b) conformal radiotherapy (CFRT) without intensity-modulation and
(c) CFRT with intensity modulation (IMRT).

ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

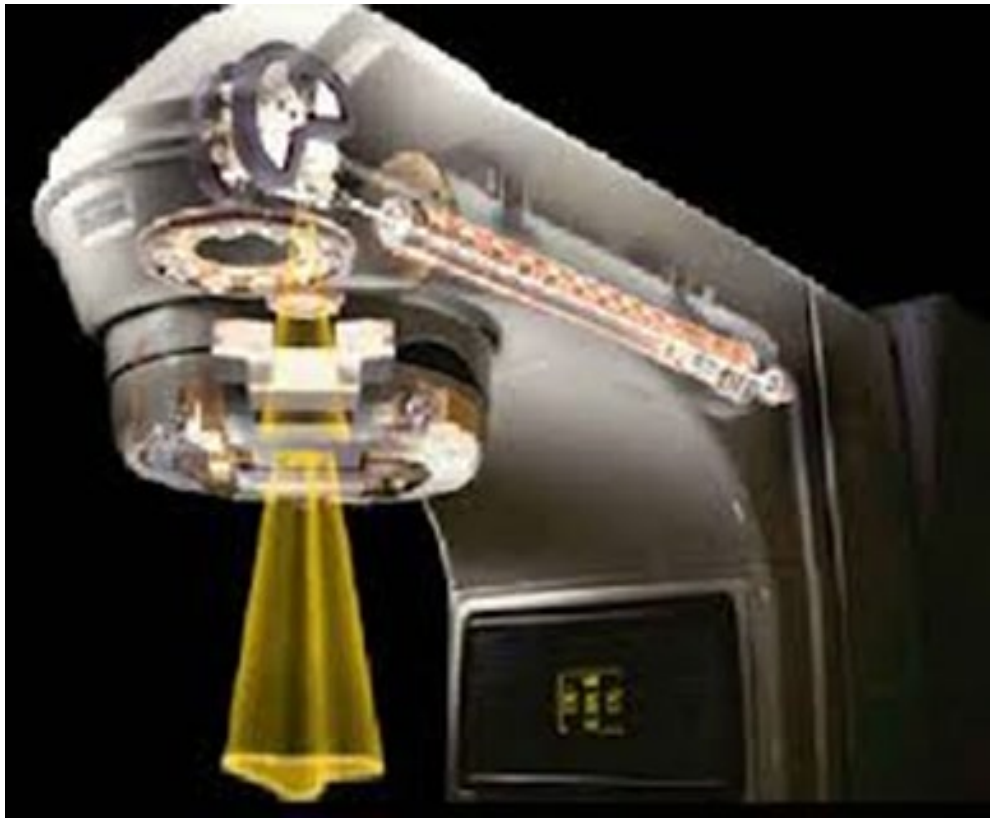
- Ο κατευθυντήρας πολλαπλών φύλλων (mlc)





ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

- Η κεφαλή του Γραμμικού Επιταχυντή



ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

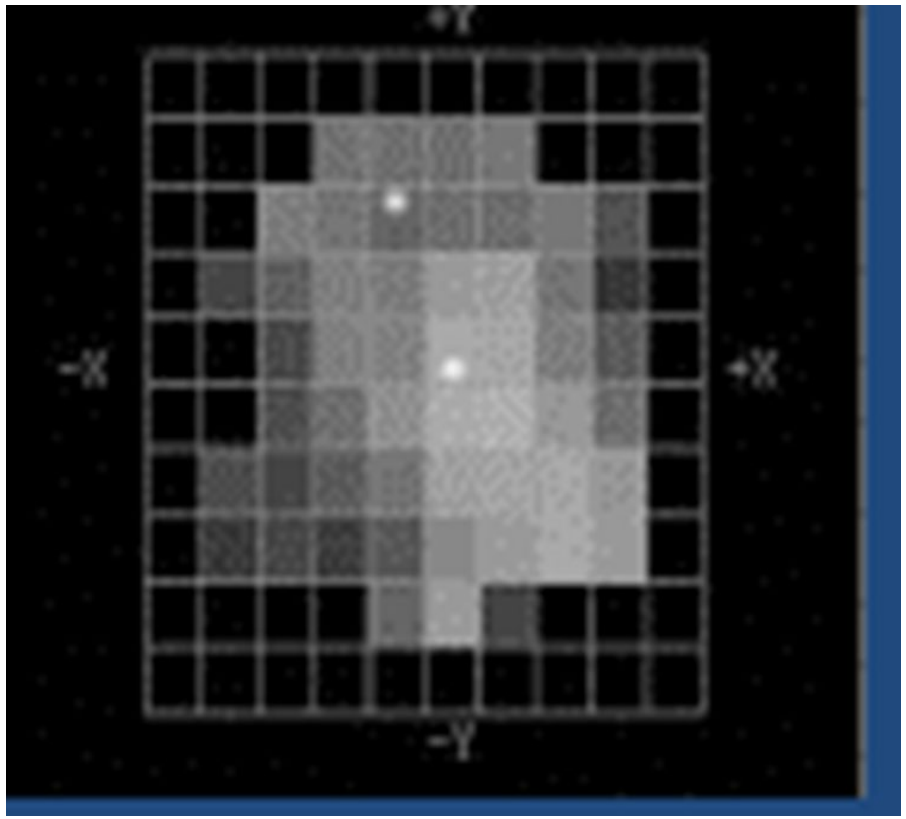
- Το πεδίο χωρίζεται σε υποπεδία
- Κάθε υποπεδίο ακτινοβολείται

διαφορετικό χρόνο

- Κάθε voxel στο χώρο θεραπείας

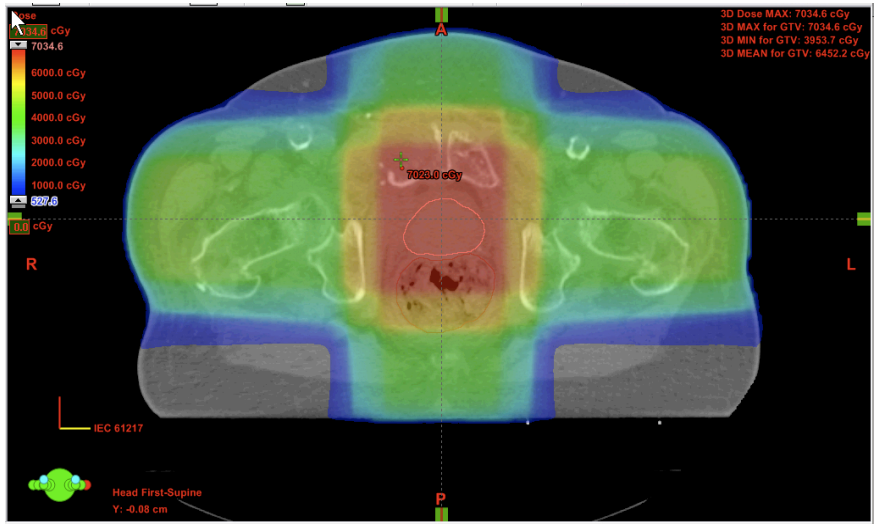
δέχεται το άθροισμα της δόσης των υποπεδίων που το στοχεύουν.

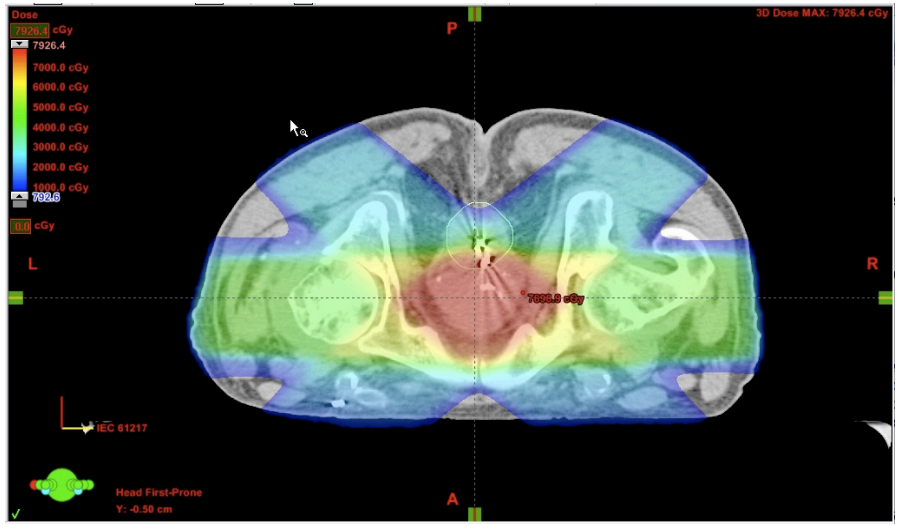
- Το τελικό αποτέλεσμα είναι η «ιδανική» κατανομή δόσης

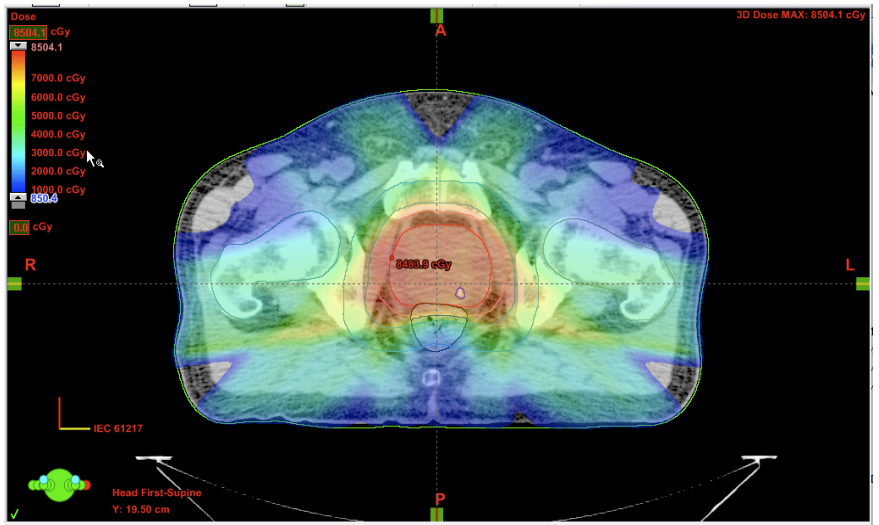


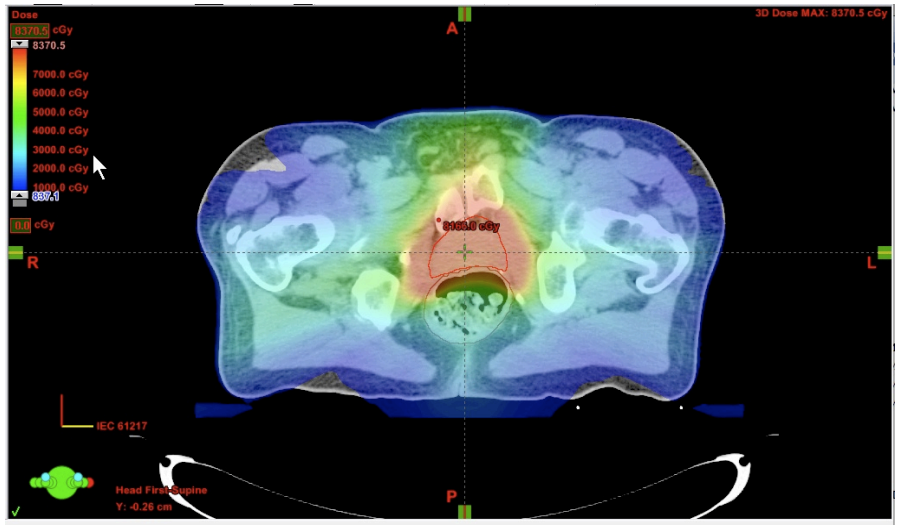
Κατανομή δόσης σε 2D-CRT(3D)-IMRT, IGRT

2D RT

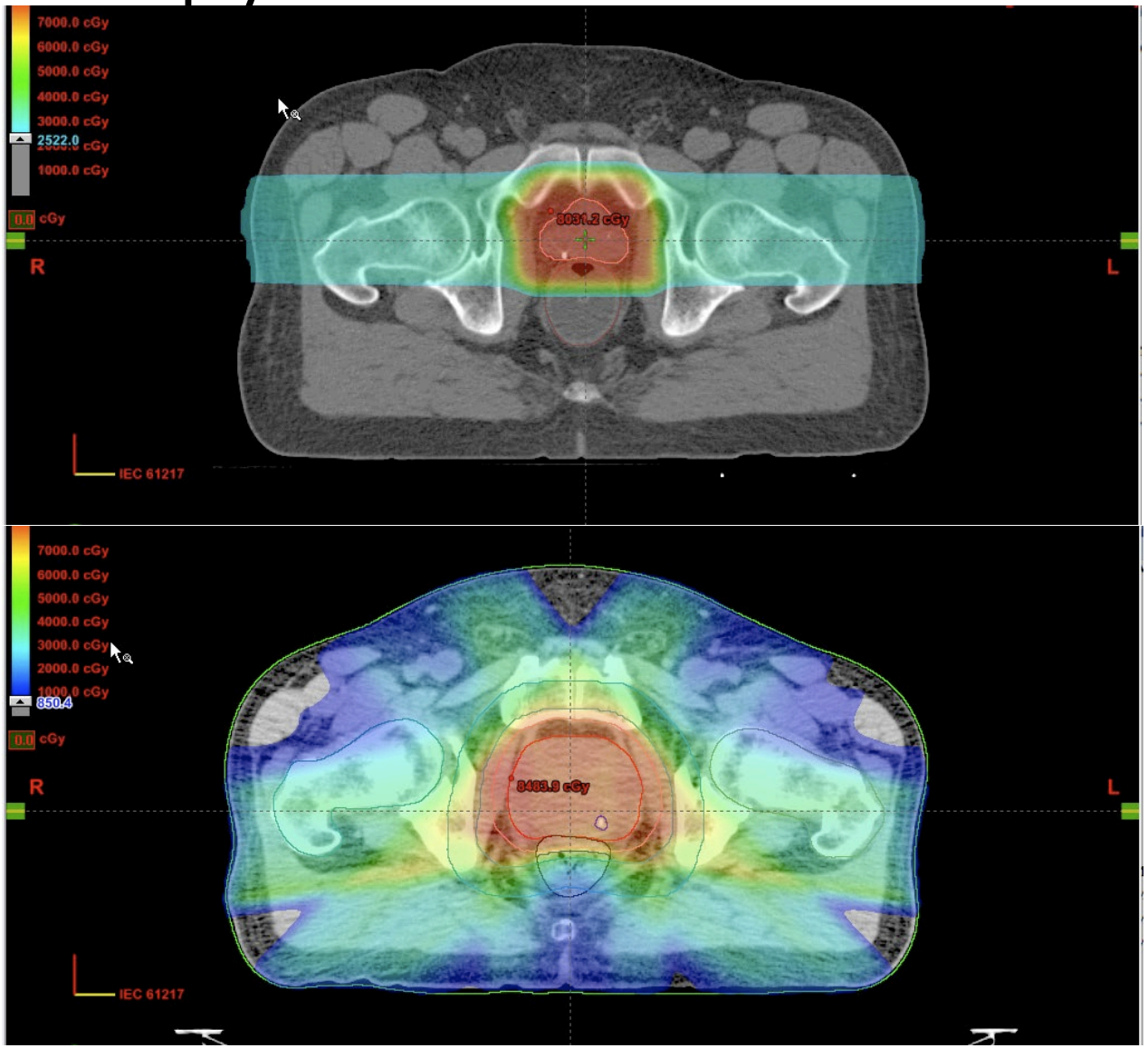




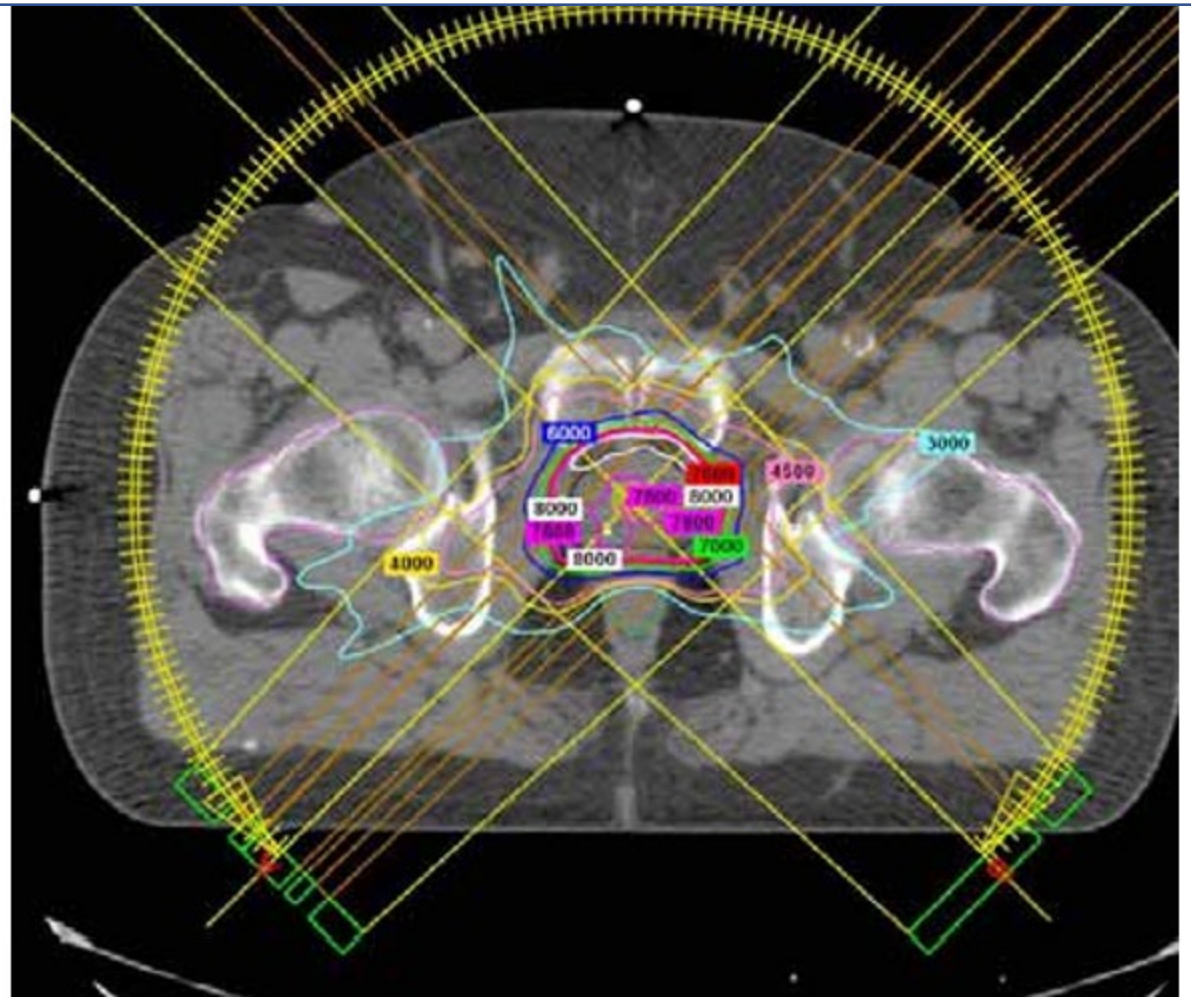




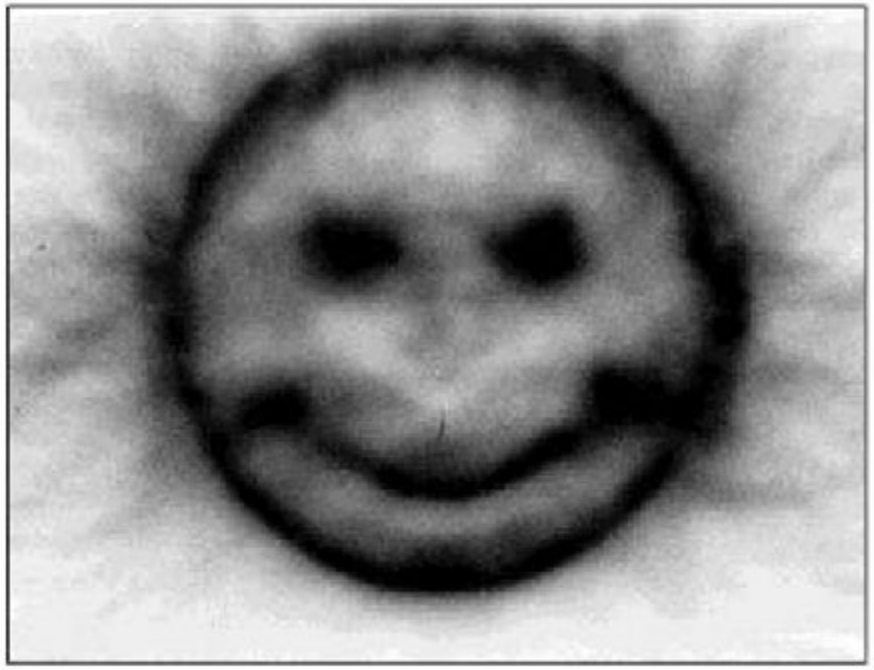
Proton Therapy vs. IMRT



ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

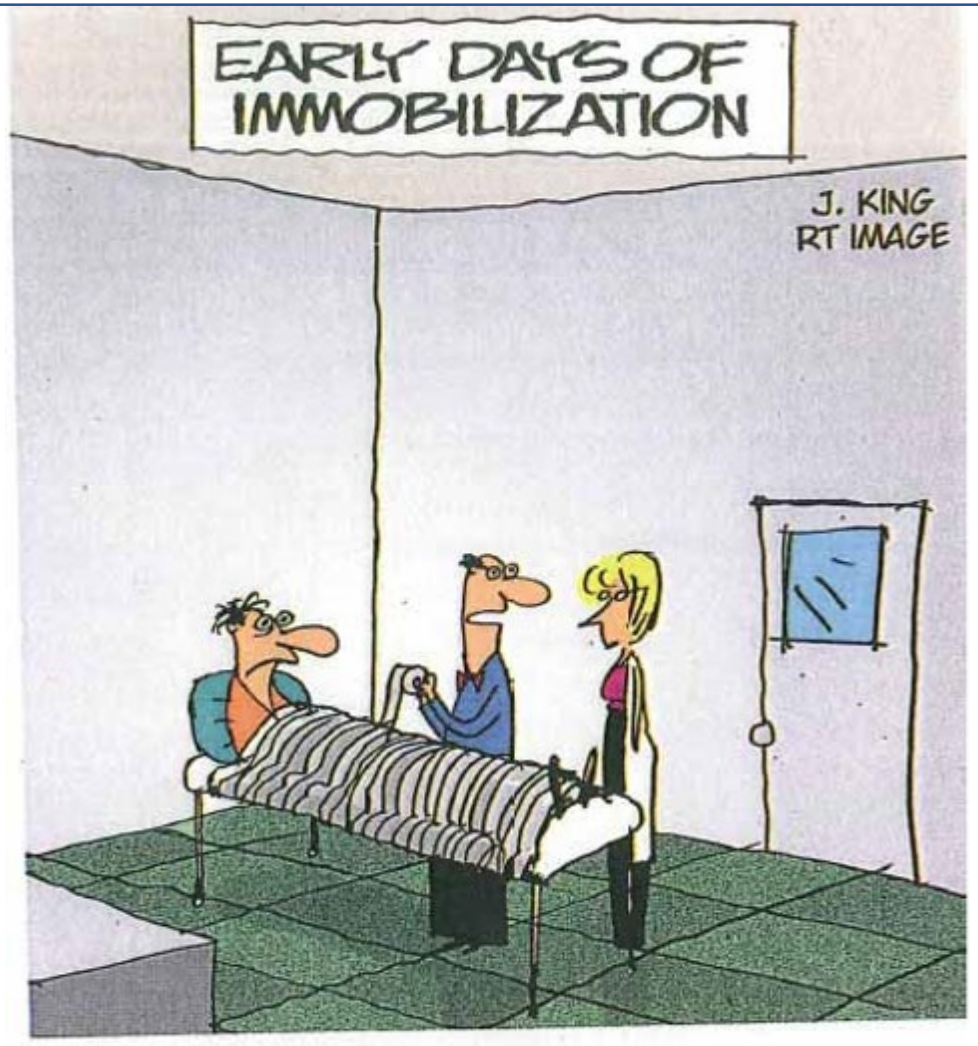


ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ



A smiling face demonstrating how radiation can be deposited in almost any pattern.

ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ



"We're out of duct tape."

ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

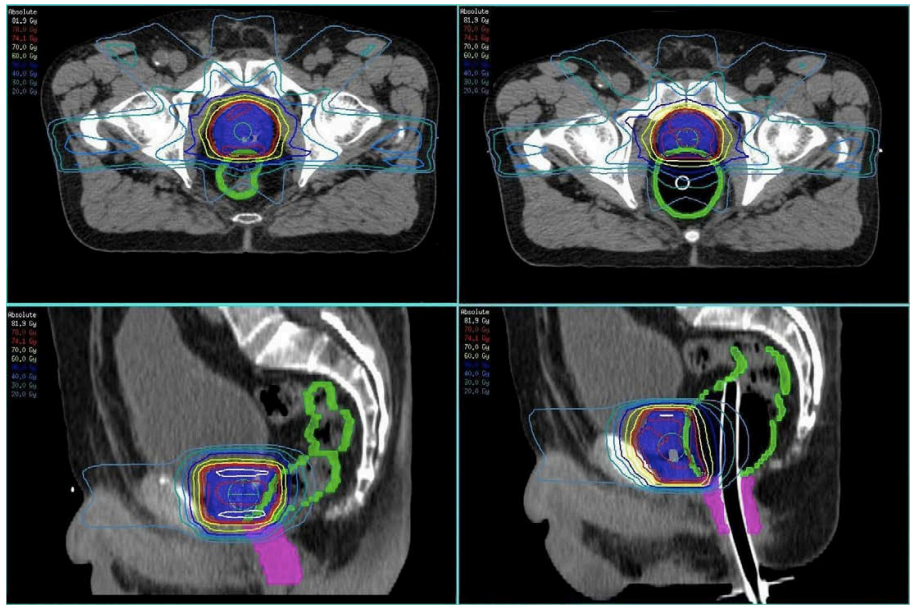
- Εξελιγμένα συστήματα σχεδιασμού της θεραπείας επιτυγχάνουν την «ιδανική» κατανομή, αλλά πως θα φτάσει στον στόχο;
- Οι μεγάλες δόσεις απαιτούν περιορισμένα πεδία για την άσκοπη έκθεση των γύρω φυσιολογικών ιστών
- Η εσωτερική κίνηση των οργάνων επιβάλλει την καθημερινή επιβεβαίωση του στόχου

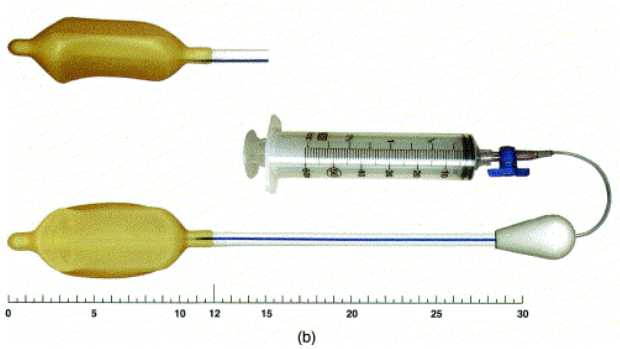
ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

Ενδοορθικό μπαλόνι.

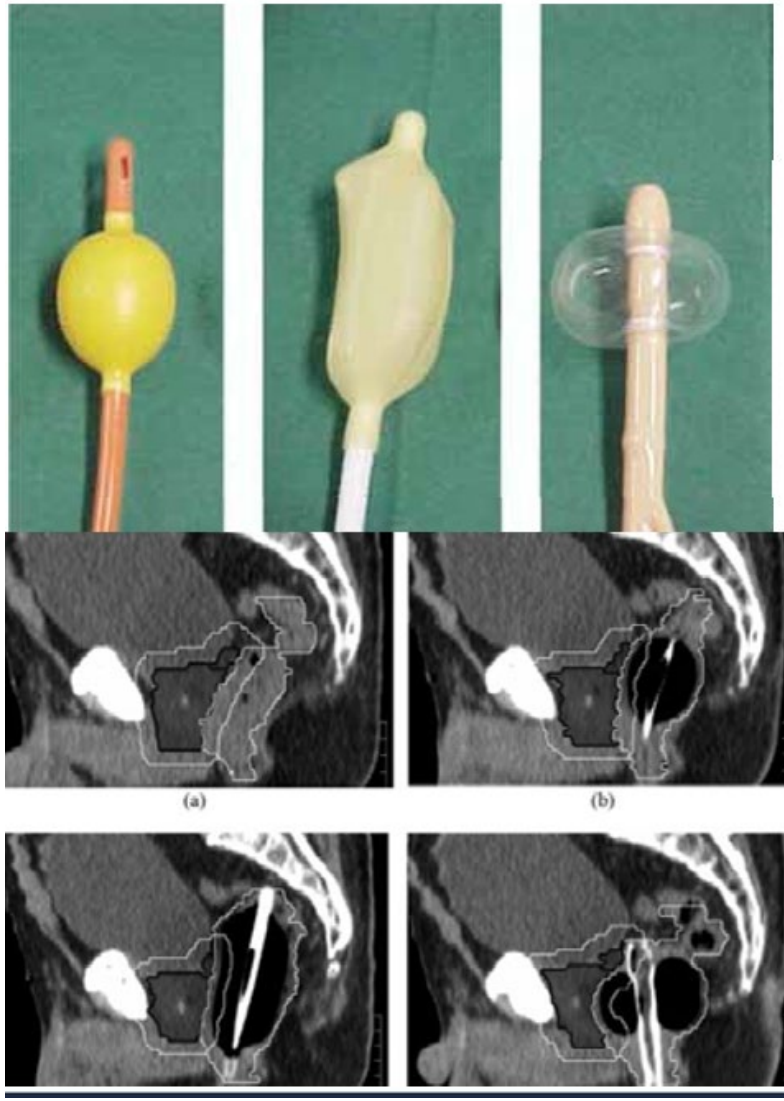
Τοποθετείται καθημερινά πριν από τη θεραπεία και διατείνεται με αέρα, ώστε να καθηλώσει τον προστάτη πισω από την ηβική σύμφυση

Teh, Red Journal 2001



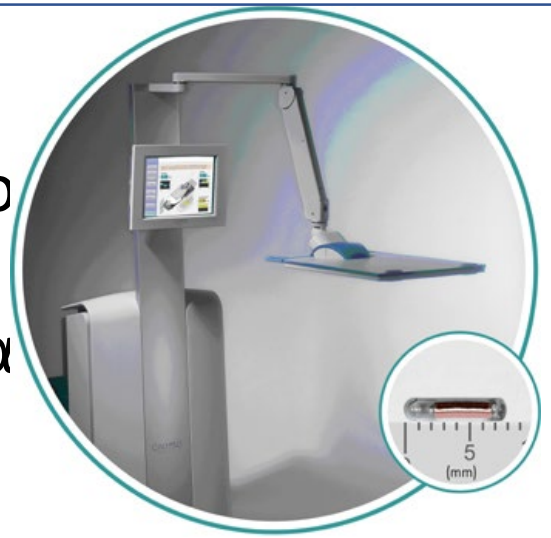


78 Gy πλάνο θεραπείας χωρίς ή με τοποθετημένο τον καθετήρα

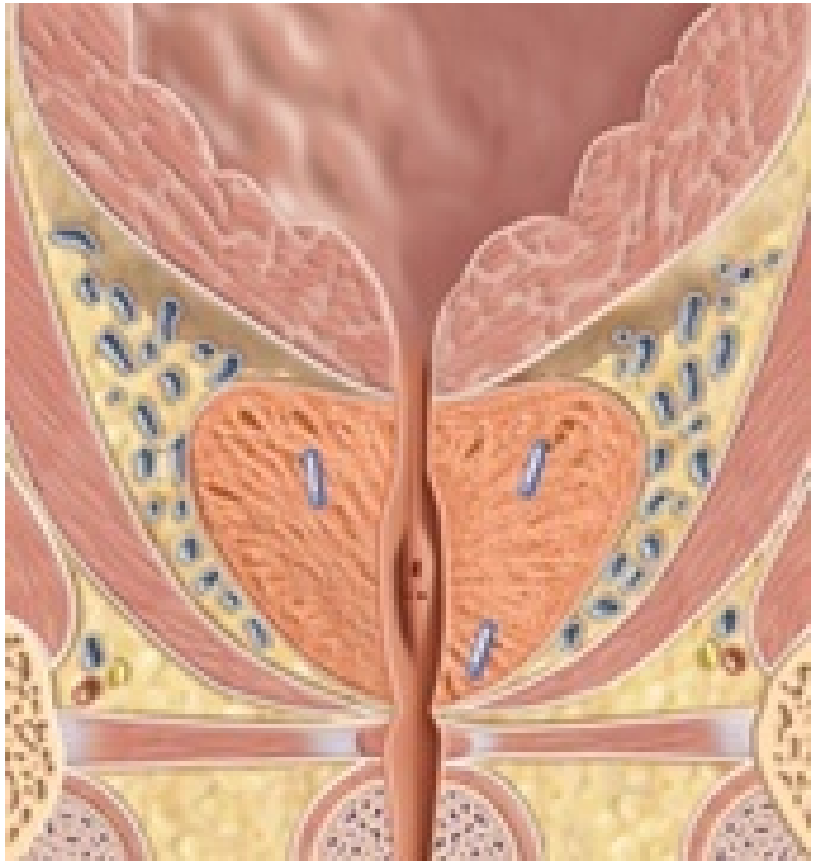


ΤΕΧΝΙΚΕΣ ΑΚΤΙΝΟΘΕΡΑΠΕΙΑΣ

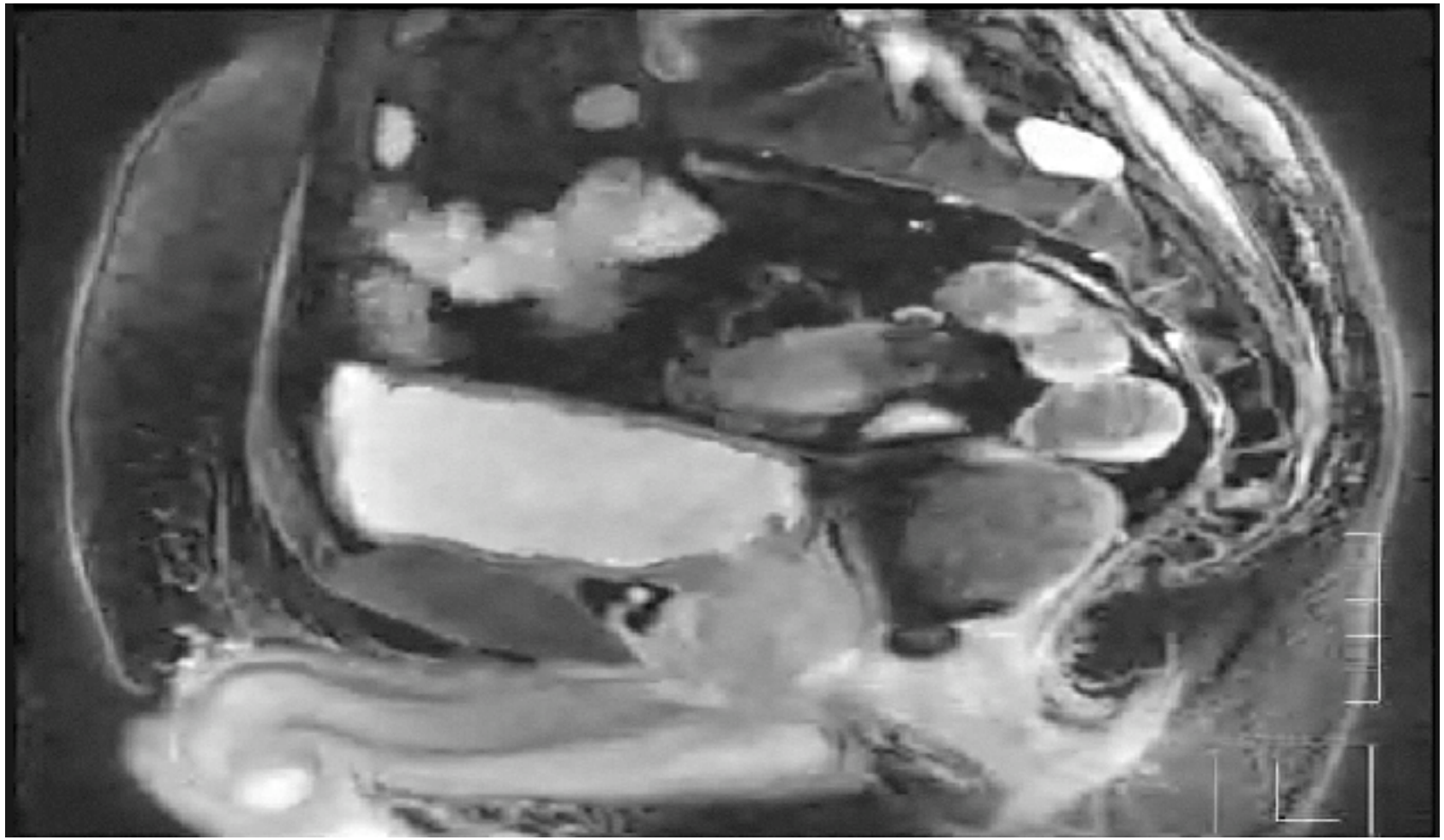
Η τοποθέτηση κόκκων χρυσο στο προστάτη επιτρέπει την ακτινολογική αναγνώριση κα τη διόρθωση του στόχου



Εναλλακτικά τοποθετείται αξονικός τομογράφος μαζί με τον γραμμικό επιταχυντή για την καθημερινή επιβεβαίωση στόχου



- IGRT



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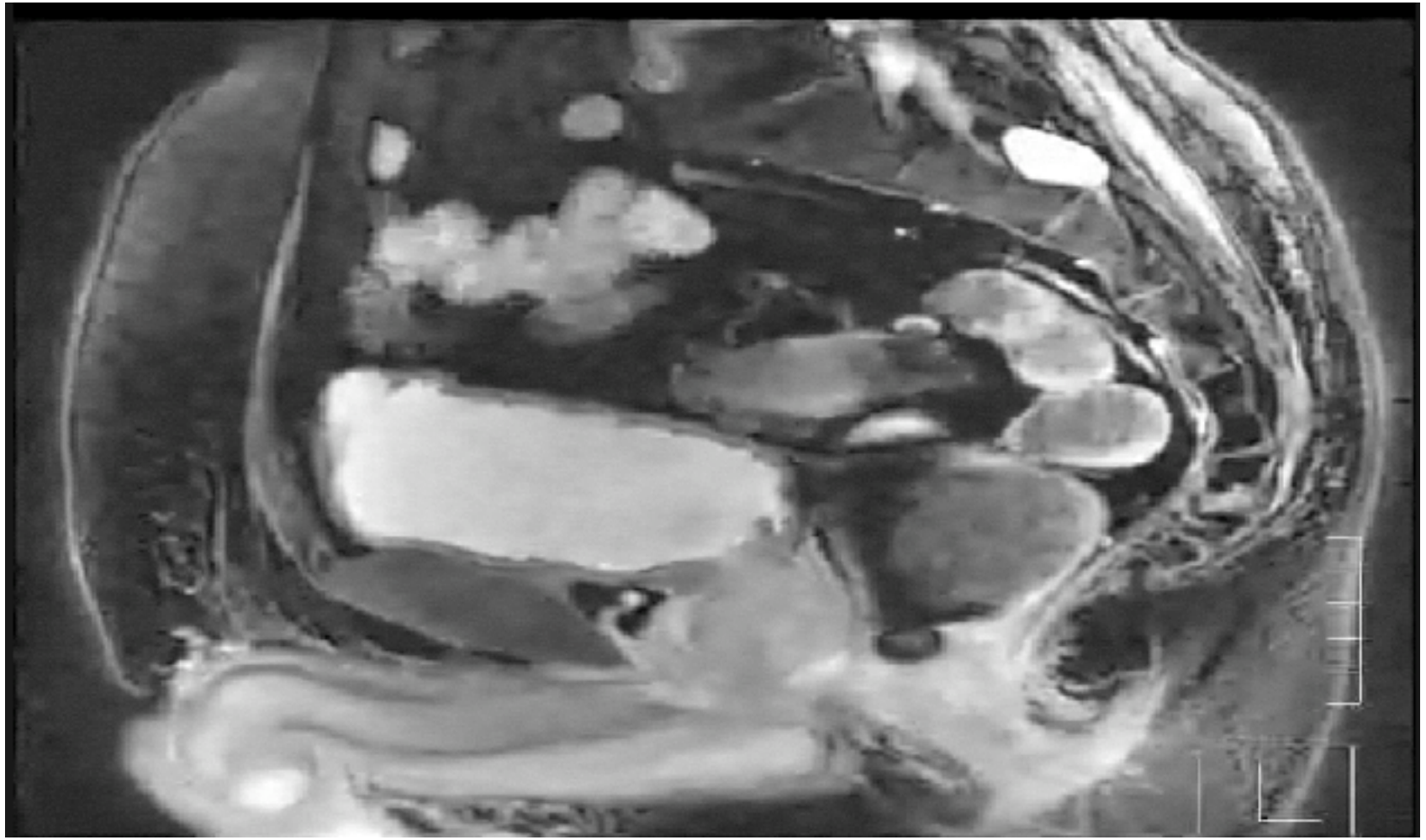

