Proffered papers: Oncology service delivery

L7.1 Evaluating the need for CBCT imaging in Breast patients receiving radiotherapy to the IMC

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This study was designed to determine the feasibility and value of undertaking CBCTs in patients receiving radiotherapy to breast and associated nodal groups, specifically in patients receiving radiotherapy to the internal mammary chain (IMC). The current image verification technique for breast patients in our department uses MV imaging to check breast contour, CLD, CFD and inferior coverage. For SCF/IMC patients an additional kV anterior image is taken to verify positioning in the longitudinal direction. As part of an audit 18 patients had CBCTs acquired in DIBH on fractions 3, 6 and 11, alongside the standard MV/kV image verification.

Population, random, and systematic errors were calculated across the three imaging modalities and were found to be reasonably similar. There were large magnitudes of rotational shifts apparent when considering the PRR (pitch, roll, rotation) shifts. It was found that for 8% of images in the audit, the PRR was greater than ±3°, which would have required a re-set up. 6/18 patients on the audit had CBCTs where, at acquisition, the IMC PTV was not covered as the patient was off in the anterior/posterior direction, sometimes by almost 1.0cm. Using auto bone match on the CBCT offline improved coverage greatly.

The results of this audit showed that using CBCT for IMC patients improves the localisation and provides information about IMC coverage that otherwise would have been missed. As a result, the department has implemented online matching CBCT #1-3 and weekly for all IMC breast patients, replacing the current standard of MV imaging.

L7.2 Evaluation of the novel guided reporting strategy: quality and time of radiology report creation in MR mammography using a dedicated software

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Background: Unstructured free-text dictation (FT), the current standard is considered being too time-consuming and error prone.

Method: To assess usability and performance of a software-based guided reporting strategy (GR, RadioReport pre-marketed v0.8, NeoQ, Germany) in MR mammography. Eighty examinations evaluated previously (>8 weeks) with FT including mass, focus/non-mass enhancement, normal findings were reevaluated using GR by three specialized radiologists. Usability was assessed by subjective feed-back, quality by comparing automatically generated GR to FT for completeness. Errors in GR were categorized and analyzed for debugging in marketed v1.3. Reporting time and learning curves were analyzed.

Results: Usability was rated high by all readers. No nonsense, omission/commission, and translational error were detected in GR. Spelling/grammar error were observed in GR in 3/80 patients (3,8%), exclusively in the free-text discussion section, and 36/80 in FT (45%). Content differences between FT and GR revealed no difference in 41 patients, minor difference (33 patients), major difference resulting in treatment change (6 patients). All patients with differences were categorized content omission error in v0.8, caused by insufficient software operation or error by missing contents in v0.8 but displayable with v1.3. Mean reporting time was 576 seconds (SD 327; minimum 155; maximum 1517 seconds). Mean times per reader were 485, 557, 754 seconds.

Conclusion: Overall time is, therefore, significantly shorter compared to references from FT process1,2. Mean reported time for FT of MRI examinations was 1059 seconds and decreased by 42,3% using GR. GR allows for complete reporting while minimizing error rate and significantly reducing time.

1. Cowan, I.A.; MacDonald, S.L.; Floyd, R.A. (2013) Measuring and managing radiologist workload: measuring radiologist reporting times using data from a Radiology Information System. J Med Imaging Radiat Oncol. 57(5), 558-566. 2. Pitman, A.; Cowan, I.A.; Floyd, R.A.; Munro. P.L. (2018) Measuring radiologist workload: Progressing from RVUs to study ascribable times. J Med Imaging Radiat Oncol. 62(5), 605-618.

L7.3 Implementing the findings from the reducing pre-registration attrition and improving retention (RePAIR) project - developing an AHP support programme for improving recruitment, retention and engagement (ASPIRRE)

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There are a wealth of resources available that support educators and clinicians to reduce attrition and improve retention of students and newly qualified staff within radiotherapy and other health care disciplines. There is no central online repository where resources can be uploaded, shared, reviewed and developed. A toolkit was developed from the descriptive statistical analysis of a mixed method survey undertaken in Spring 2021 of 10 higher education institutions (HEIs) providing therapeutic radiography education, 51 radiotherapy healthcare providers and 20 therapeutic radiography students on a placement expansion programme, in England. 6 key themes emerged from the data analysis that formed the priority areas of the toolkit Effective recruitment initiatives (including outreach) Effective retention initiatives including student support, return to practice Strategies to increase student placement capacity (including simulation and non-traditional placements) Placement allocation and funding support Standardised clinical assessment documentation Preparation for practice (including preceptorship) Each priority area of the toolkit is populated with examples that include: Recruitment initiatives e.g. department open days, podcasts, virtual tours Examples of buddy schemes and peer support programmes, non-traditional placements including research, leadership and internships Innovative working patterns to increase student training capacity Simulation strategies and practical examples Example templates to support students to secure placement accommodation Initiatives from other professional groups that have implemented standardised assessments in clinical practice. Transition to professional practice initiatives and preceptorship examples The ASPIRRE toolkit enables a wide target audience to access a range of resources to be able to continue to develop new and existing ideas for supporting recruitment and retention initiatives, explore placement expansion and transformation agendas within radiotherapy.

