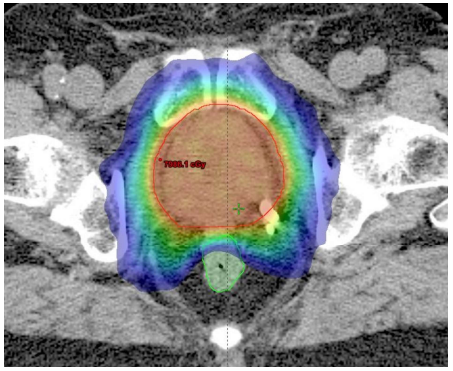
The first congress and workshop of Georgian Association of Oncological Urology
October 4-5 2017

The role of radiotherapy in the management of locally advanced and metastatic prostate cancer



Merdan Fayda, MD
Professor of Radiation Oncology
İSTİNYE ÜNİVERSİTESİ

- Definition and diagnostic work-up
- Treatment options
- Adjuvant RT
- Curative RT
- Local radiotherapy for metastatic cases
- Radiosurgery for oligomets
- Palliative RT

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Prostate Cancer

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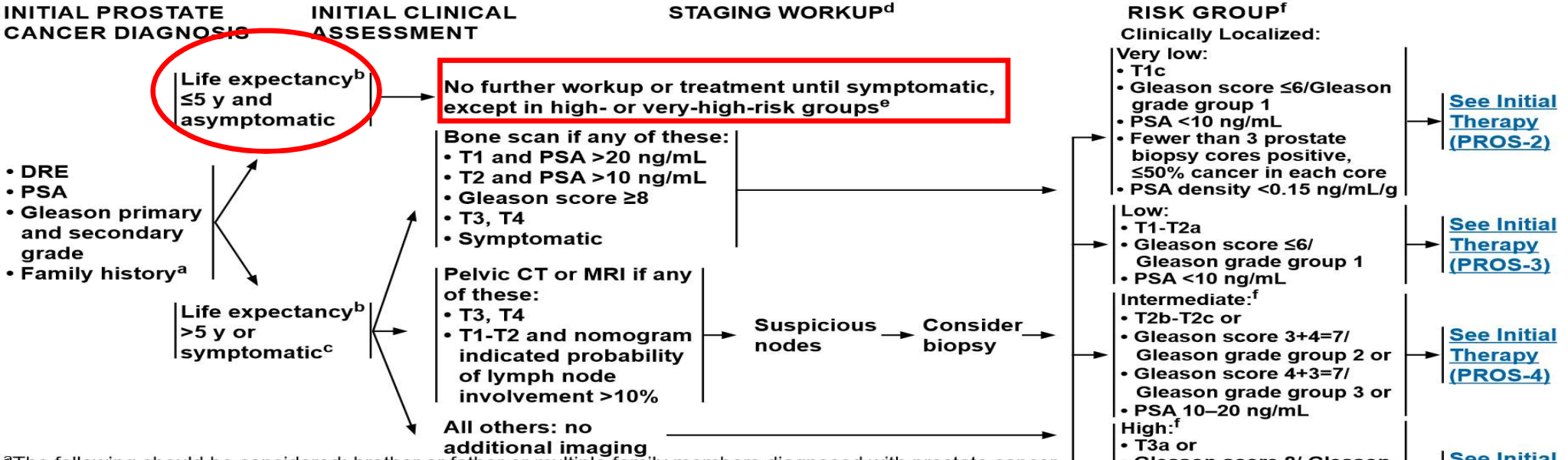

[a]The following should be considered: brother or father or multiple family members diagnosed with prostate cancer at less than 60 years of age, germline DNA repair gene abnormalities, especially BRCA2 mutation or Lynch syndrome (germline mutations in MLH1, MSH2, MSH6, or PMS2) and/or strong family history for breast or ovarian cancer (suggests possibility of BRCA2 mutation) or colorectal, endometrial, gastric, ovarian, pancreatic, small bowel, urothelial, kidney, or bile duct cancer (suggests possibility of Lynch syndrome).

[b]See Principles of Life Expectancy Estimation (PROS-A).

[c]Men with clinically localized disease may consider the use of tumor-based molecular assays. Retrospective case cohort studies have shown that molecular assays performed on biopsy or prostatectomy specimens provide prognostic information independent of NCCN risk groups. These include, but are not limited to, likelihood of death with conservative management, likelihood of biochemical progression after radical prostatectomy or external beam therapy, and likelihood of developing metastasis after radical prostatectomy or salvage radiotherapy. See Discussion.

[d]See Principles of Imaging (PROS-B).

[e]Androgen deprivation therapy (ADT) or radiation therapy (RT) may be considered in selected patients with high- or very-high-risk disease, where complications, such as hydronephrosis or metastasis, can be expected within 5 y. (See PROS-5 or PROS-6).

[f]Patients with multiple adverse factors may be shifted into the next highest risk group.

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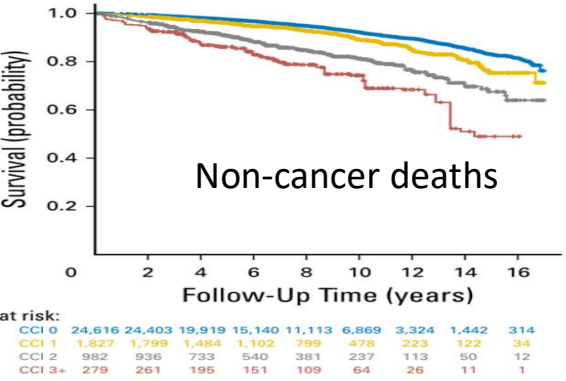
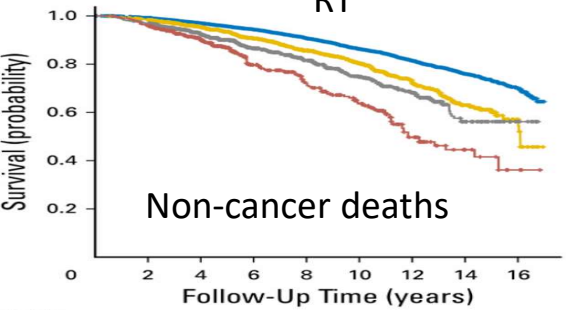
RP



at risk:

CCI 0	24,616	24,403	19,919	15,140	11,113	6,869	3,324	1,442	314
CCI 1	1,827	1,799	1,484	1,102	799	478	223	122	34
CCI 2	982	936	733	540	381	237	113	50	12
CCI 3+	279	261	195	151	109	64	26	11	1

RT



at risk:

CCI 0	13,144	12,947	10,404	7,548	5,513	3,673	2,018	896	186
CCI 1	1,916	1,876	1,484	1,040	749	474	241	104	22
CCI 2	826	797	614	429	315	203	109	49	11
CCI 3+	375	359	277	175	132	88	36	11	2

Rajan, JCO, 2017

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INITIAL PROSTATE CANCER DIAGNOSIS

- DRE
- PSA
- Gleason primary and secondary grade
- Family history[a]

INITIAL CLINICAL ASSESSMENT

- Life expectancy[b] ≤5 y and asymptomatic → No further workup or treatment until symptomatic, except in high- or very-high-risk groups[e]
- Life expectancy[b] >5 y or symptomatic[c]

STAGING WORKUP[d]

- Bone scan if any of these:
  - T1 and PSA >20 ng/mL
  - T2 and PSA >10 ng/mL
  - Gleason score ≥8
  - T3, T4
  - Symptomatic
- Pelvic CT or MRI if any of these:
  - T3, T4
  - T1-T2 and nomogram indicated probability of lymph node involvement >10%

  → Suspicious nodes → Consider biopsy
- All others: no additional imaging

RISK GROUP[f]

Clinically Localized:

- Very low:
  - T1c
  - Gleason score ≤6/Gleason grade group 1
  - PSA <10 ng/mL
  - Fewer than 3 prostate biopsy cores positive, ≤50% cancer in each core
  - PSA density <0.15 ng/mL/g → See Initial Therapy (PROS-2)
- Low:
  - T1-T2a
  - Gleason score ≤6/ Gleason grade group 1
  - PSA <10 ng/mL → See Initial Therapy (PROS-3)
- Intermediate:[f]
  - T2b-T2c or
  - Gleason score 3+4=7/ Gleason grade group 2 or
  - Gleason score 4+3=7/ Gleason grade group 3 or
  - PSA 10–20 ng/mL → See Initial Therapy (PROS-4)
- High:[f]
  - T3a or
  - Gleason score 8/ Gleason grade group 4 or
  - Gleason score 9–10/ Gleason grade group 5
  - PSA >20 ng/mL → See Initial Therapy (PROS-5)

Locally Advanced:

- Very high:
  - T3b-T4 or
  - Primary Gleason pattern 5/ Gleason grade group 5 or
  - >4 cores with Gleason score 8–10/ Gleason grade group 4 or 5 → See Initial Therapy (PROS-6)
- Metastatic:
  - Any T, N1 or
  - Any T, Any N, M1

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ANATOMIC STAGE/PROGNOSTIC GROUPS *

Group	T	N	M	PSA	Gleason
I	T1a-c	N0	M0	PSA <10	Gleason ≤6
	T2a	N0	M0	PSA <10	Gleason ≤6
	T1-2a	N0	M0	PSA X	Gleason X
IIA	T1a-c	N0	M0	PSA <20	Gleason 7
	T1a-c	N0	M0	PSA ≥10 <20	Gleason ≤6
	T2a	N0	M0	PSA <20	Gleason ≤7
	T2b	N0	M0	PSA <20	Gleason ≤7
	T2b	N0	M0	PSA X	Gleason X
IIB	T2c	N0	M0	Any PSA	Any Gleason
	T1-2	N0	M0	PSA ≥20	Any Gleason
	T1-2	N0	M0	Any PSA	Gleason ≥8
III	T3a-b	N0	M0	Any PSA	Any Gleason
IV	T4	N0	M0	Any PSA	Any Gleason
	Any T	N1	M0	Any PSA	Any Gleason
	Any T	Any N	M1	Any PSA	Any Gleason

Very low:
- T1c
- Gleason score ≤6/Gleason grade group 1
- PSA <10 ng/mL
- Fewer than 3 prostate biopsy cores positive, ≤50% cancer in each core
- PSA density <0.15 ng/mL/g

Low:
- T1-T2a
- Gleason score ≤6/ Gleason grade group 1
- PSA <10 ng/mL

Intermediate:[f]
- T2b-T2c or
- Gleason score 3+4=7/ Gleason grade group 2 or
- Gleason score 4+3=7/ Gleason grade group 3 or
- PSA 10–20 ng/mL

High:[f]
- T3a or
- Gleason score 8/ Gleason grade group 4 or
- Gleason score 9–10/ Gleason grade group 5
- PSA >20 ng/mL

Locally Advanced:
Very high:
- T3b-T4 or
- Primary Gleason pattern 5/ Gleason grade group 5 or
- >4 cores with Gleason score 8–10/ Gleason grade group 4 or 5

Table 1 Definition of locally advanced or very high-risk PCa

Author	Definition
Spahn *et al.*[22]	PSA >20 + risk factor (GS 8–10 and/or cT3–4)
Walz *et al.*[21]	Multiple risk factor (PSA >20, GS 8–10, cT3–4)
Joniau *et al.*[23]	GS 8–10 + risk factor (PSA >20 and/or cT3–4)
Sundi *et al.*[24]	GS 5 or ≥5 cores with GS 8,9 or multiple risk
NCCN guideline[20]	T3b–T4
EAU guideline[3]	cT3–4 or cN^+

Saika, IJU, 2017

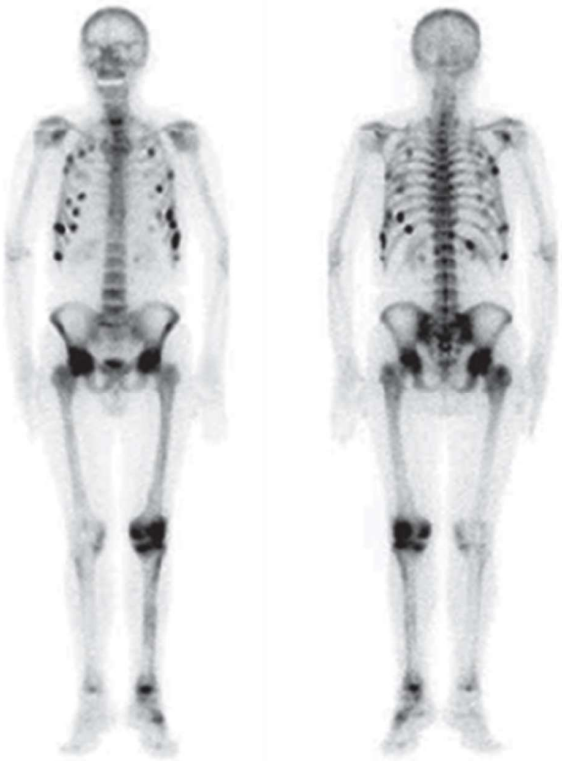
Prostate cancer at first diagnosis

- Local disease 80% — 5y survival ~ 100%
- Regional disease 12 % — 5y survival ~ 100 %
- Metastatic 8 % — 5y survival ~ 30 %

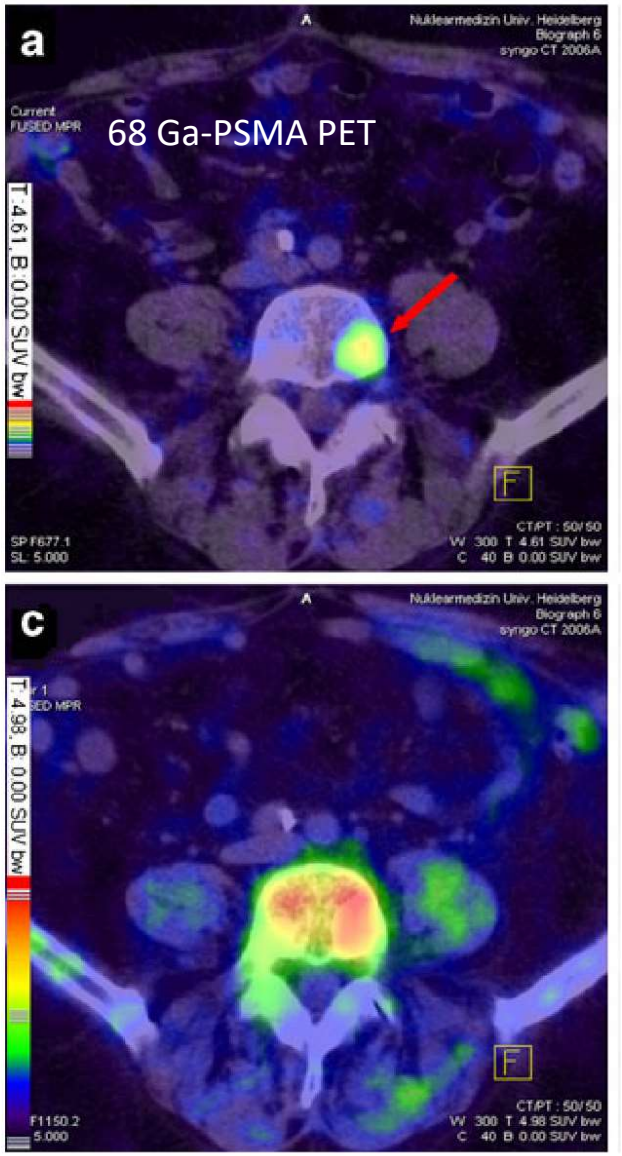
ACS, website

Diagnostic work-up

- Bone scan



- **Bone scan is indicated in the initial evaluation of patients at high risk for skeletal metastases.**
  - **T1 disease and PSA ≥20, T2 disease and PSA ≥10, Gleason score ≥8, or T3/T4 disease**
  - **Any stage disease with symptoms suggestive of osseous metastatic disease**



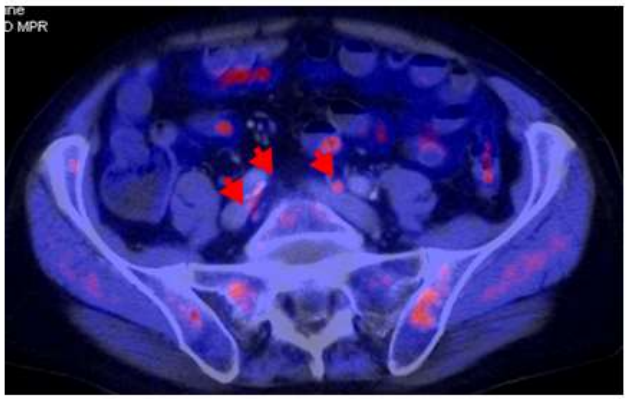
68Ga-PSMA PET/CT for recurrence

- (68)Ga-PSMA PET/CT can detect lesions characteristic for PC with improved contrast when compared to standard (18)F-fluoromethylcholine PET/CT, especially at low PSA levels for recurrent prostate cancer.

