PSMA-PET/CT-based RT

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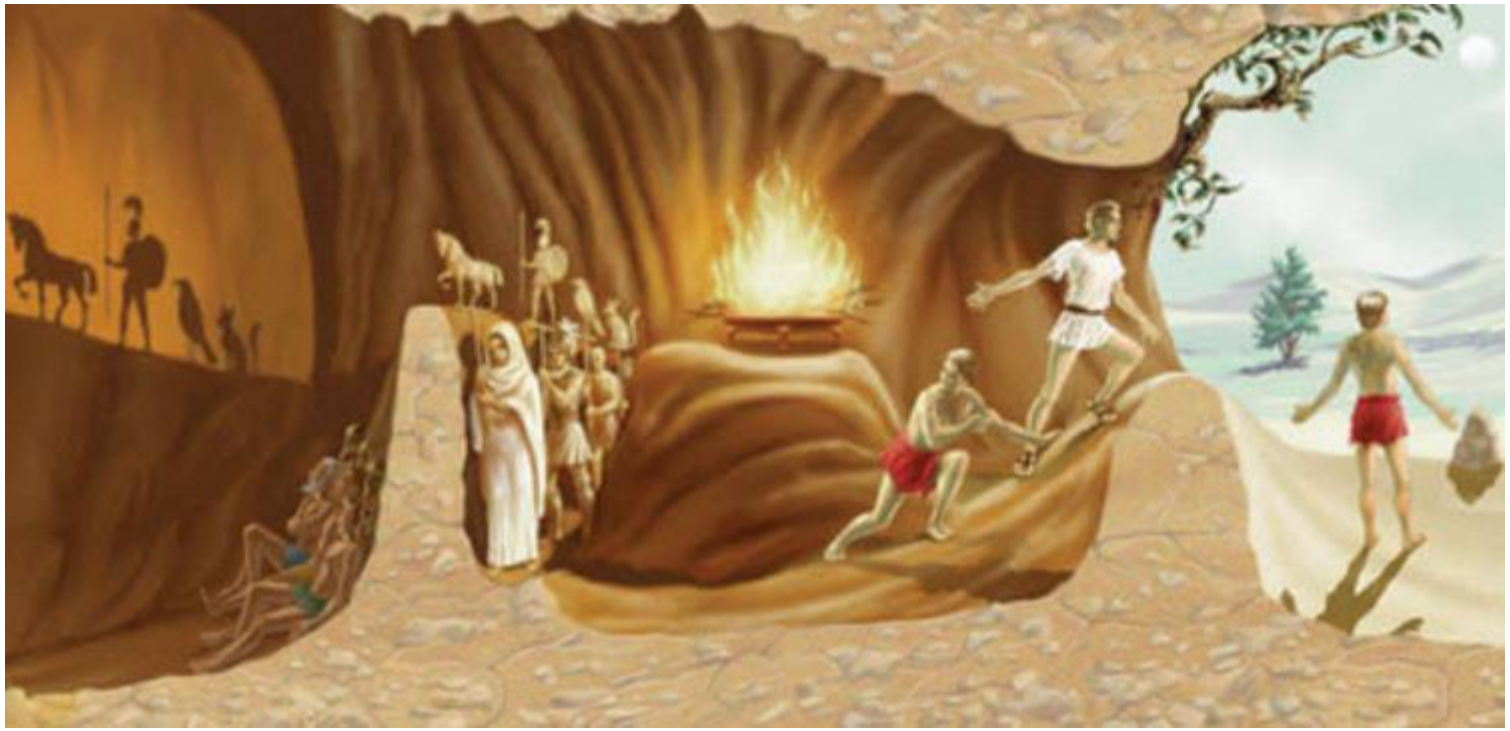
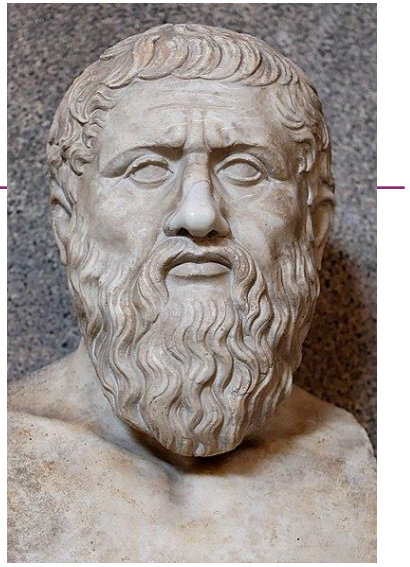
Conflicts of interest

Type of affiliation / financial interest	Name of commercial company
Receipt of honoraria or consultation fees	Janssen - Bayer

