

**Radiation Oncology Annual Scientific Meeting 2023**  
**Faculty of Radiologists and Radiation Oncologists**  
**Royal College of Surgeons of Ireland**

**September 28th – 29th 2023**

**Poster Presentations**

## Financial implications of evolving breast cancer radiotherapy treatment protocols

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### *Aim*

Adjuvant breast radiotherapy (RT) represents a significant portion of RT treatments. Updates in RT protocols have reduced late toxicity(1). Considering the high prevalence of breast cancer(2), we designed a study to evaluate the impact of past changes and create a model to allow prediction of cost implications for future changes.

### *Materials and Methods*

We analysed changes in RT treatment resources and infrastructure for each protocol. Staff time and cost/Gy were calculated on standard time slots and staff discussions. The cost/Gy was €37.72/Gy based on linac cost of €2.5M, 10% annual service charge over 12-year lifetime, 2.7 patients treated/hour and standard 2Gy fraction(3). We collected data of RT patients for breast cancer (n=224). Demographic, disease and treatment data were extracted from electronic records and anonymised. Impact of protocol changes was calculated for each patient.

### *Results*

Accumulative protocol changes resulted in overall cost saving of €66,748 (12.29%). Total linac time was reduced by 29.3 days (19.31%). Non-linac staff time increased by 1.9 days (0.75%). Implementation of Fast Forward for those not receiving a boost resulted in largest cost reduction of €47,619. Increased use of IMN RT resulted in highest cost increase of €4,560.

### *Conclusion*

Changes in breast RT, such as updated indications for boost and ultra-hypofractionated radiotherapy, resulted in overall savings within the analysed cohort. A resource cost algorithm can be used to predict future cost minimisation in breast RT by identifying cost savings from previous protocol changes. The impact of introducing simultaneous integrated boost and partial breast radiotherapy is currently under analysis.

## Unveiling the Hidden: Radiomic Insights into Parotid Gland Transformations During Radiotherapy for Xerostomia Prediction

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### *Aim*

Using radiomic analysis of CT images, this study aims to quantify the shape, intensity, and textural changes of the parotid glands that occur during radiotherapy to the head and neck. We tested the hypothesis that the variability in individual radiomic features is associated with xerostomia.

### *Materials and Methods*

RTOG toxicity scores for xerostomia were reported at mid treatment, “near end” of treatment, and 3-6 months post treatment for 26 patients. Forty-two radiomics features (RF) based on CT scans taken before treatment, mid-treatment, and at the completion of treatment were extracted, and the paired percentage difference between timepoints of each feature was calculated. Mann Whitney U tests compared differences in RF values between each imaging timepoint for patients with and without xerostomia.

### *Results*

There was significant variation ( $p < 0.05$ ) in 95% of RF values over the whole course of treatment, with the greatest variation occurring during the first half of treatment compared to the second half (74% vs 65%). Variation of two RF during the first half of treatment were associated with acute xerostomia, and four with late xerostomia. Variation in Shape\_Surface ( $U = 35.000$ ,  $p = 0.025$ ) and NGLDM\_Contrast ( $U = 33.000$ ,  $p = 0.018$ ) over the full course of treatment indicated a significant association with late xerostomia.

### *Conclusion*

This study has described the changes in CT based RF of the parotid gland during a course of radiotherapy and has identified complex shape and texture features associated with xerostomia. These results highlight the complexity of the glands architecture in response to radiation and its impact on xerostomia.

## Expert consensus for the prevention of osteoradionecrosis (ORN) in patients with head and neck cancer (HNC) treated with radiation therapy (RT)

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### *Aim*

Expert consensus for the prevention of osteoradionecrosis (ORN) in patients with head and neck cancer (HNC) treated with radiation therapy (RT). In Ireland, more than 700 new cases of HNC are reported annually. ORN is a morbid and costly late complication of RT in patients with HNC. Conservative management of ORN is reported to cost US\$4000 to US\$35,000. The aim of this study was to develop multidisciplinary international consensus guidelines for the prevention and management of ORN, including the patient perspective.

### *Materials and Methods*

The e-Delphi technique was utilised to determine consensus from multidisciplinary dental and radiation oncology teams involved in the care of patients with HNC. The Delphi study consisted of three rounds. To date, Rounds 1 and 2 have been completed. The sample consisted of a team of 43 professionals. On a 10-point Likert scale, IQR  $\leq 2$  was considered as consensus. Patients and patient carers were surveyed once about their experience of ORN.