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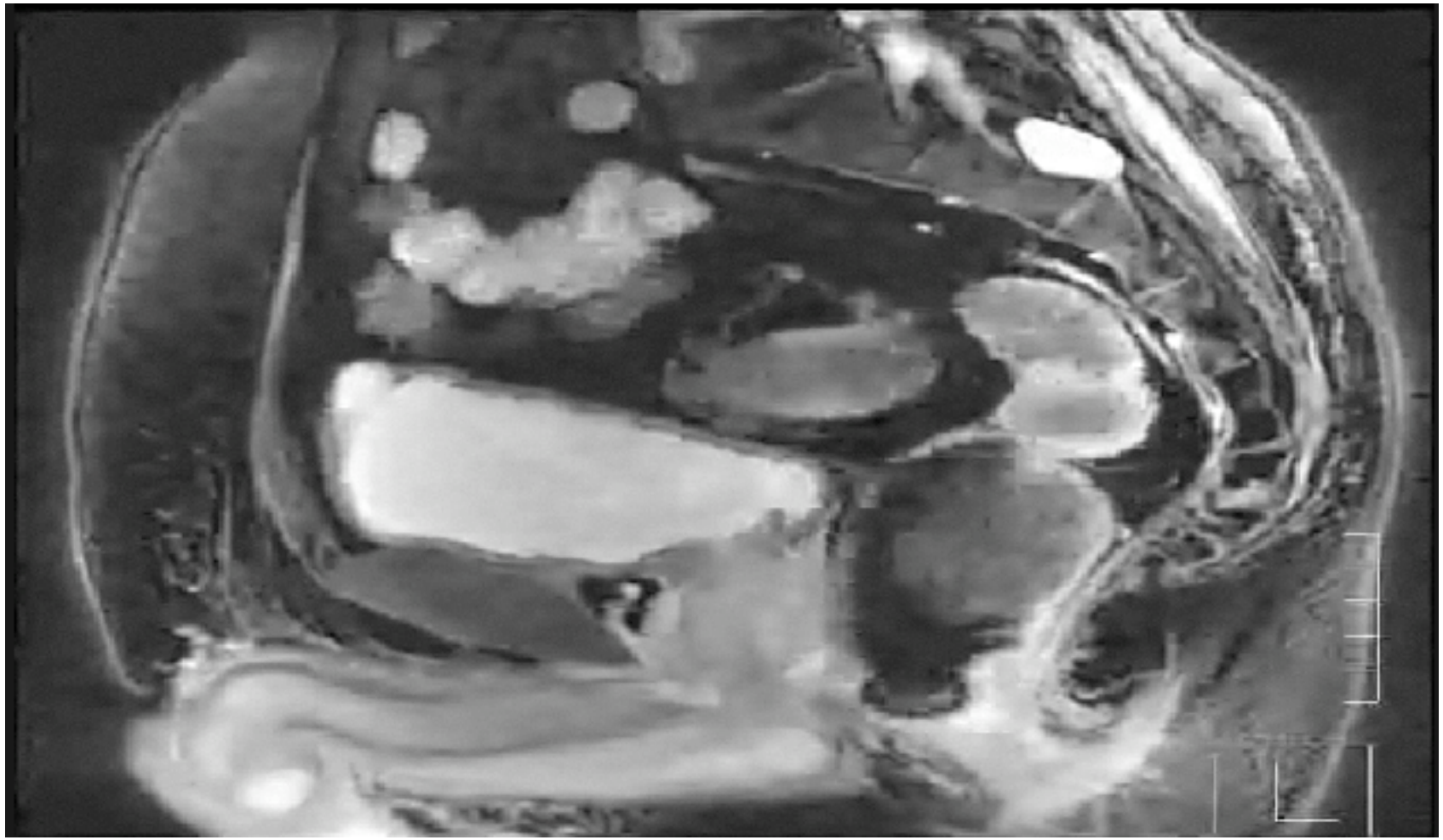

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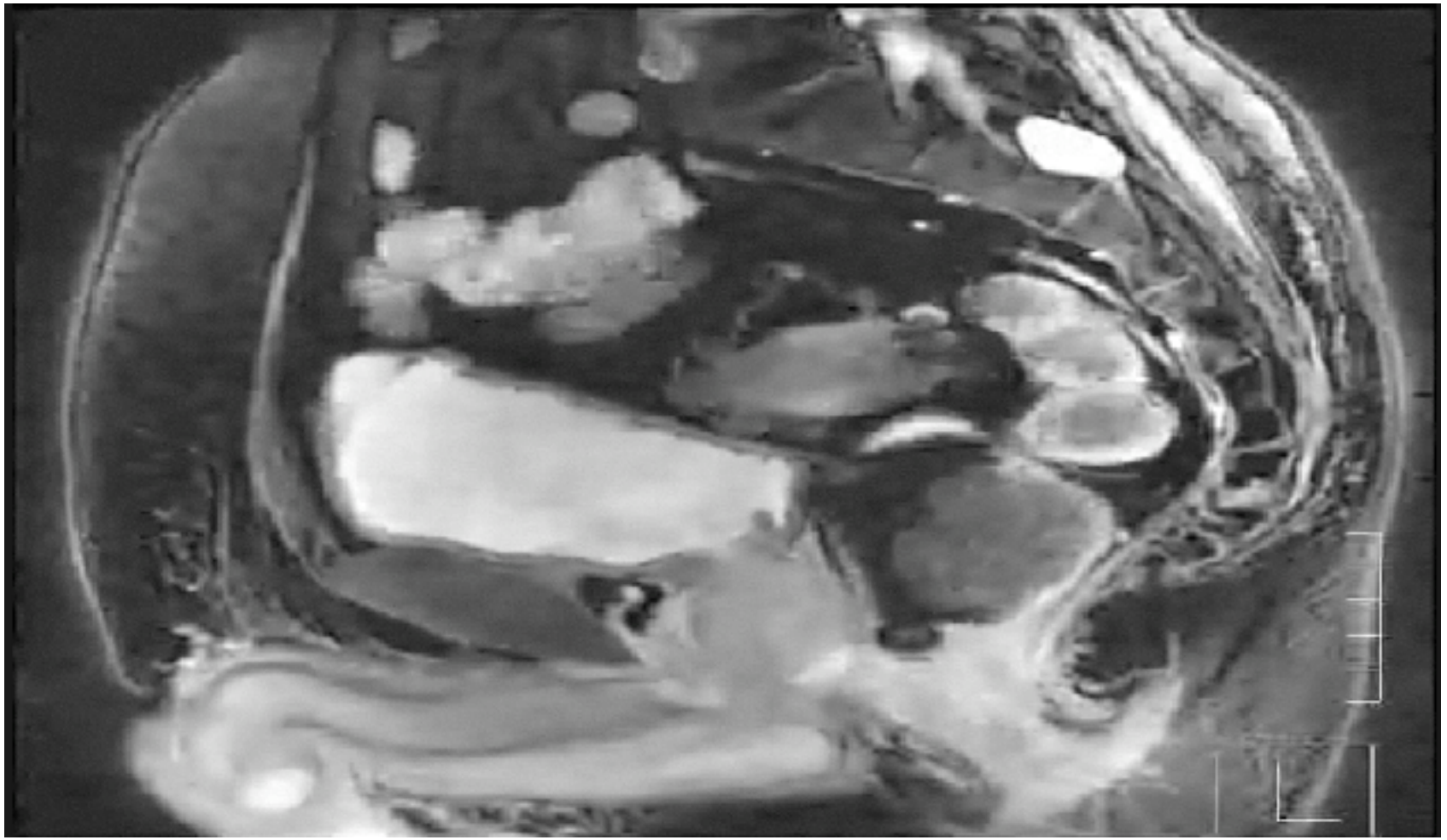

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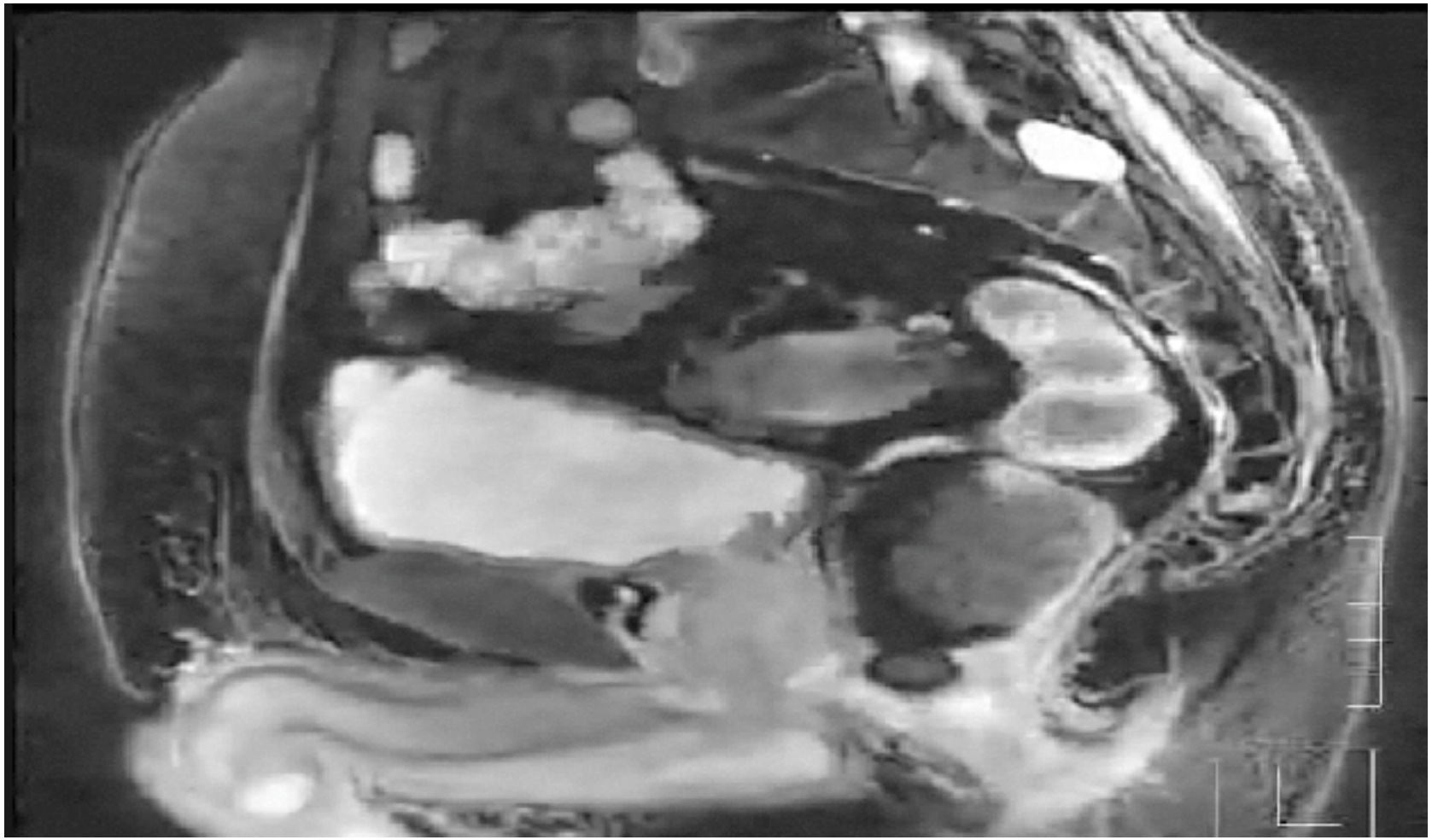

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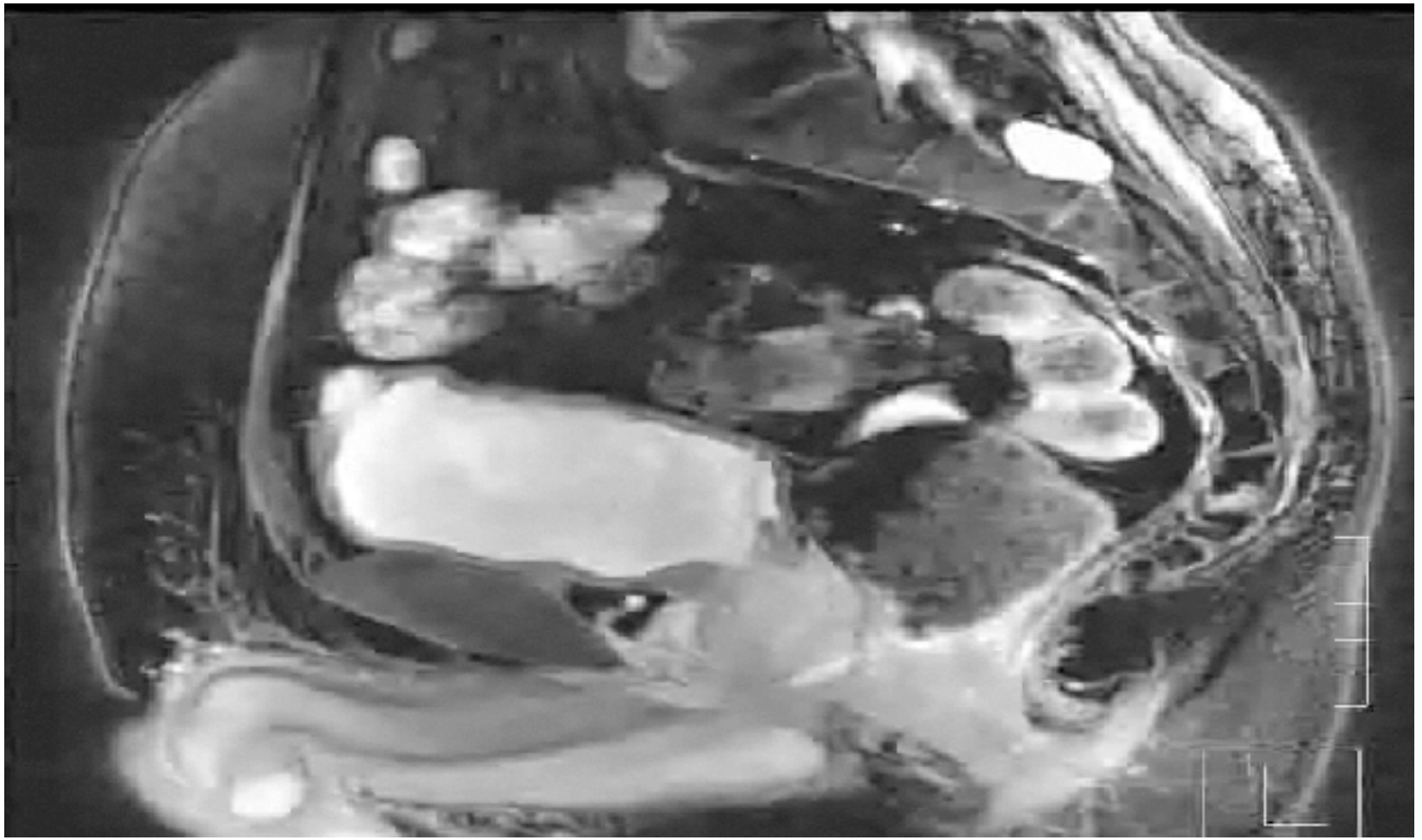

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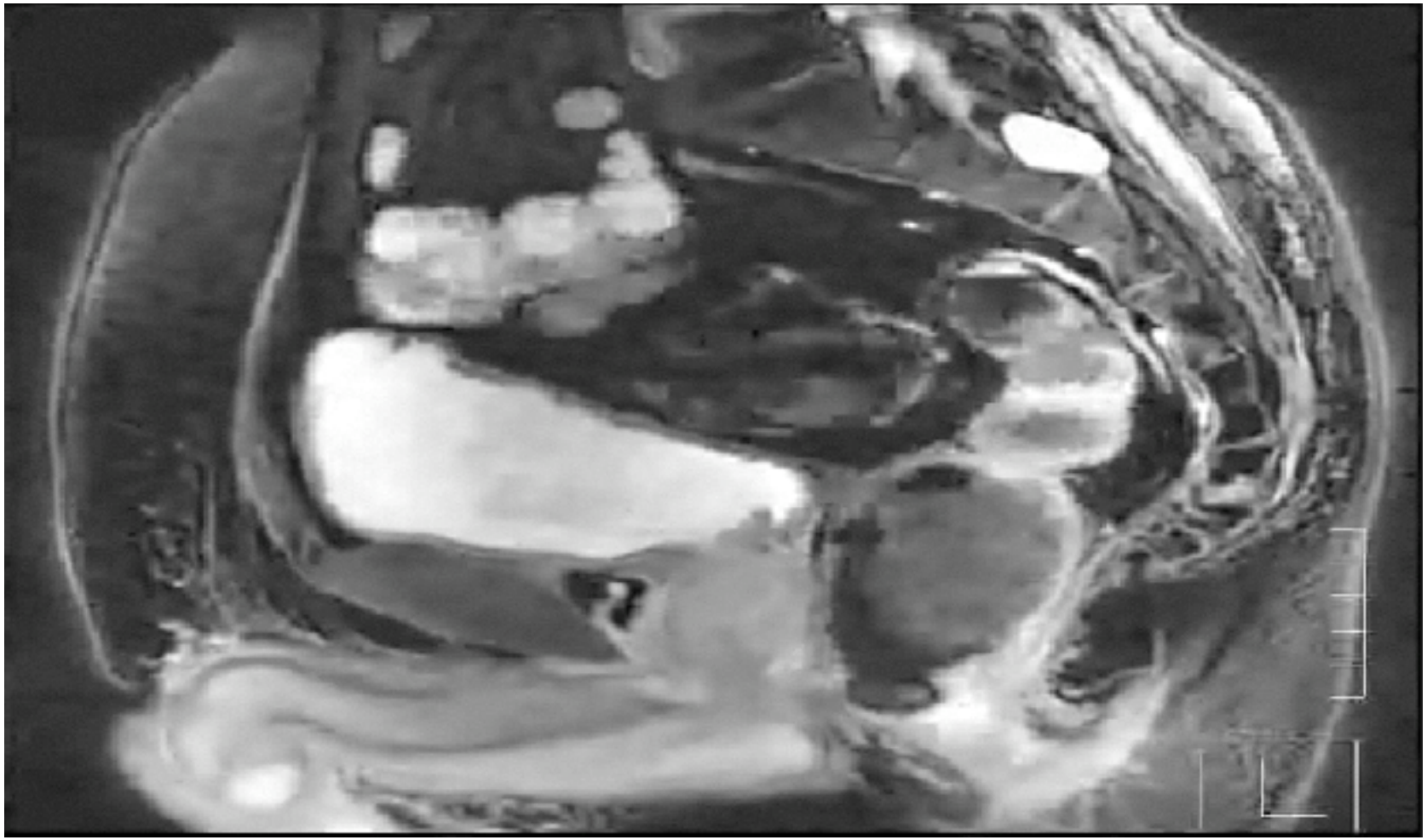

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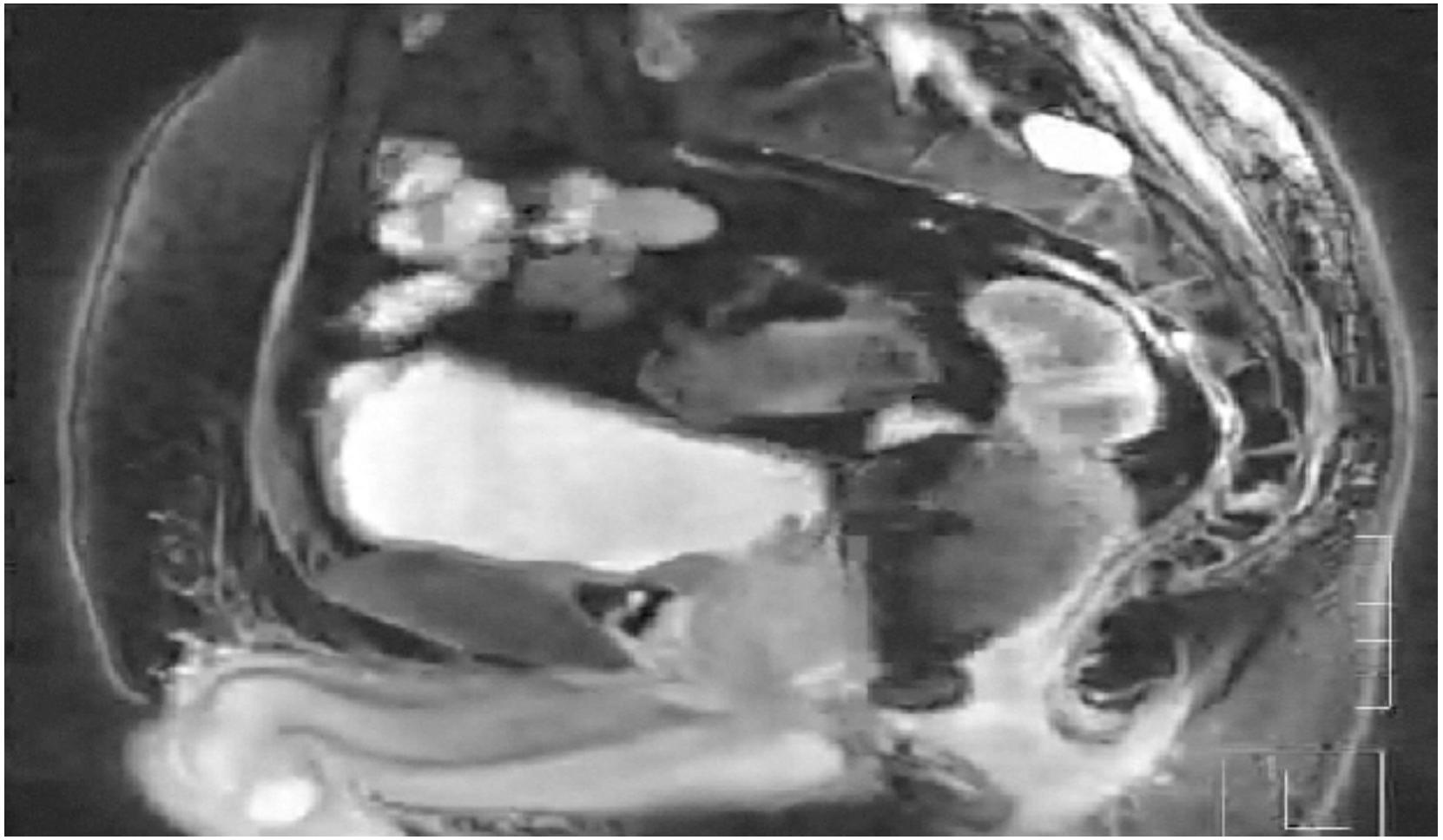

