

Prostate volume changes during radiotherapy

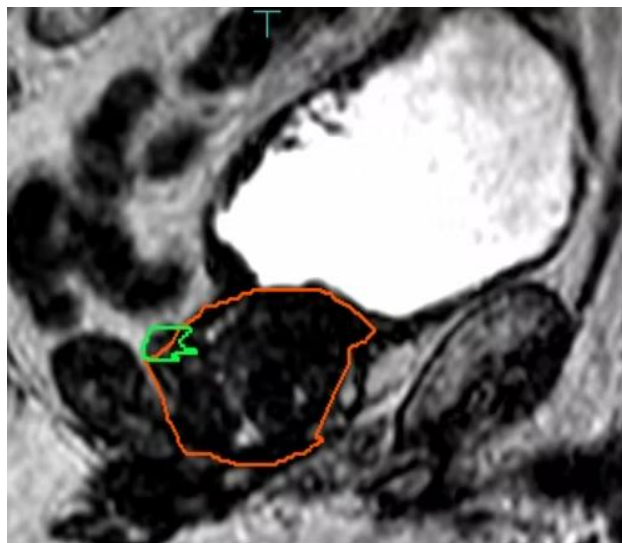
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PACE-B
HYPO-RT-PC

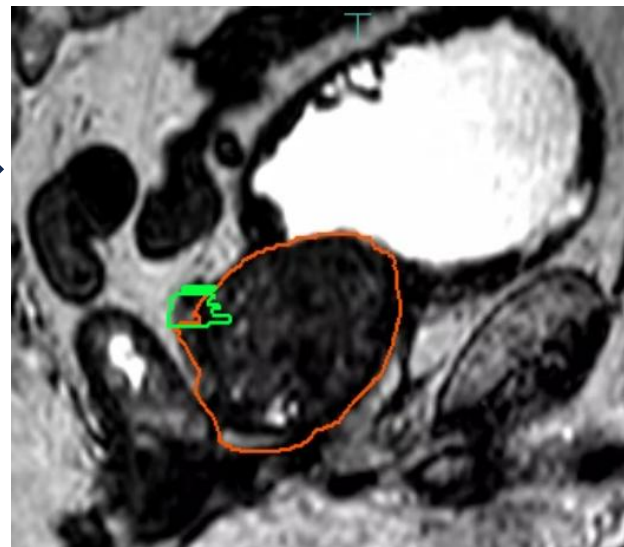
Prostate Swelling during RT



1st day of treatment

82 cm³

21% increase



5th day of treatment

111 cm³

S Alexander et al, Clin Oncol 2022
Nicosia et al RO 2024

Aims & Study Design



Quantify volume changes in MRlgART cohort
Identify predictors of significant swelling (SS >15%)

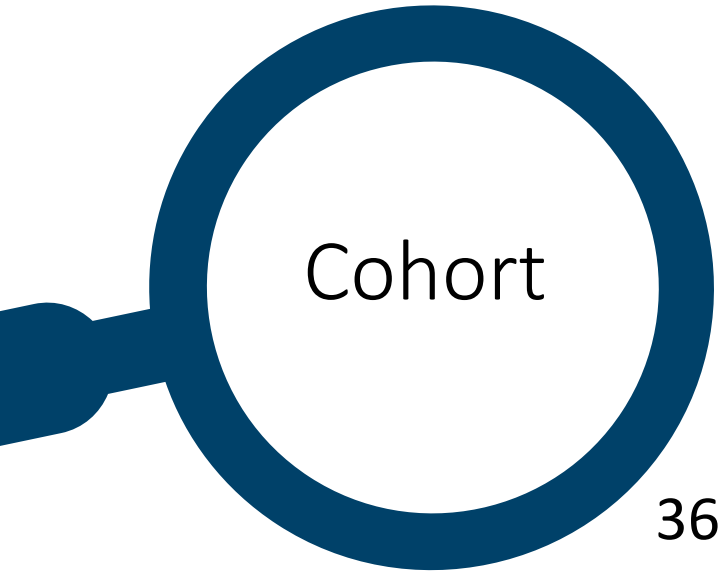
Design: prospectively collected MOMENTUM
registry

