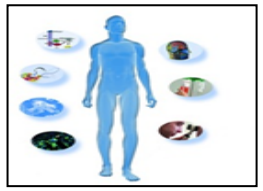
UNIVERSITÄTS KLINIKUM FREIBURG

CCCF COMPREHENSIVE CANCER CENTER FREIBURG

dkfz.

German Cancer Consortium

Partner site Freiburg



HypoFocal-SBRT

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Universitätsklinikum Freiburg

Team

PIs:

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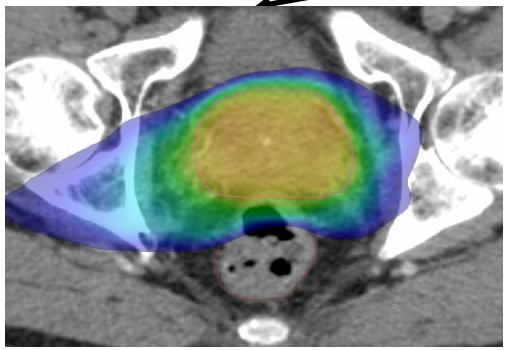
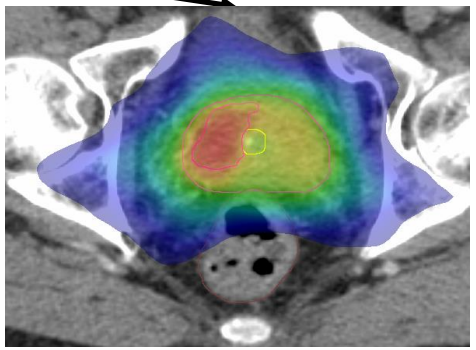
- PD. Dr. Tanja Sprave
- M.Sc. Tobias Fechter

HypoFocal-SBRT

374 Patienten
Unfavorable Intermediate- / High-Risk PCa
staged cN0 und cM0 in PSMA-PET/CT and MRI
22 centers in D, CH, A, CYP





Control arm

MHRT

Prostate + SV

46.4 Gy in 20 fractions

Prostate:

60-62 Gy in 20 fractions

Experimental arm

SBRT

Prostate + SV:

30 Gy in 5 fractions

Prostate:

35 Gy in 5 fractions

Focal Boost based on PSMA-PET/MRT:

40-42 Gy in 5 Fractions

Inclusion criteria

- Histologically confirmed adenocarcinoma of the prostate
- Primary localized PCa (**cN0 and cM0 in mpMRI and PSMA-PET**):
  - high- or very high-risk according to NCCN v2.2021

  OR
  - unfavorable intermediate-risk disease according to NCCN v2.2021
- **IPSS score ≤ 15**
- **Prostate volume ≤ 75 mL at RT planning**

Exclusion criteria

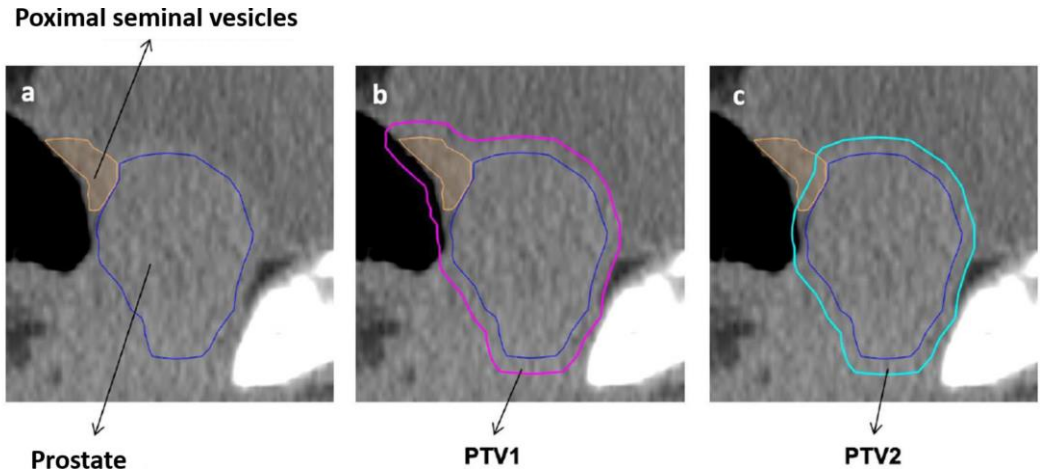
- Prior radiotherapy to the prostate or pelvis or radical prostatectomy
- **Time gap between the beginning of ADT and conduction of initial mpMRI and PSMA-PET scans is >1 month**
- Evidence of cT4 disease in mpMRI and/or PSMA-PET/CT
- PSA > 30 ng/mL prior to starting ADT
- Bilateral hip prostheses or any other implants/hardware that would introduce substantial CT artefacts
- Prostate surgery (TURP or HOLEP) with a significant tissue cavity or prostate surgery (TURP or HOLEP) within the last 6 months prior to randomization
- In mpMRI and PSMA-PET/CT or PSMA-PET/MRI scans, no visible tumor
- **Dose constraints for organs at risk cannot be adhered to**

