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Abstracts – Oral Presentations

Predicted cardiac and second cancer risks following treatment for Hodgkin lymphoma in Ireland

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Purpose:

To predict cardiovascular disease (CVD) and second cancer 30-year absolute mortality risks (AMR30) for patients treated for mediastinal Hodgkin lymphoma (HL) in Ireland.

Materials and Methods:

This is a multicentre study of consecutive patients treated for mediastinal HL 2016-2019. Standard practice was to optimise both chemotherapy and radiotherapy (RT) to minimise the risk of late effects for individual patients. Radiation doses were estimated to the heart, left ventricle, cardiac valves, lungs, oesophagus, carotid arteriesand female breasts. Individual CVD and second cancer AMR30 were predicted using Irish background population rates and published dose-response relationships.

Results:

Forty-four patients were identified, 23 female. Median age 28 years (IQR 24-42). 77%had stage IIA/IIB disease. 98% received anthracycline regimens, 80% received 4-6 cycles ABVD. VMAT +/- deep inspiratory breath hold was delivered. Median prescribed RT dose was 30Gy. Average mean heart dose 9.8Gy (range 0.2-23.8Gy). Excess mean AMR30 of CVD following chemotherapy and RT was 2.1% (0.8%, 0.9%, 0.0%, 0.1%, and 0.2% for coronary heart disease, congestive heart failure, valvular heart disease, stroke and other cardiac diseases respectively). Mean cumulative AMR30 of CVD increased by 1.1% with chemotherapyand a further 1.0% with RT. Excess mean AMR30 for second cancer following RT: lung cancer 2.2%, breast cancer in females 0.3%, and oesophageal cancer 0.3%.

Conclusions:

Excess mortality risks from CVD and second cancers remain clinically significantfor patients undergoing optimised chemotherapy and photon-RT. Ongoing efforts to de-intensifycombined modality treatment and implement techniques such as proton beam therapy for high risk patients are justified to further reduce potentially fatal effects of treatment.

Bladder Volume Variation in Hypofractionated Prostate Radiotherapy

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Purpose:

A full bladder for prostate radiotherapy treatment limits overall dose to the bladder and displaces bowel from high dose regions {1-3}. To identify potential ways to improve bladder filling consistency we analysed bladder volume variation over the course of a patient's treatment and its relationship to various patient and treatment factors.

Materials and Methods:

We included all patients treated with 60gy in 20 fractions to the prostate only over 1 year. Patient, tumour and treatment characteristics were collected retrospectively. We recorded IPSS scores that were completed pre and post treatment. Daily bladder volumes were recorded from CBCT retrospectively for a subset of patients and includedin correlative analyses with various treatment and patient factors.

Results:

69 men were included in this study with a mean planning CT bladder volume of 272ml(79-574). Patients were divided into Large (>180ml) and Small subgroups (N= 46 vs 23).
Smaller bladders resulted in a greater post treatment IPSS score (10.2 vs 7.7 (p=0.2)) and greater change in IPSS (3.3 vs 1.4 (p= 0.23). The variation of daily bladder volumes is positively associated with planning CT volume, variation in daily treatment time and urinary symptoms.

Conclusion:

Smaller bladder volumes are potentially associated with increased urinary symptoms whereas larger volumes undergo more daily variation. This data suggests an optimalbladder volume of 200-350ml to minimise variation. This is first study to demonstrate a relationship between treatment time and daily bladder variation. Several areas for improvementhighlighted by this study have formed the basis for a single centre pilot study.

Pineal Parenchymal Tumours of Intermediate Differentiation: A retrospective analysis of treatment outcomes

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Purpose

Pineal parenchymal tumours are rare, accounting for <0.3% of all primary central nervous system tumours. Pineal parenchymal tumour of intermediate differentiation (PPTID) was first classified by the World Health Organisation (WHO) in 2000, as a tumour with an intermediate prognosis, between pineocytoma (WHO grade 1) and pineoblastoma (WHO grade 4). Mitotic index and immunohistochemistry are used to classify PPTIDs as grade II or III pathologically. Their clinical behaviour is variable and they present a risk of seeding to cerebrospinal fluid. Whilst the role of radiotherapy (RT) has been highlighted in various studies, the extent of RT has yet to be determined and the role of chemotherapy remains controversial. The aim of this study was to evaluate clinical outcomes in patients with PPTID who were treated with radical RT at our institution.

