

P2.305: Sparing pulmonary arteries during thoracic radiotherapy: towards reducing pulmonary hypertension

M. Ben Rejeb¹, S. Abdessaied¹, G. Abdessatar¹, A. Hamdoun¹, M. Saadi², N. Mejri², L. Kochbati

¹ Radiation oncology department, Abderrahman Mami Hospital

² Medical oncology department, Abderrahman Mami Hospital

Correspondence: brjmouna@gmail.com

INTRODUCTION

- Thoracic radiotherapy (RT) delivers substantial dose to the pulmonary arteries (PA), which may drive pulmonary vascular remodelling and pulmonary hypertension (PH).
- PA dose has been linked to overall survival and, unlike lung or distal vessel dose, predicts incident PH after RT for locally advanced NSCLC.
- Despite this, the PA is not routinely delineated as an organ at risk (OAR) and no dose constraint is in general use.
- Aim:** to quantify PA dose in lung cancer RT and test whether PA sparing is feasible without compromising target coverage.

METHODS

Design: retrospective single-centre dosimetric re-planning study.

- 50 patients previously treated with thoracic RT for lung cancer.
- Original 3DCRT plans were re-planned with VMAT including explicit PA-sparing objectives; median prescribed dose 58.8 Gy (range 44–66 Gy).
- Right and left PA contoured manually on the planning CT using anatomical landmarks.
- Extracted metrics:** Dmean, Dmax, V20Gy, V30Gy and V55Gy for each PA.
- Statistics:** Wilcoxon signed-rank test for paired comparisons; $p < 0.05$ considered significant.

