Clinical Implementation of Pencil Beam Scanning (PBS) Proton Therapy

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Panel Discussion

- Implementation issues
- Practical issues
- Staffing issues
- Training issues

Panel Discussion – Upgrade vs. Acquire New

- What are the main obstacles to move to PBS if you have only double-scatter or uniform scanning technologies/experience?
  - Treatment planning (IMPT; Robustness evaluation; RBE)
  - TPS commissioning
  - Motion issues
  - QA
  - Availability of gantry or more beam angles
  - Others?
Panel Discussion – Upgrade vs. Acquire New

- All PBS vs. mixed PBS & scatter-based treatment rooms?
  - Patients suitable for each type of treatment rooms
  - Is there a risk to have all PBS treatment rooms?
- Is it smart to upgrade existing treatment rooms or acquire new proton tx systems?
  - Beam time issues for upgrade situations
- How many treatment rooms are ideal?
  - 1 vs. 2 vs. 3 vs. >3

Panel Discussion – Staffing

- How do you staff physicists in a proton center? Is there a recommendation?
  - No. of rooms
  - Patient load
  - Facility maintenance time
  - Ratios of physicists, physicist assistants, dosimetrists, therapists, physicians?
  - Do we need to hire the full team at the beginning? If not, what is the recommended mixed at initial hiring?
  - Should I hire everyone with prior proton therapy experience?

Panel Discussion – Staff Time

- How is a typical workday for physicists in proton therapy?
  - Do you need two shifts?
  - Is there something to consider in the staffing model?
- Do you use Saturdays?
  - What do you do on Saturdays?
- Do you still have a life if you choose to work in a proton therapy center?
What are “Typical” Staffing Levels for Radiation Oncology??

- Three commonly used references
  - Manual for American College of Radiation Oncology (ACRO) Accreditation
  - Radiation Oncology Practice Accreditation Program Requirements for American College of Radiology (ACR)
  - Safety Is No Accident, Sponsored by American Society of Radiation Oncology (ASTRO)

What are “Typical” Staffing Levels for Proton Therapy?

- NAPT sent out anonymous surveys to all active Proton Therapy Centers
  - Categorize the Proton Center
    - Academic / Free Standing / Community Hospital or Academic / Non-Academic
  - Number of treatment rooms
    - Proton Rooms + Photon Rooms
  - Staffing levels (# of FTE’s) of
    - Radiation Oncologists / Medical Physicists / Dosimetrists / Radiation Therapists
  - Are Assistants used and what is their role??
    - Physics / Dosimetry / Radiation Therapists
  - Additional request for number of patients treated annually was made
**What are “Typical” Staffing Levels for Proton Therapy?**

- 10 Centers responded
- All replied to additional request for patient numbers
- 3 Centers reported both Photon + Proton
  - Dedicated Proton and dedicated Photon staffing were NOT provided
  - Estimations for Proton Only Staff were made by subtracting photon staff calculated by the average of ACRO and ACR recommendations
- Some questions may not have been interpreted consistently
- Results are reported for informational purposes only with full disclosure of the limitation of the results.
- A more specific and detailed survey may be commissioned if additional interest exists within this community.

**In Summary: A Quick Glance**

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<th>Academic Proton</th>
<th>Non Academic Proton</th>
<th>All Proton</th>
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**Panel Discussion – Staffing**

- Do you believe the survey data?
  - What is the percentage of PBS rooms in the survey?
  - Do you think the staffing model would be different for PBS vs. DS?
Panel Discussion – Vendor Implementations

- Disclosure of employment by speakers
- Is synchrotron vs. cyclotron an important factor to consider?
  - PBS Beam quality; QA; motion management; maintenance;
  - Commissioning, gantry angle dependence, symmetry of spot size;
- How do you consider a treatment planning system?
- What do you consider for imaging?
  - Is DECT required for simulation?
  - CBCT or CT-on-rails required for in-room imaging?

Panel Discussion – PBS Commissioning Time

- How long is expected after room handover to completion of commissioning?
- How many cases do I need to verify before I feel comfortable to release the machine?
- Are there criteria to be considered as “satisfactory commissioning”?
  - What about acceptance test?

Panel Discussion – Adaptive

- It appears that adaptive is much more important for PBS, why?
- Practically, how many patients require repeat CT scans?
  - How many patients (%) actually receive new plans?
- Do we have an accepted guideline for replanning?
- Do I need to consider additional simulation capacity to accommodate adaptive patients?
Panel Discussion – Downtime Management

- How do you management machine downtime?
  - Accelerator issues vs. In-room Issues
  - Are there more problems with PBS rooms compared to DS?

- If my practice also has photon therapy with linacs, do I need to choose immobilization system to share with proton therapy?

- How often do I need to replan a patient for photon therapy?
  - What is the best approach to transfer a patient to photon therapy?
  - What if the patient refuses to be treated on a linac?