

DOSIMETRIC COMPARISON BETWEEN 3-DIMENSIONAL CONFORMAL RADIOTHERAPY AND INTENSITY MODULATED RADIOTHERAPY IN PATIENTS TREATED FOR RECTAL CANCER

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Introduction

Recently, there has been interest in the use of highly advanced treatment approaches, such as intensity modulated radiotherapy (IMRT), to treat locally advanced rectal cancer especially for some particular cases that do not meet dose constraints with 3DCRT, or in previously treated patients with recurrent disease requiring re-irradiation. In neoadjuvant setting, both conventional and short course radiotherapy protocols are accepted. Nonetheless, there are only a few dosimetric studies that aimed to compare the two radiotherapy techniques (3DCRT and IMRT), in terms of planning target volume coverage and organs at risk sparing, for both conventional and short course protocols.

Aim of the Work

The aim of this study was to compare the dosimetric parameters of two radiotherapy techniques, three - dimensional conformal radiotherapy (3DCRT) technique and intensity modulated radiotherapy (IMRT) technique, in terms of PTV coverage and OARs avoidance, for patients who received radiotherapy in neoadjuvant setting for locally advanced (stage II & III) rectal cancer.

Patients and Methods

This study included twenty rectal cancer patients. To compare the coverage of the planning target volume, between the two techniques, 3DCRT and IMRT, the following parameters were compared: PTV D95%, D-max, and homogeneity index. Organs at risk sparing was also compared between the two techniques using the dose constraints for each organ, for both conventional and short course protocols.

Results

The results showed that IMRT plans demonstrated greater sparing of organs at risk (particularly bowel and bladder) compared to 3DCRT plans, with similar dose coverage to the target, for both conventional and short course radiotherapy protocols.

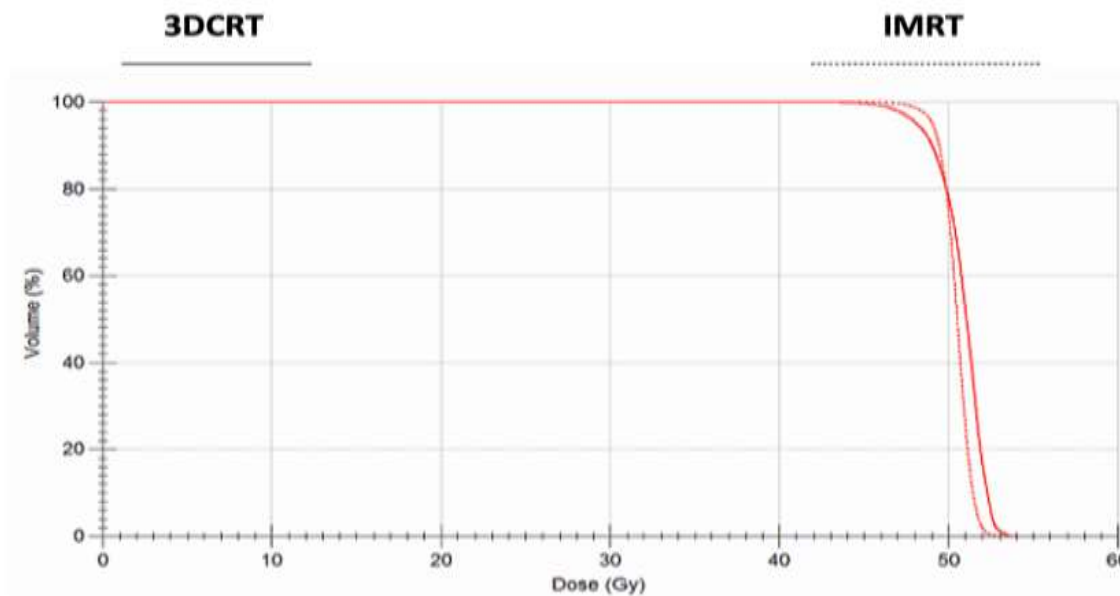


Figure 1: Example of DVH comparing PTV coverage between 3DCRT and IMRT for conventional protocol

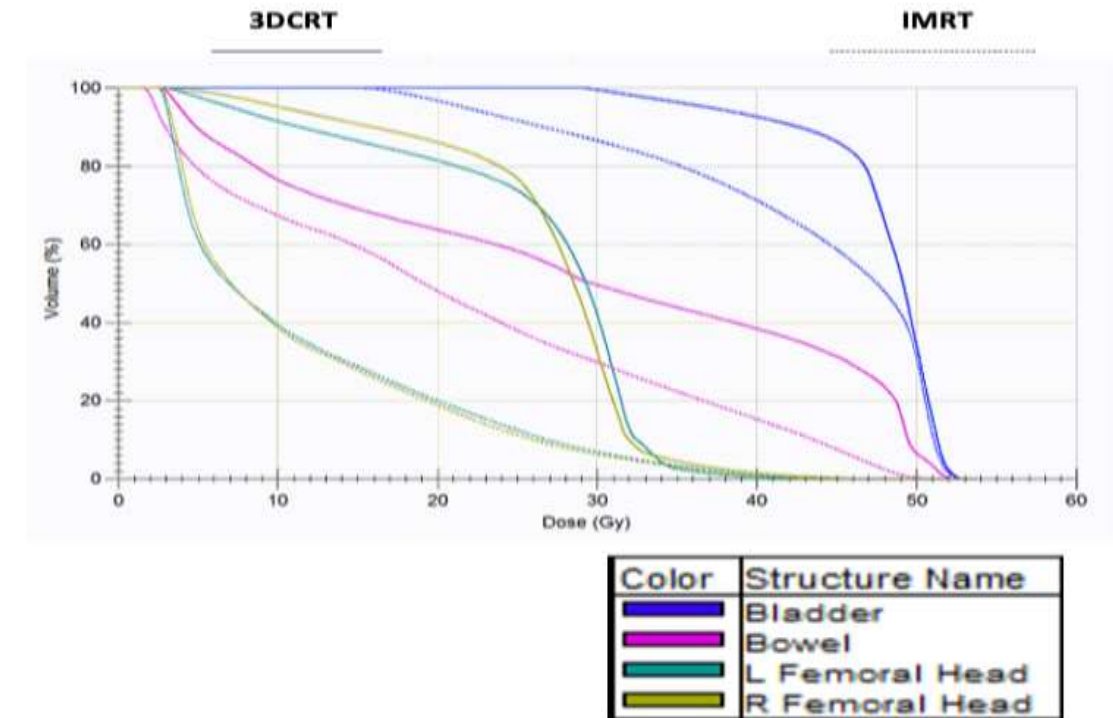


Figure 2: Example of DVH comparing organs at risk (OARs) sparing between 3DCRT and IMRT for conventional protocol

Conclusion

Wherever available, IMRT technique should be preferred over 3DCRT technique in the treatment of patients with rectal cancer, as far as organs at risk sparing is concerned, for both conventional and short course radiotherapy protocols.