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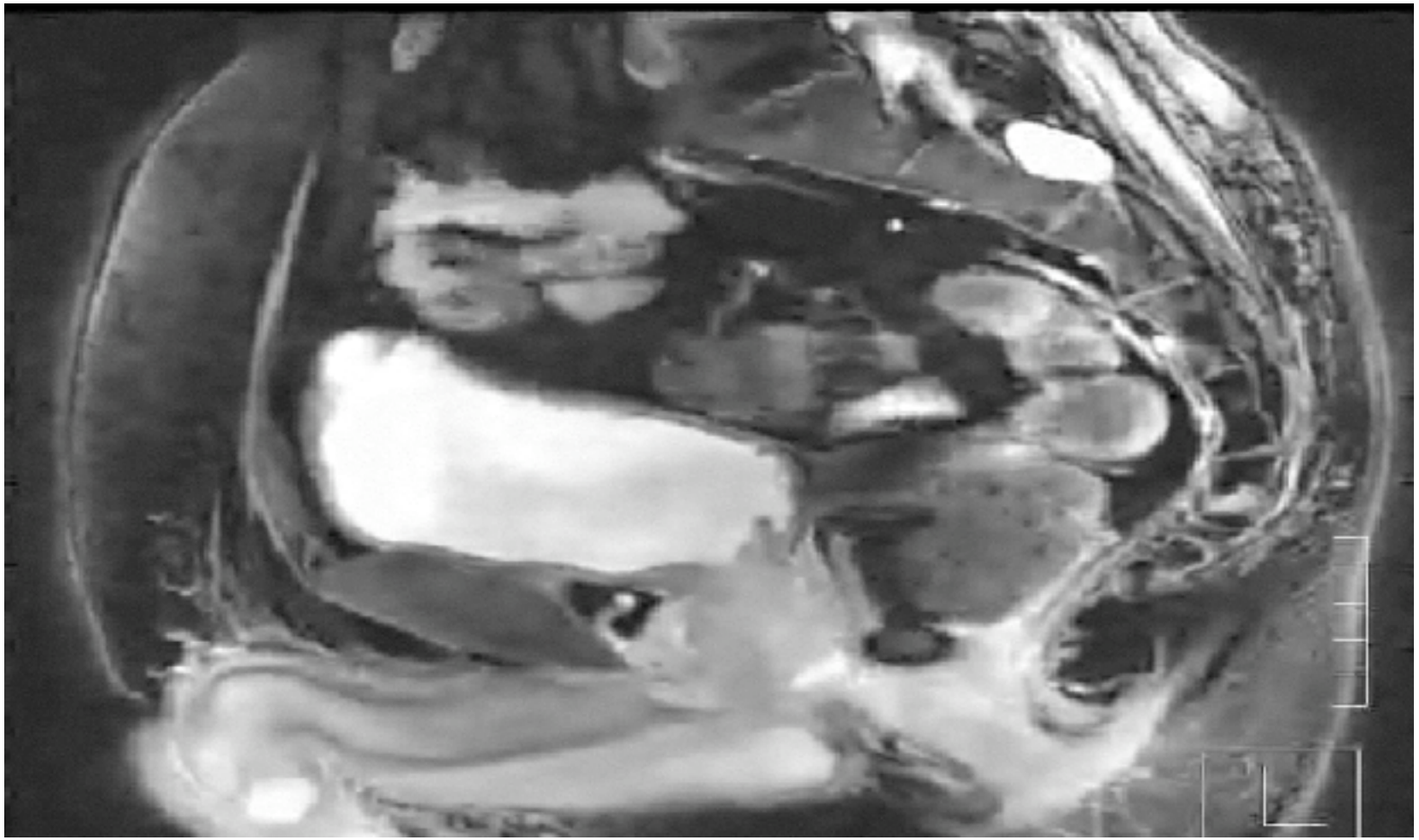

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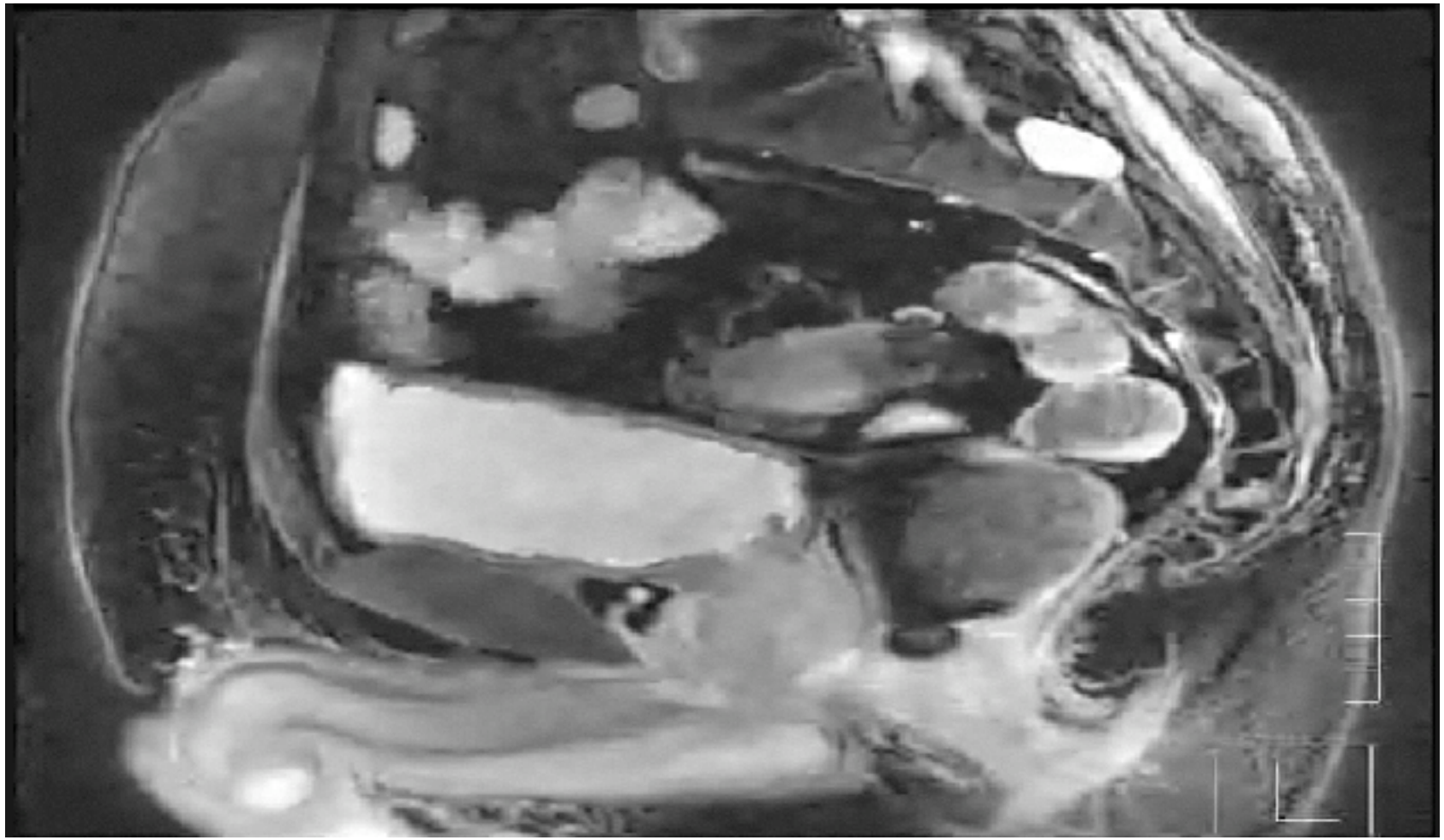

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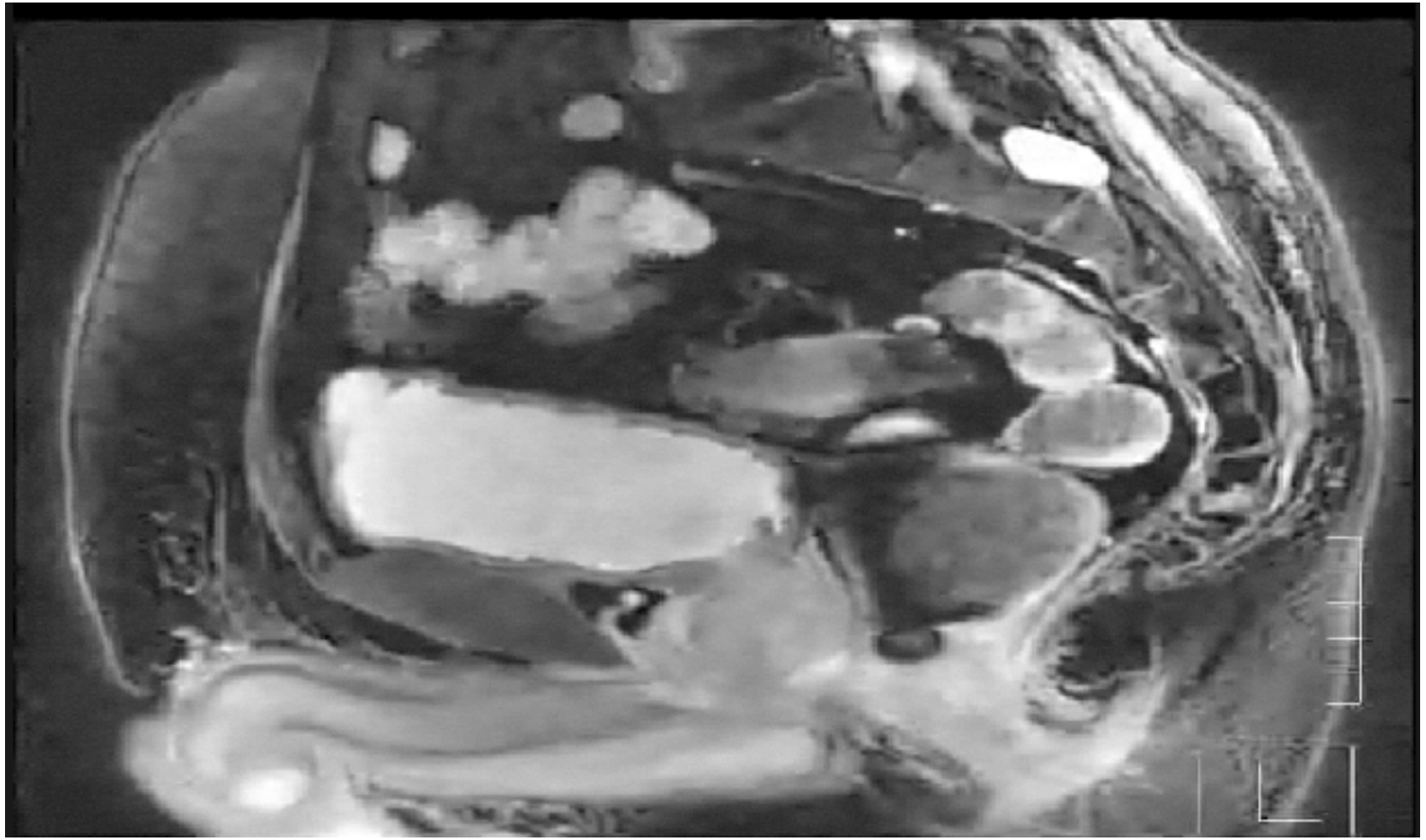

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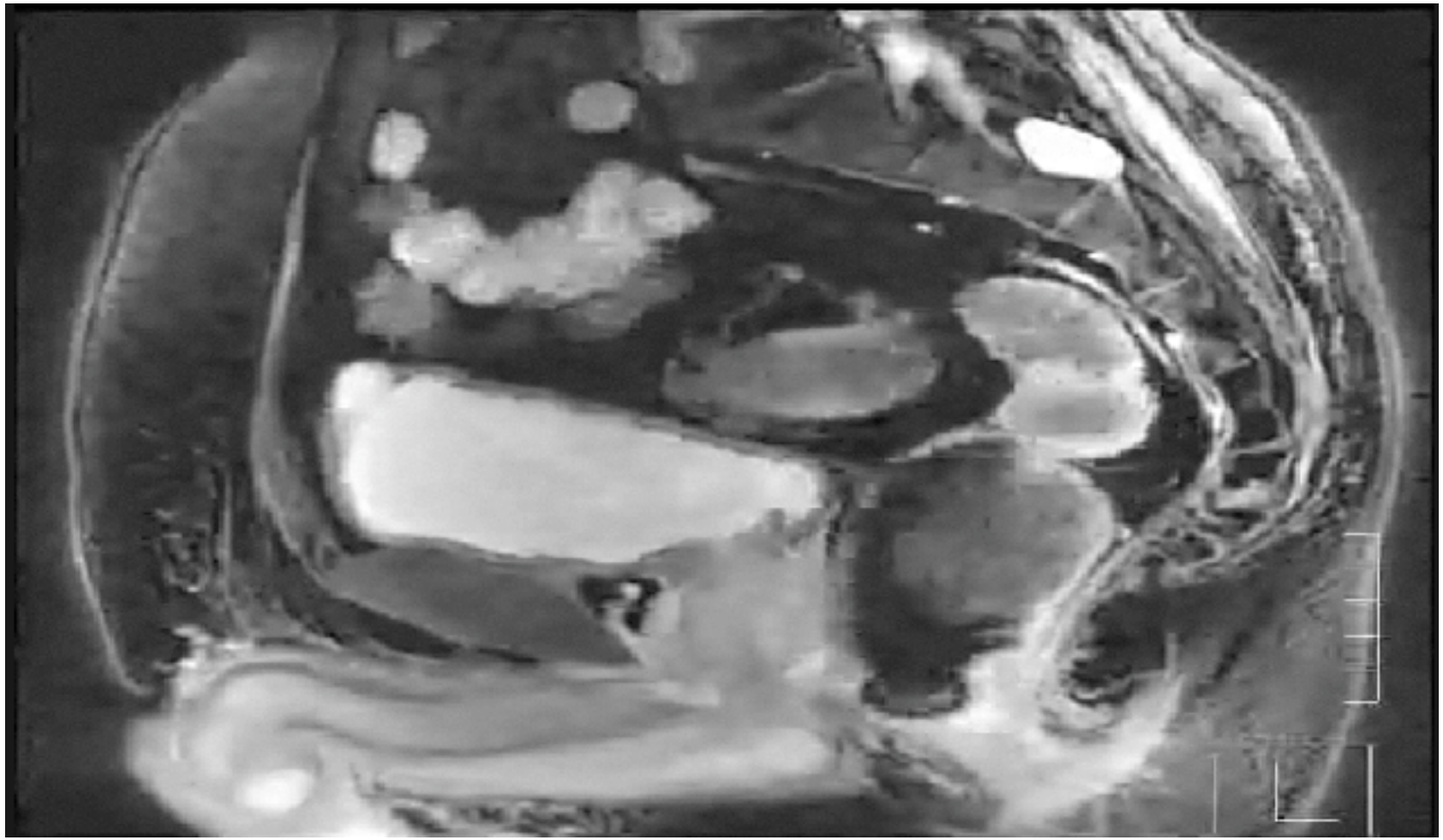

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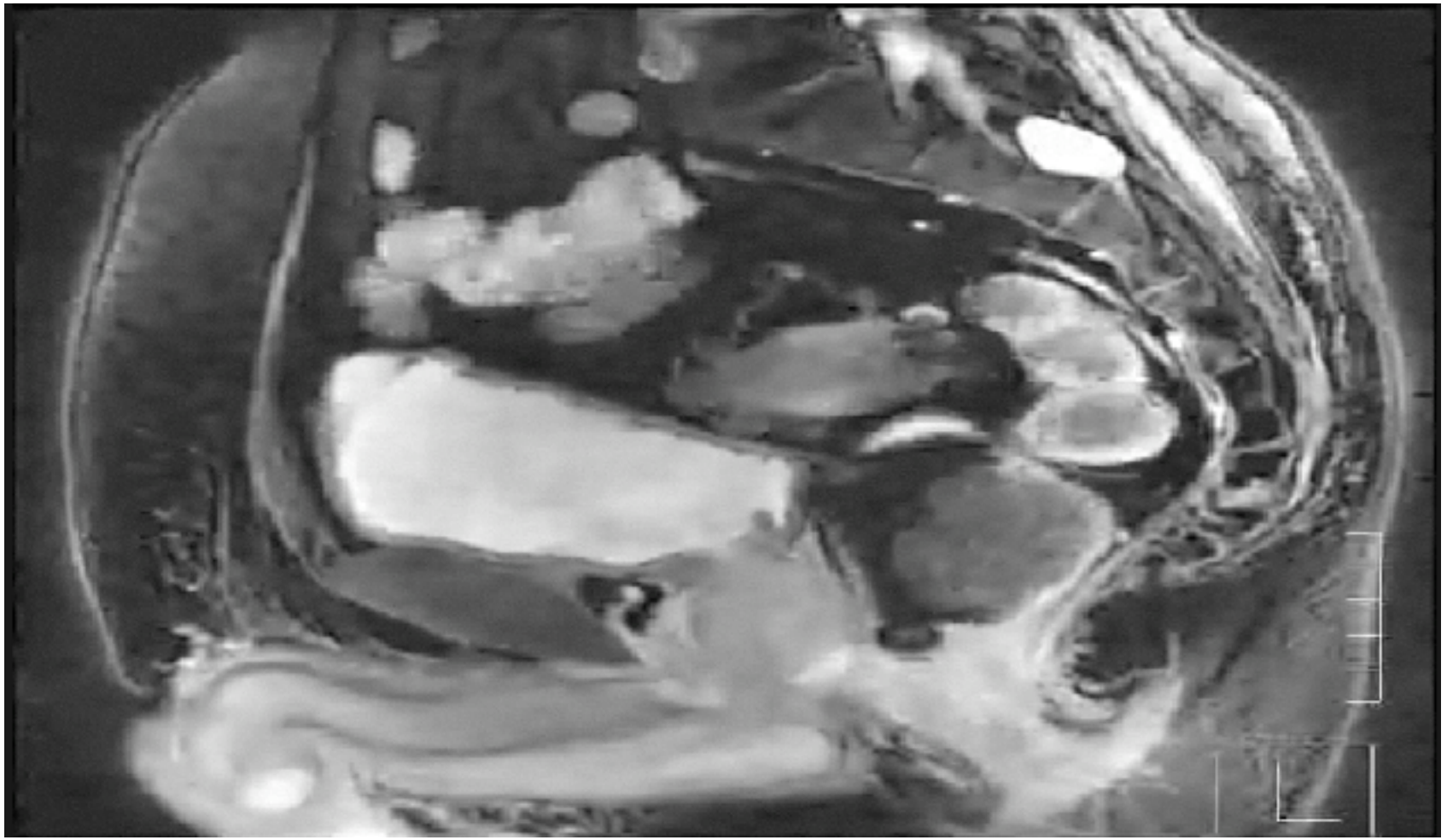

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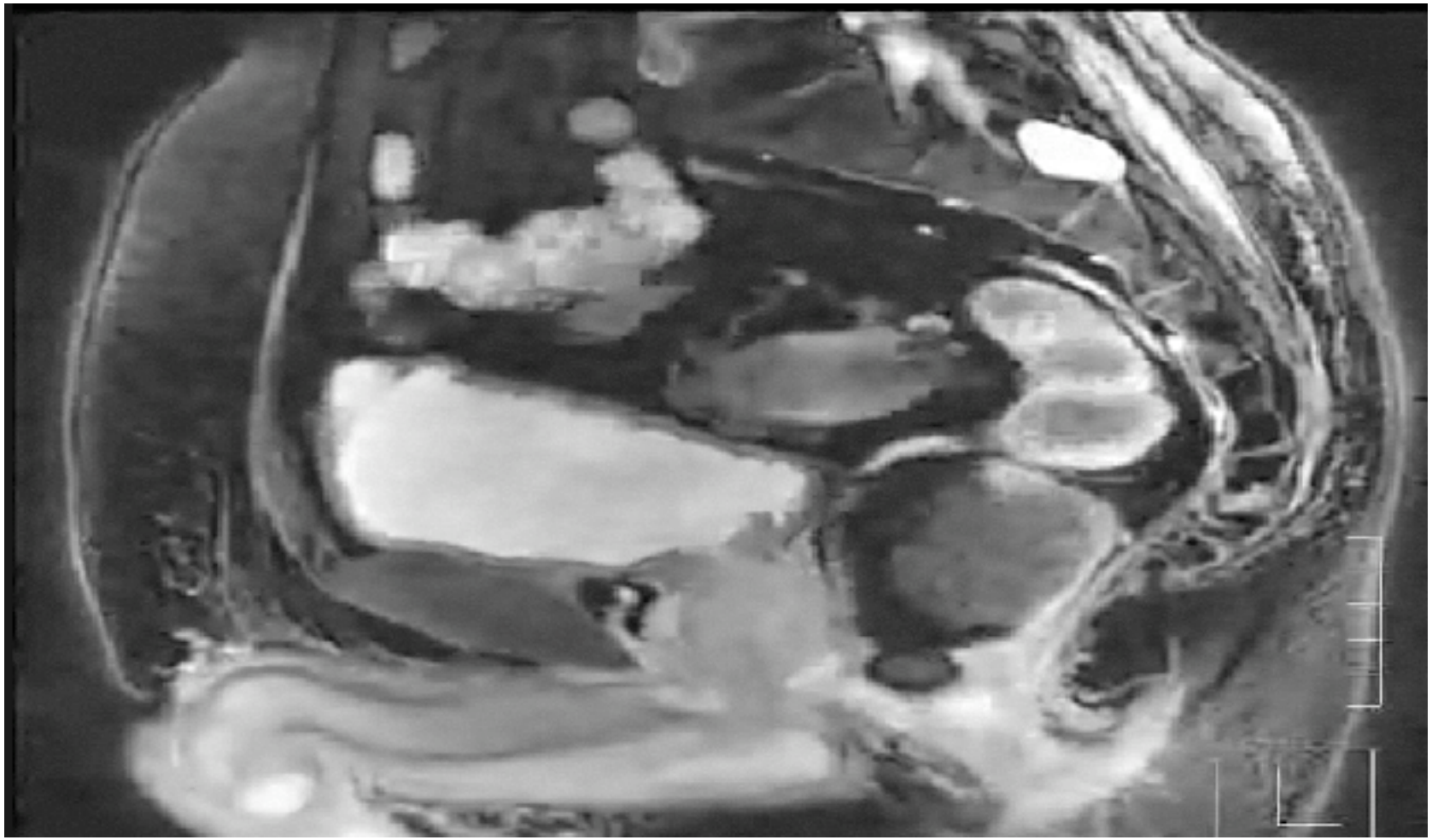