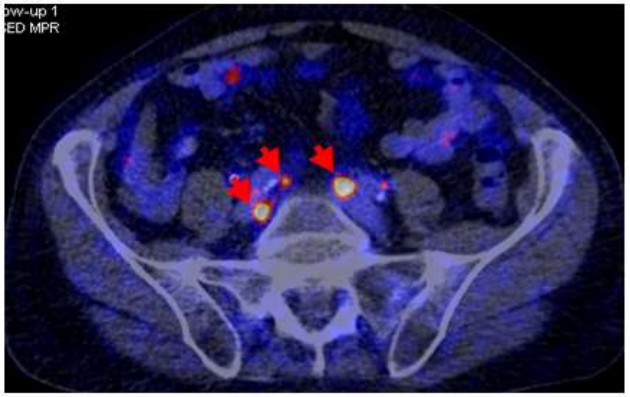
Afshar-Oromieh, EJNMMI, 2014

Lymph nodes

^{11}C-choline



^{68}Ga-PSMA



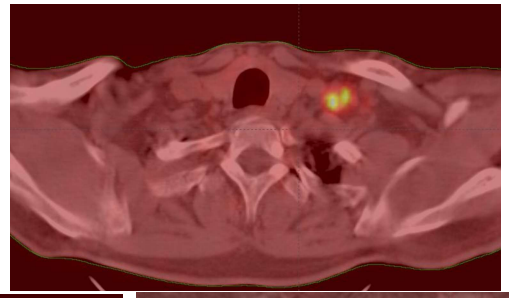
68 Ga PET Primary cancer staging

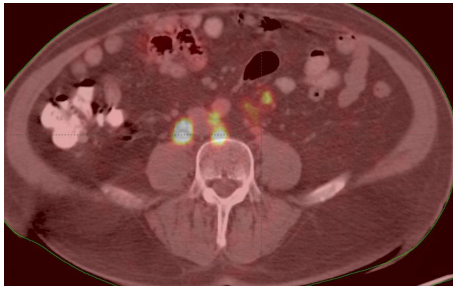
- 68 Ga PET has higher detection rate for lymph node and bone lesions

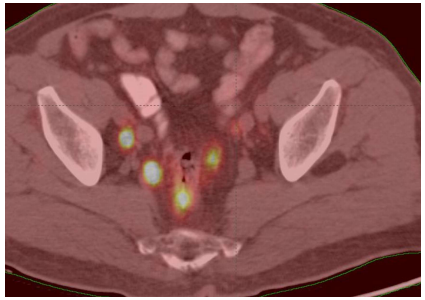
Schwenck, ENMMI, 2017

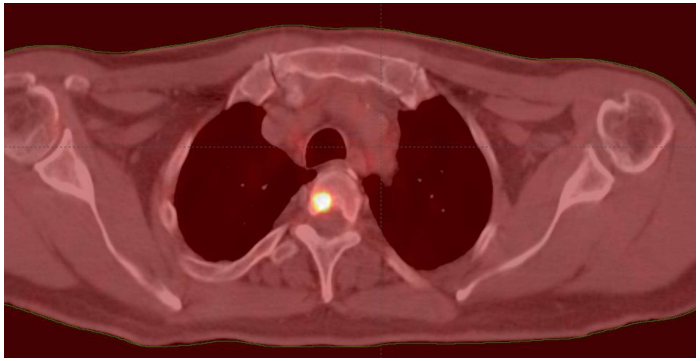
Primary staging- 68Ga-PSMA PET

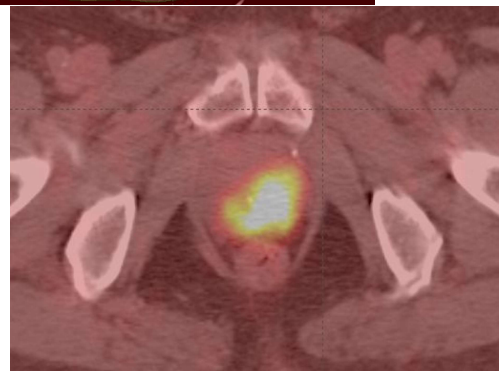
- Prostate cancer

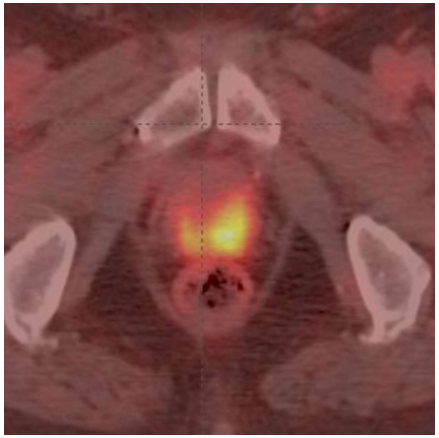






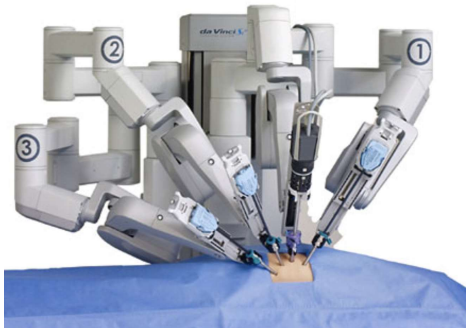






PSMA after Hormonotherapy

RT vs surgery in high risk disease



- No randomized comparison
- Retrospective pooled analysis showed that RT has worse PCSM than surgery
  - aHR = 2.08 (1.76-2.47) p<0.000001
  - More favorable and healthy people could go to surgery
  - Hormontherapy may not be optimal
  - Lower doses than the standard döşe
  - If you correct these errors the 10 year CSS difference between RP and RT would be less than 1%

Roach III, IJROBP, 2015

Wallis, EU, 2016

Adjuvant RT

Table 4 Oncological outcomes of RALP for locally advanced PCa

Authors	*n*	Very high-risk criteria	Mean/median preoperative PSA	Stage ≥pT3 (%)	PSM (%)	BCR criteria	BCR (%)	BCRFS time estimate, % (years)	Mean follow up in months
Ham *et al.*[35]	121	≥cT3	65.8	96	48.8	NI	NI	NI	NI
Casey *et al.*[36]	35	≥pT3	7	100	20	NI	28.6	NI	13.3
Vora *et al.*[37]	140	≥pT3	8.3	100	47.1	PSA >0.2	18.5	50.0 – 1 year	54
Koo *et al.*[38]	53	≥cT3b or cN1	26.3	NI	60	PSA >0.2	NI	20.0 – 2 years	36.1
Gandaglia *et al.*[39]	94	≥cT3	9.7	76.6	32.3	PSA >0.2	22.3	63.3 – 3 years	23.5

