BELdART-3

BELgian dosimetry Audits in Radio Therapy

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• Intracranial SRS:
  – Material
  – procedure

• Results
  – Testing of head phantom

• Extracranial SBRT

• Conclusion
• BELdART-3 focuses on intracranial SRS and extracranial SBRT
  – Basic dosimetric check (water tank and solid water)
  – End-to-end dose verification of RT treatment (with film and alanine)
  – Benchmarking
    • With BHPA IC
    • SCK
Intracranial SRS: Material

- STEEV phantom
- Use 2 pieces of film
  - 1 film in combination with alanine (small detectors read by EPR)
  - 1 film without alanine
  - Films are placed in axial plane
  - All the films are read together

Custom support system:
Levelling plate with cushion (cushion could be improved with a 3D printed support)
Intracranial SRS: Procedure

- Send phantom (prepared with film and alanine) to the clinic
- Scan phantom
- Transfer contours
- Make dose plan for SRS (1 fraction of 10 Gy), margins can be added according to local rules
- Irradiate the phantom.
- Send the phantom back to BELdART
- Send also dose plan and CT-scan of the phantom
• Combination of films with alanine
  – Calibration (about 0, 50, 100, 200, 400, 800, 1600 cGy)
  – 2 points (800 cGy and 1600 cGy) measured with alanine (to measure the dose of the film)
  – One-scan procedure
Film/alanine analysis

Slice with film and alanine (large contour)
- larger than 2x2 cm² to avoid problems with alanine

Slice with only film
Film/alanine combination

Large contour

Dose_{TPS}/Dose_{Alanine} = 0.987

Passing rate 99.9%
- 5%/1mm criteria
- 50% LD threshold

DD criteria

Thin lines: Film
Thick lines: TPS
Film/alanine combination

Small contour

- Passing rate 100%
- 5%/1mm criteria
- 50% LD threshold

Thin lines: Film
Thick lines: TPS

DD criteria

Passing rate 100%
5%/1mm criteria
50% LD threshold
Extracranial SBRT

• Virtual water IMRT dose verification phantom
• Phantom is ordered
• Tests to be done
  – Position of the tumour
Conclusion

• Promising results for film/alanine dosimetry
• Larger fields than 2x2 cm² necessary for accurate alanine results
• Ready for first tests with a small number of clinics (intracranial SRS)
• Steering committee:
  – Stefaan Vynckier, Dirk Verellen, François Sergent, Alex Rijnders, Milan Tomsej

• No scientific committee but possibilities to test or ask for advices.