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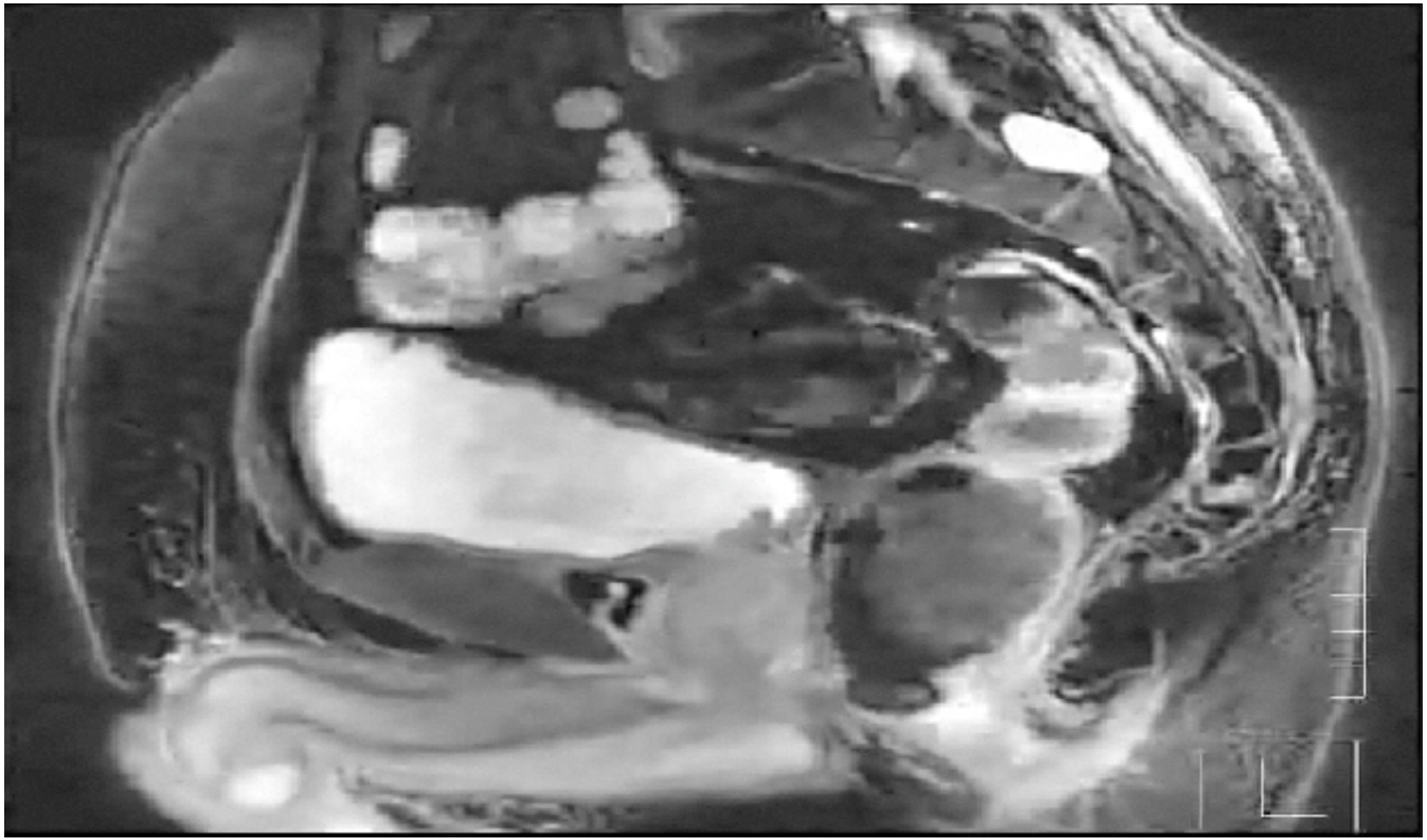

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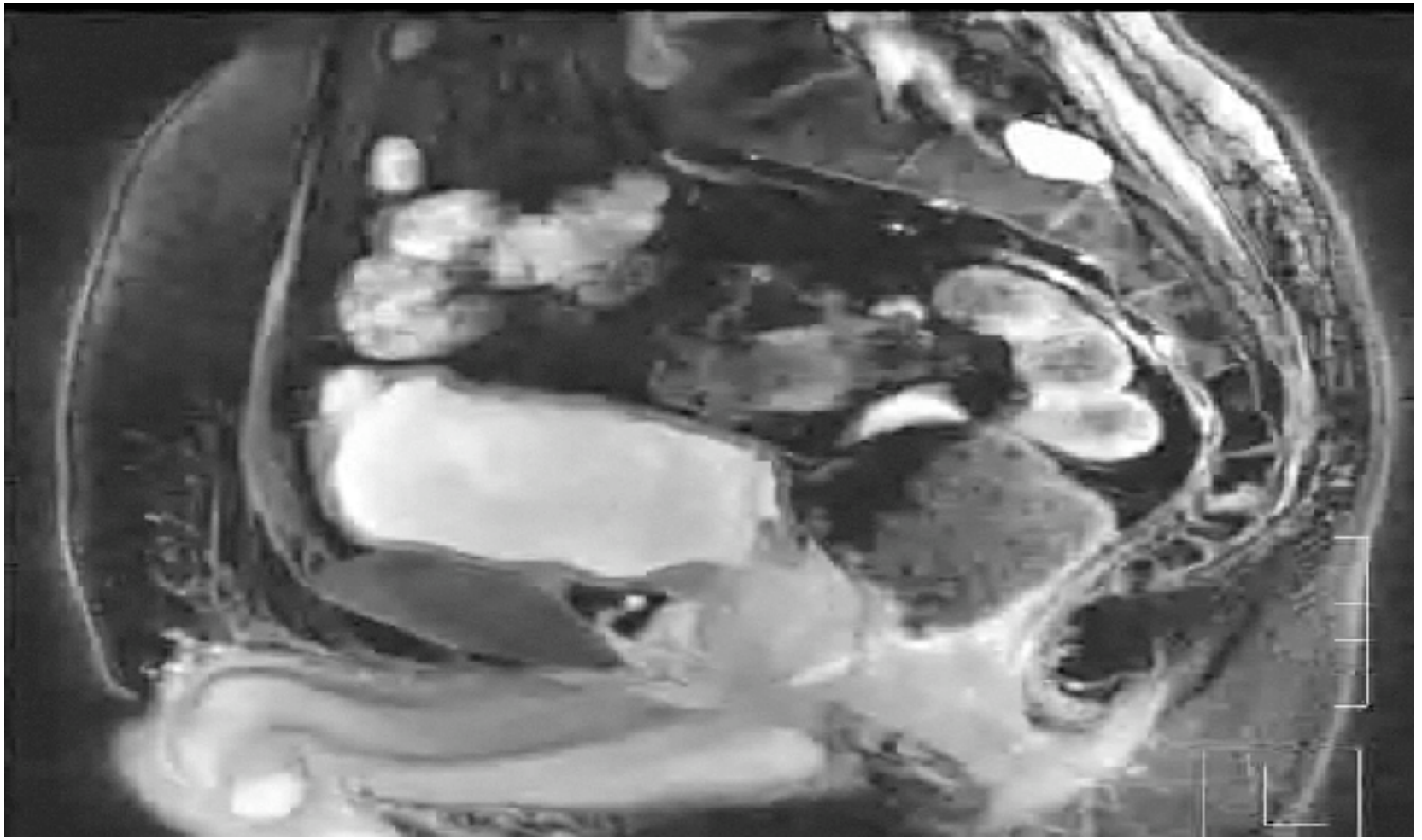

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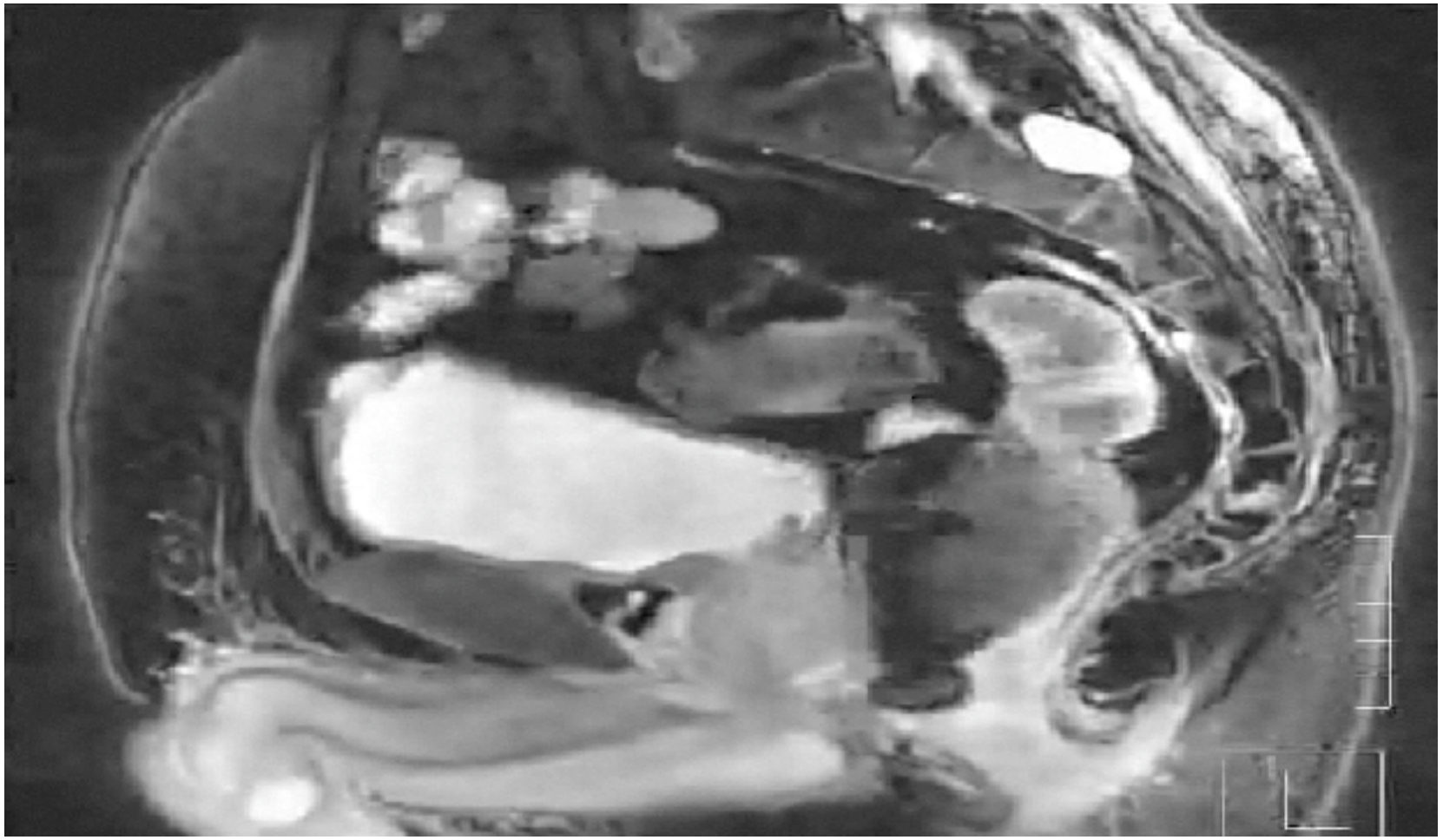

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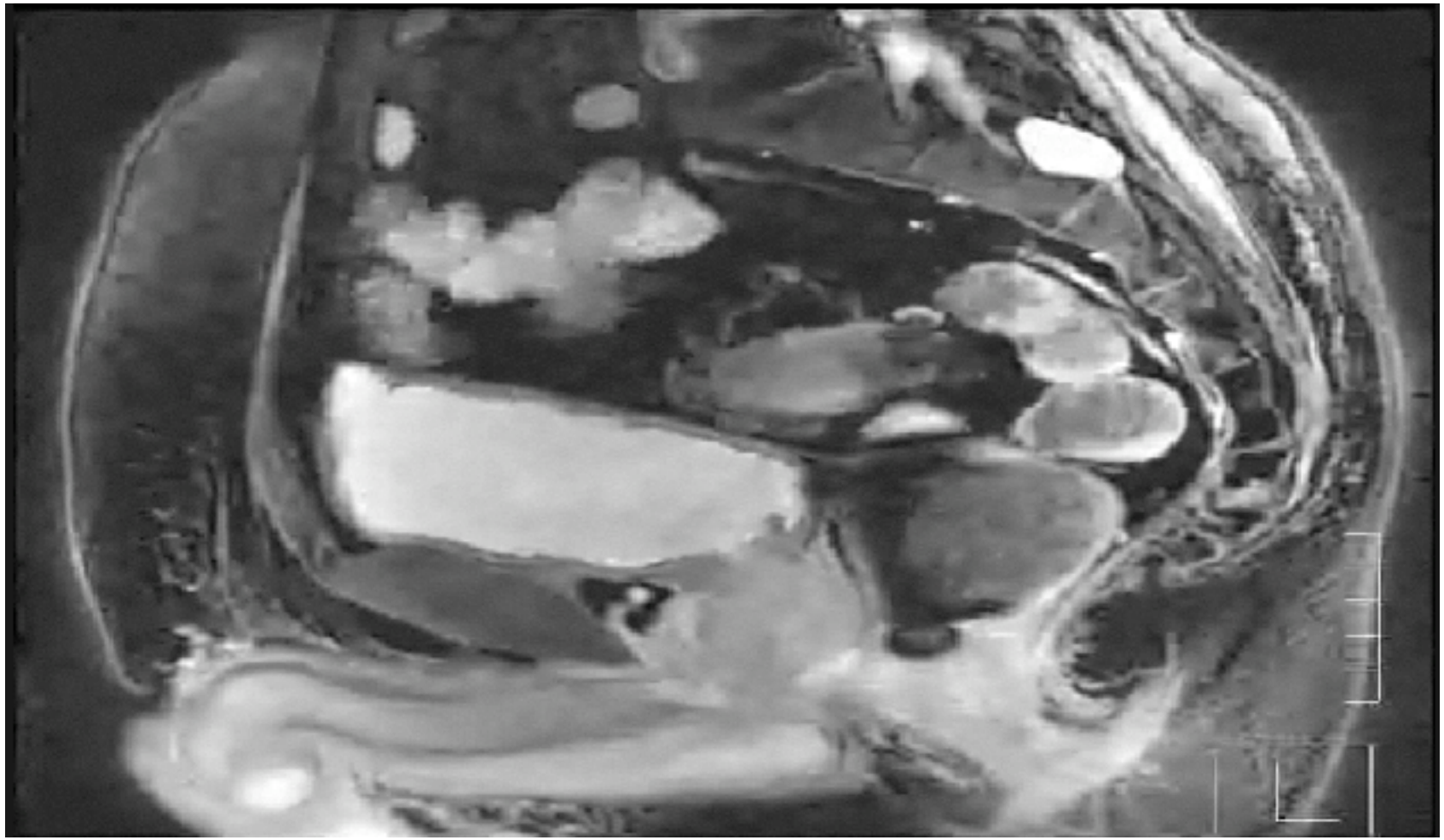

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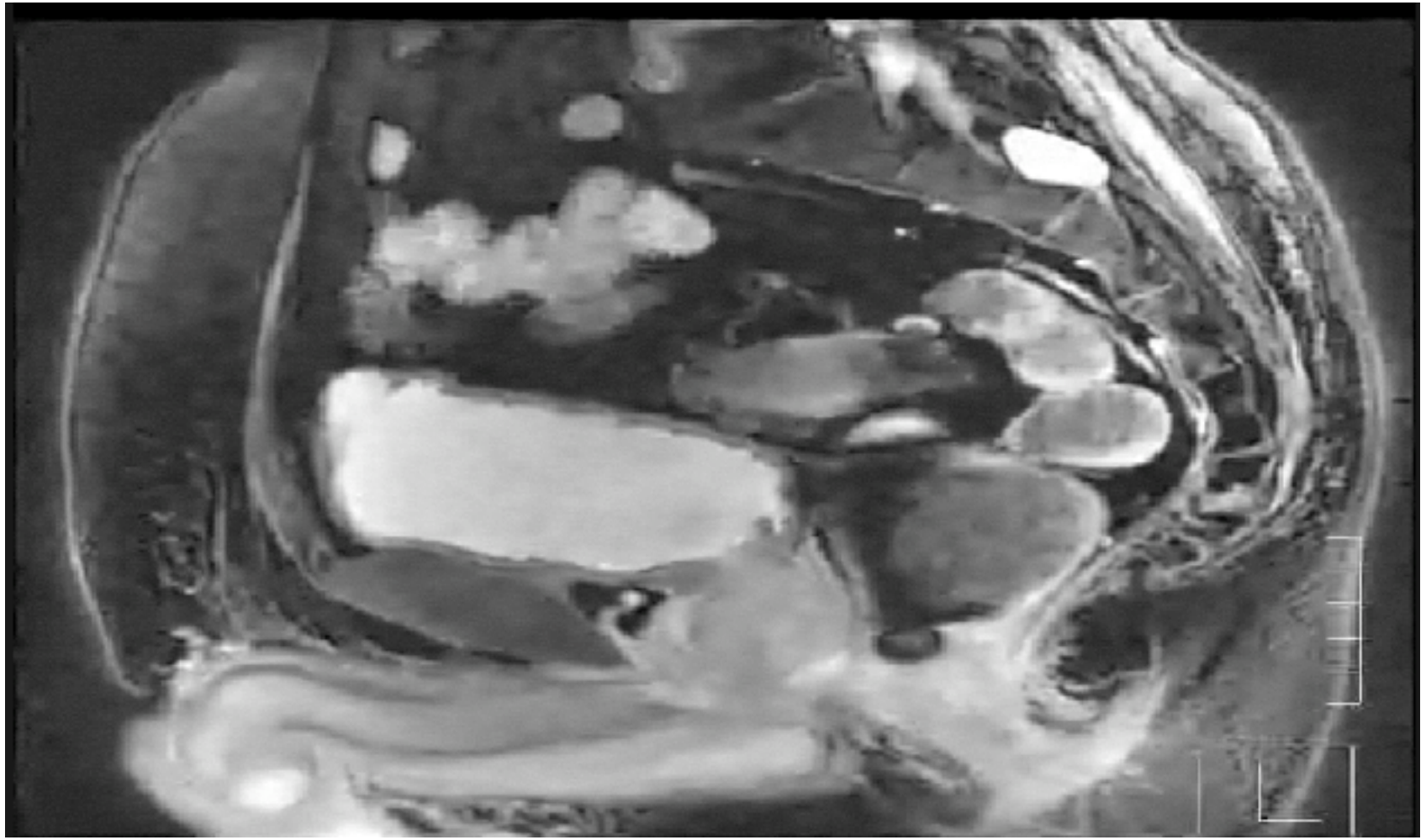

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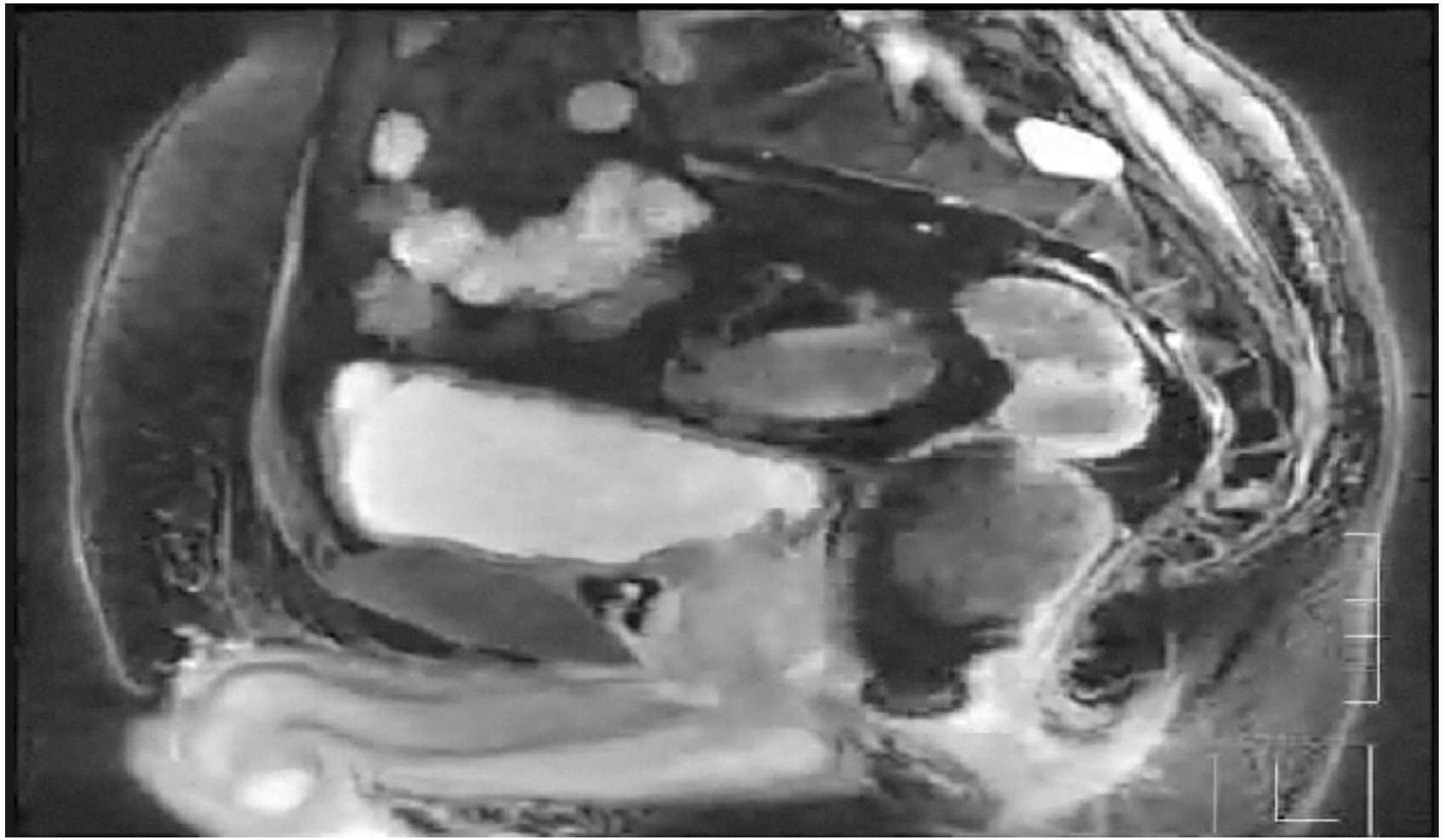