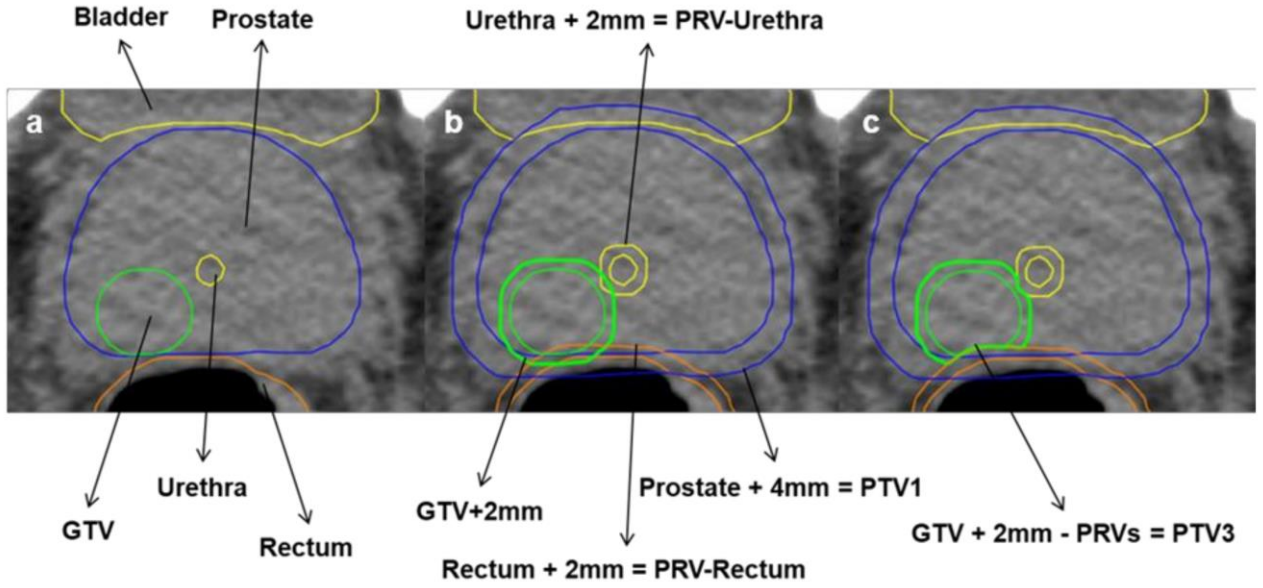
Endpoints

- **Primary:**
  - Relapse-free survival (biochemical recurrence according to Phoenix criteria + new PCa lesions in imaging + begin of any salvage therapy
- **Secondary:**
  - **Local failure rate, MFS**, OS, PCSS, time to BF, **QoL, GU und GI Tox (CTCAEv5.0**), feasibility dose constraints
- **Translational Projects**:
  - Immunresponse
  - Toxicitiy and outcome prediction
  - Comparison of imaging

Planning – SBRT

- CTV1: Prostata inclusive extracapsular or intravesical PCa
- CTV_SV proximal 1-1,5 cm
- PTV margin: 4mm
- GTV-Union based on GTV-MRI und GTV-PET
- PTV-Margin 0-2mm, Subtraction of overlapping parts with PRV-Urethra and -Rektum





Planning – SBRT

Table 2. Prescription doses of the target volumes (PTVs) for stereotactic body radiotherapy (experimental arm).

PTV1 (PTV1–PTV3)		CTV1		PTV2 (PTV2–PTV3)	CTV2	PTV3		
D50%	D98%	D99%	D50%	D98%	D99%	D50%	D98%	D0.01cc
≥30 Gy	≥28.5 Gy	≥28.5 Gy	≥35 Gy	≥33.25 Gy (minor deviation ≥ 31 Gy)	≥34.5 Gy (minor deviation: ≥34 Gy)	40–42 Gy	≥95% of prescribed dose (minor deviation: up to 36.25 Gy)	≤105% of prescribed dose (minor deviation up to 110%)

Planning – SBRT

Table 3. Dose constraints for organs at risk for stereotactic body radiotherapy in 5 fractions (experimental arm). PRV-Rectum_adapt is created by 2 mm isotropic expansion of Rectum_adapt. Rectum_adapt will be generated by delineation of the rectum in the co-registered CB-CTs, MV-CTs or MRI images of the first three fractions. Manual delineation of the Rectum_adapt should consider the mean rectal volume.