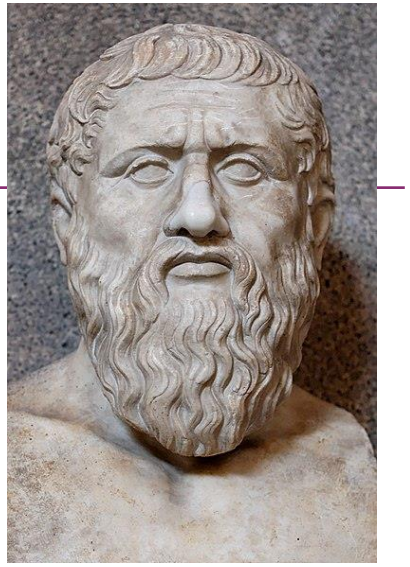
Allegory of the cave





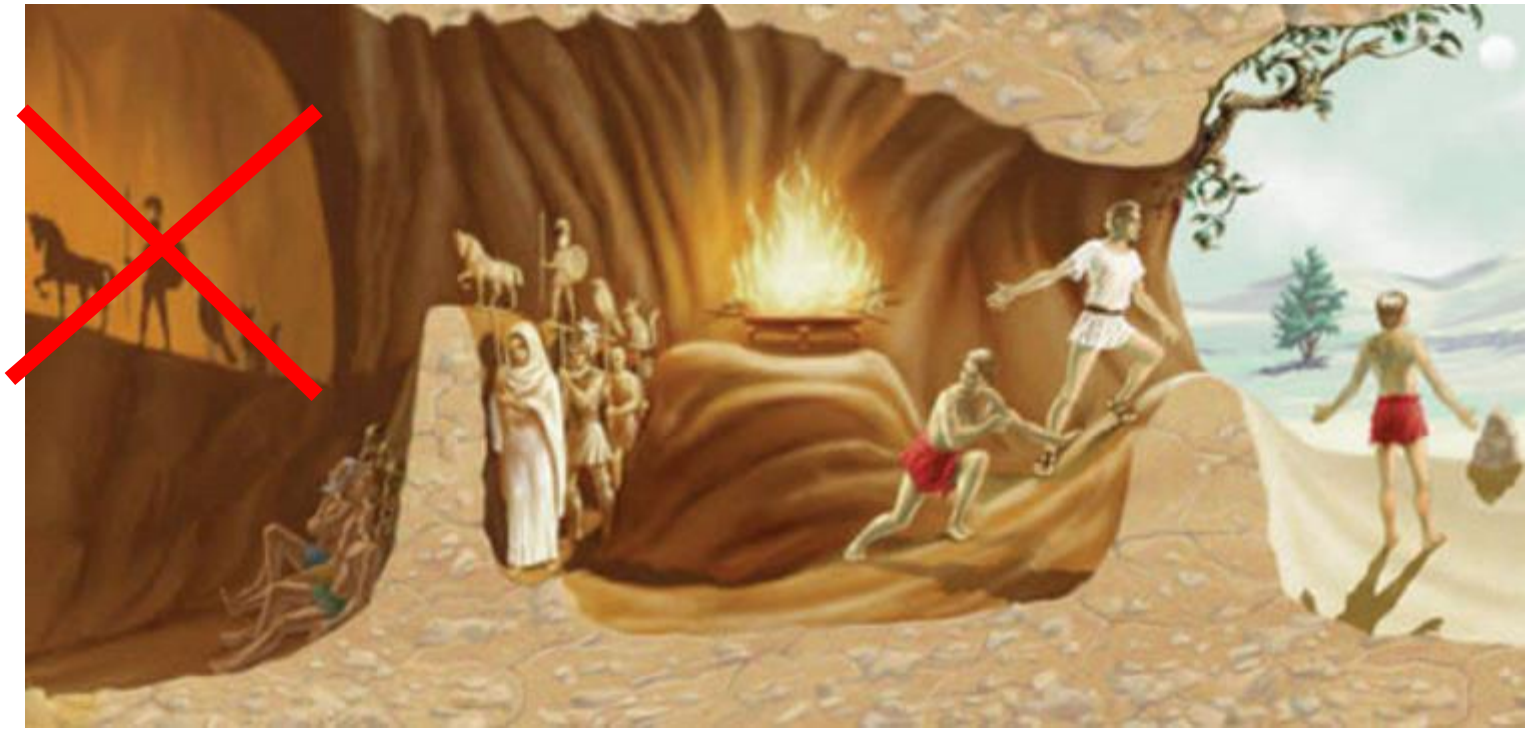
Plato

Allegory of the cave



Plato

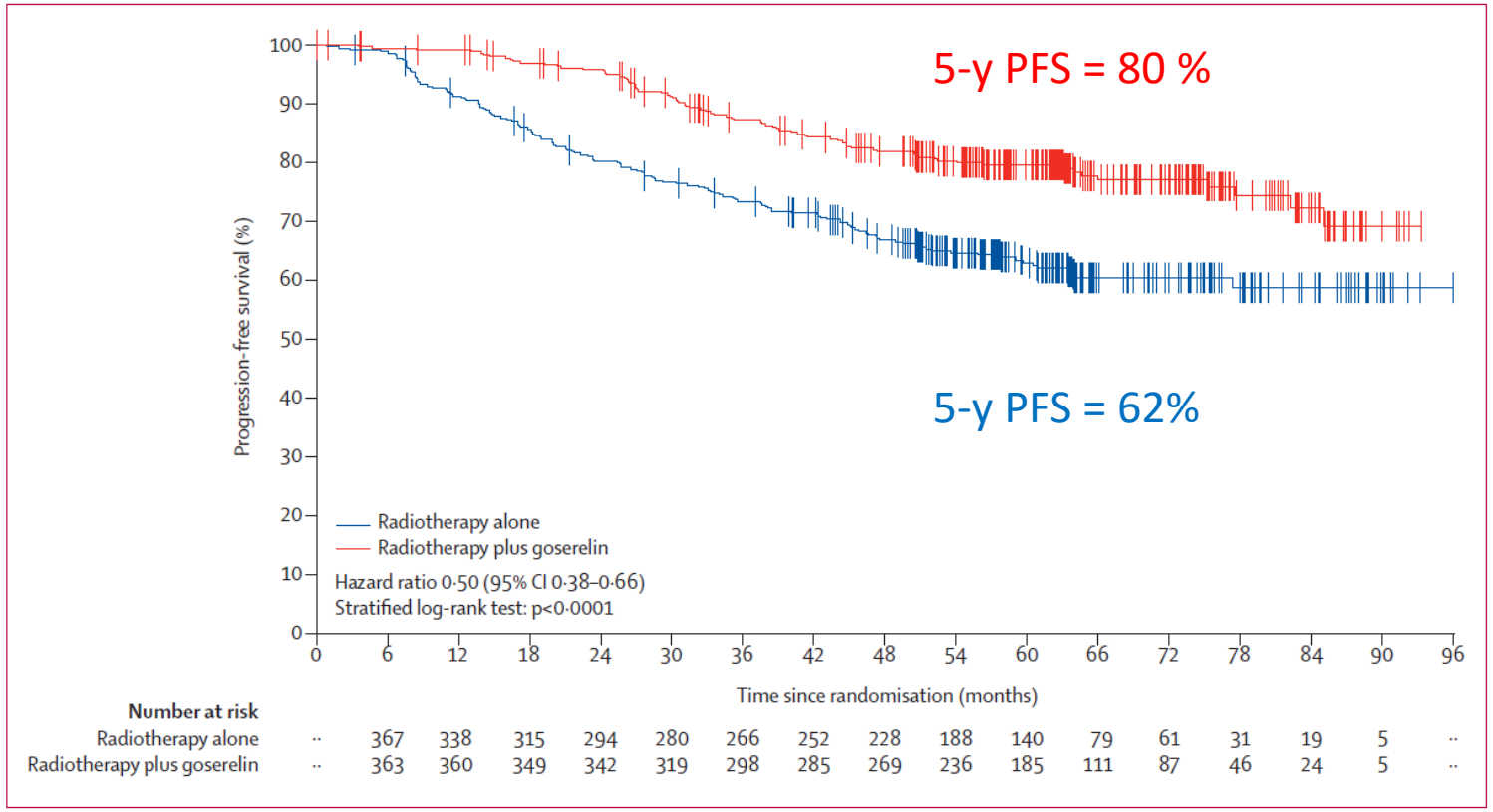
Before PSMA-PT/CT



Before PSMA-PET/CT: Prostate bed RT ± ENRT

GETUG-AFU 16

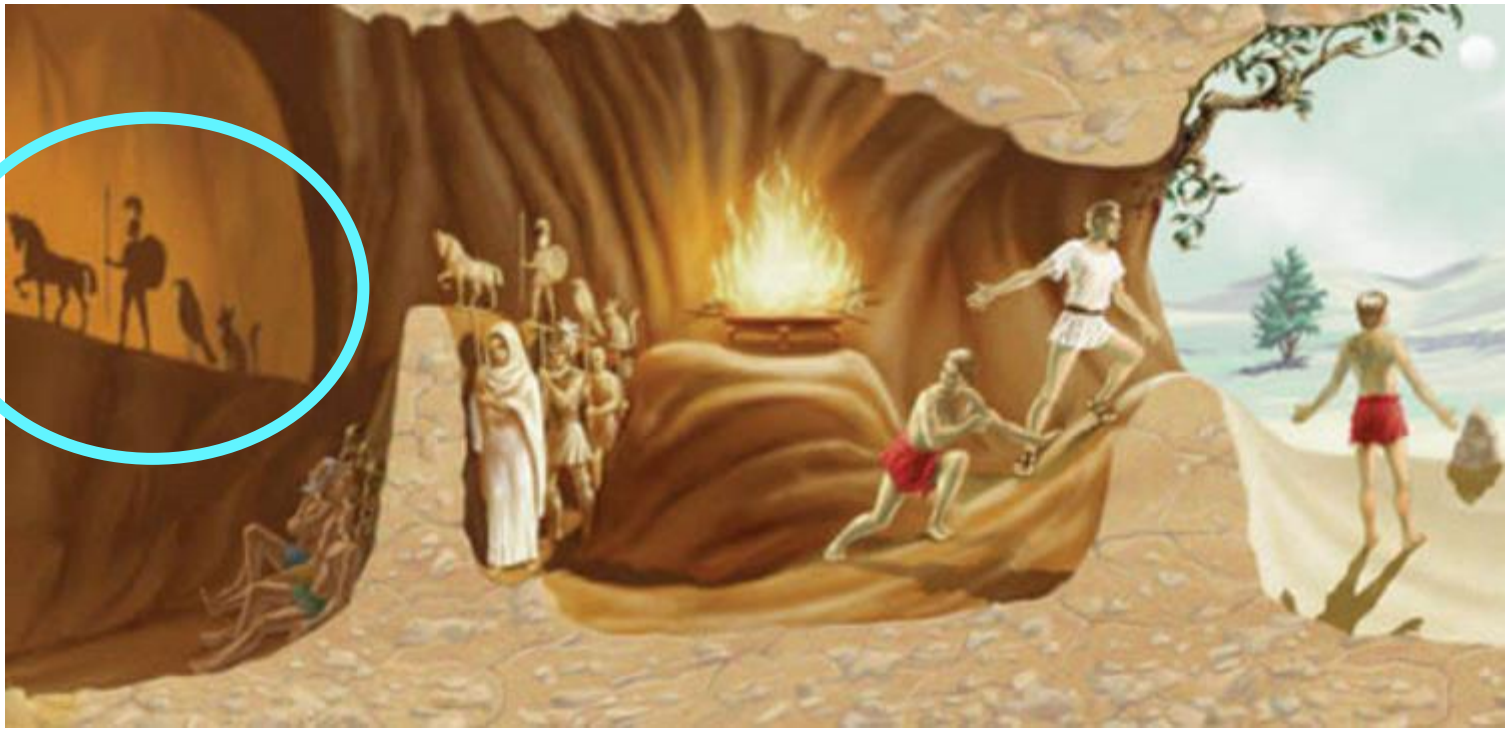
- 743 patients
- Median PSA 0.30
- 89% pts GS <8
- 66 Gy in PB volume
- 15% ENRT



Carrie et al. Lancet Oncol 2016

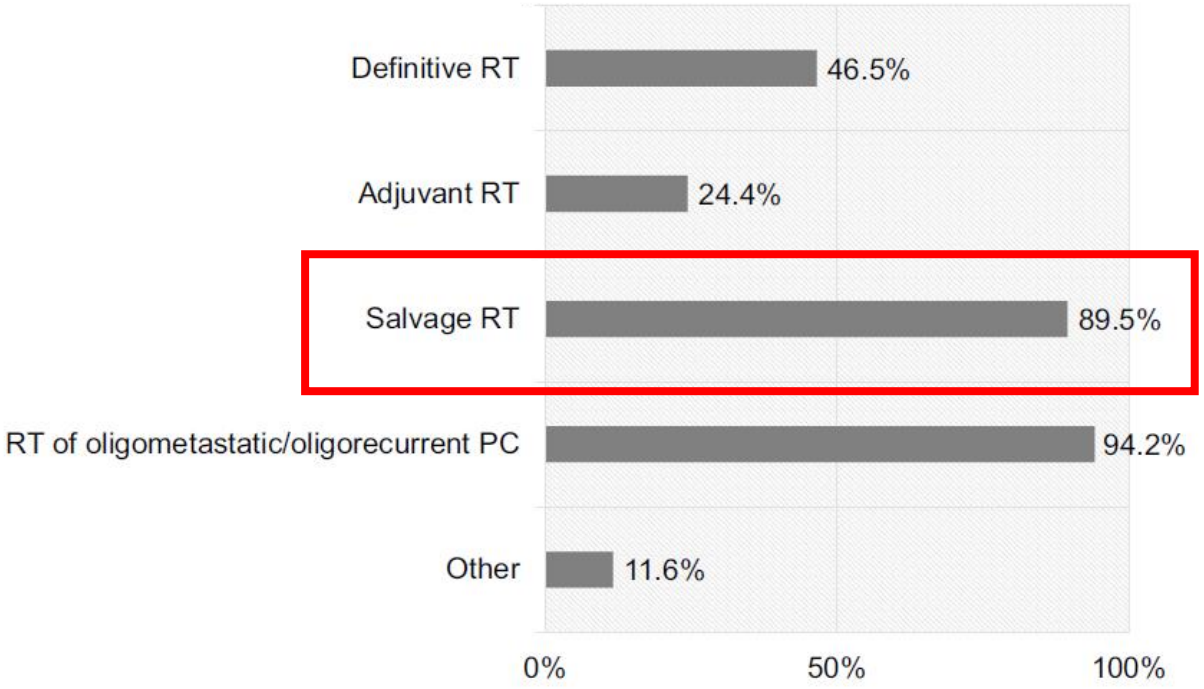
Allegory of the cave

With PSMA-PT/CT



Radiation-oncologists have access to PET and use it for sRT planning