### *Results*

Here we present the results of Rounds 1 and 2 of the e-Delphi method. Consensus has been reached on the optimal oral health management of patients with HNC, including the pre and post-RT assessment with a standardised oral health assessment tool. Extractions of poor prognosis teeth, use of fluorides and oral health care advice have also reached consensus. However, time of extraction before RT, the number of teeth extracted, and prophylactic antibiotic use, among other parameters, have yet to reach consensus.

### *Conclusion*

This interim analysis demonstrates the complexity and variability in the management of ORN internationally. We await the final round results to ascertain if consensus can be reached on outstanding items.

## Outcomes in older patients with oropharyngeal squamous cell carcinoma treated with radiotherapy with curative intent

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### *Aim*

There are increasing numbers of elderly patients with oropharyngeal squamous cell carcinoma (OPSCC), owing to the human papilloma virus and an ageing population. Previous studies have reported age as a determinant of treatment (1). We investigate outcomes in older patients with OPSCC treated with radiotherapy with curative intent.

### *Materials and Methods*

Data was collected retrospectively on patients with OPSCC treated with radiotherapy with curative intent in the St Luke's Radiation Oncology Network. Statistical analyses were performed using R v4.2.1.

### *Results*

Data was collected on 260 patients with OPSCC treated with radiotherapy with curative intent. 32 patients (12.3%) were over age 70 at time of final fraction. Median survival was not reached for over or under 70s (median follow up time 26 months for population). A statistically significant difference in overall survival was not found ( $p=0.7$ ).

### *Conclusion*

Patients over the age of 70 represent a small cohort of those receiving radical radiotherapy for OPSCC. In our population, we did not find significantly worse survival in this cohort. This could be due to selection bias, with elderly patients undergoing radical treatment if they had less co-morbidities and more favourable disease.

## Requirement for acute inpatient care in a tertiary referral head and neck cancer radiotherapy treatment service

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### *Aim*

Radiotherapy for the treatment of head and neck cancer (HNC) is associated with significant toxicities for patients who may also have significant medical and social challenges. We aim to determine the indications for, duration and timing of hospital admissions for patients undergoing radiotherapy for head and neck cancer in our institution.

### *Materials and Methods*

A retrospective analysis of admissions in patients having radiotherapy for HNC from January 2022 to December 2022 was completed. Patient and disease related factors were extracted from the medical record. The primary presenting issue requiring admission was recorded for each patient.

### *Results*

A total of 185 patients were treated in the study period. Fifty (27%) patients experienced 52 admissions. The median age was 64.5 years (range 34-89) with 73% male. Of these admissions, 90% occurred during radiotherapy or within 6 weeks of completion. Five (10%) were admitted greater than 6 weeks post radiotherapy. 2 patients required readmission. Ninety-four % of those admitted received radical radiotherapy, 61.5% of those receiving concomitant chemotherapy. The median length of stay was 17 days (range 1-102), total 1,182 bed days used. The predominant reasons for unplanned admission were for nutritional support (48%) and due to fever or suspected infection (9.6%). Six patients (11.5%) were admitted to facilitate radiotherapy treatment.

### *Conclusion*

Twenty-seven % of HNC patients required hospital admission. The majority of patients were admitted for nutritional support due to treatment related toxicities. This will help to inform treatment discussions with patients and facilitate service planning.

## Prevention of trachea-oesophageal fistula in cervical oesophageal Squamous Cell Carcinoma - a novel chemoradiotherapy approach

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### *Aim*

Oesophageal SCC tumours (cT4b) with invasion of the trachea pose a treatment challenge with options including definitive chemoradiotherapy (CRT) or palliation. Squamous Cell Carcinomas (SCC) are very CRT- sensitive. In the setting of tracheal invasion, there is a risk of trachea-oesophageal fistula (TOF), due to rapid tumour regression from CRT. Therefore we have developed a novel CRT approach to slow tumour response, allow tracheal wall to re-establish and thus diminish this risk.

### *Materials and Methods*

We study two cases of upper oesophageal SCC with tracheal invasion. Patient A is a 62 year old male with bronchoscopy confirmed mucosal tracheal invasion treated with definitive CRT, RT alone for 2 weeks, and then weekly concomitant Carboplatin/Paclitaxel. RT dose was 59.4Gy in 33#. Patient B is a 74 year old male with bronchoscopy confirmed tracheal invasion treated with the same regime.

