I have a comment that with the anatomy tiny changes in later fractions, the dose coverage would decrease in PTV while to pertain the same level of tumor control so to rescale the prescription dose to 95% of PTV volume is a feasible way most of the time. But the shortcoming is also obvious, the total MU would increase. I did some test to verify the rescale phenomenon. (Only for ATP)

For ATS, more uncertainties may included. The main variation is organ or tumor deformation in reflected in MRI. So if we want to pertain the original or referenced plan protocol, it’s more difficult to achieve as the tumor control decreased as well as normal tissues.

**UMCU prostate ATS cases (Pros3625U2, Pros3625U2ADT02)**

|  |  |  |
| --- | --- | --- |
|  | Pros3625U2 | Pros3625U2ADT02 |
| Total Segment # | 34 | 52 |
| Total MU | 1918.3 | 2758.4(43%) |
| MU of G205 (# seg) | 205.56 (5) | 342.44 (10) |
| MU of G260 (# seg) | 542.66 (6) | 589.47 (7) |
| MU of G310 (# seg) | 175.41 (5) | 289.47 (8) |
| MU of G0 (# seg) | 219.09 (5) | 389.45 (7) |
| MU of G50 (# seg) | 211.28 (3) | 279.68 (5) |
| MU of G100 (# seg) | 400.81 (5) | 469.65 (7) |
| MU of G155 (# seg) | 163.46 (5) | 398.20 (8) |
| Vol. of PTV\_3625 (cm^3) | 66.60 | 70.48 |
| Vol. of Rectum (cm^3) | 88.44 | 137.77 |
| Vol. of Bladder (cm^3) | 267.01 | 284.60 |

**ATS BEV PLOT, it’s obvious the structure has tremendous changes**

Pros3625U2 (G205)

图片包含 游戏机

描述已自动生成

Pros3625U2ADT02 (G205)

图片包含 室内, 小, 关, 桌子

描述已自动生成

Pros3625U2 (G260)

图片包含 室内, 杯子, 桌子, 关

描述已自动生成

Pros3625U2ADT02 (G260)

图片包含 室内, 桌子, 星星, 显示器

描述已自动生成

Pros3625U2 (G155)

图片包含 灯光, 游戏机

描述已自动生成

Pros3625U2ADT02 (G155)

夜晚的月亮

描述已自动生成

**TEST offline planning with Agility Model**

|  |  |  |
| --- | --- | --- |
|  | Pros3625U2 (CONV) | Pros3625U2ADT02 (CONV) |
| Total Segment # | 59 | 57 |
| Total MU | 2007.06 | 2630.15 |
| MU of G205 (# seg) | 225.72 (8) | 255.7(6) |
| MU of G260 (# seg) | 359.82 (8) | 522.72 (11) |
| MU of G310 (# seg) | 242.91 (8) | 325.96 (8) |
| MU of G0 (# seg) | 330.51 (9) | 355.37 (9) |
| MU of G50 (# seg) | 238.13 (8) | 394.48 (7) |
| MU of G100 (# seg) | 351.54 (9) | 440.68 (8) |
| MU of G155 (# seg) | 258.43 (9) | 335.24 (8) |
| Vol. of PTV\_3625 (cm^3) | 66.60 | 70.48 |
| Vol. of Rectum (cm^3) | 88.44 | 137.77 |
| Vol. of Bladder (cm^3) | 267.01 | 284.60 |

**TEST offline planning with Unity Model**

|  |  |  |
| --- | --- | --- |
|  | Pros3625U2 (Unity) | Pros3625U2ADT02 (Unity) |
| Total Segment # | 49 | 57 |
| Total MU | 2207.7 | 2498.2 (13%) |
| MU of G205 (# seg) | 164.49 (7) | 217.10 (7) |
| MU of G260 (# seg) | 681.50 (8) | 705.74 (10) |
| MU of G310 (# seg) | 223.07 (7) | 246.40 (8) |
| MU of G0 (# seg) | 208.27 (7) | 211.13 (7) |
| MU of G50 (# seg) | 286.24 (7) | 310.89 (8) |
| MU of G100 (# seg) | 371.86 (5) | 477.55 (7) |
| MU of G155 (# seg) | 272.22 (8) | 329.40 (10) |
| Vol. of PTV\_3625 (cm^3) | 66.60 | 70.48 |
| Vol. of Rectum (cm^3) | 88.44 | 137.77 |
| Vol. of Bladder (cm^3) | 267.01 | 284.60 |

**图片包含 游戏机, 截图

描述已自动生成**

**电脑萤幕的截图

描述已自动生成**

**电脑萤幕的截图

描述已自动生成**

**In Unity Environment, we compare the original plans from UMCU and reoptimization ones (TEST1 for reference plan, TEST2 for adaptive plans). Here we cannot recalculate dose from the original plans with segments pertained due to the limitations of Monaco 5.4.**

**It’s obvious from DVH statistics for adt2 plans that most of the OARs protocol was hard to meet so the plan was much more difficult than the original plans. The total MU increased by 13% really make sense as the IMRT constraints were copied from referenced plan.**

**电脑软件截图

描述已自动生成**

**电脑萤幕的截图

描述已自动生成**