A Survey among 109 German-speaking radiation oncologists on PET-based radiotherapy of prostate cancer



- 79% have access to PET for RT planning
- 89.5% use PET for sRT planning

Vogel et al. Radiat Oncol 2021

PSMA-PET/CT impacts sRT planning….

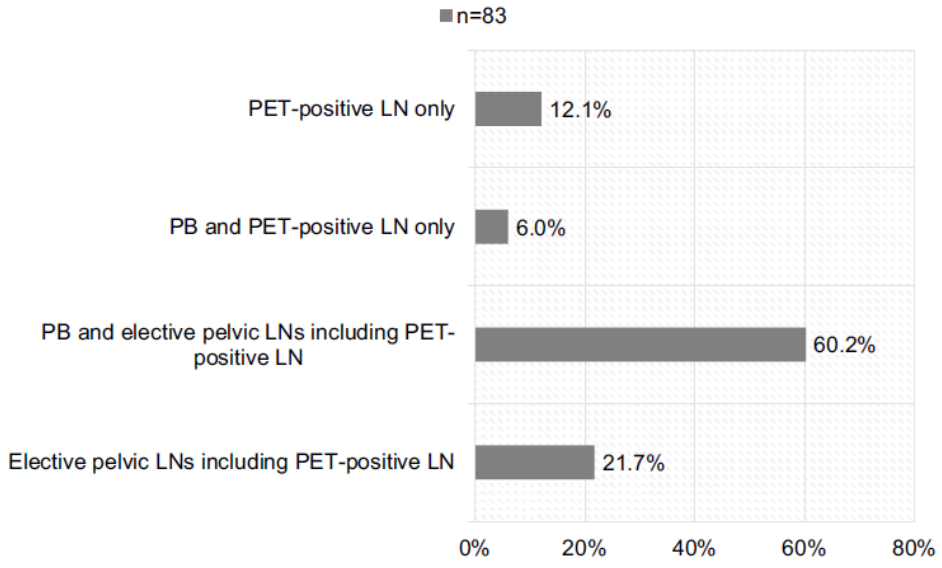
Author	year	n	Median PSA (ng/ml)	Any sRT planning Change
Bluemel	2016	45	0.67	**42%**
Albisinni	2016	48	2.2	**76%**
Schiller	2017	31	0.71	**87%**
Hemkenberens	2017	39	1.2	**59%**
Schmidt-Hegemann	2017	49	0.49	**57%**
Habl	2017	83	0.69	**57%**
De Bari	2018	12	0.51	**17%**
Koerber	2018	71	1.2	**54%**
Frenzel	2018	75	0.2	**43%**
Farolfi	2018	119	0.32	**30%**
Calais	2018	270	0.48	**19%**