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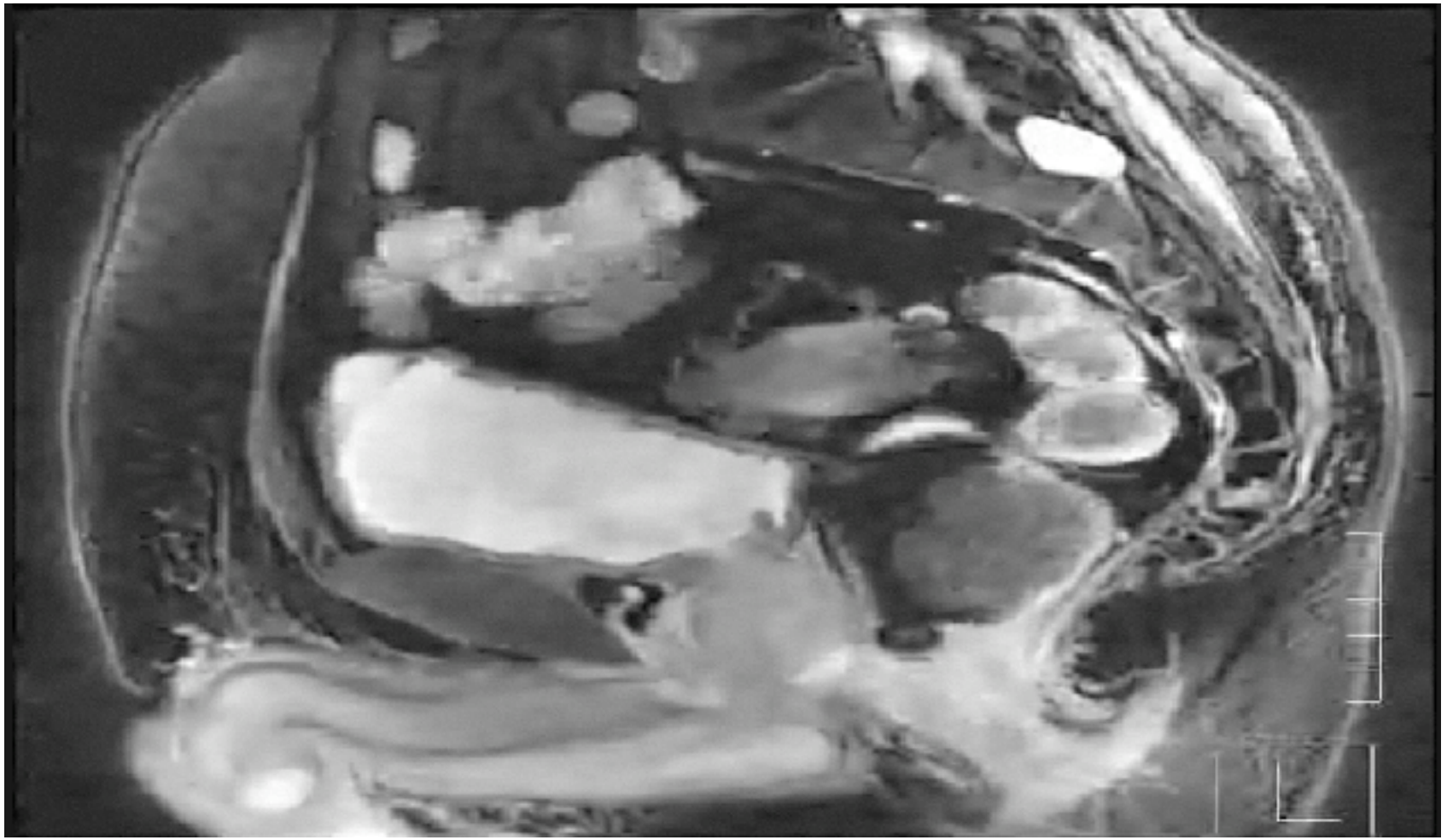

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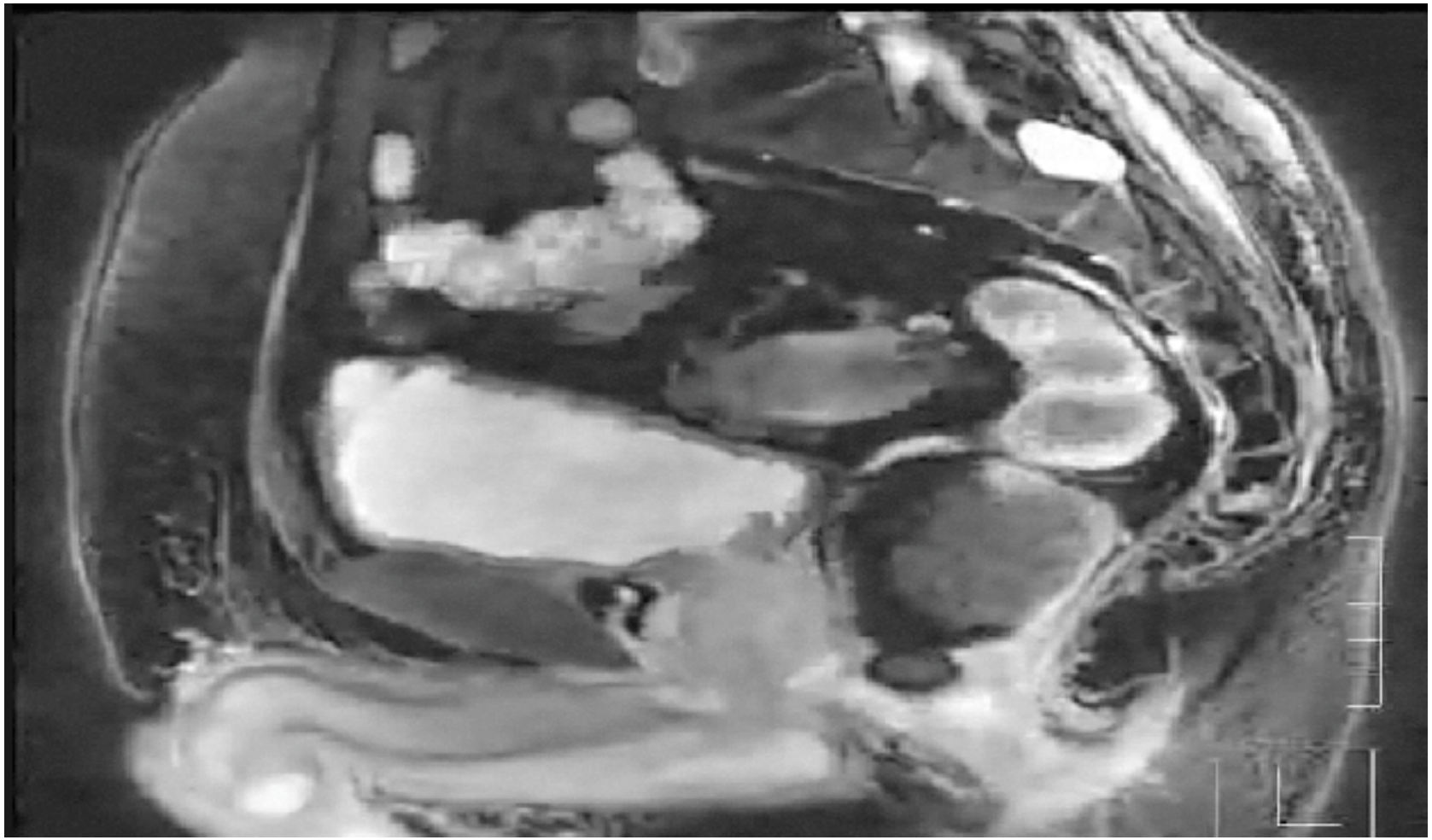

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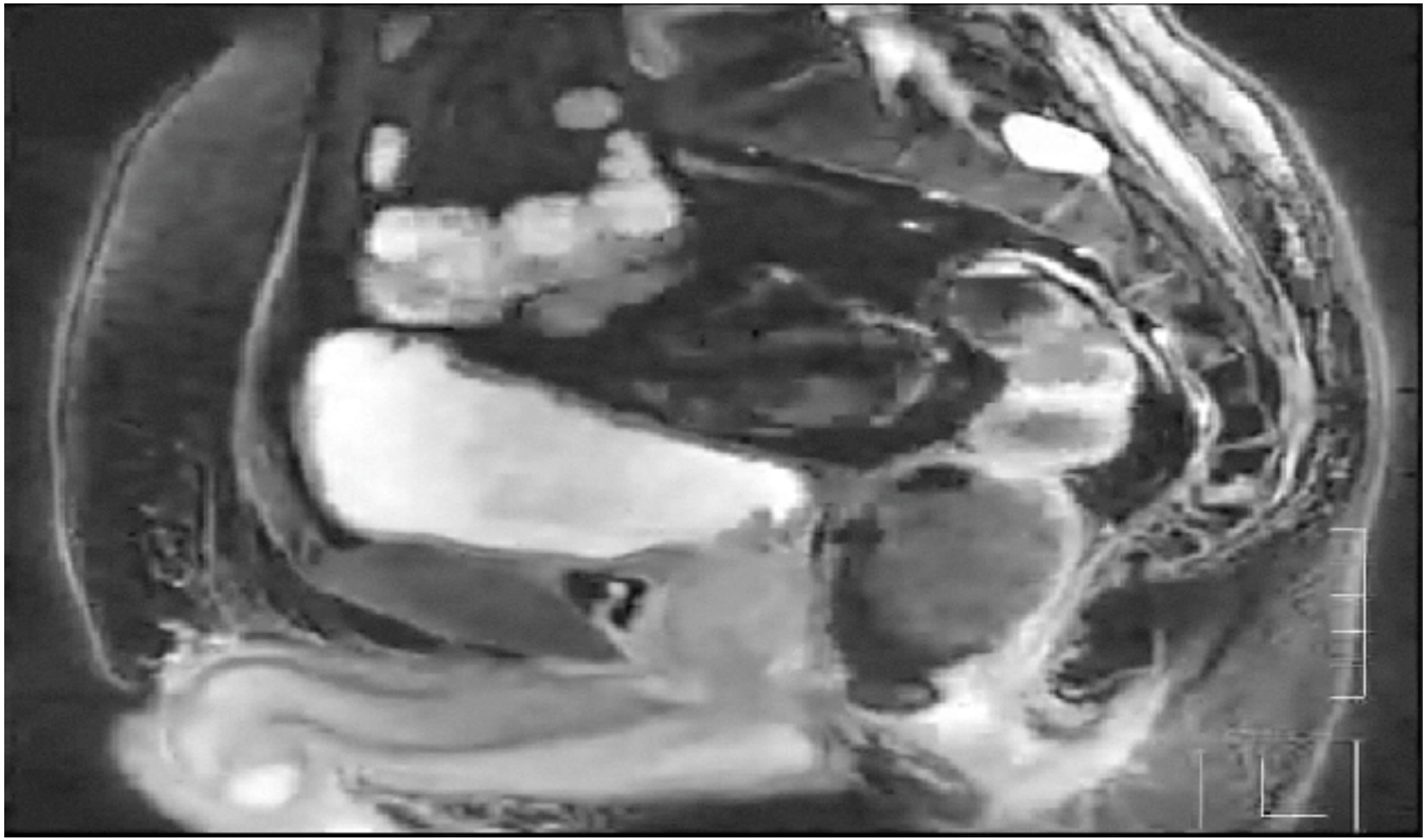

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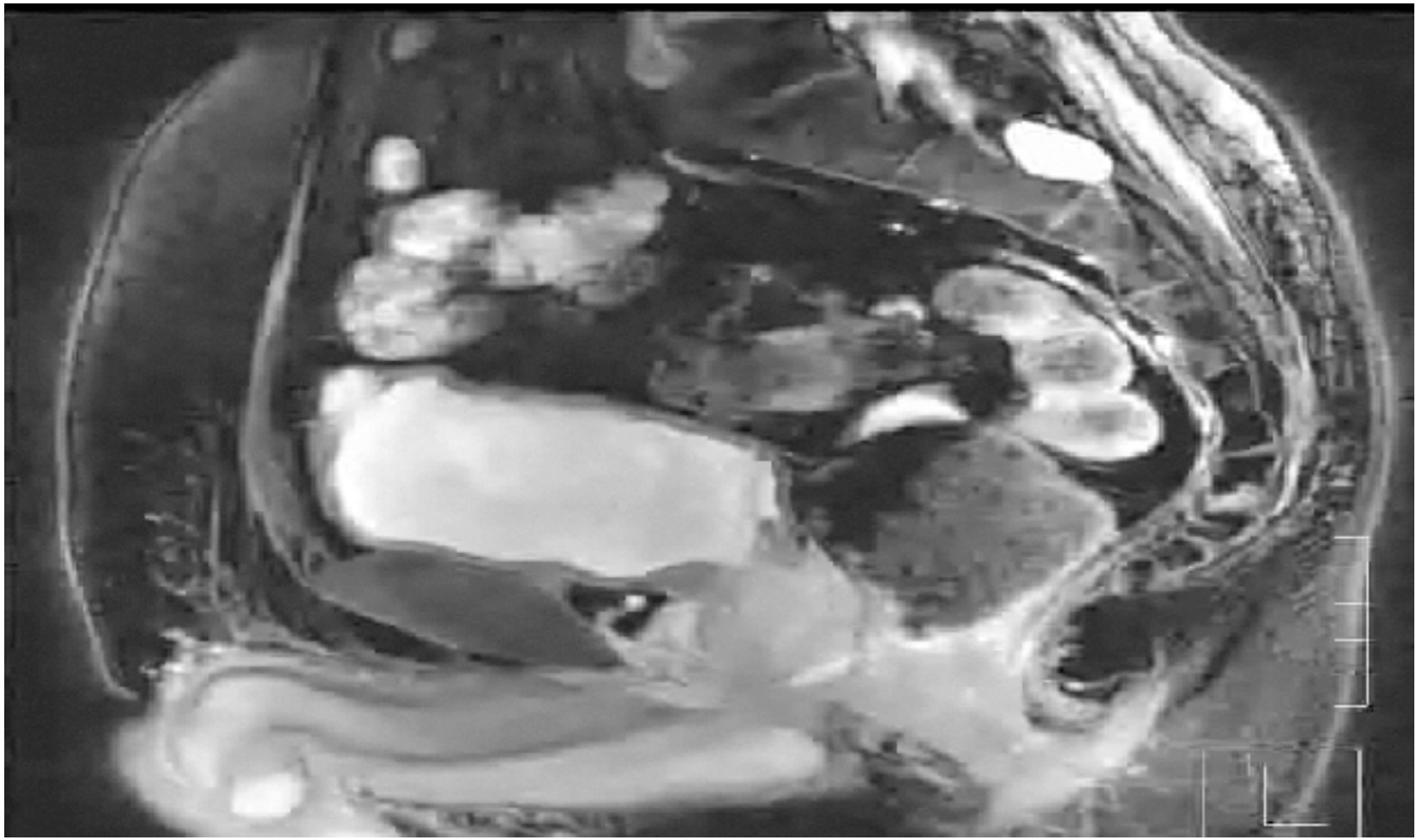

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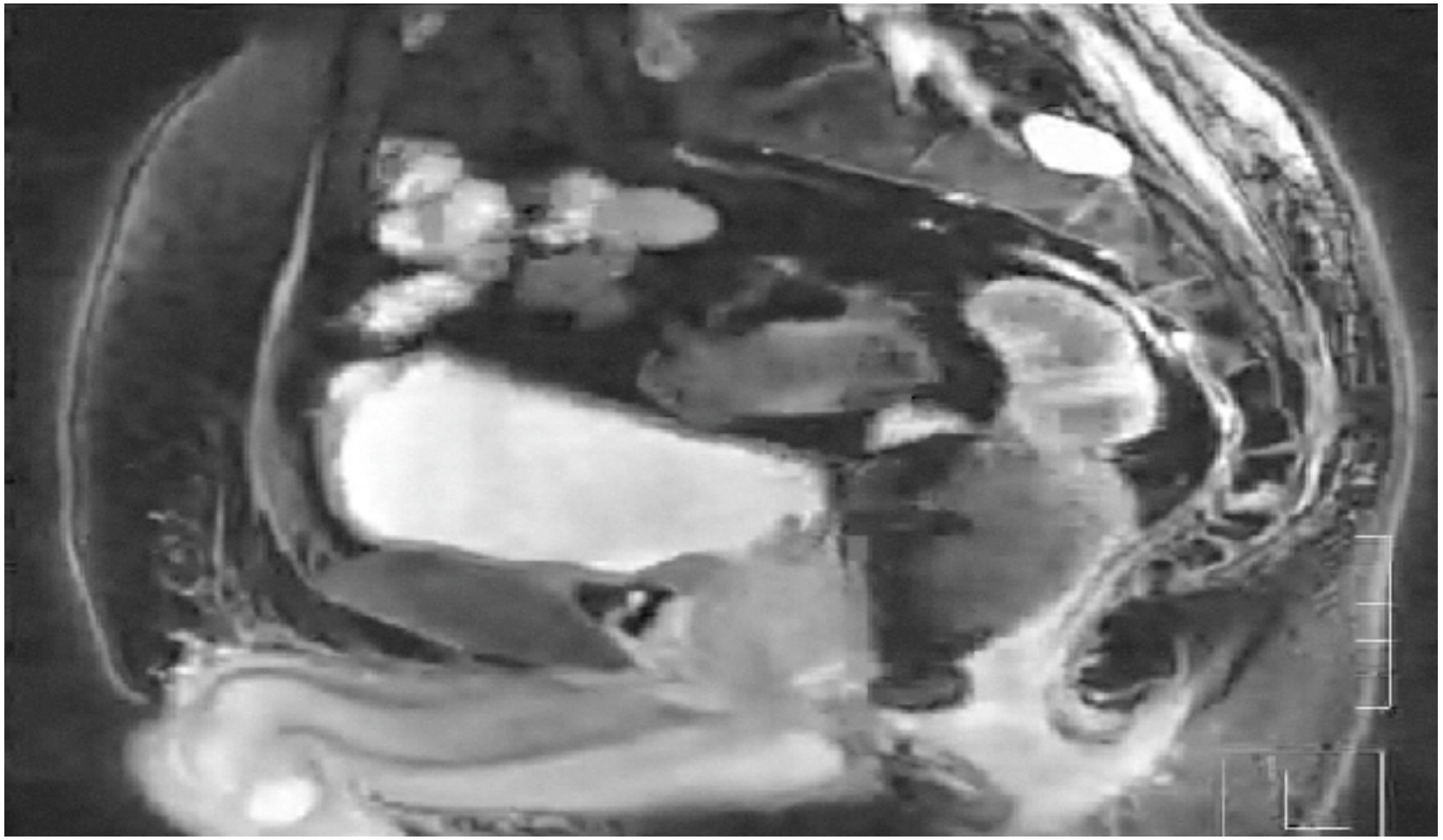

