

The Effectiveness of The Hybrid 3DCRT-IMRT Planning Technique for The Left Chest Wall and Supraclavicular Fossa (SCF)



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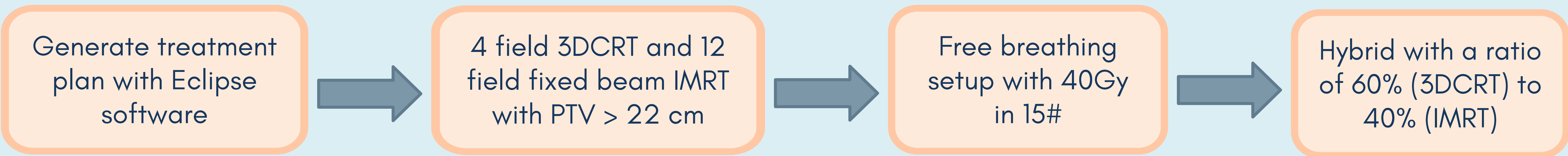
01 INTRODUCTION

Radiotherapy plays a crucial role in treating breast cancer, encompassing both the breast and supraclavicular fossa (SCF). However, the proximity of the heart and lungs presents challenges in minimizing radiation-induced toxicity. A hybrid approach combining intensity-modulated radiation therapy (IMRT) with three-dimensional conformal radiation therapy (3DCRT) is introduced.

02 OBJECTIVE

- To assess and compare target conformity and homogeneity.
- Comparing heart and lungs dose sparing between hybrid and 3DCRT techniques in left chest Wall and SCF treatment.