17% to 87% sRT planning change

Adapted from Calais et al. BMC Cancer

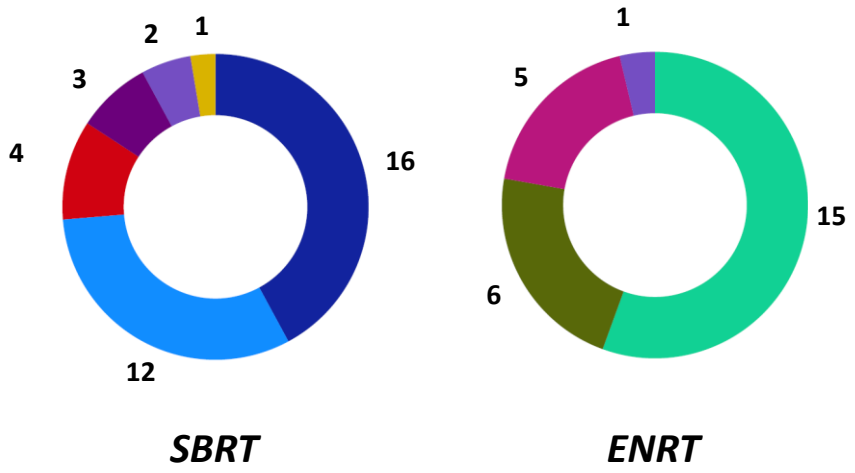
….in a non-uniform way

e.g. for PET-positive pelvic lymph nodes



DIFFERENT VOLUMES

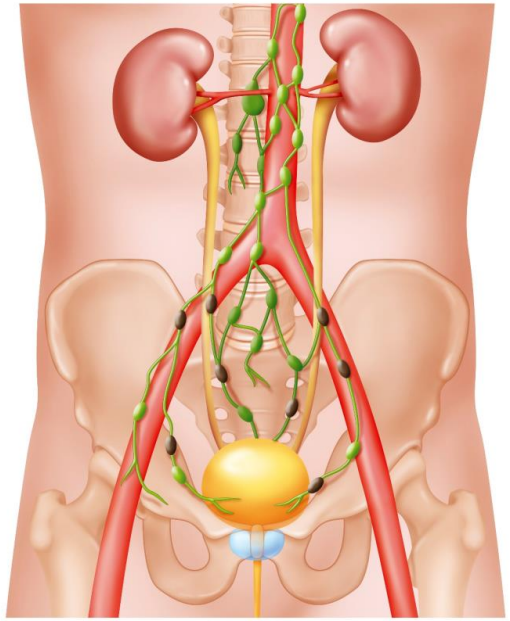
Vogel et al. Radiat Oncol 2021



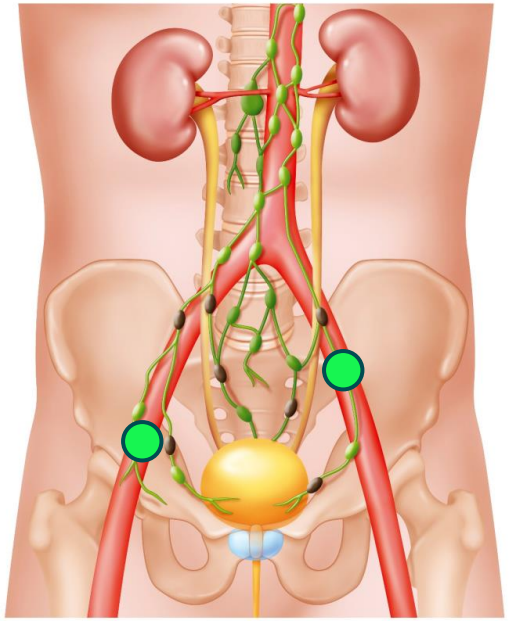
DIFFERENT DOSES

Zilli et al. Radiother Oncol 2022

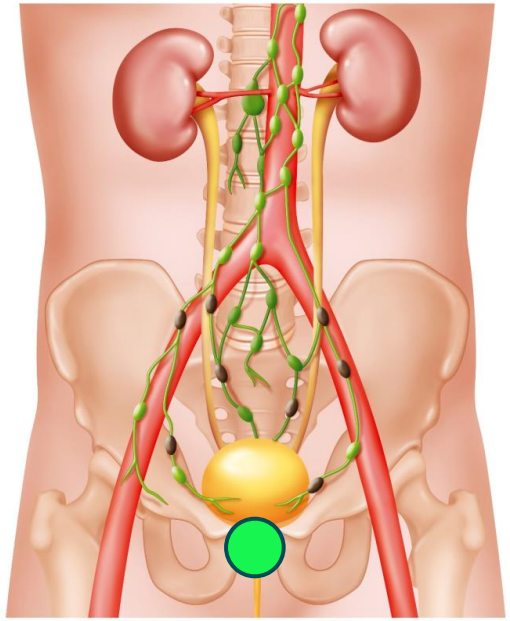
68Ga-PSMA-11 PET/CT Mapping of PCa with BCR after RP in 270 patients with PSA < 1.0 ng/ml



