2016
RADIOThERAPY
PLAN COMPETITION

Pinnacle TPS v9.10

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Virtual structure not needed for this case using Auto-Planning system from Pinnacle

- No OAR’s intersect with PTV:
  - LUNG_LEFT / PTV_TOT_EVAL
  - SPINAL CORD / PTV_TOT_EVAL

- Hotspots and Coldspots points created as ROI to reduce / increase dose

- A ring for the SCL and a LIMIT PTV* are created only if done without Auto-Planning system.

*LIMIT PTV = External Roi – (PTV+2cm)*
Isocenter location:
- Lateral direction => Center of the patient (to avoid collisions)
- Sup-Inf direction => Center of the PTV_TOT_EVAL’s volume (which is big in this direction)
- Ant-Post direction => 13 cm from the Breast Board (to avoid collisions)
Field / Arc Geometry

- **Energy:**
  - 6 MV

- **Gantry:**
  - 2 arcs (high level of modulation required)
  - 174° to 281°
    - 174° to contribute to the post part of the PTV_TOT_EVAL (not 180° to protect LUNG_LEFT)
    - 281° to be tangent to the maximum of PTV_TOT_EVAL (no more to protect the BREAST_RIGHT)
  ⇒ Give the best angulation to improve your algorithm efficiency

- **Maximum Delivery Time:**
  - 70 seconds (no more: you will loose efficiency)
Collimator:
- Angle: 0° (I consider the interleaf leakage transmission as negligible with the Agility Collimator)
- Size:

<table>
<thead>
<tr>
<th>X2: 17.79 cm</th>
<th>X1: 19.98 cm</th>
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<tbody>
<tr>
<td>Y1: 14.50 cm</td>
<td>Y2: 14.00 cm</td>
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The size is automatically fixed by Pinnacle (depending on PTV_TOT_EVAL’s size)
4 steps:
1. Define Target and OAR Optimization goals
2. Start Auto-Planning and observe
3. Fine Tune your objectives and weightings
4. Adjust your UM’s number
1. Auto-Plan window:
   - Defining Target Optimization Goals
     - 50 Gy in the PTV_TOT_EVAL
   - Defining OAR Optimization Goals
     - Define all the OAR Optimization Goals more strictly than asked in the Plan Competition
     - All the priority are “High”
2. Start Auto-Planning

- Start Auto-Planning and observe (this is your base)

- Plan with Thin Dashed Lines is what I’ve submitted

- Plan with Medium Solid Lines is what you get after Auto-Planning.
3. In the Optimize window:

- Focus on target coverage first.
- Then, try to satisfy your OAR’s criteria. This step must be done gradually (if you ask something too strong, you will “disturb” the optimization and your results will be bad).
- When you are fine with OAR’s criteria (you think you did the best as you can), work (again) with dose homogeneity if necessary.

Good homogeneity

4. You can increase UM’s number manually and satisfy hard criteria on the PTV_EVAL_TOT if necessary
General comments and recommendations

- Most important things

=>> KNOW HOW YOUR OPTIMIZER WORKS

- Isocenter location
- Gantry’s angulation
- Fine Tune your objectives
Without Auto-Planning

- Create a Limit PTV (External ROI-(PTV+2cm))
- Create a RING PTV_SC (5mm) => If you want a better conformity on PTV_SC
- Fine Tune your weightings at each optimization
- Work your dose homogeneity
- Adjust your UM’s number if needed

I have been using Auto-Planning to get a good base faster.
Material:
- TPS: Pinnacle v9.10 (Philips)
- R&V: MOSAIQ (Elekta)
- Accelerator: Synergy (Elekta)
- Collimator: Agility
- Patient-specific QA system: Octavius 2D (PTW)/Octavius 729

Results:
- Treatment time:
  - Arc 1: 1’23”
  - Arc 2: 1’20”
- Percentage of points with a gamma index < 1:
  - 94.9 % passing (3% global 3mm, 10% lower Threshold)
  - 95.5 % passing (3% global 3mm, 05 % lower Threshold)

=>> Octavius 3D will be better for this kind of localization
Thank you for your attention!