1. Health Education England (2018). Reducing Pre-registration Attrition and Improving Retention [online]. Available at https://www.hee.nhs.uk/our-work/reducing-pre-registration-attrition-improving-retention.

L7.4 Renal cell carcinoma audit - preoperative radiological TNM staging versus histological outcomes

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Background: 13,300 new renal cell cancer (RCC) cases in the UK every year. Overall, 5-year mortality is high -35% (4300 deaths/year). Staging by CT is crucial and forms the basis for surgical planning, allowing multiplanar tumour margin and vascular supply assessment. Literature suggests staging accuracy rates of around 80%.

Purpose: We present our results and 5-year postoperative survival from 2016 and use it to highlight common pitfalls with cases and images.

Summary: 50 patients underwent nephrectomy (38) or partial nephrectomy (12) for RCC in 2016. All had documented preoperative staging based on CT and MDT discussion. Radiological and histological TNM staging mismatch occurred in 13/50 cases (26%). Seven related to radiological assessment of sinus or perinephric fat; 5 upstaged from T2a/b to T3a, 2 downgraded from T3a to T2a and T2b. Two cases were upstaged from T1b and T2a to T3a due to histological invasion of renal vein, although the latter was microinvasion. Two cases were downsized from T1b to T1a and T2a to T1b. Two cases demonstrated concerning lymph nodes on CT; staged as N1, however cleared on lymph node dissection. At 5-year follow-up 11 patients died; 7 due to RCC (14% mortality; average death at 2 years). Only 2 RCC deaths occurred in radiology/histology mismatch patients, which were histologically down staged.

Conclusion: Histological upstaging of cases by early fat/vascular invasion is a well-recognised issue that all radiologists should be aware of; however, it does not appear to significantly alter management or outcome.

1. Cancer Research UK, https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/kidney-cancer/mortality, Accessed [Dececmber] [2021]. 2. Tsili, A. C., & Argyropoulou, M. I. (2015). Advances of multidetector computed tomography in the characterization and staging of renal cell carcinoma. World journal of radiology, 7(6), 110-127. https://doi.org/10.4329/wjr.v7.i6.110

L7.5   What proportion of patients receiving radical treatment for muscle invasive bladder cancer would be suitable for trimodality therapy including HDR-brachytherapy - retrospective study from a single UK tertiary referral centre

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Background: Trimodality therapy including HDR-Brachytherapy (TMT-HDR) is a management option used in select European Centres for muscle invasive bladder cancer (MIBC). Suitable patients have good bladder function, solitary tumours 5cm, no CIS, no pelvic lymphadenopathy, and are located away from the bladder trigone.

Methods: We conducted a retrospective cohort study of patients who received radical treatment: radical cystectomy and lymph node dissection (RC-LND), or radical Radiotherapy +/- chemotherapy (C-RT) at a London teaching hospital between 2010 and 2019. The aim was to determine what proportion of patients would have been suitable for TMT-HDR. To assess the accuracy of clinical tumour diameter assessment we compared the following diameter measurements in 10 patients who had undergone RC-LND without neoadjuvant chemotherapy: diagnostic CT / MRI, diagnostic TURBT, cystectomy histology.

Results: 703 patients received radical treatment over the time frame studied: 562 RC-LND, 141 C-RT. From these, 96 would have been suitable for TMT-HDR: 54 RC-LND, 42 C-RT. Diagnostic imaging and TURBT estimates of tumour diameter were all found to fall within 0.5cm of the RC-LND histology measurements.

Conclusions: Overall 13.6% of patients seen at our centre were suitable for TMT-HDR (7.7% RC-LND, 6% C-RT). Diagnostic imaging and TURBT diameter measurements are clinically appropriate for guiding patient selection.

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2. Mannion, L., Bosco, C., Nair, R., Mullassery, V., Enting, D., Jones, E., Van Hemelrijck, M. & Hughes, S. 2020, "Overall survival, disease-specific survival and local recurrence outcomes in patients with muscle-invasive bladder cancer treated with external beam radiotherapy and brachytherapy: a systematic review: Brachytherapy as part of CMT for MIBC", BJU international, vol. 125, no. 6, pp. 780-791.
3. Pieters, B.R., van der Steen-Banasik, E., Smits, G.A., De Brabandere, M., Bossi, A. & Van Limbergen, E. 2016;2017;, "GEC-ESTRO/ACROP recommendations for performing bladder-sparing treatment with brachytherapy for muscle-invasive bladder carcinoma", Radiotherapy and oncology, vol. 122, no. 3, pp. 340-346.