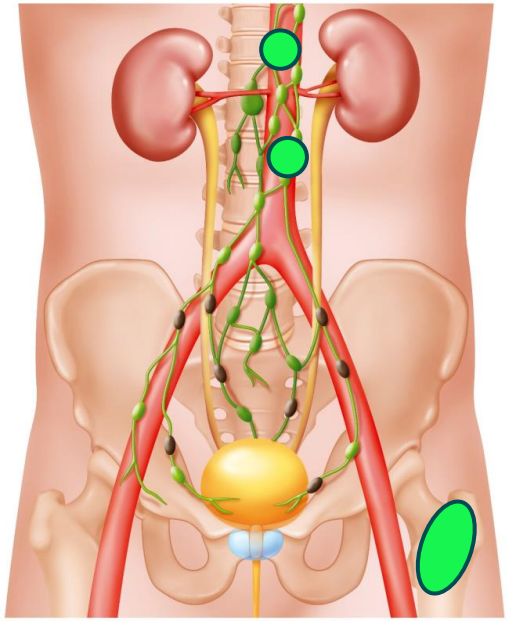
Nothing 51%



Pelvic LN (N1) 30.5%



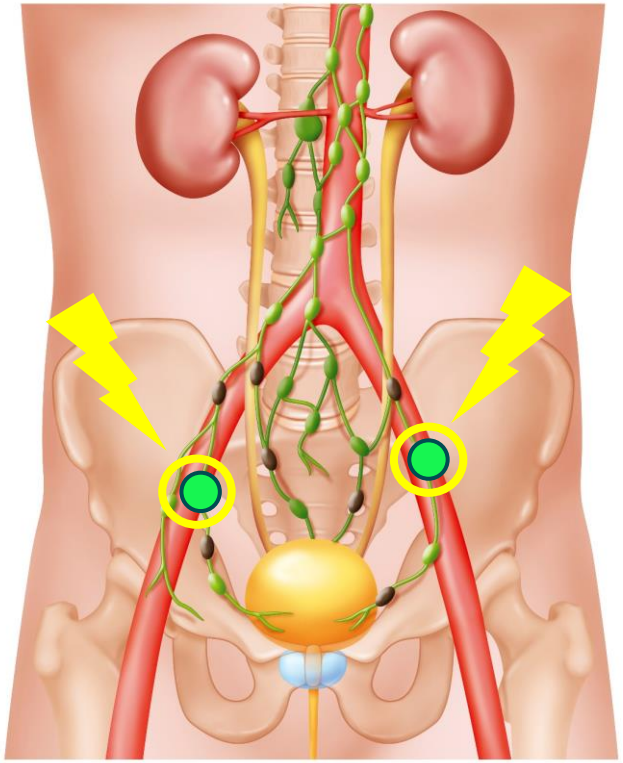
Prostate bed 17.5%



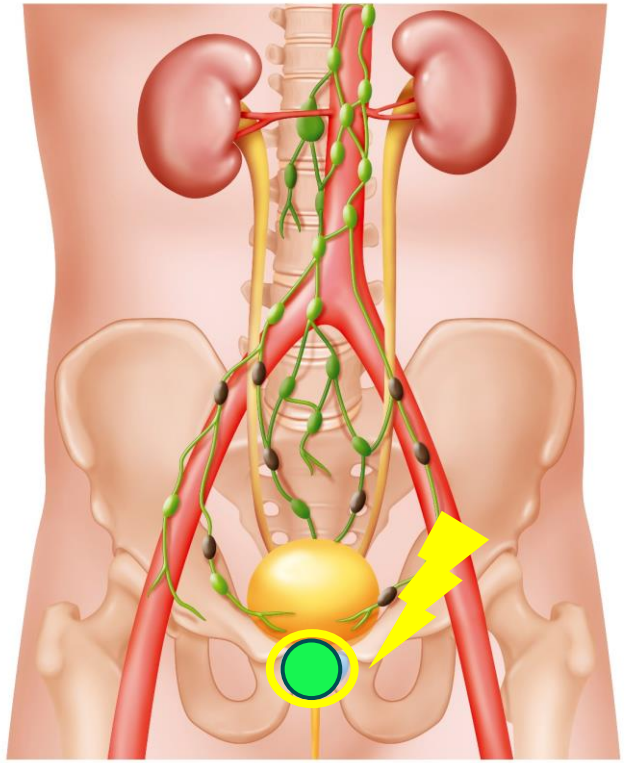
Extrapelvic LN (M1a) 3.5%
Bone (M1b) 8.5%
Visceral (M1c) 1%

Calais et al. J Nucl Med 2018

Oligorecurrent pelvic disease



Pelvic LN (N1)

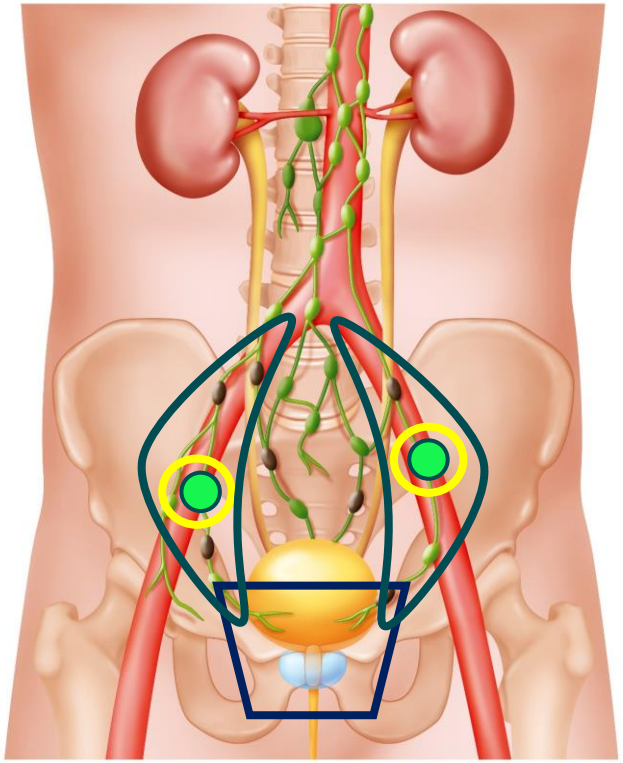


Prostate bed

What is done:

- PSMA positive lesions encompassed in treatment volumes
- Increased dose in PSMA positive lesions volumes

Oligorecurrent pelvic disease



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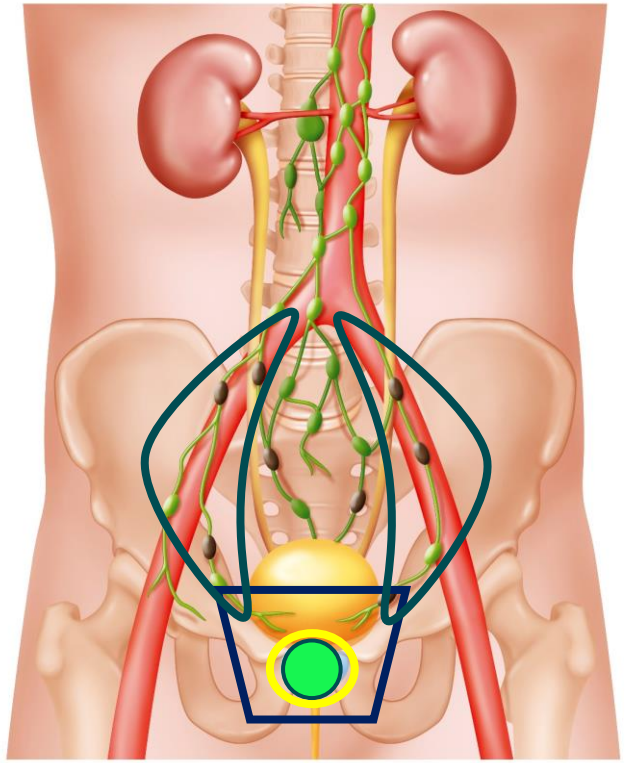
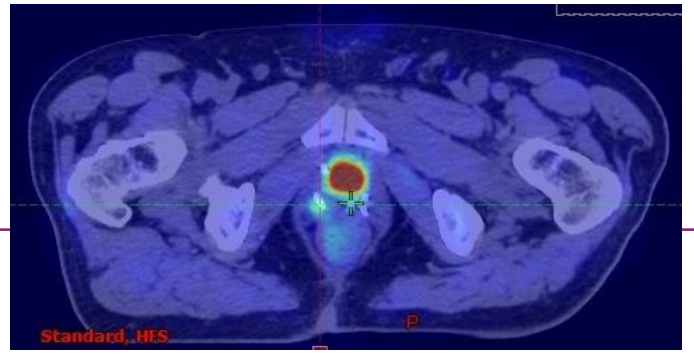


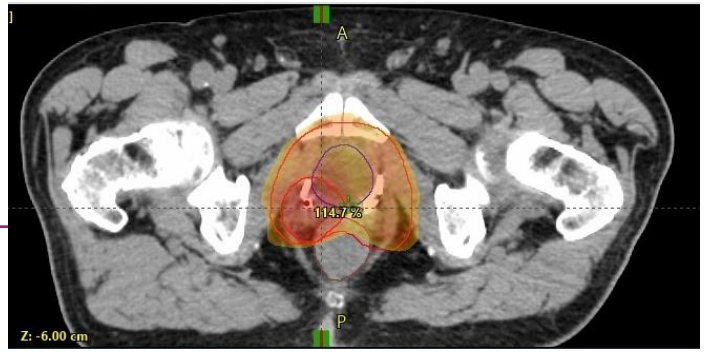
Prostate bed

Unanswered questions about treatment intensification:

- Prophylactic lymph node volumes?
- Prostate bed volume?
- Combined systemic treatment?