### *Results*

Both patients completed this regime uneventfully, without development of a TOF.

### *Conclusion*

The CROSS trial demonstrated that Oesophageal SCCs are twice as responsive to CRT than Adenocarcinomas (pathological response rate 49% vs 23% respectively). It is difficult to determine TOF risk for this cohort of patients but it is a real and fatal ultimately complication. These cases are complex, however a balanced approach is required to optimise treatment while minimising fatal complications.



## Head and neck cancers with synchronous primary cancers in Ireland – A Case Series

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### *Aim*

Head and neck cancer (HNC) patients presenting with synchronous primary cancers face significant treatment challenges and pose complex treatment decisions for clinicians. We designed a study to assess the outcome of treatment for this cohort.

### *Materials and Methods*

We identified HNC patients with synchronous primary cancers in the St Luke's Radiation Oncology Network from July 2017 to July 2022. Clinical data was obtained through review of patients electronic medical records.

### *Results*

We screened 2057 patients treated for HNC and identified 44 (2%) patients with synchronous primary cancers. The second primary cancer site was lung (33%), skin (9%) breast, colon, thyroid and oesophageal (all 7%). Forty-two percent of patients had simultaneous radiotherapy to both cancers of which only 1 patient had to stop due to radiation toxicity. In total, 77% of patients completed radical treatment to both cancers.

Median follow up was 21 months. Of the patients who completed radical therapy to both cancers, 60% had complete response, 45% were dead. For those who did not complete radical radiotherapy to both cancers, 54% were dead. The estimated median survival of patients who completed radical treatment to both cancers was 2.5 years compared to 2.1 years of those who did not.

### *Conclusion*

This is a rare condition comprising 2% of those treated for HNC. The majority of patients who underwent simultaneous radiotherapy to both cancers finished treatment. The median survival of patients who completed radical therapy to both cancers compared to those who did not were 2.5 and 2.1 years.

## **Beyond the Brain: Unveiling Extra-Cranial Glioblastoma Multiforme - A Rare Case Report and Literature Review**

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### *Aim*

Glioblastoma Multiforme (GBM) is the most common and malignant brain tumor affecting adults, with a poor prognosis even with multimodal treatment. The occurrence and underlying pathogenesis of extracranial metastases in GBM are not well understood, and further research is needed to shed light on this aspect. We present a case of extra cranial GBM treated at our institution and a review of existing literature.

### *Materials and Methods*

The patient's electronic case record and treatment details were reviewed and a literature search on extra cranial GBM was carried out.

### *Results*

A 29 year old female presented with a rapidly enlarging soft tissue mass along the post operative scar in 2023, after an initial diagnosis and treatment of a WHO Grade 4 cerebellar GBM in 2020. Biopsy of this mass confirmed GBM metastasis. Time to metastasis was 27 months. Following discussion at the Neuro- oncology MDM, the patient underwent surgery and adjuvant radiotherapy of 60 Gy in 30 fractions to the tumour bed. Adjuvant chemotherapy is due to commence shortly.

### *Conclusion*

GBM is a highly aggressive primary brain tumour that accounts for approximately 12-15% of all intracranial neoplasms. Extracranial metastasis in this group of tumours is reported as 0.4-0.5%. In existing literature mean time from initial diagnosis to metastasis is reported at 11.7 months, with mean time from metastasis to death reported at 4.6 months. Surgery, radiotherapy and chemotherapy were shown to prolong survival time after metastasis with a survival benefit of 2.9 months in patients receiving radiotherapy (89%), and 5.9 months(33%) in those receiving chemotherapy. Analysis of cases like these can provide guidance in optimal management including using radiotherapy as treatment approach in prolonging the survival time in patients diagnosed with extracranial GBM.

## **A single-centre experience with HyperArc fractionated Stereotactic Radiosurgery [fSRS] for benign brain tumours**

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### *Aim*

Treating benign brain tumours with fSRS may have radiobiologic and clinical advantages, such as lower rates of symptomatic oedema and radionecrosis[1]. HyperArc (HA, Varian Medical System) is an isocentric VMAT technique developed for non-coplanar, MLC-based stereotactic radiotherapy with automated optimizations and delivery. Here we report our initial clinical experience of HyperArc fSRS in treating benign brain tumours.