Two fractionation cohorts: SBRT vs LFRT

LMM

Logistic regression

Spherical expansion model

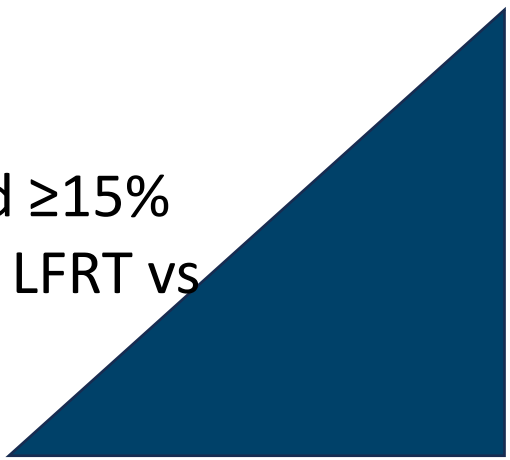


Cohort

N=1612 (1390 SBRT, 322 LFRT)

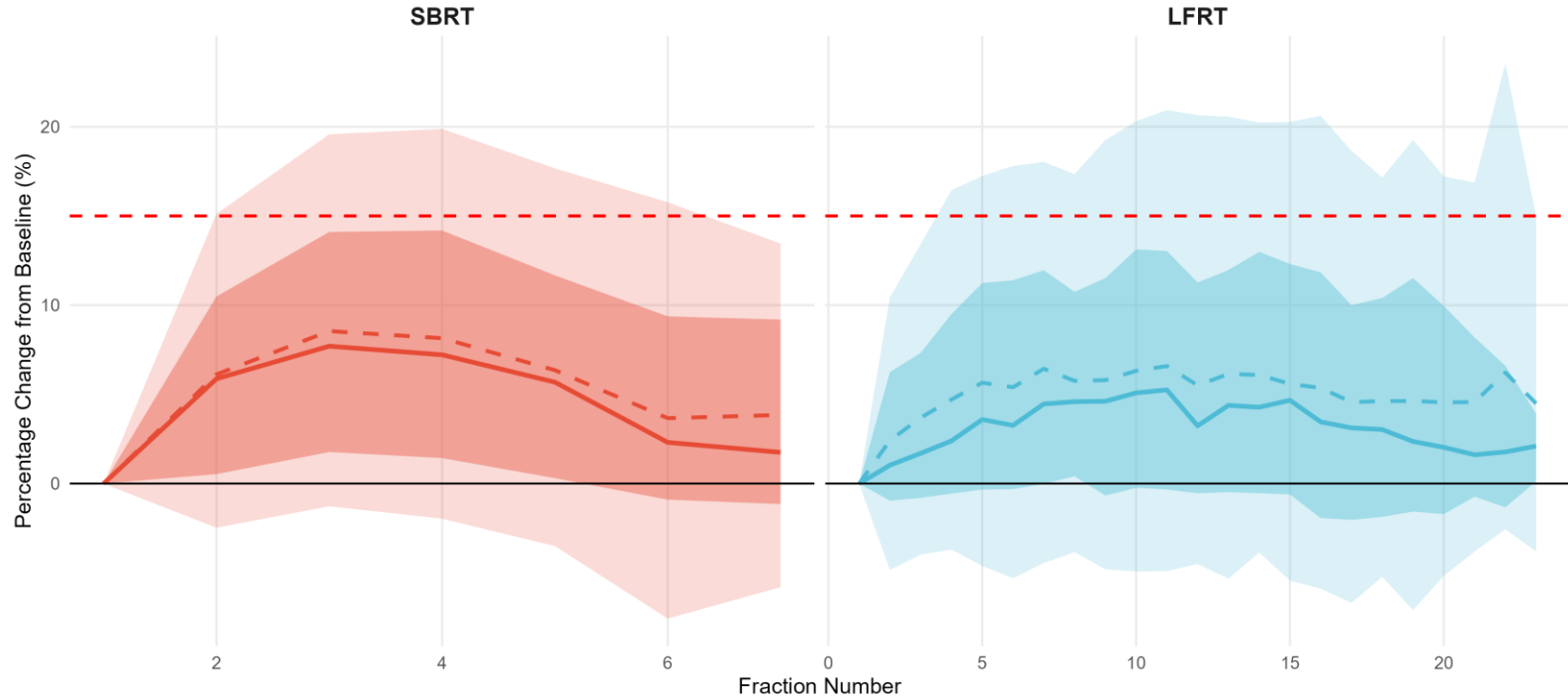
Baseline: SBRT prostates larger (median 47.5 cm³ vs 40.0 cm³ LFRT, p<0.001); PSA and T-stage balanced; ADT missing in 76% of SBRT patients