Prostate bed relapse





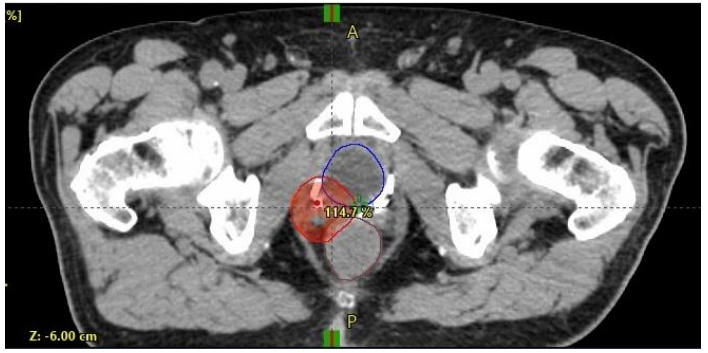
- Several retrospective studies which report outcomes of sRT for macroscopic local recurrence following RP with an integrated boost ± pelvic lymph node irradiation ± ADT

  Zaine et al. Front Oncol 2021, Shelan et al. Front Oncol 2019, Bruni et al. Clin Trans Oncol 2019, Zilli et al. Am J Clin Oncol 2017

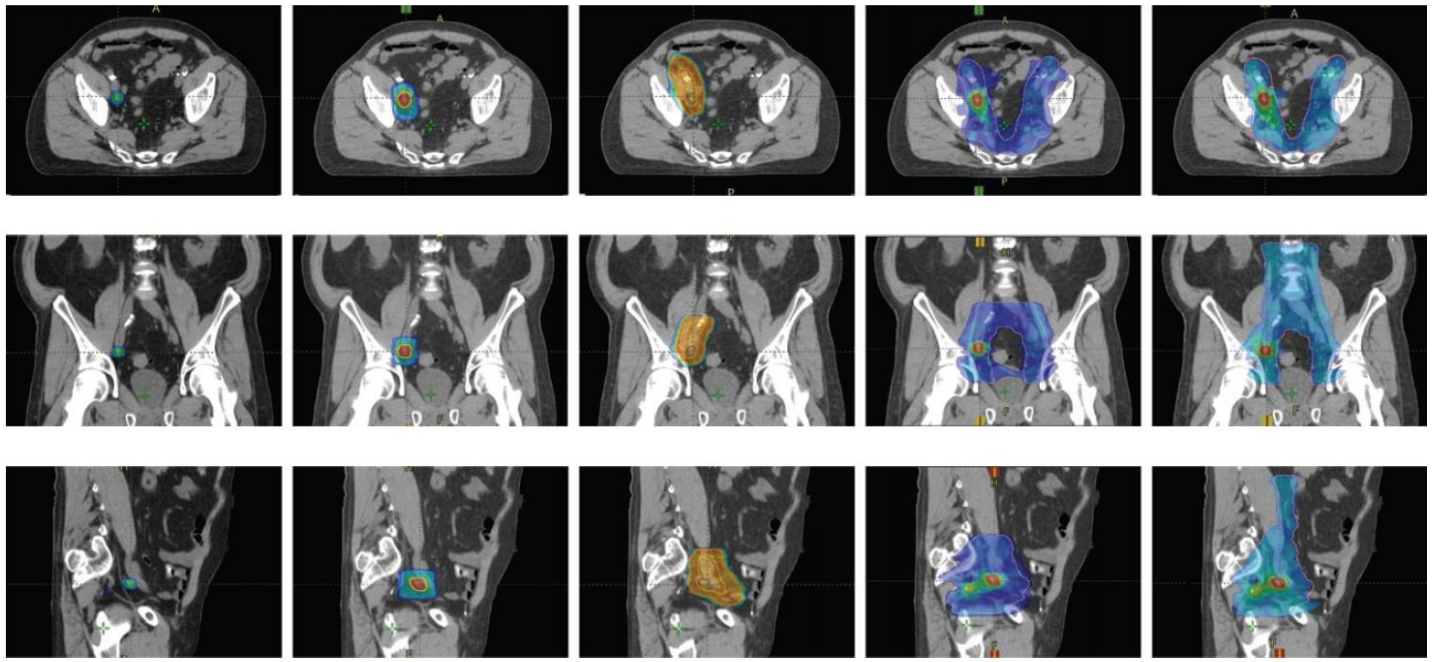
- The MAPS trial (NCT01411345): 68Gy/34fr vs 68Gy and 76.5Gy/34fr. Randomized trial that will evaluate the impact of a RT boost to the local recurrence on PSA response rate

- SBRT to the local recurrence (30-40Gy/5fr) has also been proposed

  Francolini et al. BJU int 2020, Francolini et al. Radiol Med 2022



Pelvic nodal relapse: different treatment volumes



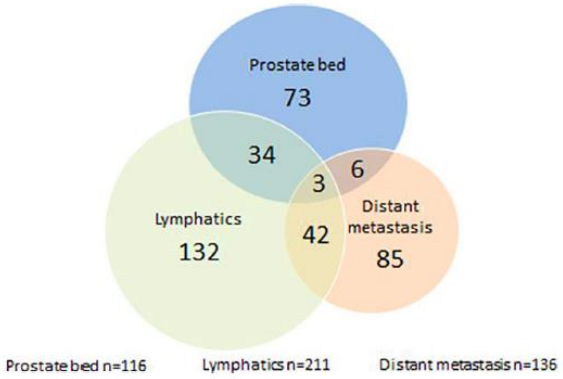
Achard et al. Act Oncol 2020

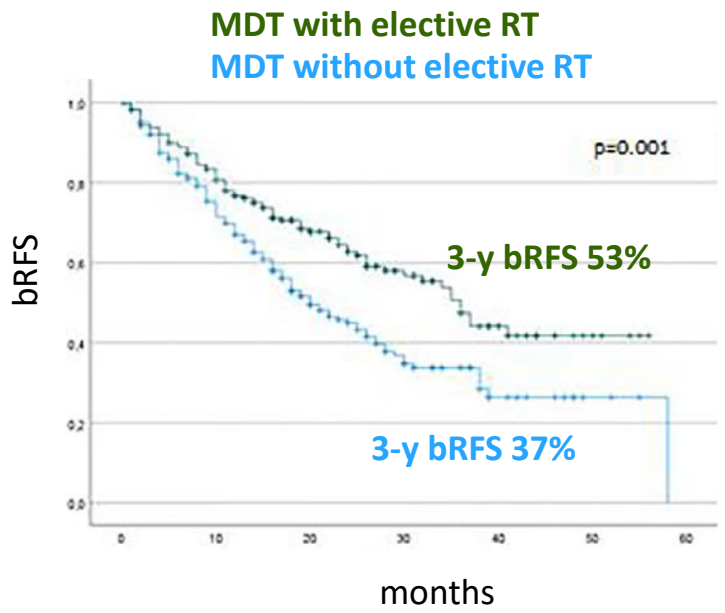
Peace V STORM trial: MDT vs MDT + WPRT
(NCT03569241)