### *Materials and Methods*

We retrospectively reviewed 21 cases of benign brain tumours treated at the Bon Secours Radiotherapy Cork between May 2020-May 2023. Clinical and dosimetric parameters are reported.

### *Results*

A total of 21 patients were treated in a total of 105 SRS fractions, all using a 5-fraction regimen (5x5Gy, N=20). The commonest tumour was meningioma (N=9), followed by vestibular schwannoma (N=7) and pituitary adenoma (N=5). Median patient age was 59 years (range 26-86). Median PTV was 4.65 cc (IQR 1.9-14.6), median number of arcs was 4 (range 3-4), median PTV coverage was 99.6 % (IQR 98.0-99.9). Median prescription isodose was 79%. Median Paddick conformity index and gradient index was 0.86 (IQR 0.83-0.98) and 3.0 (IQR 2.9-3.2) respectively. Median follow-up was 7 months. No patient suffered from toxicity  $\geq$  grade 2 (Common Toxicity Criteria, Version 5). Only 2/21 patients required steroid therapy during fSRS. No patient had a seizure.

### *Conclusion*

HyperArc fSRS is a feasible option for benign brain tumours. Initial clinical experience in terms of plan quality and acute toxicity is encouraging. fSRS for benign brain tumours should be prospectively studied.

## **A baseline audit of Deep Inspiration Breath Hold use and Heart and Lung radiation doses in Breast Cancer Radiotherapy in a Multicentre Radiation Oncology Network**

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### *Aim*

Local guidelines are to consider Deep Inspiration Breath Hold (DIBH) for patients < 60 years with left-sided breast cancer and for right-sided breast cancer for internal mammary chain radiotherapy. This audit investigates if 95% of patients undergoing adjuvant radiotherapy meeting criteria for DIBH, are considered for DIBH upfront and if 95% of patients are meeting heart and lung radiation dose constraints.

### *Materials and Methods*

The case notes of consecutive patients undergoing adjuvant breast radiotherapy 1st-28th February 2023 were reviewed for baseline patient, tumour characteristics, DIBH use, and heart and lung radiation doses.

### *Results*

In total, 32/95(34%) patients had treatment in DIBH. 24/32 patients were scanned in DIBH upfront and 8/32 had a DIBH scan after initial free breathing (FB). 27/95 (28%) patients were eligible for upfront DIBH based on local criteria. 20/27 (74%) of patients meeting criteria were offered DIBH upfront. 7/27 (26%) were not offered DIBH upfront: 1 of these 7 patients had a DIBH scan after initial FB scan. Unsuitability for DIBH was documented for 2 of these 7 patient, no reasons were documented for the remaining five. All patients met local heart and lung radiation dose volume constraints.

### *Conclusion*

In our cohort, 81% (22/27) meeting criteria for DIBH were considered for DIBH upfront including 2 patients who were deemed unsuitable. For the other 18% (5/27) of patients meeting criteria for DIBH there is not documentation to support if they were considered for DIBH. Further education regarding eligibility criteria and improved documentation regarding suitability for DIBH may be of benefit.

## Urinary Tract Infections in Patients Undergoing Frequent Urinary Catheterisation for Brachytherapy: a case series

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### *Aim*

Urinary Tract Infections (UTIs) are a common problem in patients undergoing frequent urinary catheterisation to facilitate brachytherapy. As the symptoms of radiation cystitis (dysuria, frequency, and urgency) can mimic those of UTI (ref. 1), urine cultures can be helpful in finding the cause and treating appropriately, either with antibiotics or with symptom-based management. The Aim of this audit was to review the incidence of UTIs in patients undergoing brachytherapy. We aimed to establish a rate of occurrence and establish the most common organisms grown.

### *Materials and Methods*

A retrospective analysis of 32 female patients undergoing brachytherapy over a 5 month period was performed. Information relating to each patient's brachytherapy course, symptoms, urine culture, sensitivity results and antimicrobial management was compiled. It was also recorded whether the patients had bladder filling as this required further manipulation of the catheter.

### *Results*

Of 32 patients, 31 underwent their prescribed course of brachytherapy. 12 (39%) of these patients described at least one of dysuria, frequency or urgency. 10 (32%) patients had urine cultures which returned positive. 6 (19%) of these results were mixed growth and deemed likely contamination, and 4 (13%) grew *Escherichia Coli*. 2 of the *E. Coli* positive cultures were resistant to amoxicillin. 16 (52%) patients received a course of antibiotics. 2 (6%) of patients had bladder filling, both of whom described UTI-related symptoms and both of whom had mixed growth on their urine cultures.