Saika, IJU, 2017

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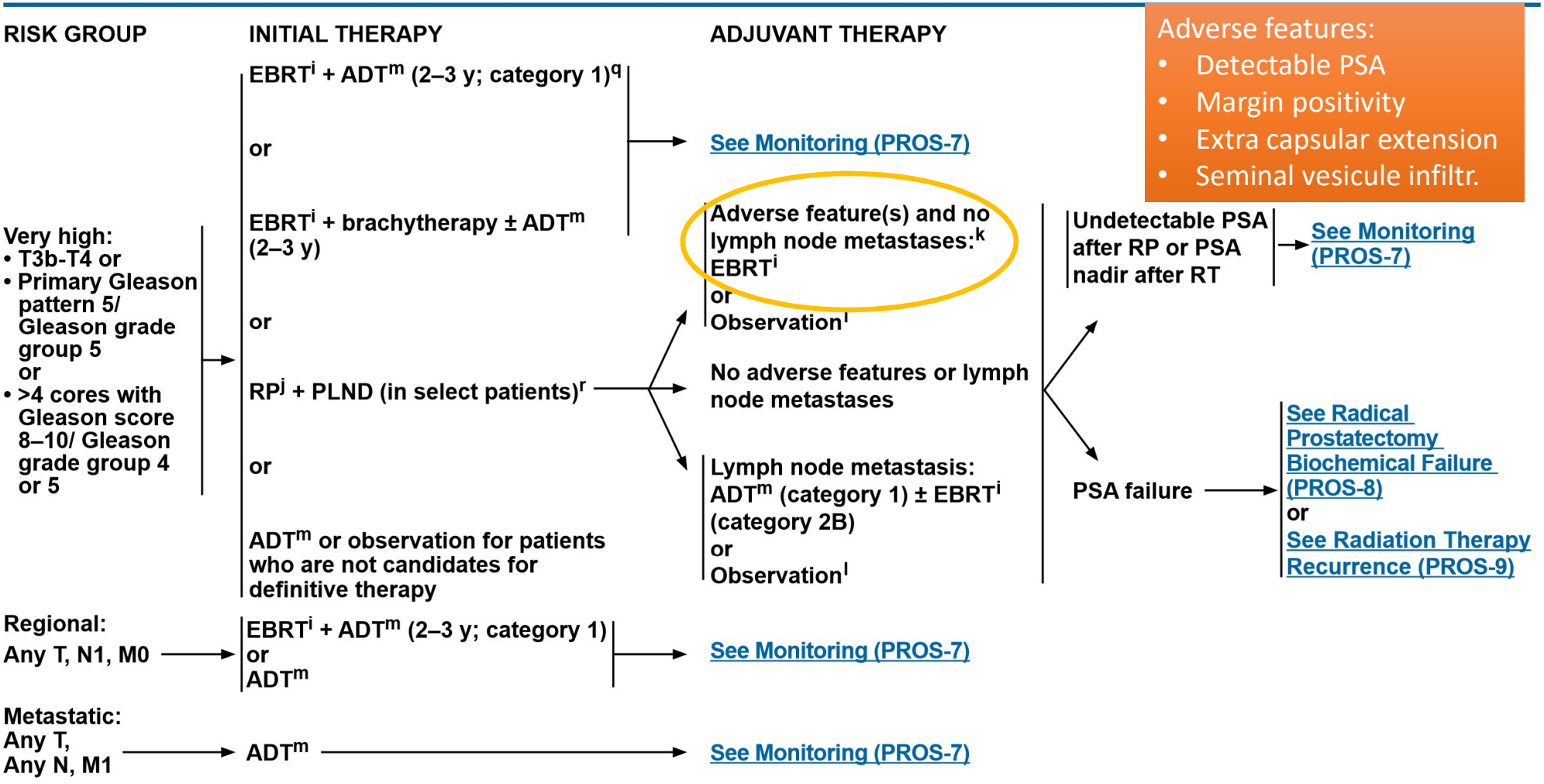

Adverse features:
- Detectable PSA
- Margin positivity
- Extra capsular extension
- Seminal vesicule infiltr.

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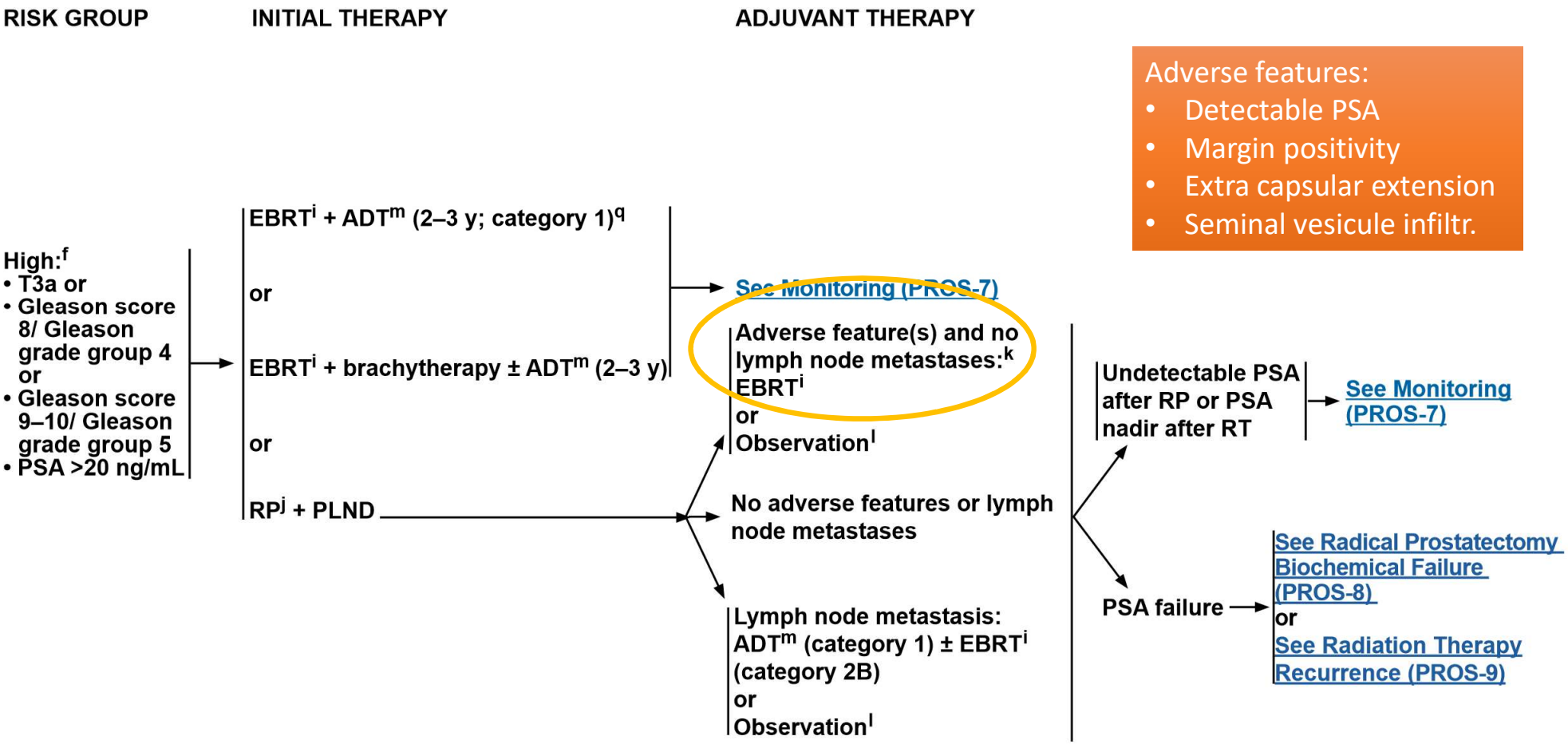