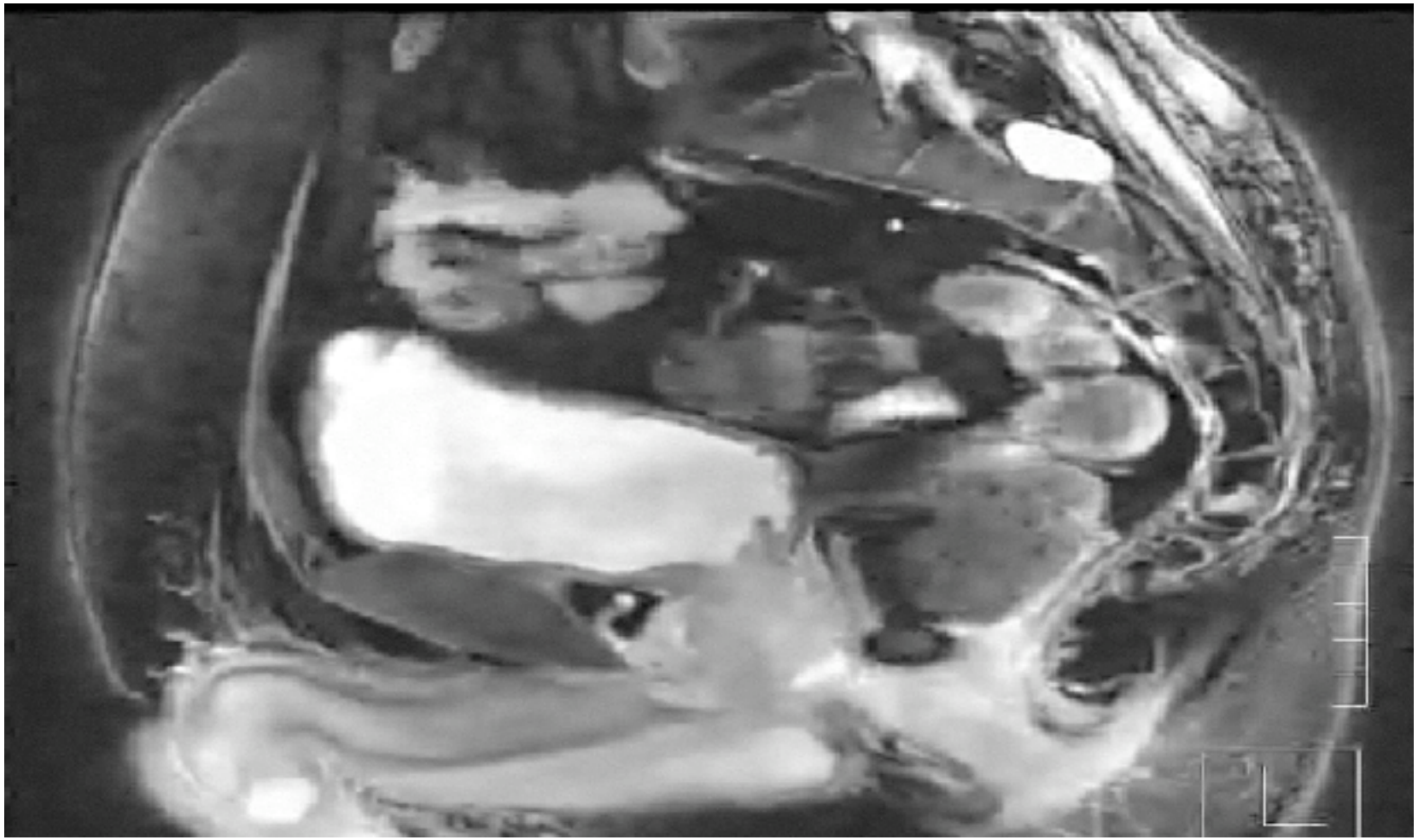

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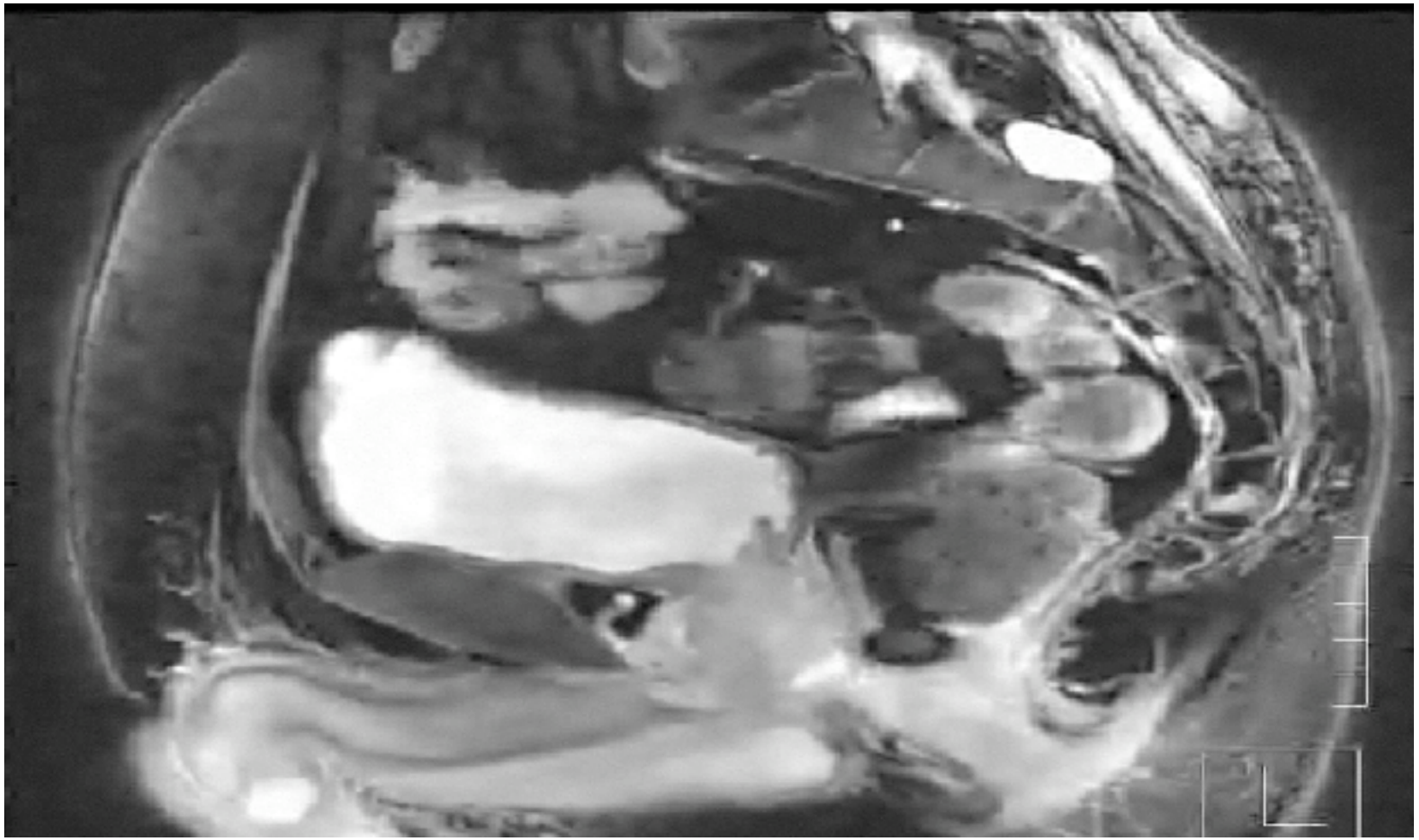
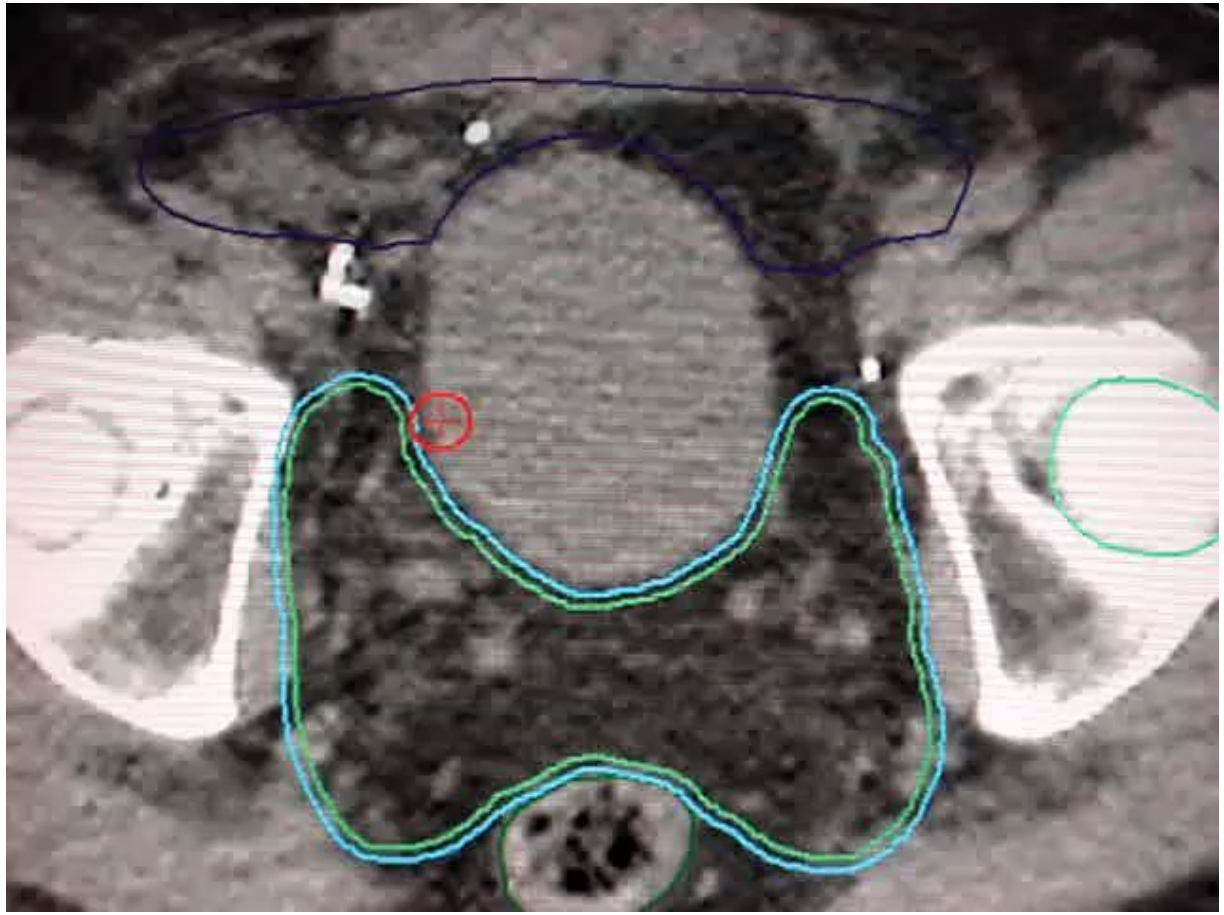
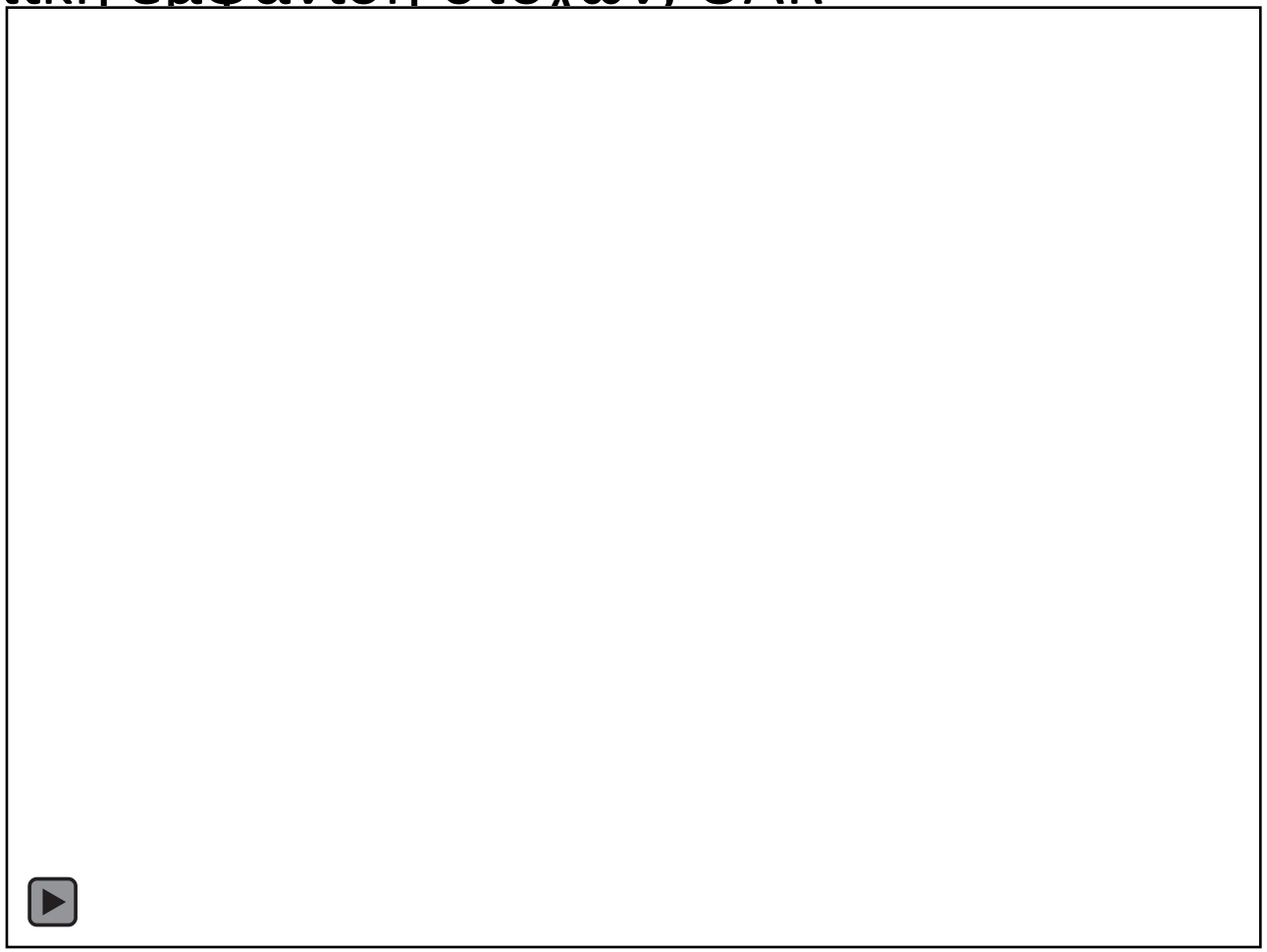
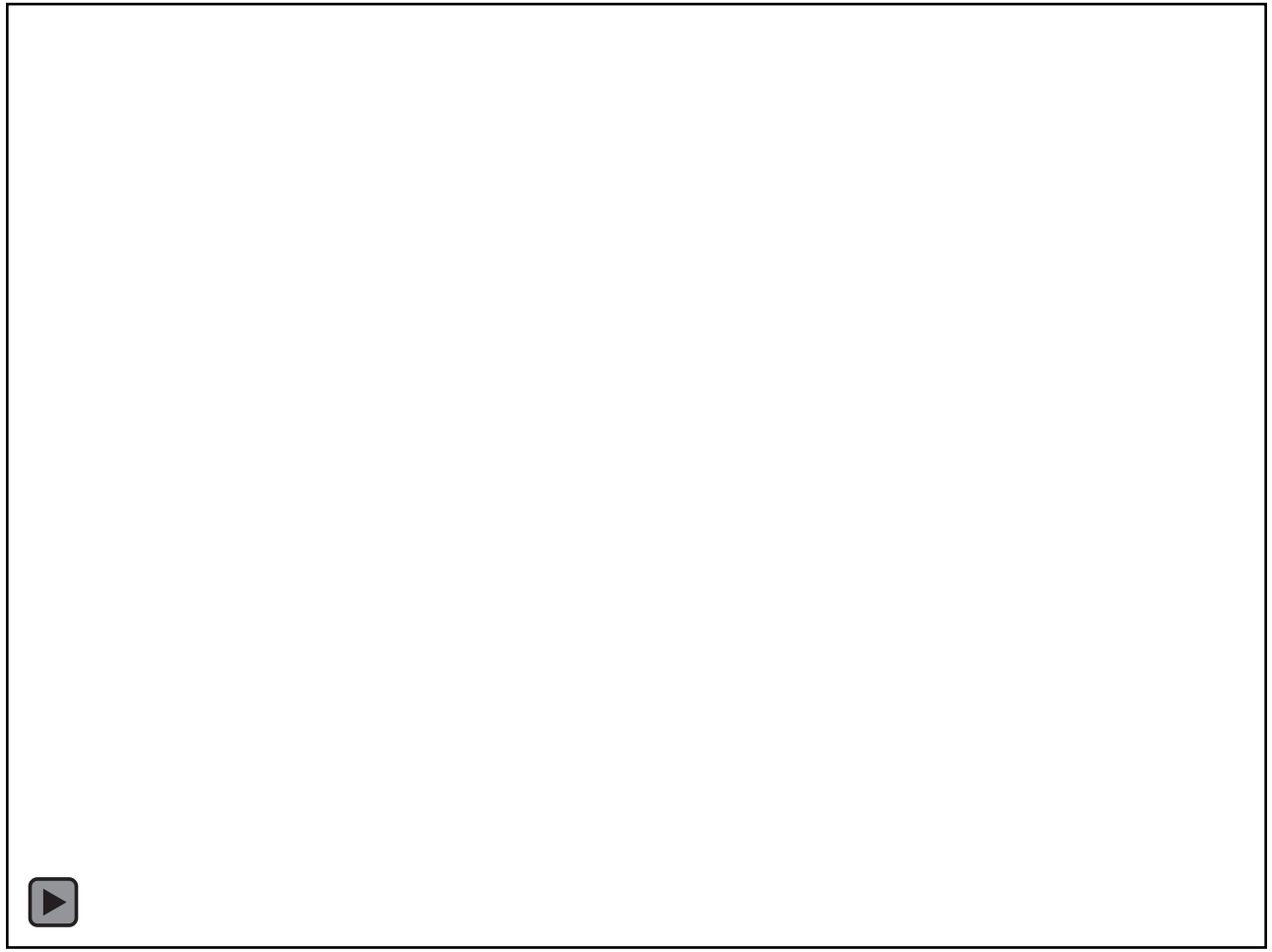


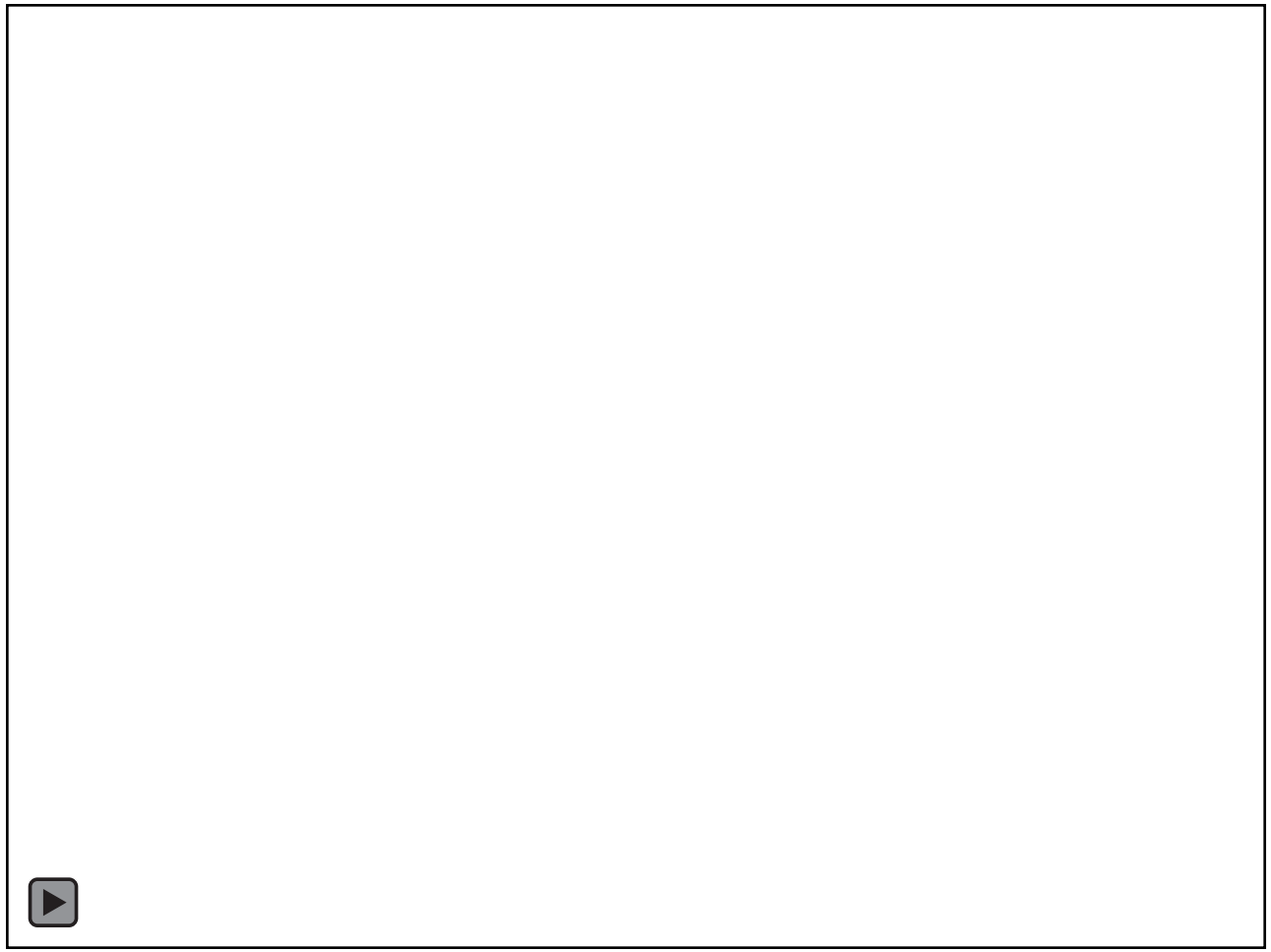
- Σχεδιασμός στόχων και προστατευόμενων οργάνων