### *Conclusion*

Frequent catheterisation may implicate a higher rate of UTIs in patients undergoing brachytherapy.

Symptoms around treatment should be thoroughly investigated including a urine culture and the results should guide antimicrobial therapy. Catheterisation techniques should be reviewed to ensure sterile introduction.

## **A real-world intrafraction motion assessment of the Qfix Encompass<sup>TM</sup> mask with Stereotactic Radiosurgery using HyperArc<sup>TM</sup>**

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### *Aim*

To quantify intrafraction motion (IFM) for patients receiving SRS to multiple metastatic brain deposits[1].

To determine if the departmental image-guided radiotherapy (IGRT) protocol could be amended to omit the post-treatment cone beam CT (CBCT)

### *Materials and Methods*

A single centre retrospective analysis of isocentre displacements for SRS treatments with two or more metastases was conducted. Patients were treated on a Varian Edge<sup>TM</sup> linear accelerator with integrated HyperArc<sup>TM</sup> planning solution to optimize delivery and precision of non-coplanar, multi-target treatments. Patients were immobilized using the Qfix Encompass<sup>TM</sup> mask and CBCT was acquired pre and post treatment. Matched pre-and post-treatment imaging were analysed to determine the magnitude of IFM recorded in six degrees of freedom.

### *Results*

Nineteen patients were included in the study. In total 68 fractions were analysed. The median number of SRS fractions per patient was 3 [range 3-5]. The most common dose and fractionation regimen was 27Gy in three fractions with three-four non-coplanar arcs.

The IFM mean, standard deviation and range quantified by post-treatment cone-beam computed topography (CBCT)s respectively are: AP(cm) 0.01, 0.02, (-0.03-0.07), SI (cm) 0.01, 0.02, (-0.07-0.12) LR (cm) 0, 0.02, (-0.11-0.07), Pitch (degrees) 0.04, 0.27, (-0.9-0.9), Roll (degrees) 0.09, 0.21, (-0.5-1.1)

Rotation (degrees) 0, 0.18, (-0.7-1.2)

### *Conclusion*

Sub-millimetre accuracy was confirmed using the Qfix Encompass mask and SRS with the HyperArc™ system. Post-treatment CBCT will now be eliminated after the first fraction for this treatment technique. Further detailed data analysis to identify trends in patient demographics (performance status, age, gender, number of lesions) and treatment-related factors such as duration of treatment delivery may provide clinically useful results.

## **A single-center experience of phase-gated lung Stereotactic Body Radiotherapy [SBRT]**

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### *Aim*

A phase-gated approach provides an attractive method of reduction in the volume of the PTV [1]. For mobile tumours, a phase-gated approach reduces the PTV compared to the ITV method and may result in reduced risk of toxicity [2]. We performed a retrospective review of SBRT lung patients was conducted to audit the use of phase-gated lung SBRT at our centre.

### *Materials and Methods*

For patients who cannot achieve a reliable breath-hold technique, institutional policy mandates a motion management strategy when motion of GTV on 4DCT exceeds 5mm in any direction. The Varian RGSC system is used at our centre. For patients with <5mm motion an ITV method is used with GTV contoured on all phases of the respiratory cycle to create a respiratory GTV denoted iGTV. If >5mm GTV motion exists in any direction a phase-gated approach is adopted with the gating window restricted to phases around end-expiration with <5mm motion. A phase-gated GTV is contoured on each phase of the gating window to create an iGTV eg iGTV30-70. A 5mm iGTV to PTV margin is routinely adopted. For mobile tumours, a phase-gated approach reduces the PTV compared to the ITV method and may result in reduced risk of toxicity [1].

### *Results*

To date 36 of 60 SBRT lung SBRT patients treated between 2020 and 2023 with either primary or metastatic lung cancer were treated using a phase-gated technique. The median PTV size was 25.5cm<sup>3</sup>

(IQR 10.7 – 36.1). The median V20Gy lung-GTV was 2% ; (IQR 2.4 – 4.3)

### *Conclusion*

Phase-gated SBRT is a practical and effective treatment option for unresectable, mobile lung tumours. A tailored treatment strategy promotes patient-focused care whilst ensuring conformal, achievable PTV margins and optimal V20 lung values. For elderly patients with additional co-morbidities who maybe unsuitable for surgery, phase-gated SBRT provides a motion management solution for patients unable to tolerate breath-hold.

