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**Poster # 191**

## OBJECTIVE:

To evaluate three-dimensional variations & their effects on Equivalent Dose in 2Gy Fractions (EQD2) for the organs at risk (OARs) during image-guided brachytherapy (IGBT).

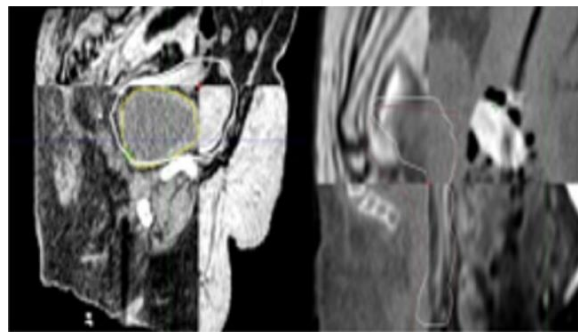


Figure 1. OAR contour changes for bladder and rectum (maximum variability case).

## MATERIALS AND METHODS:

From November 2021 to September 2022, retrospective data were collected from 13 consecutive patients with gynecological malignancies. After rectal and bladder protocols preparation and implant procedure, a planning CT scan & MRI scan were performed in all fractions. CT and MRI scans were fused with rigid registration focusing on the implant applicator. All OARs contours were independently contoured on CT and MRI, peer-reviewed images. The patient's demographic information, applicator type, and the interval between the CT and MRI were recorded.

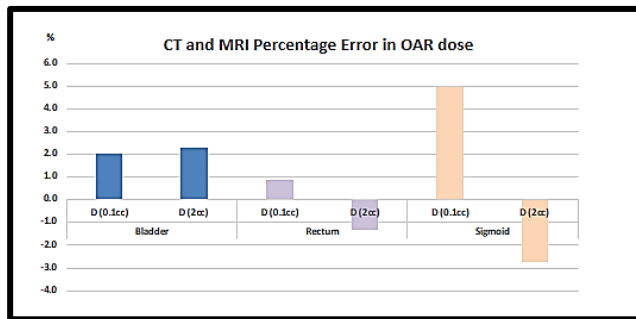


Chart 1: CT and MRI Percentage Error in OAR dose (for D 0.1cc and D 2cc).

## RESULT:

A mean of 28 minutes was recorded between the CT and MRI images. 88% of patients' bladder volumes increased by an average of 38% while in 58% of patients, sigmoid volume increased by an average of 5.6%. In 91% of patients, the volume of the rectum decreased by an average of 14%. During the analysis, on average, the center of the bladder & rectum moved 0.4 & 0.1 cm shifting away from the direction of the target. The average Dose to 2cc (D2cc) in the bladder increased by 2.3%, while it decreased by 1.3% & 2.8% in the rectum & sigmoid respectively. EQD2 of the bladder, rectum and sigmoid changed by 1.2% (CT 71.4 Gy, VS MRI 72.2 Gy), 0.3% (CT 69.8 Gy, VS MRI 69.5 Gy) & 0.2% (CT 55.6 Gy, VS MRI 55.9 Gy), that did not violate the D2cc for EQD2 cutoff as suggested by EMBRACE studies.

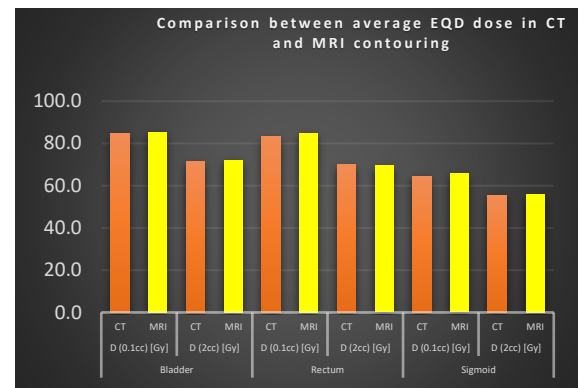


Chart 2: CT & MRI Changes in EQD2 in OAR doses for D0.1cc & D2cc

## CONCLUSION:

Our institute's time-dependent analysis of IGBT pretreatment CT and MRI scans revealed OAR motion between images. OARs deviated from the target due to these modifications, resulting in D2cc variations that did not translate significant values in terms of EQD2 calculation suggested by EMBRACE cutoffs.

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## REFERENCES::

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- Clarke C. Implementing the GEC-ESTRO Recommendations for Evaluation of OAR in Gynaecological Brachytherapy. Clinical Oncology. 2007 Apr 1;19(3):S7.