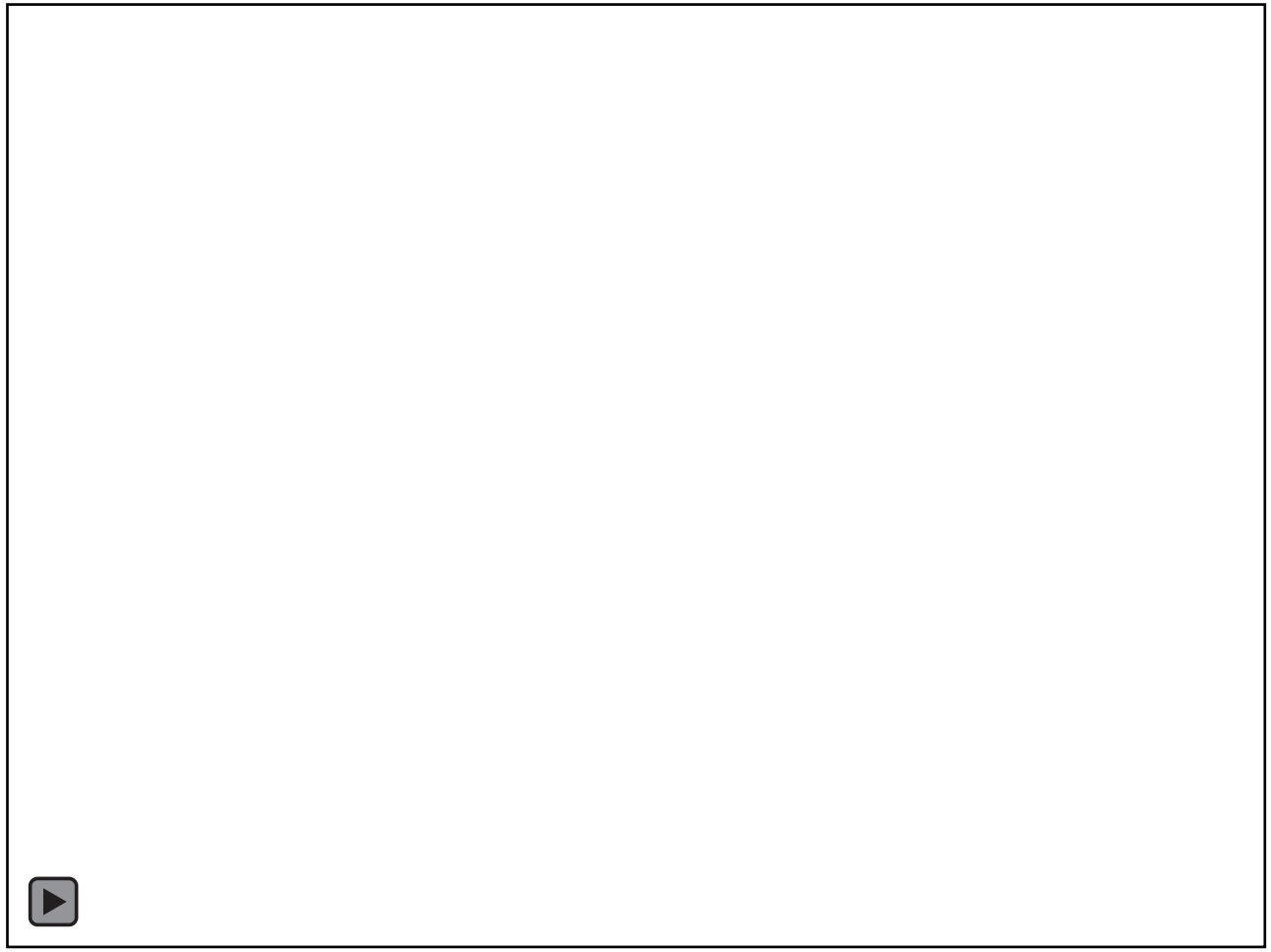
- Στερεοσκοπική εμφάνιση στόχων, OAR

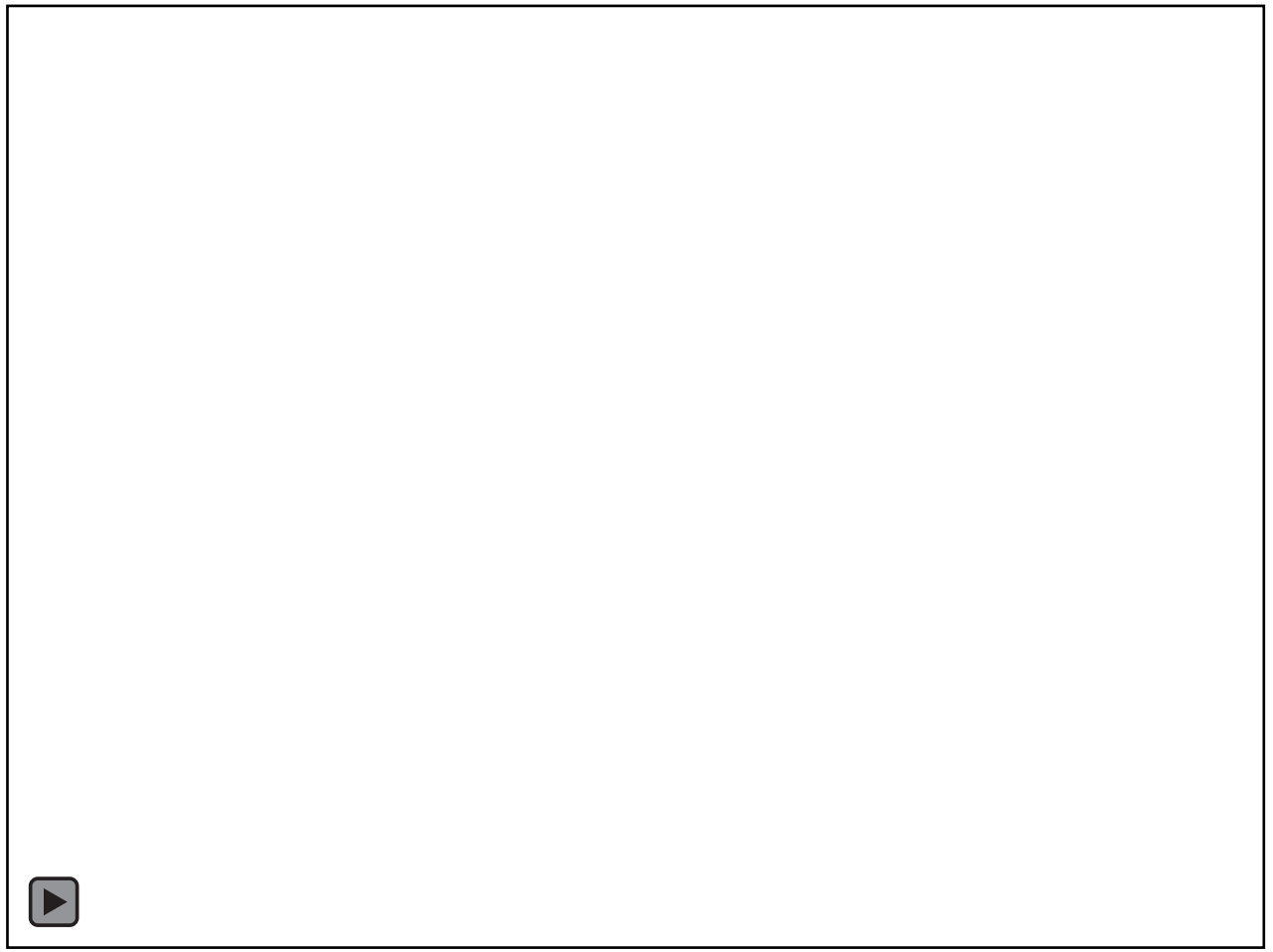


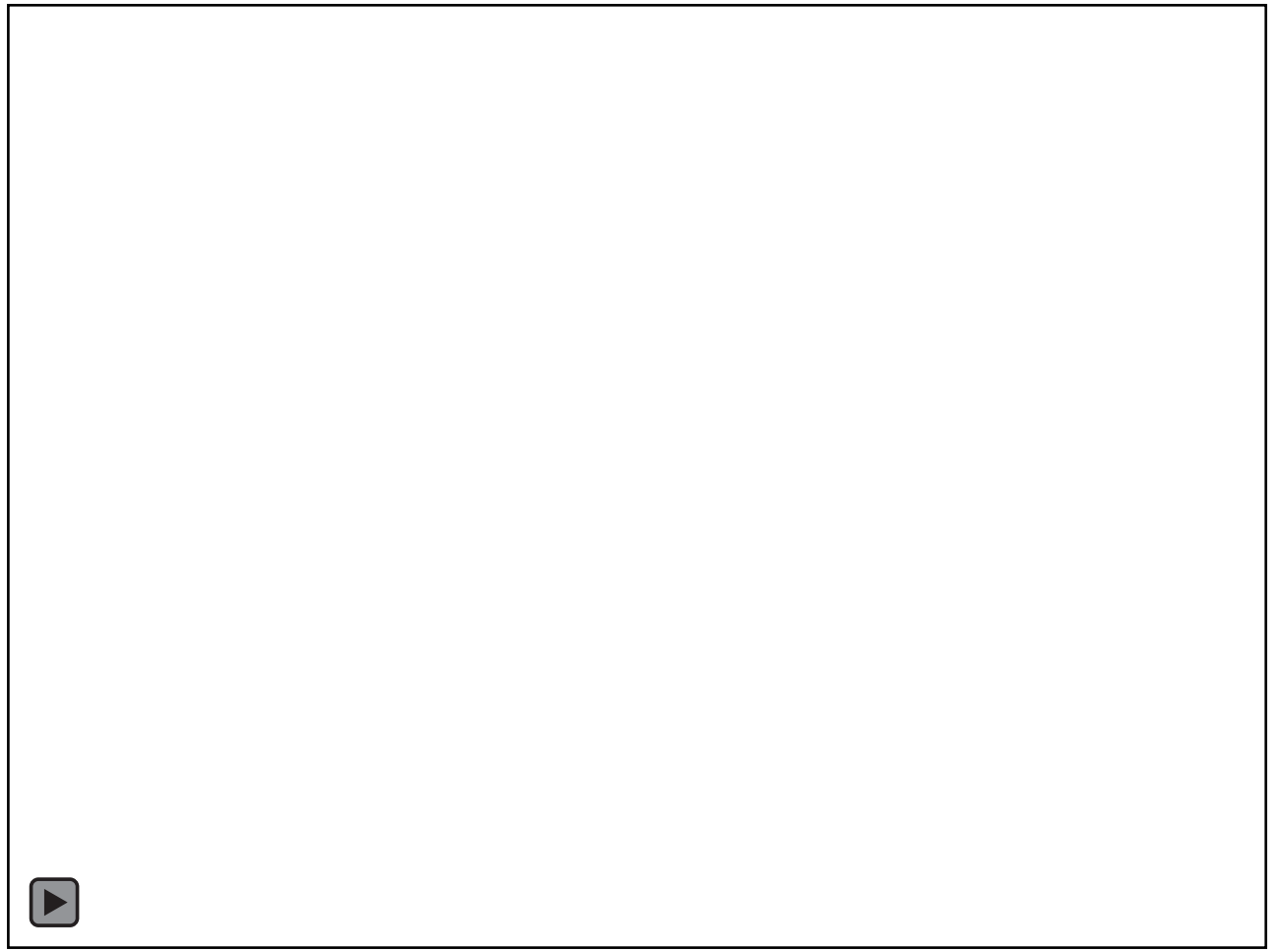


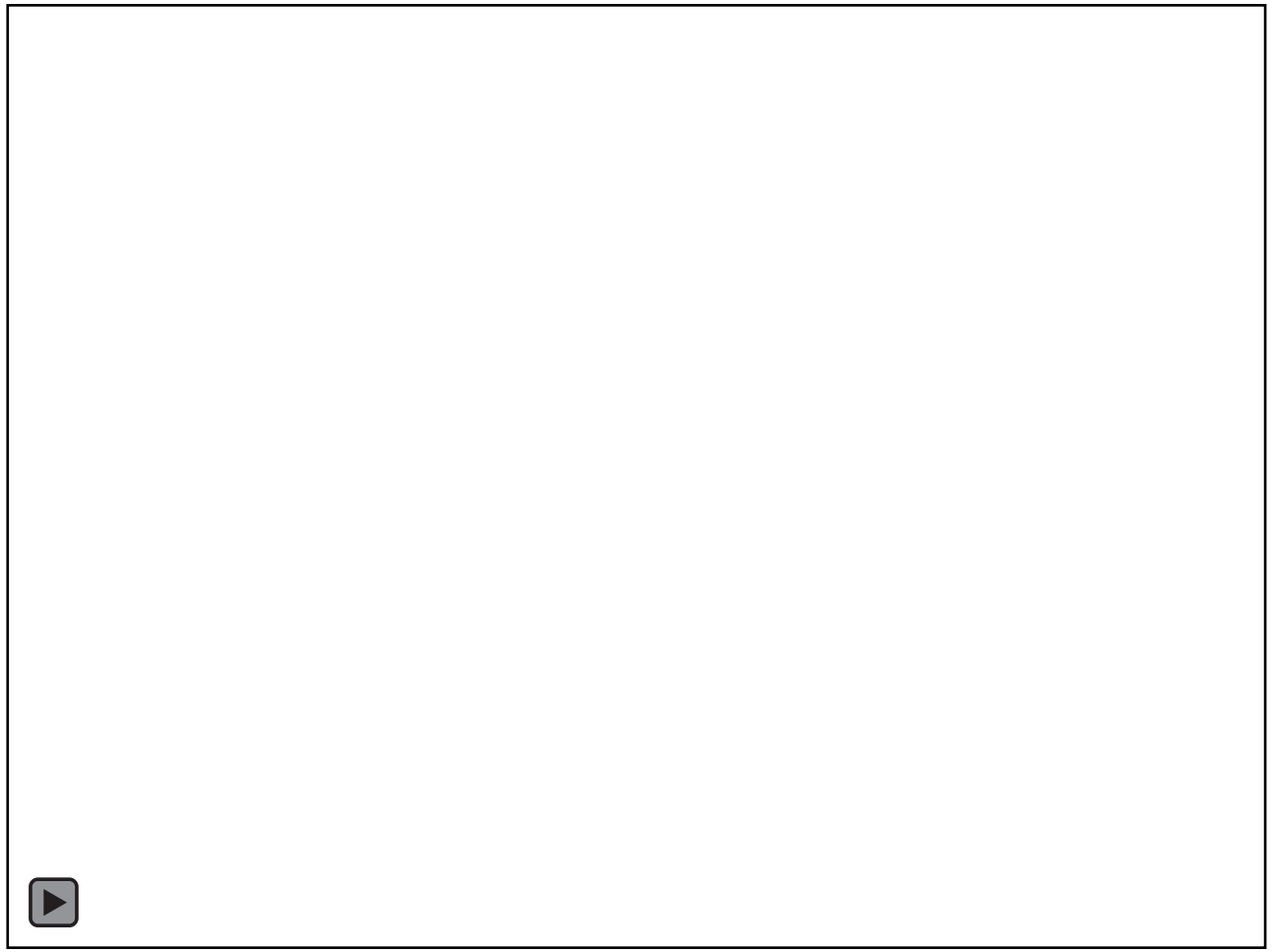


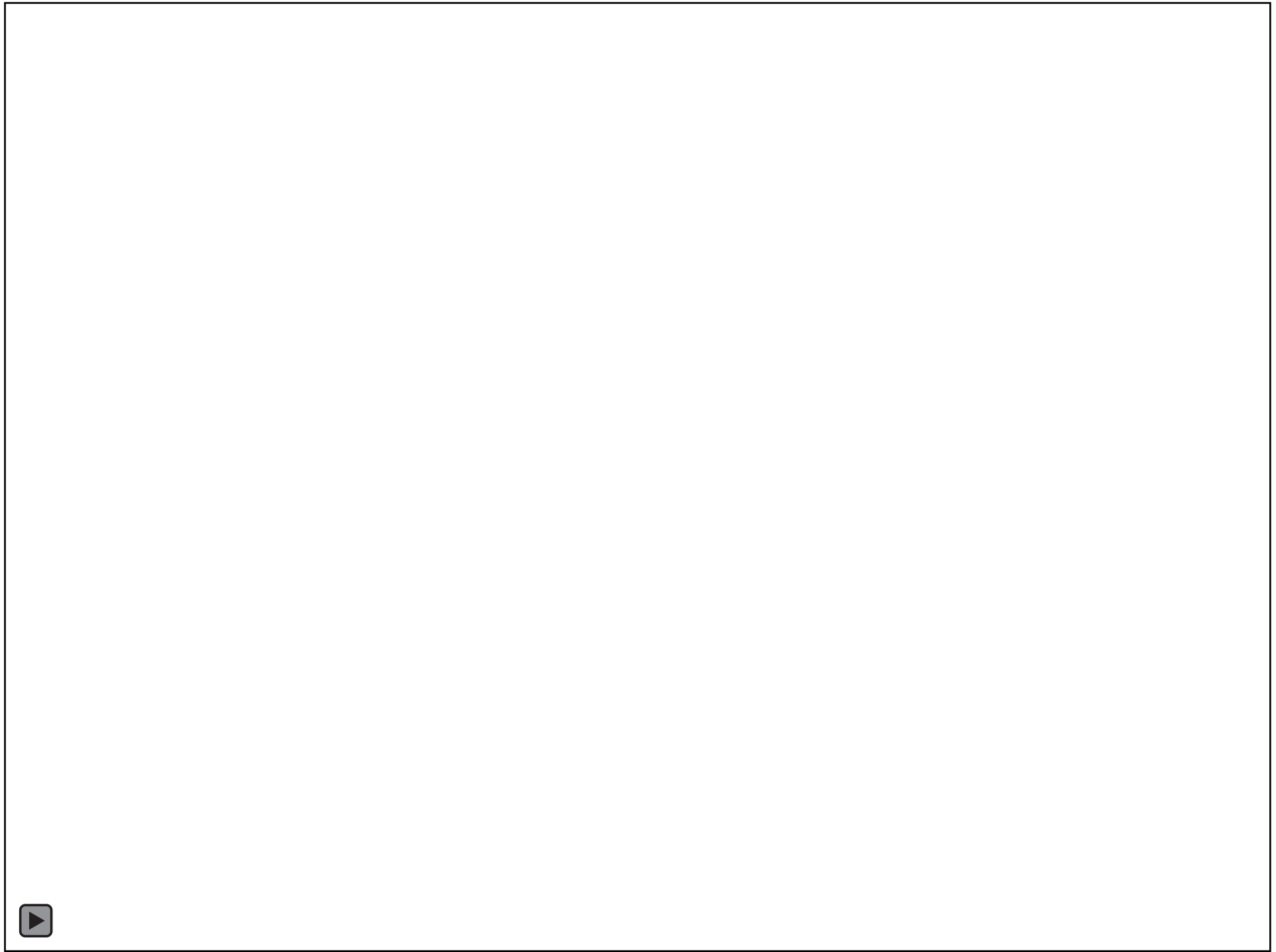
- Επιβεβαίωση στόχου

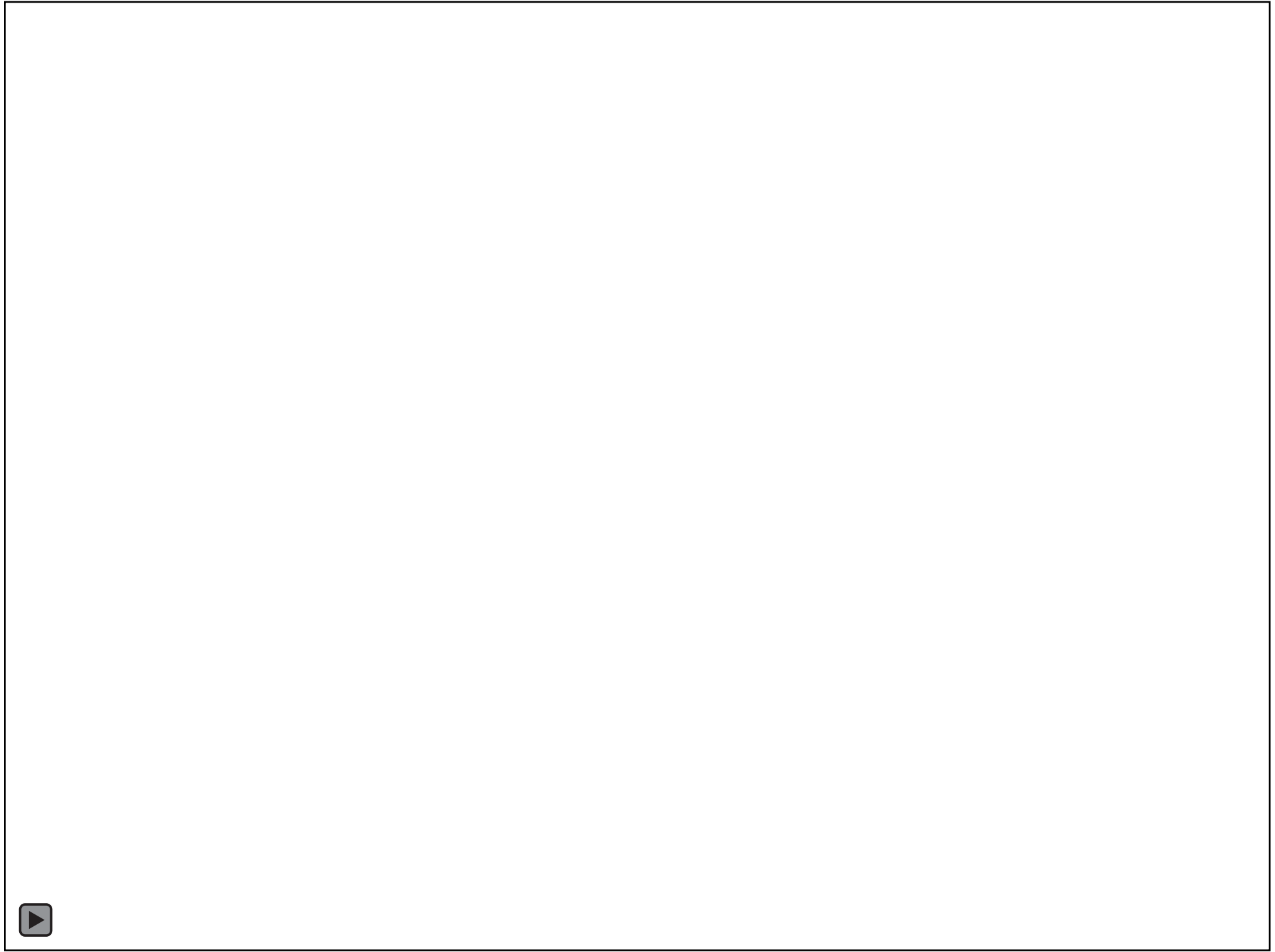












Πρόγραμμα 14ης Εκπαιδευτικής Εβδομάδος
Ελλήνων Ειδικευομένων Ουρολόγων
18-22 Φεβρουαρίου 2019
Ξενοδοχείο Athens Marriott

1η Ημέρα - Δευτέρα 18 Φεβρουαρίου 2019

Καρκίνος του προστάτη και Συμπτώματα από το κατώτερο ουροποιητικό στους άνδρες

09:30 - 11:00 Θεραπεία εντοπισμένης νόσου

09.30-09.50 Ενεργή παρακολούθηση / **Ε. Φραγκιάδης**
09.50-10.10 Χειρουργική θεραπεία / **Μ. Καραβιτάκης**
10.10-10.30 Ακτινοβολία / **Ε. Μαραγκουδάκης**
10.30-10.50 Εστιασμένη θεραπεία / **Ι. Βαρκαράκης**
10:50-11:00 Ερωτήσεις - συζήτηση

ευχαριστώ