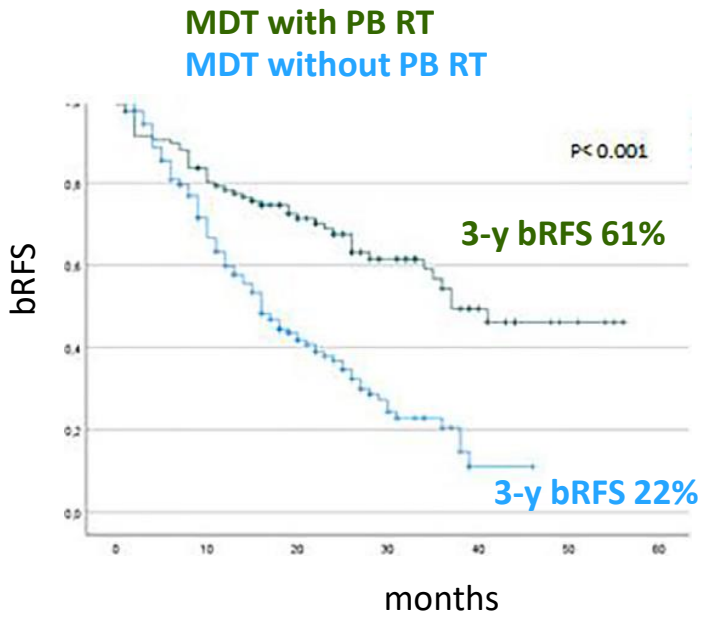
MDT vs MDT + elective RT

394 pts with oligorecurrent local/N1/M1 disease using ^{68}Ga-PSMA-PET/CT

- 51.8% MDT
- 48.2% MDT + elective RT
- Elective areas: PB, pelvic or paraaortal lymphatics



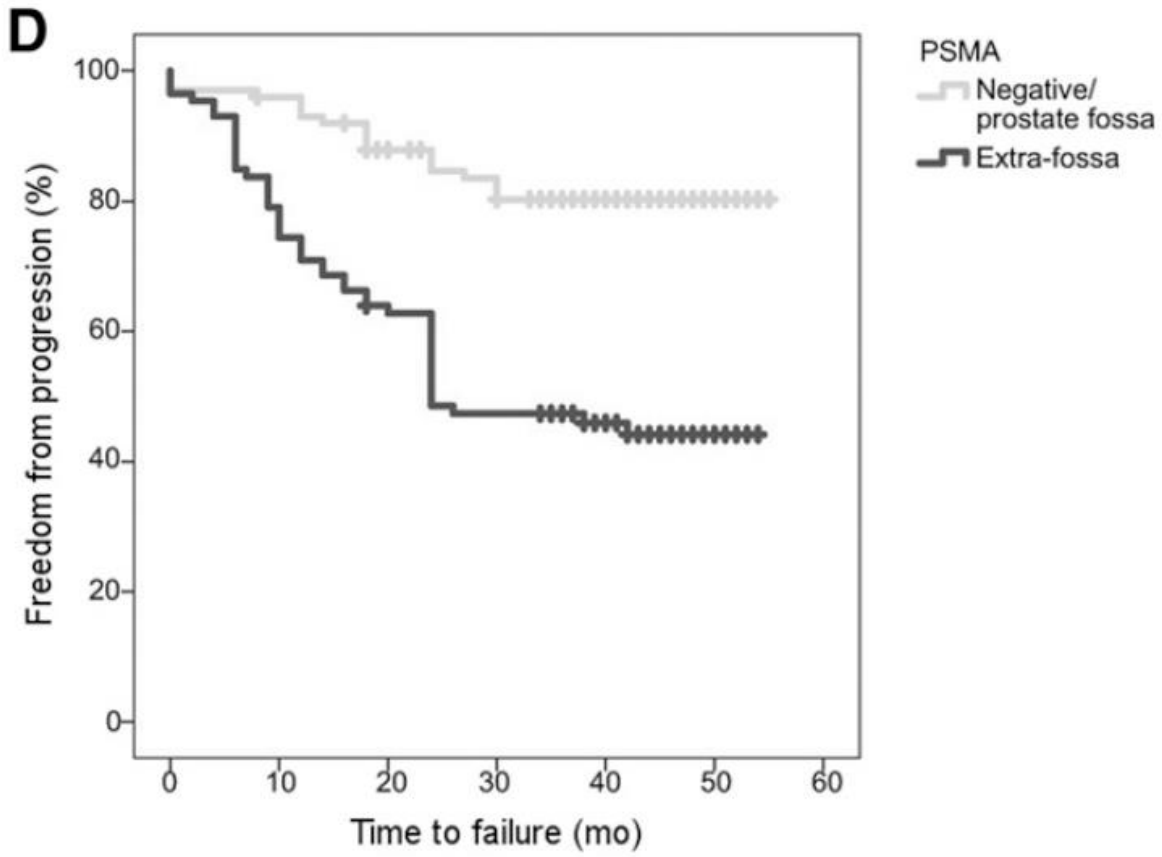




Kirste et al. Front Oncol 2021

Predictive value of PSMA PET in men undergoing sRT

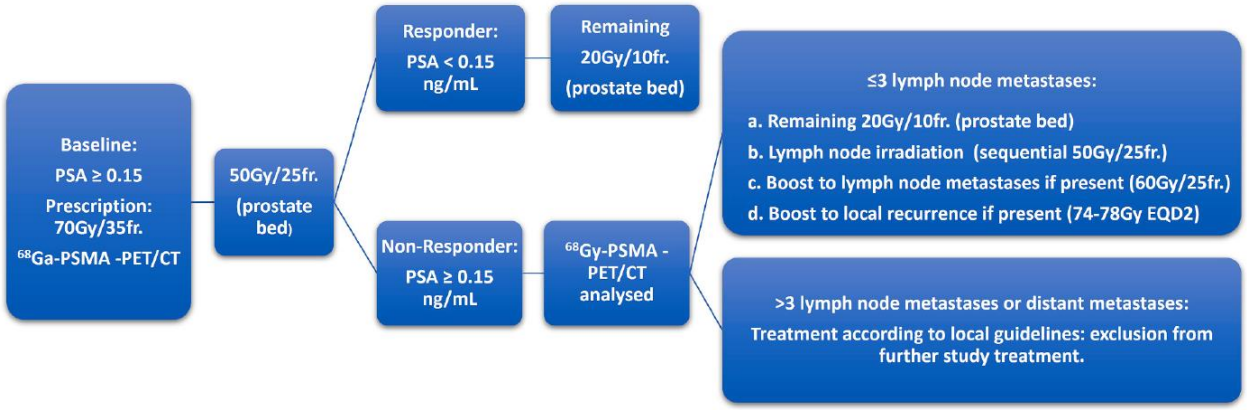
- 260 pts with BCR after RP referred to PSMA PET/CT before sRT
- Median PSA 0.26 ng/ml
- Positive PET in 65.4%



