Purpose or Objective: Target position is variable during fractionated prostate radiotherapy, mainly due to rectal changes. Margin reduction is preferable with the advancements of modulated techniques and IGRT. However, geometric uncertainty can persist in the absence of an intervention to minimise rectal motion. The purpose of this study is to retrospectively evaluate the effectiveness of three rectal emptying strategies in maintain rectal stability and reducing target motion during prostate radiotherapy.

Material and Methods: Four cohorts of consented prostate patients (total n=37) underwent different rectal strategies: daily phosphates enema; low-fibre diet and micro-lax microenema and no intervention (control). Using retrospective CBCT data, (8 CBCTs per patients), inter-fraction PTV motion relative to bony anatomy was measured using automatic bone anatomy registration, followed by an automatic Structure Volume of Interest (SVOI) match. Changes in rectal diameter (RD) at the base, mid and apex of the prostate and rectal volume (RV) were measured using the CBCT data. Frequency of prostate geometric miss was assessed, with a miss defined as any PTV shift in any direction.

Results: PTV displacement was significantly reduced in the anteroposterior (AP) direction in the micro-lax group (p=0.004), and in the superoinferior (SI) direction in the phosphate enema group (p=0.013) when compared with the control group (Table 1). The frequency of geometric miss was lowest in the micro-lax group. RD variability at the base of prostate was significantly smaller in the micro-lax and phosphate enema groups compared to the control group stats, and variation in RV was smallest in the micro-lax group. PTV motion and rectal variability were largest in the control group.

Conclusion: Microlax microenema is an effective intervention in maintaining rectal stability, and PTV motion during prostate radiotherapy, in patients with large RD(<4cm) on planning CT.

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Validation of an optimised MC dose prediction for low energy X-rays intraoperative radiation therapy
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Purpose or Objective: Low energy X-rays Intra-Operative Radiation Therapy (XIORT) is increasingly used in oncology, predominantly for breast cancer treatments with spherical applicators [1], but also for skin or gastrointestinal cancer [2] with surface and flat applicators. This study aims to validate a fast and precise method [3,4] to calculate Monte Carlo (MC) dose distributions with an optimized phase space file (PSF) obtained from a previously stored database of monochromatic PSF and depth dose curves (DDP) for different INTRABEAM® (Carl Zeiss) applicators. To validate this procedure, we compared dose computed with the PSF with measurements in phantoms designed to prove actual XIORT scenarios.

Material and Methods: PSF were optimized from experimental DDP in water and were employed to calculate dose distributions, first in water, then in validation phantoms...