Materials and Methods:

We conducted a retrospective review of the medical records of patients with PPTID treated at our institution between 2011 and 2018. Clinical data, performance status, histology, imaging reports, type of resection, details of systemic therapy, details of RT, toxicity data, response to treatment and patterns of recurrence were gathered.

Results:

We identified seven patients. Median age at diagnosis was 35.7 years. Three patients had a complete resection. Of the four patients who had a subtotal resection, two of these patients had local recurrence, one had spinal metastasis and one had extensive leptomeningeal disease. Median dose of RT was 56 Gy. Two patients were re-treated with RT. Of the four patients who developed recurrent disease, two died, one is in remission, and one has stable disease. Median progression-free survival was 44.7 months (95%CI: 15-75 months).

Conclusions:

PPTID is a rare tumour with variable outcomes. Our study showed that patients who had adjuvant RT and chemotherapy following complete resection had improved progression-free survival compared to those who had subtotal resection. A large multi- institutional study is warranted to determine the best treatment guidelines for patients with these rare tumours.

An interdepartmental comparison of documentation of driving advice for grade 3 and 4 brain tumours.

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Purpose:

The Road Safety Authority mandates that patients with brain tumours must not drivefor at least two years after completing treatment (RSA, 2016). Neurosurgical resection can impair executive function leading to a risk of impaired speed control and lack of awareness of on-road behaviours (Mansur et al., 2018). From a medical legal standpoint, it is essential to accurately document the correct advice given to patients regarding driving advice.

Materials and Methods:

Seventy-six patients with a grade 3 and 4 brain tumour were analysed. A comparison was made between the documentation in the medical and radiation oncology department in Beaumont Hospital. For medical oncology (MO), medical charts were examined for the initial consultant consultation. Clinic letters were examined. For radiation oncology (RO), Aria notes, letters uploaded to documents and clinical notes uploaded were assessed. The Beaumont medical charts were also examined to assess for radiation oncologydocumentation.

Results:

29% of MO medical records had the correct documentation, 62% had incomplete documentation by not specifying the length of time. 26% of RO medical records had the correct documentation, 68% had incomplete documentation by not specifying the length of time. 39% had driving advice in one of the records, 8% had it documented in both, 53% in neither.

Conclusion:

Accurate documentation of driving restrictions for patients with brain tumours wassuboptimal. Quality improvement initiatives should be considered to address any possible medico-legal implications of inadequate documentation in the management of grade 3 and 4 brain tumours.

Days and Gray: The cost of cyber-crime in Radiation Oncology

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Purpose:

This summer the HSE's IT services were victim of an organised ransomware attack.All hospital IT systems were shut down while the damage was assessed and repaired. In our radiotherapy department, 101 patients had their treatment disrupted. This study assesses the radiobiological impact of this gap in radiotherapy for patients and the efficacy of compensation strategies.

Materials and Methods:

Radiotherapy for high-risk patients was recommenced in a neighbouring private hospital. Remaining patients were restarted in CUH when systems becameoperational after 21 days. New CT simulation and radiotherapy plans were required for transferred patients. We calculated the planned total duration and actual duration of each patients' treatment. A planned BED and actual BED was calculated for each treatment course. Treatment acceleration, bi-daily treatment and extra fractions were employed as compensation strategies. We calculated the BED lost and potential BED saved per patient.

Results:

The mean gap in treatment for the cohort was 16 days (11-28). Patients had a cumulative 1127 fractions of their treatment course remaining. 44 patients were transferred to the private hospital. Mean time from new CT to start was 4.8 days (3-10). The mean number of days saved by compensation strategies was 3 (0-10) per patient. Potential Gray lost overall was803Gy, mean 8.46Gy per patient (0- 19.8Gy). Total Gray saved was 276Gy, mean 2.9Gy (0- 9Gy) saved per patient.