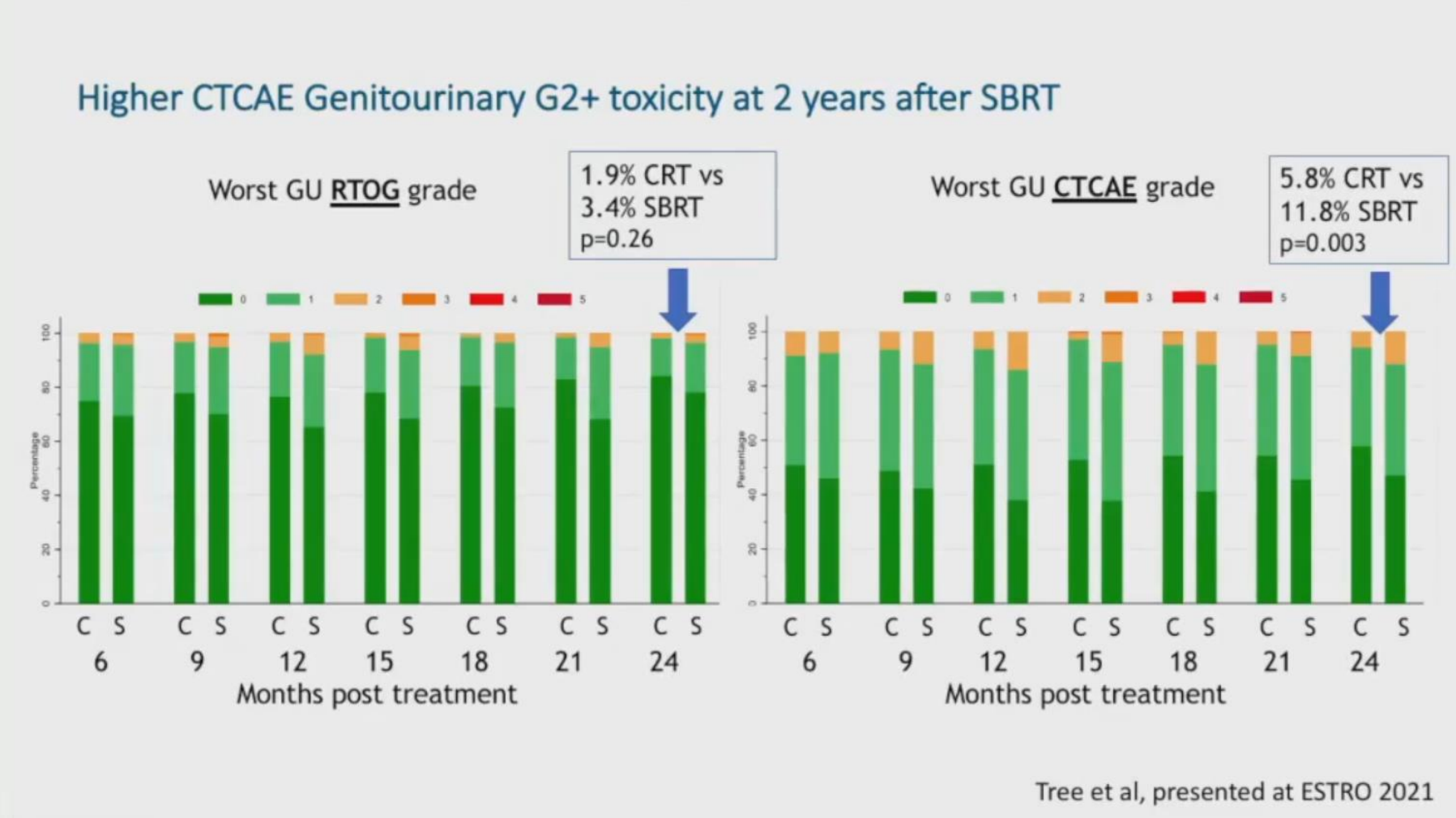
OAR	Constraint
PRV-Rectum or PRV-Rectum adapt	D0.03cc (near Dmax): <38 Gy (minor deviation: 38–40 Gy)
Rectum	D1cc: <36 Gy (minor deviation: 36–38 Gy)
	D2cc: <35 Gy
	D20%: ≤28 Gy
PRV-Urethra	D0.01cc (near Dmax): <40 Gy (minor deviation: 40–42 Gy)
Urethra	D50%: <36 Gy (minor deviation: 36–39 Gy)
Bladder	D0.03cc: <38.06 Gy (minor deviation: 38.06–40 Gy)
	D5cc: <37 Gy
	D15%: ≤32 Gy:
	D20%: ≤28 Gy
	D50%: <18.12 Gy (minor deviation: 18.12–20 Gy)