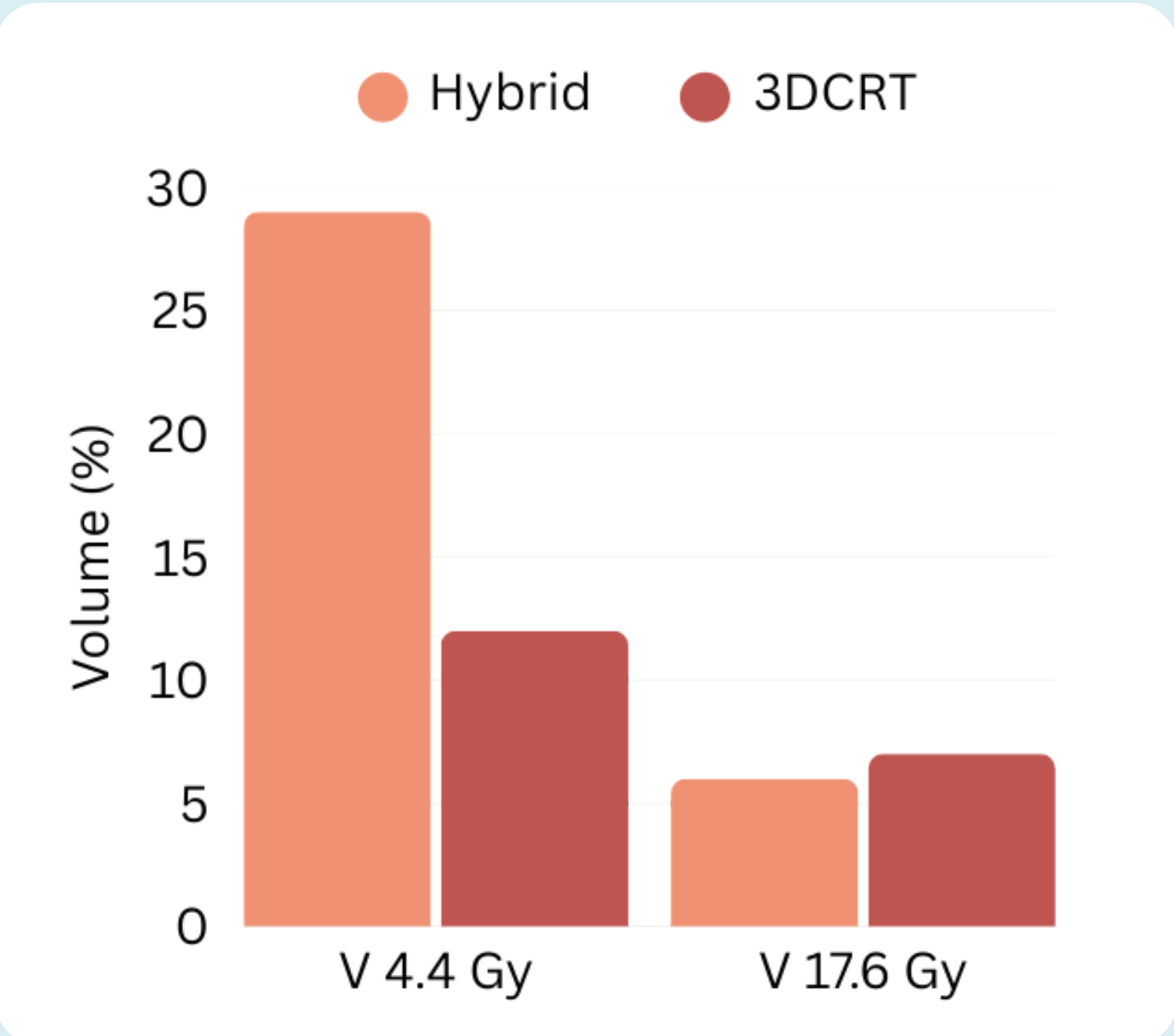
03 METHODOLOGY & MATERIAL



Material: Eclipse Planning System

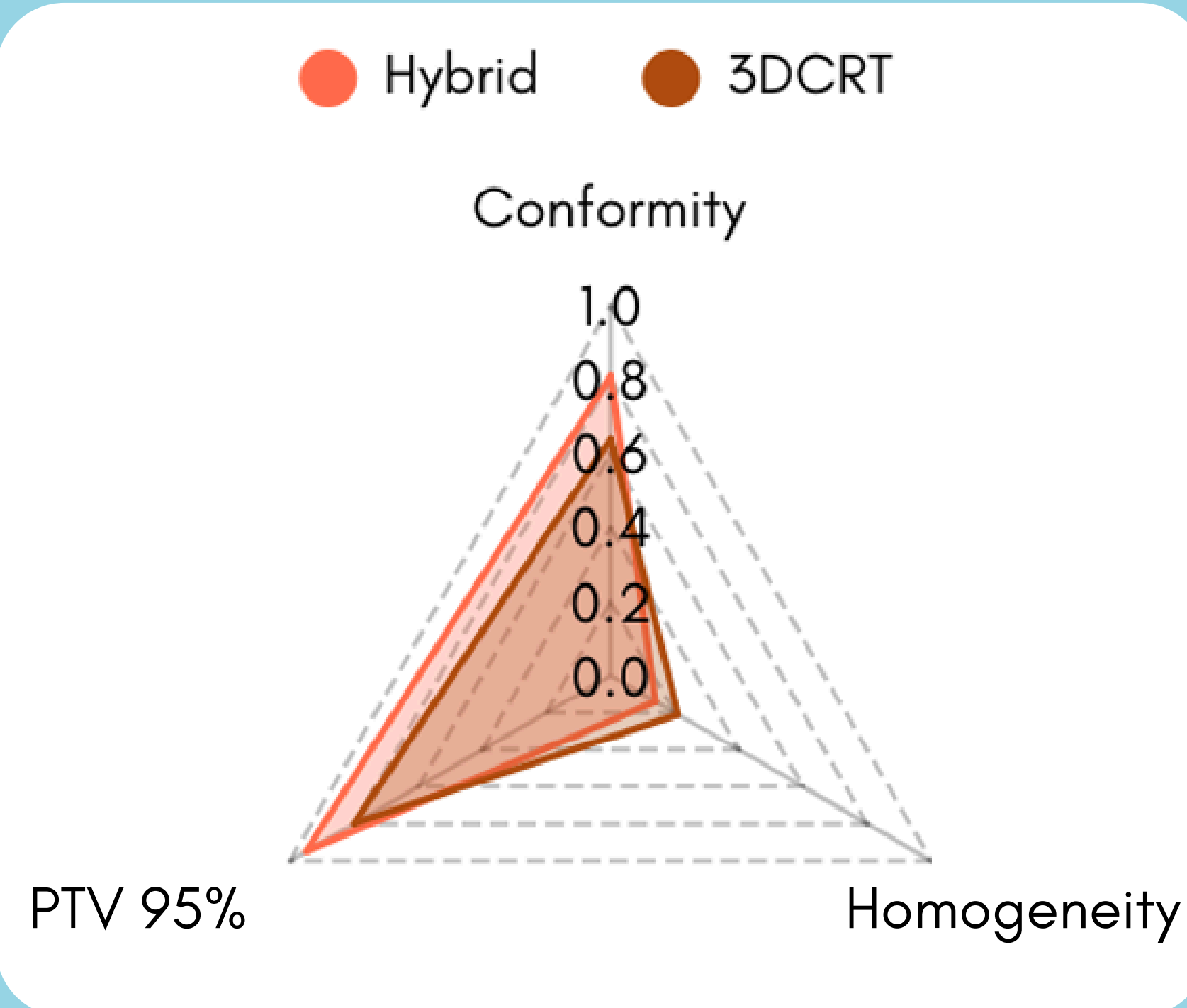
04 RESULTS & ANALYSIS