Conclusion:

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Clinical and radiological outcomes of frameless stereotactic radiosurgery for brain arteriovenous malformations

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Purpose:

To evaluate the results of frameless linear accelerator stereotactic radiosurgery (SRS) for brain arterio-venous malformations (AVMs) using the Novalis (Brainlab) system.

Materials and Methods:

Patient demographics, AVM anatomy, treatments prescribed, as wellas clinical and radiological outcomes were recorded and analysed.

Results:

Between December 2013 and December 2017, 40 patients were treated. Of these 23(57.5%) had presented with hemorrhage. 12 patients had previous treatments for their AVM. Spetzler-Martin grade was 1 in 3 patients, 2 in 17 patients, 3 in 18 patients and 4 in 2 patients. Median nidus volume was 2.28 cc (0.15-9.60). Median marginal dose was 18 (15-20) Grays.
During a median follow-up of 34 months (range 22-54 months), 31/40 (77.5%) AVMs have been completely obliterated as assessed on DSA or MRA. 2 (5%) patients suffered hemorrhage during the latency period. Adverse radiation effects included seizures in two patients, worsening of headaches in one, and an asymptomatic cyst in one.

Conclusion:

Novalis frameless SRS for selected AVMs results in good angiographic andclinical outcomes, comparable to published Gamma knife SRS results.

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An audit of timelines for adjuvant SRS for brain metastases at the St Luke's Radiation Centre at Beaumont

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Purpose:

To review timing of adjuvant intracranial stereotactic radiotherapy (SRS) at thenational tertiary referral centre for SRS.

Materials and Methods:

A recent single-institution retrospective review published in Practical Radiation Oncology (1) suggests that adjuvant intracranial SRS for resected brain metastases should commence within 4 weeks of surgery to reduce the risk of local failure (2.3% vs 23.6%, n=133). Our previous local findings identified 6 weeks as a cut-off and this is our institutional target. We reviewed electronic medical records for all patients undergoing adjuvant intracranialSRS in 2019. 2019 was selected as the most recent full calendar year unaffected by the Covid-19 pandemic. Data was also collected for Q4 of 2020 to assess timelines at the time of the audit. We recorded the number of calendar days between surgery and 1st fraction of SRS. Wealso recorded the timeline for each component of the radiotherapy planning pathway to help identify possible areas for improvement.

Results:

37 patients were treated in 2019. Median time from surgery to SRS in 2019 was 47 days (IQR 41-66.5). 1/37 (2.7%) was treated within 4 weeks of surgery and 13/37 (35%) within 6weeks. The corresponding numbers for Q4 2020 (n=15) were 44 days (IQR 35.5-62.5), 2 (13.3%) within 4 weeks, and 6 (40%) within 6 weeks of surgery. These results were presented at the SRS MDT in May 2021.

Conclusion:

Our median time from surgery to SRS exceeds our target of 6 weeks. Thisimproved slightly between 2019 and Q4 2020 but we are aiming for further improvement.

Efficacy and toxicity of primary re-irradiation for malignant spinal cord compression basedon radiobiological modelling: a phase II clinical trial

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1 = St Luke's Radiation Oncology Network, 2 = Cancer Trials Ireland, 3 = Department of Radiation Oncology, University Hospital Galway, 4 = SDMO, The Royal Hospital, Belfast 5 = Centre for Public Health Queen's University, Belfast 6 = HRB Clinical Research Facility, NUI Galway, Galway

Purpose:

The efficacy and safety of primary re-irradiation for MSCC is not known. The aim ofCTI (formerly ICORG) 07-11 was to establish efficacy and safety of biologically effective dose-based re-irradiation.