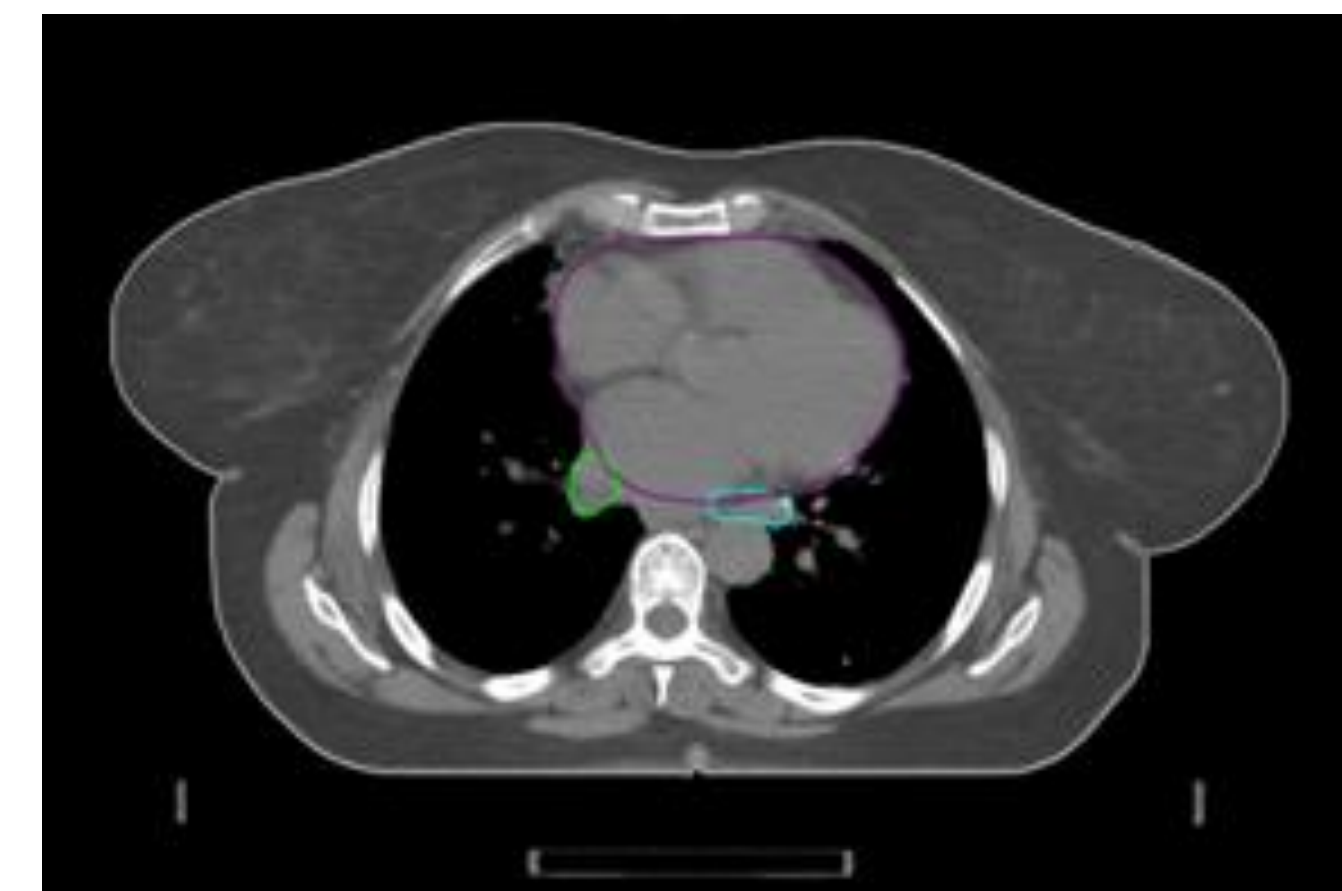


Figure 1: PA delineation

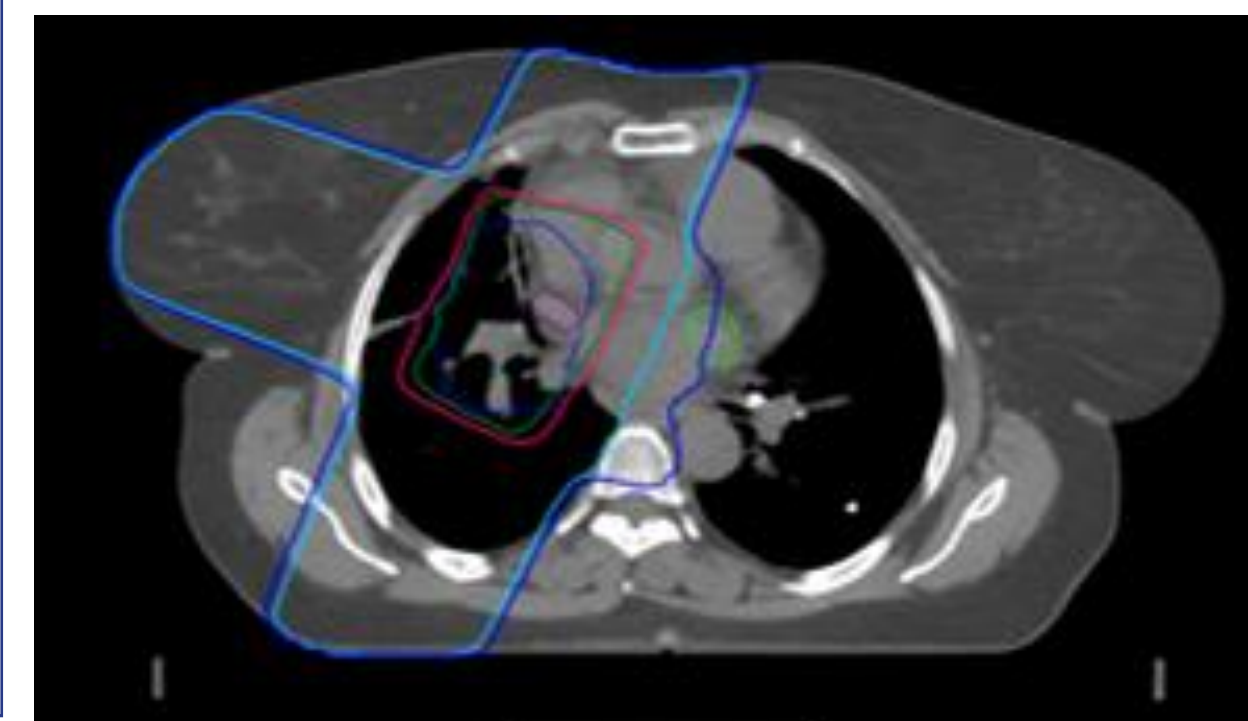


Figure 2: 3D plan

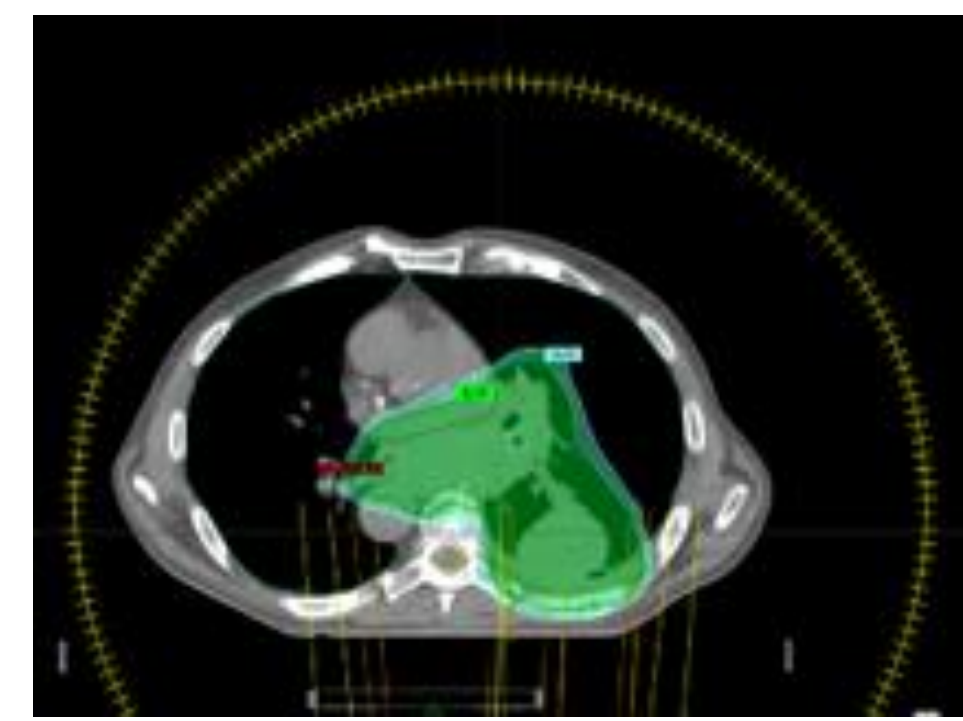


Figure 3: VMAT plan

DISCUSSION AND CONCLUSION

Actionable Take Away Message

- In routine 3DCRT lung plans the PA is irradiated almost in full (V20Gy > 84%, V55Gy up to 50%).
- PA-optimised VMAT significantly reduces mean and high-dose exposure of both branches, with preserved target coverage.
- The PA can and should be delineated and constrained as an OAR in thoracic RT.

Future Direction for Research

- Prospective correlation of PA dose with echocardiographic PH and cardiopulmonary morbidity.
- Derivation of usable PA dose–volume constraints for planning protocols.

Artificial Intelligence (AI) Use Disclaimer

No artificial intelligence (AI) tools were used in the preparation of this poster.