Central prospective RTQA

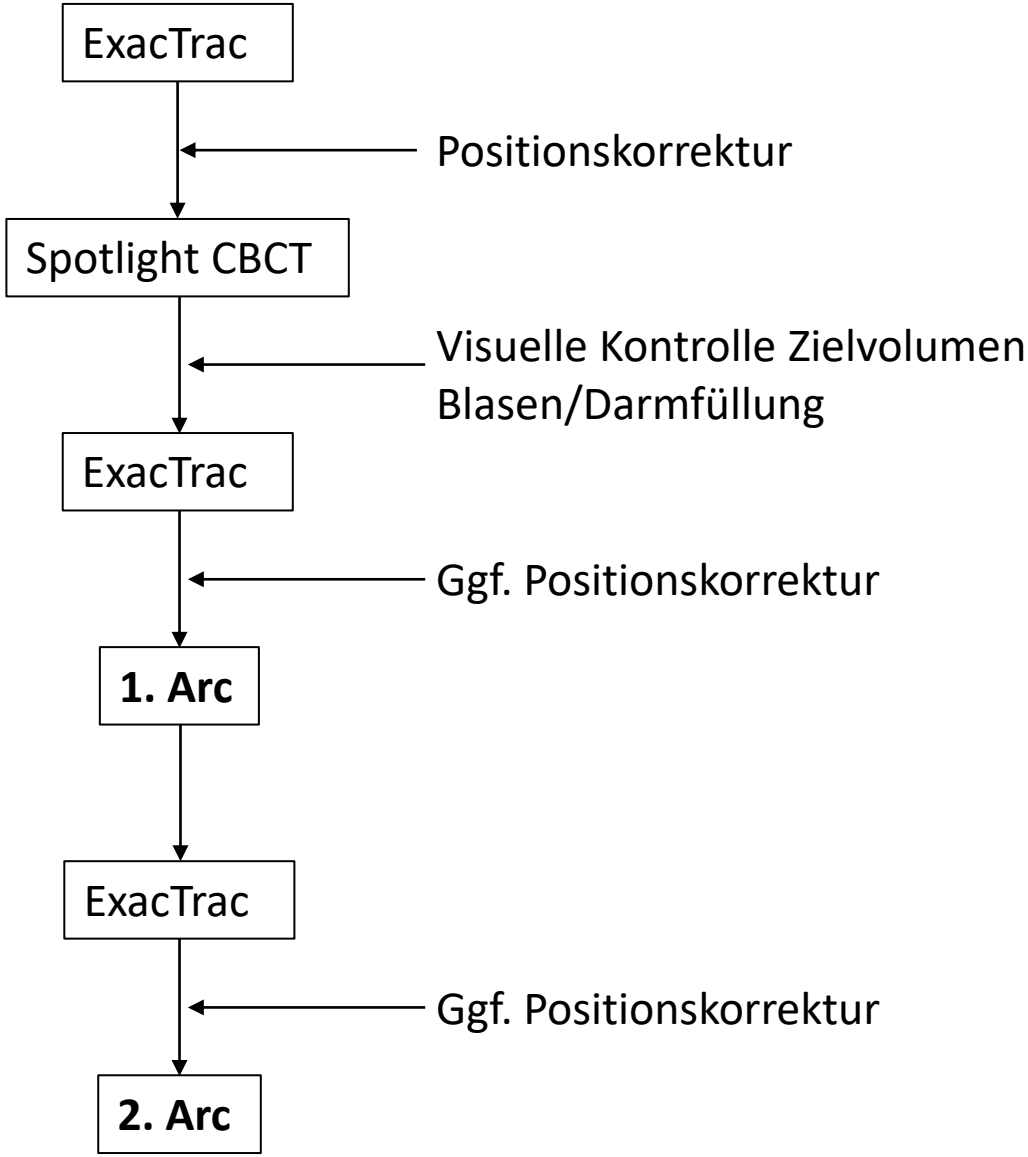
- Co-registered planning CT, mpMRI and PSMA-PET/CT
- Contours
- Treatment plan

- Image quality
- Registration
- Delineation
- DVHs

IGRT - SBRT


Higher CTCAE Genitourinary G2+ toxicity at 2 years after SBRT
Worst GU RTOG grade
1.9% CRT vs
3.4% SBRT
p=0.26
Worst GU CTCAE grade
5.8% CRT vs
11.8% SBRT
p=0.003
Percentage
C S
6 9 12 15 18 21 24
Months post treatment
Tree et al, presented at ESTRO 2021

IGRT - SBRT


ExacTrac
Positionskorrektur
Spotlight CBCT
Visuelle Kontrolle Zielvolumen
Blasen/Darmfüllung
ExacTrac
Ggf. Positionskorrektur
1. Arc
ExacTrac
Ggf. Positionskorrektur
2. Arc

Danke für die Aufmerksamkeit

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UNIVERSITÄTS KLINIKUM FREIBURG

NATIONALE DEKADE GEGEN KREBS

Study protocol