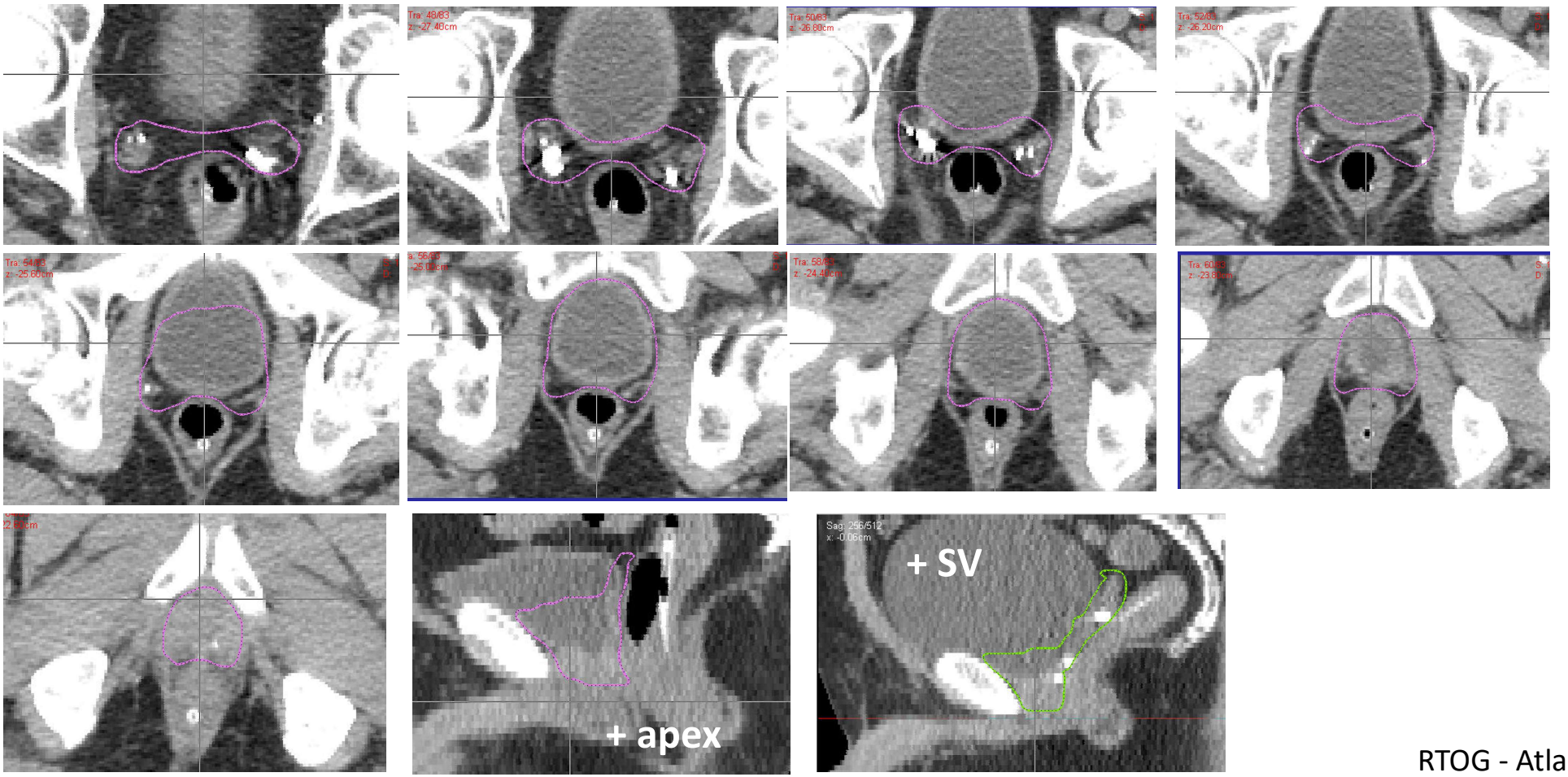
Adverse features:
- Detectable PSA
- Margin positivity
- Extra capsular extension
- Seminal vesicule infiltr.

Table 1 Randomized Clinical Trials of Postoperative Radiation vs Observation After Radical Prostatectomy With Adverse Pathologic Features

Trial	Enrollment Dates	Median f/u	Arms	*n*	Risk Factors	% Receiving assigned Rx	RT Timing, Dose, and Technique	Neoadj ADT (Before RP)	Definition of PSA Progression	bPFS	cPFS	MFS	OS	Salvage Tx
SWOG 8794	8/1988-1/1997	12.7 y	Adjuvant radiation	214	ECE or R1: 67% SVI: 10% pN0: 100% GS 7-10: 43% Preoperative PSA level ≥ 10 ng/mL: 53% Postoperative PSA level ≥ 0.2 ng/mL: 35%	95%	≤ 18 wk post-op 60Gy/30 fx-64Gy/32 fx RT: conventional Tx Vol: PF and periprostatic tissue	9%	>0.4 ng/mL	10 y: ~50% Median: 10.3 years	Median: 13.8 years	10 y: 71% Median: 14.7 y	10 y: 74% Median: 15.2 y	Salvage HT by year 5: 10%
		12.5 y	Observation	211	ECE or R1: 67% SVI: 11% pN0: 100% GS 7-10: 54% Preoperative PSA level ≥ 10 ng/mL: 48% Postoperative PSA level ≥ 0.2 ng/mL: 32%	98%	–	8%		10 y: ~25% Median: 3.1 y	Median: 9.9 y	10 y: 61% Median: 12.9 y	10 y: 66% Median: 13.3 y	Salvage RT: 33% Salvage HT by year 5: 21%
EORTC 22911	11/1992-12/2001	10.6 years	Adjuvant radiation	502	ECE: 75% R1: 62% SVI: 25% pN0: 98.6% WHO 2-3: 85% Preoperative PSA level: median 12.3 ng/mL Postoperative PSA level > 0.2 ng/mL: 9.2%	82%	Median 90 d post-op 60 Gy/30 fx 4 field (70%) Tx Vol: Large field (>9 × 9 cm eqsq) in 92.3% Small field (<9 × 9 cm eqsq) in 54.0%	10%	>0.2 ng/mL above post-RP value	5 y: 74.0% 10 y: 60.6% Median: 6.12 y	10 y: 70.3%	10 y: 76.5%	5 y: 93.1% 10 y: 76.9%	Salvage HT by year 5: 10.1%
		10.6 y	Observation	503	ECE: 79% R1: 63% SVI: 25% pN0: 99.6% WHO 2-3: 88% Preoperative PSA level: median 12.4 ng/mL Postoperative PSA level > 0.2 ng/mL: 12.3%	98%	–	10%		5 y: 52.6% 10 y: 41.1% Median: 13.2 y	10 y: 64.8%	10 y: 71.3%	5 y: 92.3%; 10 y: 80.7%	Salvage RT: 33% Salvage HT by year 5: 15.5%
ARO 96-02	4/1997-9/2004 (required undetectable post-op PSA)	9.3 y	Adjuvant radiation	148	ECE; 67% R1: 68% SVI: 27% pN0: 98.6% GS 7-10: 62% Preoperative PSA level: median 9.7 ng/mL Postoperative PSA level: < 0.1 ng/mL	77%	Median 81 days postoperation 60 Gy/30 fx 3 or 4 field, 3D-CRT Tx Vol: Surgical margins (apex to SV) + 1 cm	11%	2 Consecutive PSA level increases	5 y: 72% 10 y: 56% Median: NR	NR	NR	NR	NR
		9.4 y	Observation	159	ECE; 64% R1: 61% SVI: 27% pN0: 98.1% GS 7-10: 64% Preoperative PSA level: median 9.4 ng/mL Postoperative PSA level: < 0.1 ng/mL	97%	–	12%		5 y: 54% 10 y: 5% Median: 5.5 y	NR	NR	NR	NR

Abbreviations: CRT, conformal radiation therapy; ECE, extracapsular extension; f/u, follow-up; fx, fraction; GS, Gleason score; NR, not reported; SV, seminal vesicle; Tx, treatment; Vol, volume.