Lung Constraint



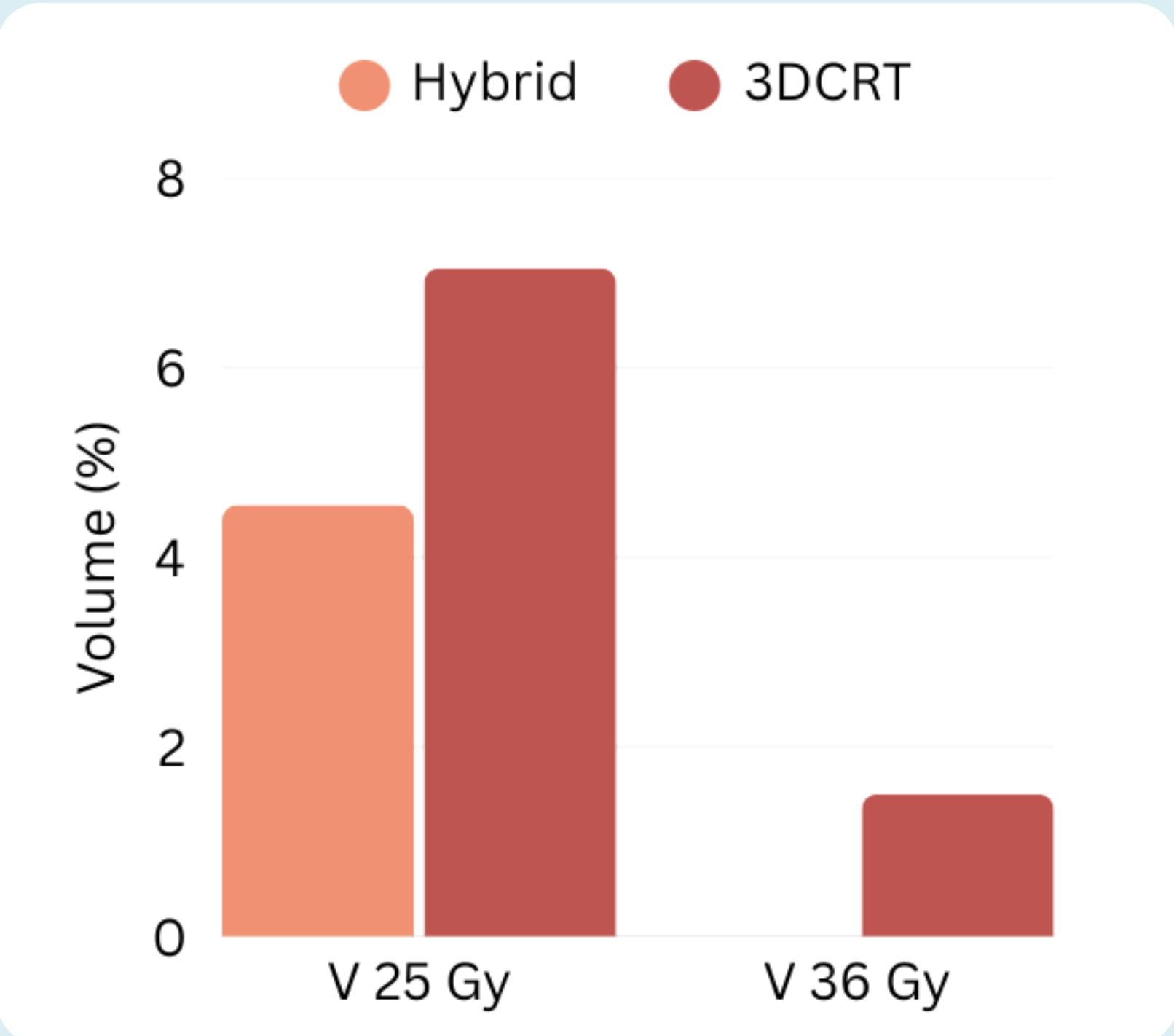
	V 4.4 Gy	V 17.6 Gy	Mean dose
Hybrid	28.82 %	6.17 %	4.43 Gy
3DCRT	12.42 %	6.88 %	3.03 Gy