Emmett et al. J. Nucl. Med 2020

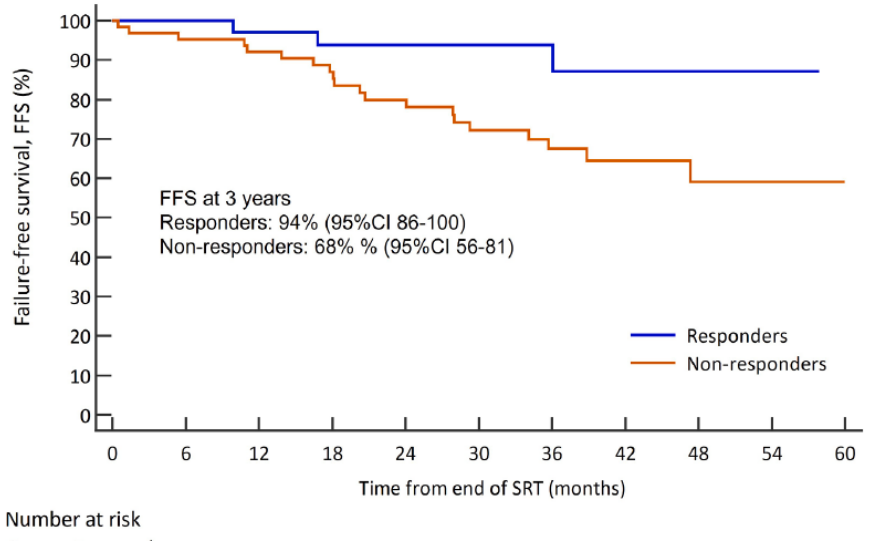
PSA – PSMA-guided RT: The PROPER 1 trial

- Open-label prospective phase 2 trial
- 97 pts with BCR after prostatectomy
- Median PSA 0.25 ng/ml
- Overall PSMA-PET dectection rate: 26%



Responders: 34 pts, detection rate PSMA PET 9%

Non-responders: 63 pts, detection rate PSMA PET 35%



Gunnlaugsson et al. Clin. Transl. Radiat. Oncol.2022

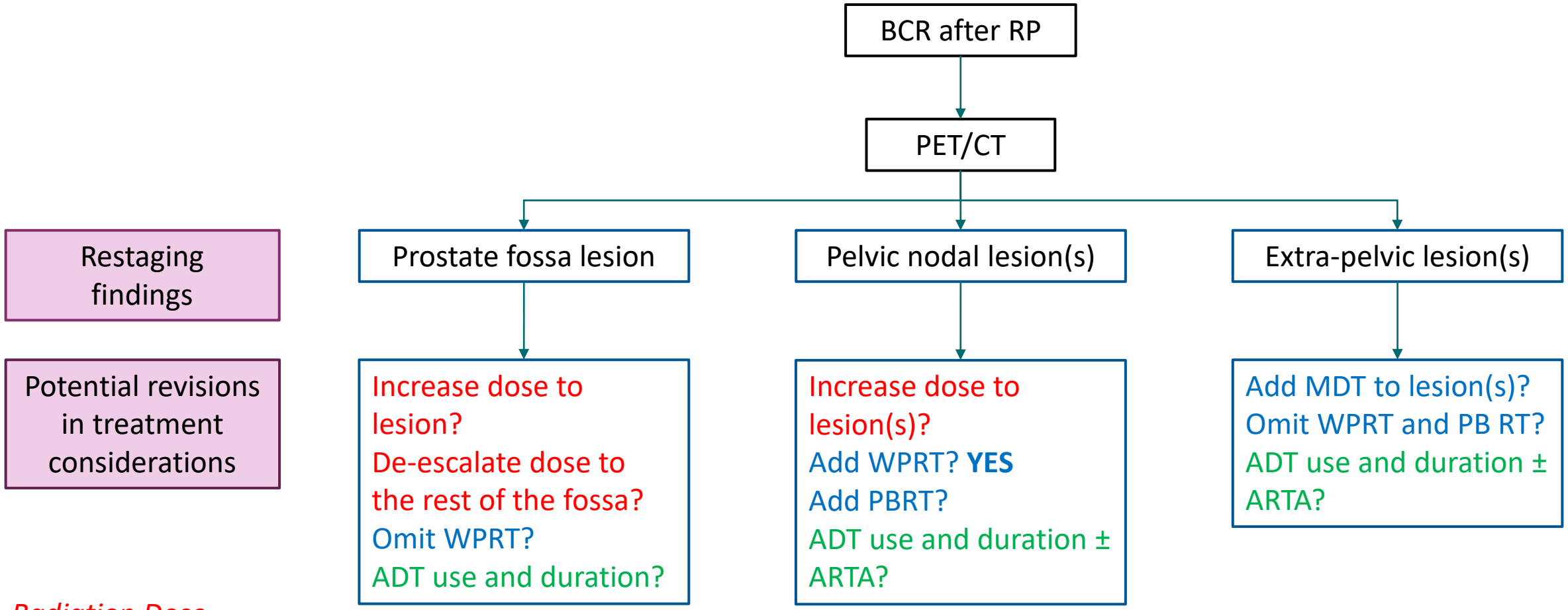
Oligorecurrent metastatic relapse

For metachronous mHSPC that is low volume on NGI and nonmetastatic on conventional imaging:

- 57% of panellists: MDT + systemic therapy
- 22% of panellists : MDT only
- 21% of panellists : systemic therapy alone

Gillessen et al, Eur Urol 2022, APCCC 2021 report

Potential management changes based on PET/CT findings



Radiation Dose
Radiation Volume
Systemic treatment

Inspired from Vale et al. Eur Urol Oncol 2021

Take home points

WHERE ARE WE NOW?

- PSMA-PET imaging has been included into daily clinical practice
- PSMA-PET findings impact sRT planning in non uniform way among phycisicians

WHERE DO WE WANT TO BE ?

- standardized modified sRT planning for each situation (PB, N1, M1, no lesion)
- evidence of improved clinical outcomes with PSMA-PET guided RT

HOW WILL WE GET THERE?

Enroll patients in clinical trials

Thanks for your attention

Where we are

Where we want to be

Some practical scenarios

Undetectable PSA High risk features	Low/Int Decipher	→	Observation / early SRT
	High Decipher	→	Discuss adjuvant RT
PSA < 0.5 ng/mL High risk features	Low/Int Decipher	→	SRT +/- STADT
	High Decipher	→	SRT + PNRT + STADT
PSA >= 0.5 ng/mL High risk features	PSMA PET (-)	Low/Int Decipher →	SRT + PNRT + STADT
		High Decipher →	SRT + PNRT + LTADT?
	PSMA PET (+)	N+ →	SRT + PNRT + LTADT + Abi

*Life expectancy > 10 yrs