Adjuvant RT



RTOG - Atlases

Adjuvant RT

Table 1 Acute toxicity effects of RT after prostatectomy (ranges based on RTOG or CTCAE grading system)

Study arm type	Genitourinary		Gastrointestinal	
	Grades 1-2	Grades 3-4	Grades 1-2	Grades 3-4
Adjuvant	10.5%-26%	2.0%-8.0%	22.0%-25.0%	0.0%-2.0%
Salvage	3.0%-82.0%	0.0%-6.0%	2.9%-96.0%	0.0%-2.2%
Mixed	5.0%-92.0%	0.0%-3.0%	4.3%-87.0%	0.0%-1.3%

Valicenti, IJROBP, 2013

Adjuvant RT

Table 2 Late toxicity effects of RT after prostatectomy (ranges based on RTOG/EORTC or CTCAE grading system)

Study arm type	Genitourinary		Gastrointestinal	
	Grades 1-2	Grades 3-4	Grades 1-2	Grades 3-4
Adjuvant	2.0%-22.0%	0.0%-10.6%	1.0%-12.7%	0.0%-6.7%
Salvage	1.0%-49.0%	0.0%-6.0%	0.0%-66.0%	0.0%-18.0%
Mixed	1.3%-79.0%	0.0%-17.0%	2.0%-59.0%	0.0%-4.3%

Valicenti, IJROBP, 2013

Adjuvant RT

Conclusions: Physicians should offer adjuvant radiation therapy to patients with adverse pathologic findings at prostatectomy (ie, seminal vesicle invasion, positive surgical margins, extraprostatic extension) and salvage radiation therapy to patients with prostate-specific antigen (PSA) or local recurrence after prostatectomy in whom there is no evidence of distant metastatic disease. The offer of radiation therapy should be made in the context of a thoughtful discussion of possible short- and long-term side effects of radiation therapy as well as the potential benefits of preventing recurrence. The decision to administer radiation therapy should be made by the patient and the multidisciplinary treatment team with full consideration of the patient's history, values, preferences, quality of life, and functional status. The American Society for Radiation Oncology and American Urological Association websites show this guideline in its entirety, including the full literature review.

Valicenti, IJROBP, 2013

Salvage RT

- Detectable PSA after surgery
- N=2460
- Med FU 5 years
- 5year FFBF
  - 71% for PSA 0.01-0.2
  - 37% for PSA >2 ng/mL

Tendulkar, JCO 2016

Node positive disease

Regional:
Any T, N1, M0 → **EBRT^{i} + ADT^{m} (2–3 y; category 1)**
or
ADT^{m}

NCCN, 2017

Curative raditoherapy for node positive

Table 2 Studies Evaluating Definitive Radiotherapy for Node-Positive Prostate Cancer

Study	Study Design	Median Follow-Up (Y)	No. of Patients	Overall Survival	Prostate Cancer–Specific Survival	Recurrence-Free Survival
Definitive radiotherapy (RT) vs no RT						
Zagars et al[5]	Retrospective, single institution	ADT: 9.4 RT+ADT: 6.2	255	(10 y) ADT: 46% RT + ADT: 67% ($P = 0.008$)	N/A	(10 y) ADT: 25% RT + ADT: 80% ($P < 0.001$)
Lin et al[6]	Retrospective, National Cancer Data Base	2.7	638	(5 y) ADT: 53% RT + ADT: 72% ($P < 0.001$)	N/A	N/A
Tward et al[7]	Retrospective, SEER	7.5	1100	(5 y) No RT: 56% RT: 68% ($P < 0.01$)	(5 y) No RT: 71% RT: 78% ($P < 0.01$)	N/A
Rusthoven et al[8]	Retrospective, SEER	6.8	2991	(10 y) RT: HR = 0.57 ($P < 0.001$)	(10 y) RT: HR = 0.58 ($P < 0.001$)	N/A
Radiotherapy (RT) alone vs RT plus ADT						
RTOG 85-31[10,11]	Secondary analysis of randomized trial data	6.5	173	(5 y) RT: 62% RT + ADT: 72% (multivariate $P = 0.03$)	Favors RT + ADT (Percentages not reported; multivariate $P = 0.014$)	(5 y) RT: 10% RT + ADT: 54% (multivariate $P < 0.001$)
Granfors et al[12]	Secondary analysis of randomized trial data	9.7	39	Favors RT + ADT ($P = 0.005$)	N/A	N/A

Abbreviations: ADT, androgen deprivation therapy; HR, hazard ratio; N/A, not available; PFS, progression-free survival; RTOG, Radiation Therapy Oncology Group; SEER, Surveillance Epidemiology & End Results.

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Postop RT for node positivity

Table 3 Studies Evaluating Radical Prostatectomy and Adjuvant Treatments for Node-Positive Prostate Cancer

Study	Study Design	Median Follow-Up (Years)	No. of Patients	Overall Survival	Prostate Cancer–Specific Survival	Recurrence-Free Survival
Radical prostatectomy (RP) vs conservative management						
Frohmüller et al[49]	Retrospective, single institution	ADT: 4.7 ADT + RP: 4.3	139	(10 y) ADT: 30% RP + ADT: 51% ($P = 0.067$)	(10 y) ADT: 32% RP + ADT: 71% ($P = 0.002$)	(10 y) ADT: 15% RP + ADT: 36% ($P = 0.002$)
Engel et al[16]	Retrospective, Munich Cancer Registry	5.6	938	(5 y) ADT: 60% RP + ADT: 84% (*P* value unknown)	(5 y Relative survival) ADT: 70% RP + ADT: 95% (*P* value unknown)	N/A
Steuber et al[50]	Retrospective, single institution	8.2	158	N/A	(10 y) ADT: 46% RP + ADT: 76% ($P = 0.001$)	(10 y) ADT: 31% RP + ADT: 61% ($P = 0.005$)
Adjuvant ADT vs observation						
ECOG 3886[17,18]	Randomized trial	11.9	98	(Median) Adjuvant ADT: 13.9 y Observation (delayed ADT): 11.3 y ($P = 0.04$)	(Median) Adjuvant ADT: Not reached Observation (delayed ADT): 12.3 y ($P < 0.001$)	(PFS) Favors adjuvant ADT (multivariate HR = 4.11) ($P < 0.001$)
Adjuvant radiotherapy (RT) vs no RT						
Briganti et al[19]	Retrospective, 2 institutions	7.9	364	(10 y) ADT: 55% ADT + RT: 74% ($P < 0.001$)	(10 y) ADT: 70% ADT + RT: 86% ($P = 0.004$)	N/A
Kaplan et al[21]	Retrospective, SEER-Medicare	N/A	577	(10 y) No RT: 3.77 deaths/100 person-y RT: 5.09 deaths/100 person-y ($P = 0.153$)	(10 y) No RT: 1.31 deaths/100 person-y RT: 2.89 deaths/100 person-y ($P = 0.09$)	N/A

Abbreviations: ADT, androgen deprivation therapy; HR, hazard ratio; N/A, not available; PFS, progression-free survival.

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Local radiotherapy for metastatic cancer

- SEER-based Culp study n=8185
  - Radical prostatectomy n=245
  - Brachytherapy n=129
  - No local tx n=7811 med.FU: 16 months

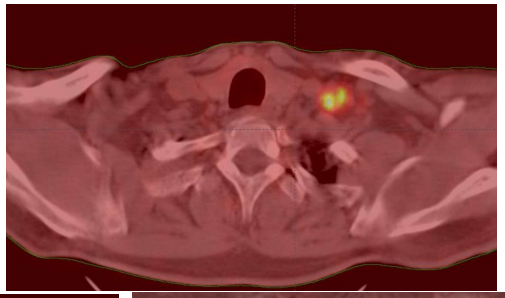
	No local tx	Radical prostatectomy	Brachytherapy
5-year OS	22.5%	67.4%	52.6%
Cancer spes. survival	48.7%	75.8%	61.3%

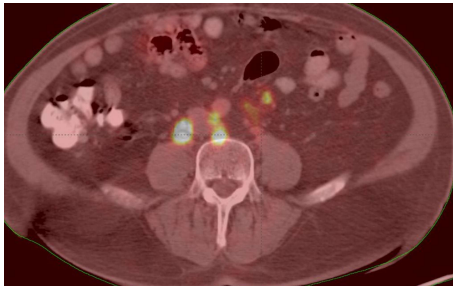
- Munich cancer registry
  - Radical prostatectomy n=74
  - No local tx n=1464

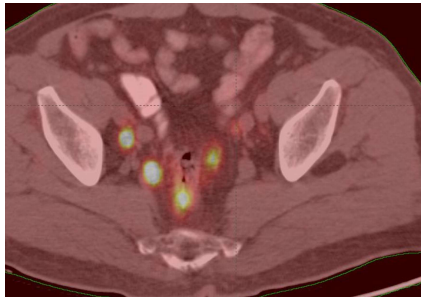
	No local tx	Radical prostatectomy
5-year OS	21%	55 %