Coverage



	Conformity Index	Homogeneity Index	PTV 95%
Hybrid	0.81	0.14	95.05 %
3DCRT	0.64	0.21	80.2 %

Heart Constraint



	V 25 Gy	V 36Gy	Mean dose
Hybrid	4.55 %	0 %	3.78 Gy
3DCRT	7.05 %	1.50 %	4.23 Gy

The hybrid radiotherapy technique demonstrated superior target coverage and better cardiac sparing compared to 3DCRT. Although 3DCRT provided better sparing of lungs at low doses (V4.4Gy), both approaches showed comparable dosimetric results in terms of lung V17.6Gy and mean lung dose.

05 CONCLUSION

The hybrid technique provides better homogeneity, conformity and bridges the junctional dose irregularities and demonstrates favorable clinical effectiveness, especially in anatomically challenging breast cancer.

06 REFERENCES

1. Zainab Alsaihaty, Manan, H. A., Akmal Sabarudin, & Yahya, N. (2024). Hybrid Treatment Planning for Chest Wall Irradiation Utilizing Three-Dimensional Conformal Radiotherapy (3DCRT), Intensity-Modulated Radiation Therapy (IMRT), and Volumetric Modulated Arc Therapy (VMAT): A Systematic Review. *Cureus*. <https://doi.org/10.7759/cureus.59583>
2. Das Majumdar, S. K., Amrit, A., Dhar, S. S., Barik, S., (2022). A Dosimetric Study Comparing 3D-CRT vs. IMRT vs. VMAT in Left-Sided Breast Cancer Patients After Mastectomy at a Tertiary Care Centre in Eastern India. *Cureus*, 14(3). <https://doi.org/10.7759/cureus.23568>
3. Hennes, M., Radonic, S., Schneider, U., & Hartmann, M. (2022). Retrospective evaluation of a robust hybrid planning technique established for irradiation of breast cancer patients with included mammary internal lymph nodes.
4. Rastogi, K., Sharma, S., Gupta, S., Agarwal, N., Bhaskar, S., & Jain, S. (2018). Dosimetric comparison of IMRT versus 3DCRT for post-mastectomy chest wall irradiation. *Radiation Oncology Journal*, 36(1), 71-78. <https://doi.org/10.3857/roj.2017.00381>