

ABSTRACT

- Compare Volumetric Modulated Arc Therapy (VMAT) for craniospinal irradiation (CSI) against three-dimensional conformal radiotherapy (3DCRT) - total dose 36Gy;
- 18 pediatric CSI cases were analyzed;
- Heart, lungs, and kidneys were evaluated;
- Our findings, VMAT results:
 - Superior PTV coverage;
 - Higher V5Gy and Lower V20Gy to Lung;
 - Lower Dmax e Dmean to heart;
 - Higher Dmin to kidney, lung and heart;

INTRODUCTION

- VMAT and 3DCRT are commonly used techniques in CSI. While 3DCRT remains a standard in many institutions, VMAT has shown potential for better dose conformity and reduced exposure to organs at risk (OARs).
- This study aims to compare VMAT and 3DCRT in pediatric CSI cases, focusing on dose distribution to OARs and PTV coverage.

METHODS

● 3DCRT Planning (Fig. 1):

- CNS: Opposed lateral fields
- Spine: Direct posterior field with 3 mm gap from CNS region
- For split spinal fields: 2 cm gap

● VMAT Planning (Fig. 2):

- PTV < 65 cm: 2 isocenters (1 CNS, 1 spine)
- PTV > 65 cm: 3 isocenters (1 CNS, 2 spine)
- CNS: 3 arcs (2 posterior, 1 anterior).
- Spine: 2 posterior arcs
- 5 cm junctions at isocenter intersections



Volumetric Modulated Arc Therapy: A Superior Approach for Pediatric Craniospinal Irradiation?

Leandro Baptista, Fabiana Ogata Pereira, Fernanda Belletti, Michael Chen, Maria Luisa S. Figueiredo, Julio César Somazz, Andre Próspero

GRAACC - RTCON BRAZIL leandro@gruportcon.com

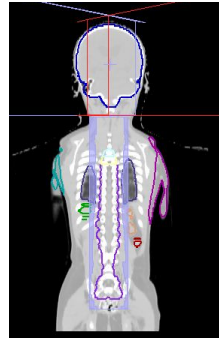
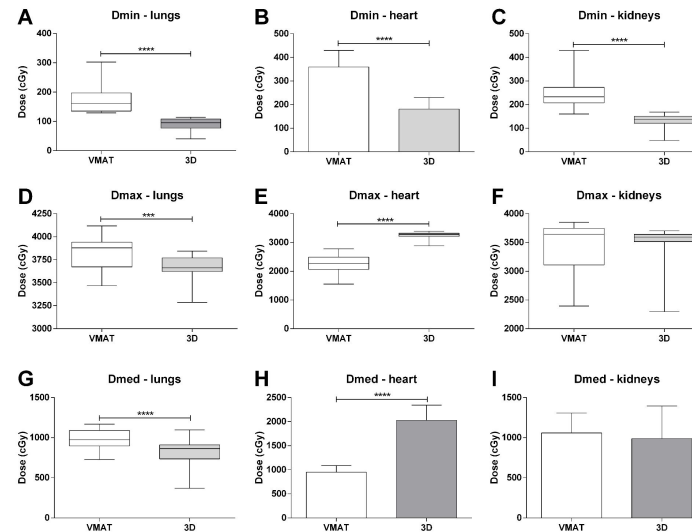


Fig. 1: 3DCRT field arrangement



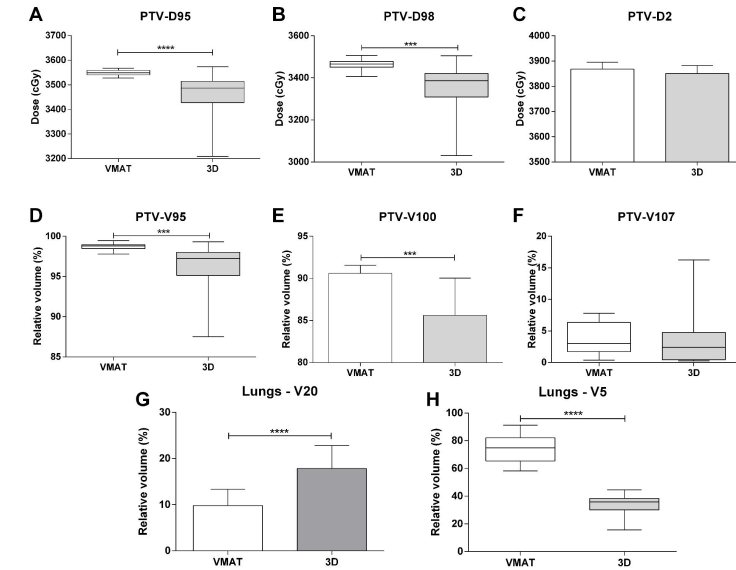
Fig. 2: VMAT field arrangements

RESULTS



RESULTS

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CONCLUSION

- VMAT plans resulted in higher volumes of low-dose exposure (V5Gy) - which is associated to potential long-term risk (second malignancies);
- 3DCRT plans showed higher volumes receiving high doses (V20Gy) which is related to pneumonitis risk;
- Possible trade-offs when choosing between VMAT and 3DCRT should be considered (better PTV coverage versus higher low-dose exposure);
- Further studies are needed to address which protocol is better to individual cases.

REFERENCES

- Roshan S. Prabhu, et al., Practical Radiation Oncology, (2022) 12, e101-e109
- Minh Nguyen, et al., Journal of Medical Radiation Sciences published by John Wiley & Sons Australia - 2022
- Olch, Arthur J., Pediatric radiotherapy planning and treatment - 2013