Audit of radiographer led plan selection in imaged guided adaptive radiotherapy (IGART) for bladder cancer

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Introduction
Variation in bladder shape and position significantly compromises target coverage during standard radiotherapy despite use of large population based expansions [1]. Cone beam CT (CBCT) allows soft tissue visualisation and offers IGART planning solutions to compensate for this day-to-day variation with both improved target coverage and normal tissue sparing [2]. The plan of the day (PoD) strategy accesses a library of plans for treatment based on CBCT assessment immediately prior to each fraction [2,3].

In accordance with NRAG recommendation to maximise use of a multi-skilled workforce, we have implemented radiographer led on-line verification and plan selection for those who have completed in-house training for bladder IGART [4]. This audit was performed to ensure that radiographers achieving initial competency maintained appropriate standards for treatment delivery.

Standard
Plan selection was deemed appropriate if
• online radiographer plan selection used for treatment matched off line plan selection by clinician. A >90% agreement was deemed acceptable [3]

• target coverage of the bladder as assessed on cone beam CT, CBCT (pre and post radiotherapy) was in accordance with ICRU-83 guidelines; achieving D98% >95% of prescribed dose [5]

Method
Patients receiving daily PoD bladder IMRT were assessed.

Following treatment CBCT images were imported into the planning system (Pinnacle version 9.6). A clinical oncologist carried out off-line PoD selection for all pre-radiotherapy CBCTs. The bladder was contoured on each CBCT; the isodoses were overlaid to determine D98%. The time between pre and post radiotherapy CBCTs was used as a surrogate of plan selection and treatment delivery time.

Results
125 CBCTs (63 pre; 62 post radiotherapy) were evaluated. Concordance of plan selection was 92% (58/63).

Mean time between pre and post CBCTs was 13 minutes (SD 2.1, range 9-18).

Mean intra-fraction filling was 14cm3 (SD 16.3, range 0.23-107.9). Mean D98% pre-RT CBCT was 99.1% (SD 1.09, range 95.5-100). Mean D98% post-RT CBCT was 98.7% (SD 1.78, range 69.9-100).

Conclusion
Suitability trained radiographers deliver PoD for bladder cancer with good concordance with clinicians. Plan selection also adequately accounts for intra-fraction filling without compromise to target coverage.

Action plan
Development of advanced competency-training workbook, illustrating consistent and inconsistent plan selection. Re-audit to ensure competencies maintained.

References