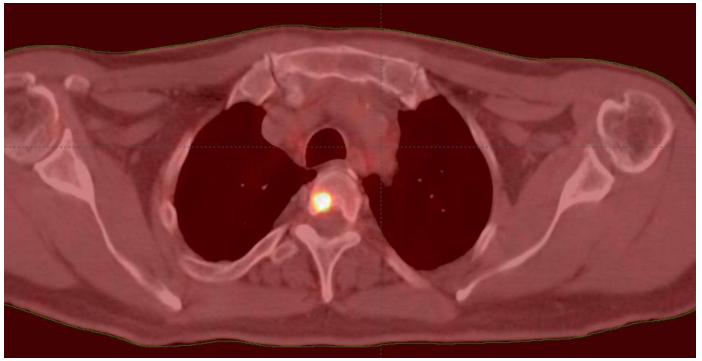
Randomized trials are needed

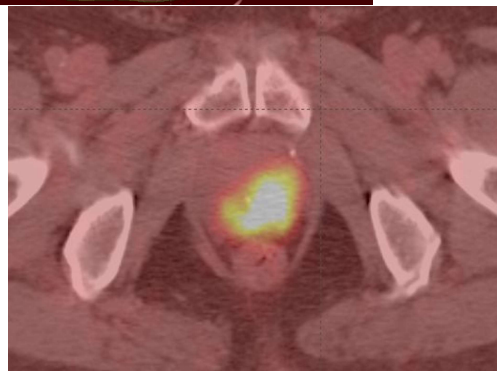
Culp, EU, 2014

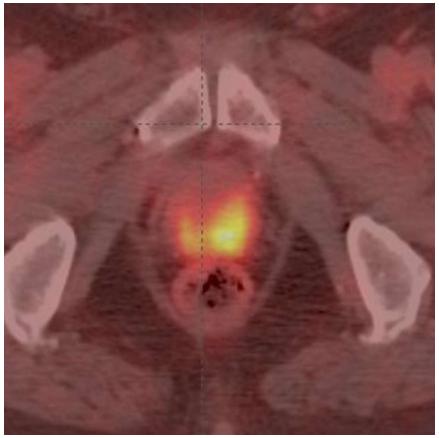




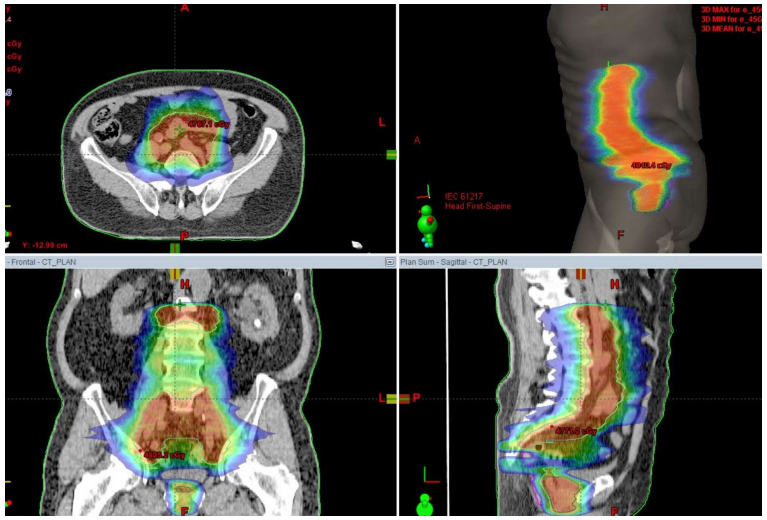








PSMA after 1y
Hormonotherapy



Metastasis directed treatment for oligo mets (≤ 5)

- Rationale
  - Nonsmall cell lung cancer 5 y OS 23 % with met directed treatments
  - Colon cancer 5 y OS 50 %

  - Prostate cancer ??
    - Surgery / radiosurgery to the metastatic site or radiosurgery

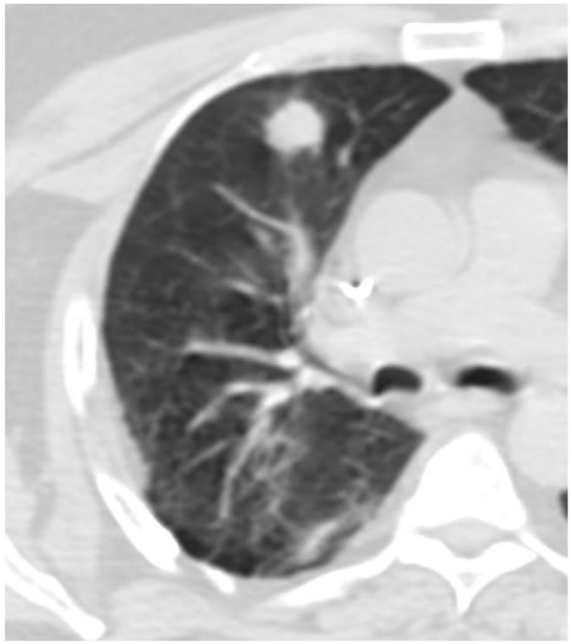
Table 4 Studies Evaluating Aggressive Metastasis-Directed Treatment in Patients With Oligometastatic Prostate Cancer

Study	No. of Patients	Treatment	Median Follow-Up (Months)	Metastatic Sites Treated (Nodes/ Bone/Visceral)	Outcomes
Schick et al[41]	50	IMRT	31	33/15/2	(3 y) OS: 92%; BRFS: 55%; CFFS: 59%. No grade 3 toxicity
Muacevic et al[46]	40	SBRT	14	0/40/0	(2 y) LC: 95.5%
Decaestecker et al[47]	50	SBRT	25	27/22/1	(2 y) LC: 100%; PFS: 35%. Grade 1 toxicity: 17%; Grade 2 toxicity: 6%
Berkovic et al[48]	24	SBRT	24	11/13/0	(2 y) LC: 100%; PFS: 42%. No grade 3 toxicity

Abbreviations: BRFS, biochemical recurrence-free survival; CFFS, clinical failure–free survival; IMRT, intensity-modulated radiation therapy; LC, local