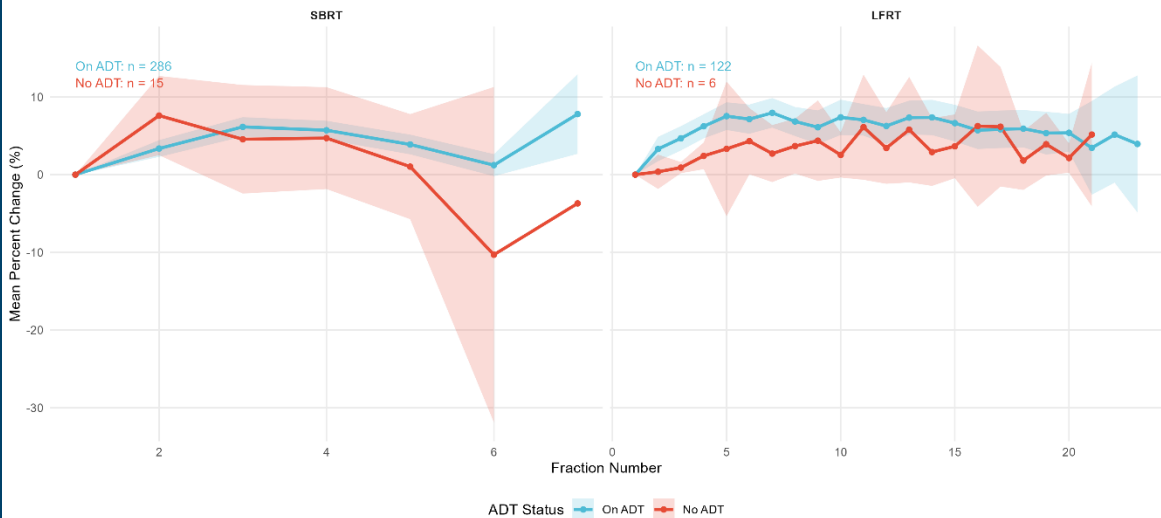
36.2% (584/1,612) exceeded ≥15% swelling at some point: 45% LFRT vs 34.8% SBRT



Prostate Volume Change During Radiotherapy

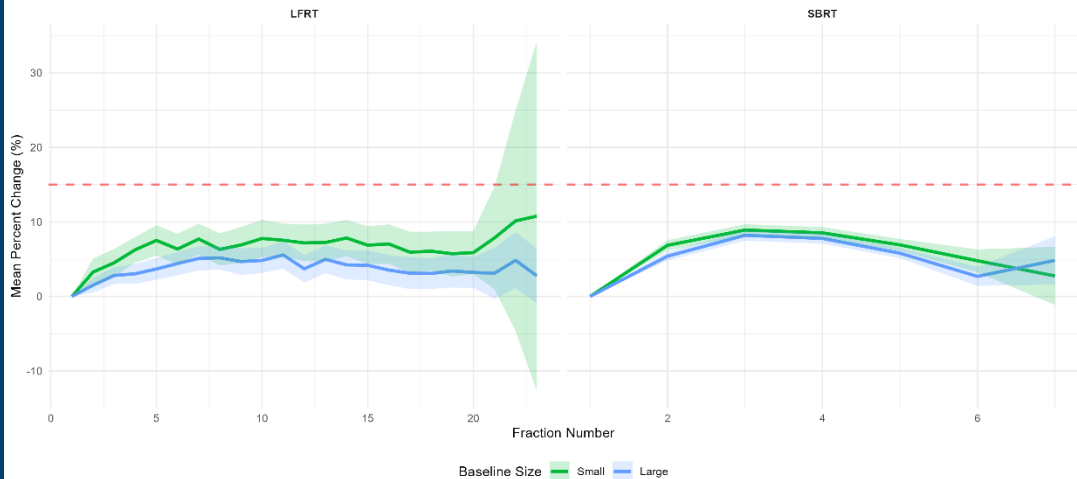
Dark band: IQR; Light band: 10th-90th pctl. Solid: median; Dashed: mean





Prostate Volume Trajectory by Baseline Size

Mean $\pm$ 95% CI, stratified by regimen



Clinical Impact: Margins&Prediction

Isotropic spheroid
margin: Only 0.4%
>3mm



CTV-PTV margins
adequate

Early-phase change predicted later SS well in LFRT on
external validation (n=219); SBRT model showed reduced
discrimination

Strengths, limitations, next steps



- + largest prospective, multicentre MRI-defined cohort
- Contouring variability, ADT missingness, non linear trajectory

Future: autosegmentation, link swelling to GU AE

Conclusion

Prostate swelling during MRIgART is common but geometrically modest

Standard margins are adequate

Baseline prostate volume is the dominant driver of variation





Thankyou to co-authors, Prof Alison Tree and
our patients