RESULTS

PA doses were high with 3DCRT and were **significantly reduced** by PA-optimised VMAT, on both sides.

- Mean dose to the right PA fell by ~5 Gy and to the left PA by 2.7 Gy.
- The largest gains were in the high-dose range: right PA V55Gy 49.6% → 36.8% and left PA V55Gy 29% → 19%.
- Maximum doses did not differ significantly between techniques.

Table 1. Pulmonary artery dose metrics, 3DCRT vs PA-optimised VMAT (n = 50).

Metric	3DCRT	VMAT	p
Right PA — Dmean (Gy)	46.2	41.3	0.002
Right PA — V20Gy (%)	85.4	82.0	0.040
Right PA — V55Gy (%)	49.6	36.8	0.005
Left PA — Dmean (Gy)	43.0	40.3	0.036
Left PA — V20Gy (%)	84.0	80.0	0.004
Left PA — V55Gy (%)	29.0	19.0	0.003

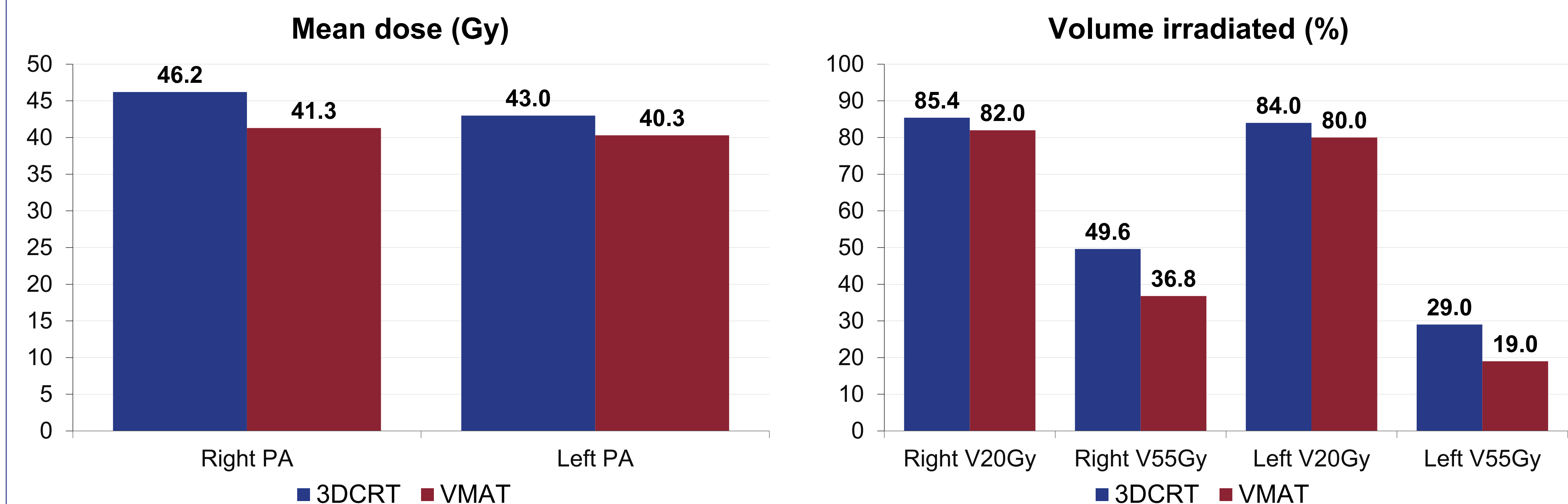


Figure 2. PA dose metrics by technique.

All differences shown are statistically significant (Wilcoxon signed-rank test).