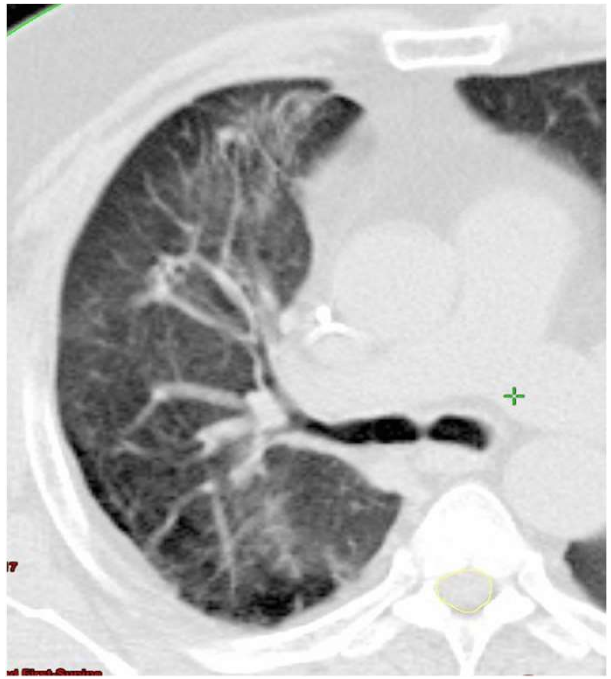
LIV HOSPITAL RMC - Treatments

Stereotactic RT SRS/SBRT

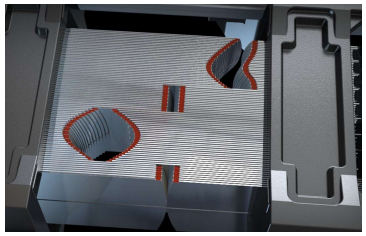


before

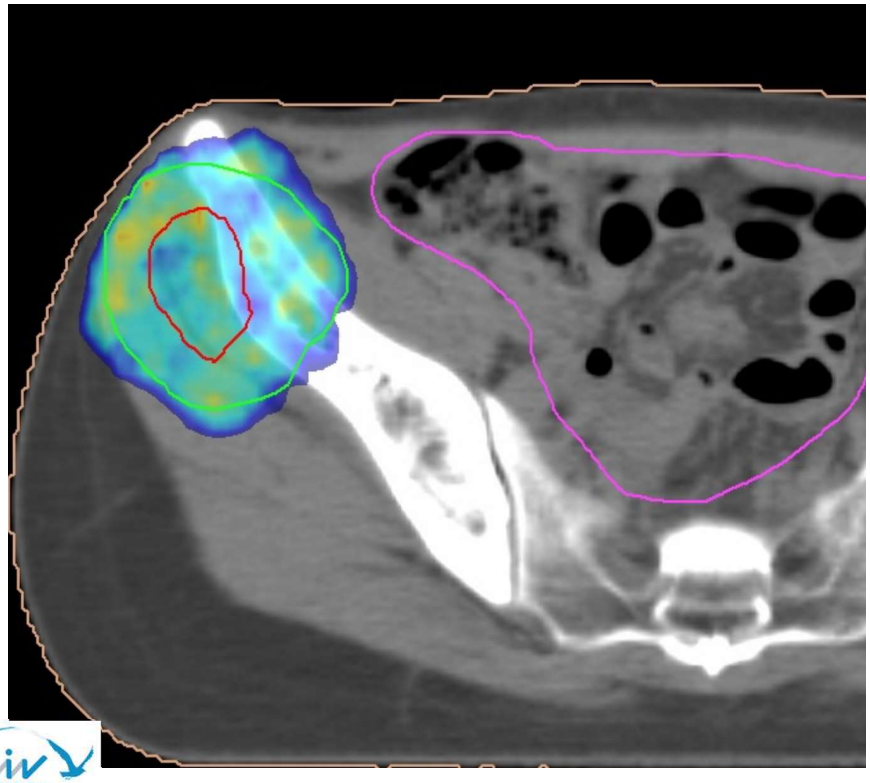
after



Palliative radiotherapy



30 Gy –Full Dose



15 Gy – Half Dose

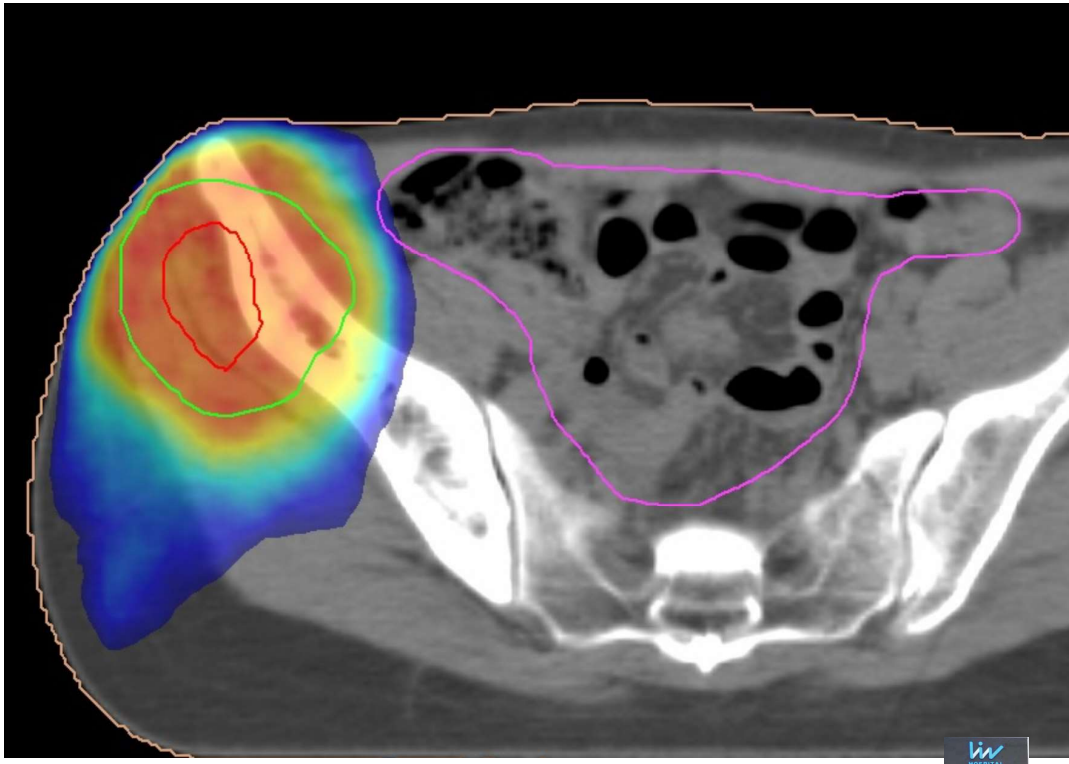
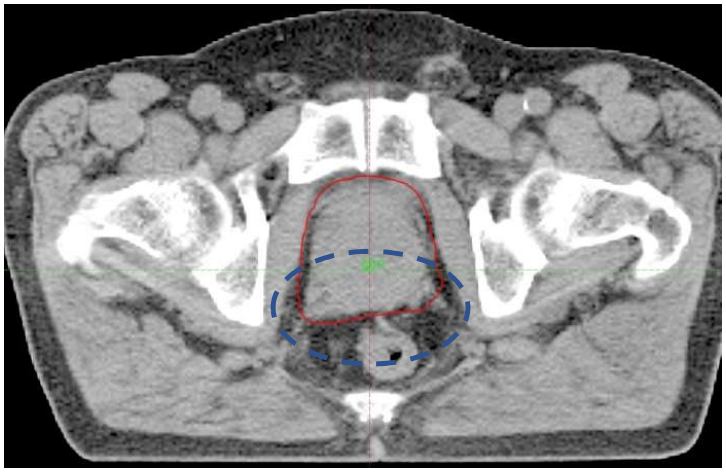
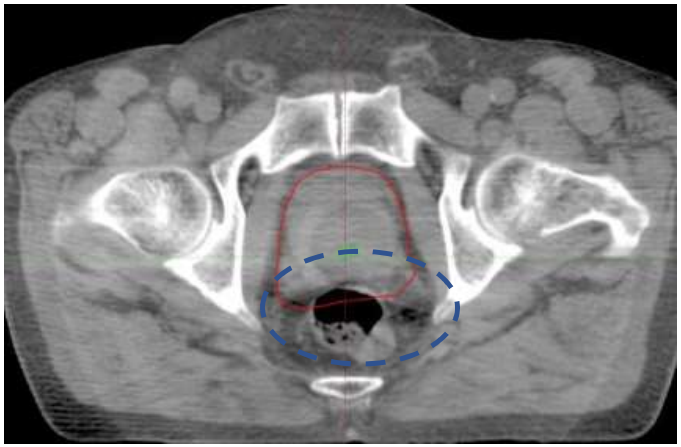
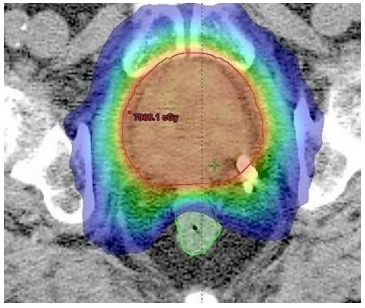


Image guided radiotherapy – IGRT

«Treat what you see, with proper positioning»







Daily 3D IGRT can warn you about the little daily changes

Summary

- The 68-Ga PET-BT could identify some small lymph node (Could spare unnecessary pelvic RT).
- RP and radiotherapy are viable options in tx of locally advanced cancer
- According postop RT guideline, almost all cases would need postop Adjuvant RT and is not an innocent procedure
- The salvage RT is more effective in the case of lower PSA (i.e.<2 even smaller)

Summary-2

- Local radiotherapy could be helpful in selected cases. Without rand. data, I prefer to choose patients with good reponse to initial systemic agent
- Radiosurgery for oligomets ($\leq$5) is an emerging option.
- The modern RT like IMRT is also helpful for palliative cases.
- Image guided radiotherapy is safer methodology to give high dose RT.

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