Materials and Methods:

This phase II clinical trial enrolled 22 patients at two Irish sites between 01/08 and 09/16. Patients presenting with MSCC at a previously irradiated spine segment, and not proceeding with surgical decompression, were eligible. A 3 Gray per fractionexperimental schedule (minimum 18 Gy / 6 fractions, maximum 30 Gy / 10 fractions) was used,delivering a maximum cumulative spinal dose of 100 Gy2 if the interval since last radiotherapy was within 6 months, or 130 Gy2 if longer. The primary outcome was change in mobility from baseline to 5 weeks, as assessed by the Tomita score. Response rate was estimated from the evaluable patients as a proportion of cases with an overall response to the total number of evaluable cases. The RTOG SOMA score was used to screen for spinal toxicity and an MRI performed to assess for radiation-induced myelopathy (RIM).

Results:

22 patients were enrolled, of whom eleven were evaluable for the primary endpoint. 9of 11 (81.8%) had stable or improved Tomita scores at 5 weeks. 2 of 8 (25%) evaluable for latetoxicity developed RIM. These results were presented at the American Society for Radiation Oncology (ASTRO) 2020 (1).

Conclusion:

Re-irradiation is an efficacious treatment for MSCC. However, cumulative doses of120 Gy2 (beyond 6 months), carry a risk of RIM.

Implementation of rectal balloon spacers in Prostate Cancer Radiotherapy – A single institution experience

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Purpose:

Intensity Modulated Radiotherapy (IMRT) for treatment of localised prostate cancer allows for dose escalation and improves biochemical disease-free survival. The dose-limiting structure tends to be the rectum with development of toxicities between 5-40% 1. The use of IMRT has been associated with a 27% reduction in long term rectal toxicities 2. Rectal spacershave been shown to further reduce the dose received by the rectum. We report on the implementation of the use of rectal spacers in patients undergoing RT for Prostate cancer.

Materials and Methods:

Our institution was part of a multicentre clinical trial. 7 eligible patientswere randomised to be treated with or without spacers. The patients who received the balloon implant had fiducials and spacers inserted under a spinal anaesthetic in our centre. They required additional imaging post insertion to monitor the size and eventual degradation of the device.

Results:

There were no acute complications after insertion of the rectal balloons. Patients weremonitored throughout their treatment. One out of 7 patients reported an acute grade 1 rectal toxicity. Patients were scanned post insertion and cone beam imaging performed while on treatment. The position of the device remained adequate throughout RT in all patients. The rectal dose volume constraints were met.

Conclusion:

Our institutional experience showed the use of rectal spacers was tolerated wellwith minimal complication rates. Pending the studies of long term follow-up and the ongoing clinical trial, we hope that use of balloon spacers become more widespread and they becomestandard of care.

Standardised clinic template for screening radiation-induced late-effects in Hodgkin lymphoma (HL) patients: A quality improvement project.

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Purpose:

Long-term survivors of HL require screening (Ng, 2014). We identified that screening was not adequate. We recognised a need for a screening protocol tailored to a clinic setting withrotating NCHDs without expert knowledge. We completed an audit to quantify the problem. This quality improvement project (QIP) will consist of a clinic template based on the National Comprehensive Network (NCCN) and Childhood Oncology Group (COG) guidelines (Richard et al., 2017) (Group., 2014).

Materials and Methods:

Analysis was completed on a cohort of 30 patients. Aria notes and clinic letters were assessed for screening. The template form was designed following a literaturereview of the guidelines and drafted into a user-friendly document uploaded to ARIA. Discussionwith stakeholders, i.e. all consultants treating lymphoma patients in the network, was held to ensure agreement with the QIP. A post-intervention audit will be completed to determine efficacy.

Results:

Of 30 patients, 21 were followed up, and eight were discharged to their haematologist.Within the first year, one died. Of the 21, 0% had complete follow-up; however, this was due to advice re influenza vaccination being omitted at 100% of yearly intervals. Taking a less punitive stance, TFTs were missed at 40% of annual follow-ups. FBC, U+E, lipids were missed at 36% of annual follow-ups.

Conclusion:

The introduction of the clinic template seeks to achieve complete follow-up of HL patients and improve on the findings of the pre-intervention audit. This QIP is a patient-centred,quality improvement intervention incorporating an innovative screening method to improve careprovision to patients.