## **Silicone Ear bolus : A Less Ear-irritating Solution**

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### *Aim*

The ear can be a particularly challenging region to bolus effectively. Our aim was to develop a new ear bolus solution in order to produce accurate dosimetry with minimal air gaps on the treatment plan. We wanted the new solution to be easily produced and reproduced. Finally and importantly, it needed to be comfortable for the patient.

### *Materials and Methods*

We reviewed all bolus strategies currently in use across the network. We carried out a literature review. We searched for commercially available solutions.

### *Results*

We identified a commercially available mouldable silicone ear putty which could be adapted for use in this novel context. We checked that the HU value of the new material was appropriate. The silicone ear putty met the aims we set out to achieve.

### *Conclusion*

Incorporating this new material into our library of available bolus solutions has improved the patient experience by reducing time on the treatment bed and improving comfort.



## **Radiation Therapy Notes Standardisation in St. Luke's Radiation Oncology Network**

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### *Aim*

This project aimed to standardise the templates and practice of recording patients daily treatment (treatment and IGRT information) across the St Luke Radiation Oncology Network (SLRON).

### *Materials and Methods*

An audit was completed on RT notes and the practice locally in terms of compliance with current procedures. A survey was completed by staff for improvement suggestions. Additional needs around RT notes were identified. Plan, Do, Study, Act (PDSA) cycles were used to implement changes.

### *Results*

Compliance increased at each PDSA cycle. The standardisation and implementation of the RT notes across SLRON has been completed. Current RT notes templates meet audit and data requirements. The quality assurance department ensures these documents will be reviewed at regular intervals

### *Conclusion*

Using the PDSA method of quality improvement successfully improved the use of RT notes in St. Luke's Radiation Oncology Network.

## **Surgical Clip Insertion in Patients Undergoing Radiotherapy Breast Boost at University Hospital Galway: An Audit**

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### *Aim*

A radiotherapy breast boost to the tumour bed reduces the risk of ipsilateral breast tumour recurrence in younger patients and in those with high-risk features. Surgical clips can help localise the tumour bed and their use is recommended by both national and international guidelines at the time of breast conserving surgery.

### *Materials and Methods*

All patients who were prescribed a radiotherapy breast boost at University Hospital Galway between February 2022 and January 2023 were evaluated. Data was collected from clinical correspondence and CT-simulation scans were reviewed for the presence of surgical clips at the tumour bed.

### *Results*

In total 128 patients received a breast boost, 126 (98%) following breast conserving surgery and 2 (2%) after mastectomy. The median age was 59. Radiotherapy was delivered to the right breast in 68/128 (53%). The prescription dose was 11.25Gy in five fractions in all cases. Surgical clips were present in 83/128 (65%).

### *Conclusion*

Further prospective studies evaluating the optimal use of clip placement may help guide clinical practice including the optimal spatial arrangement of clips and identification of patients in whom clips improve localisation in a significant way.

## **An audit of humeral head doses among patients receiving locoregional radiotherapy for breast cancer in St Luke's Radiation Oncology Network (SLRON)**

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### *Aim*

Breast cancer is highly prevalent, with >3500 new cases annually<sup>1</sup>. Upwards of 500 patients receive radical radiotherapy for breast cancer annually within SLRON. Shoulder morbidity is a well-recognized toxicity of breast radiotherapy<sup>2</sup>. The aim of this audit is to assess humeral head DVCs in patients receiving locoregional radiotherapy for breast cancer in SLRON.

### *Materials and Methods*

A literature review was performed to identify dose parameters associated with shoulder dysfunction; humeral head(HH) +1cm= Dmax <38Gy, and HH+1cm = D1cc <40Gy<sup>3</sup>. A retrospective, consecutive sample of patients receiving locoregional radiotherapy for breast cancer in 2019 was identified in institutional databases. Patient, tumour and treatment characteristics were recorded. Humeral head contours were drawn and dose volume constraints data collected.

### *Results*

47 patients were included for analysis. 76.6% of plans complied with HH +1cm Dmax <38y. 97.88% of plans complied with HH +1cm D1cc <40Gy. A further 17 patients fell within 3% of tolerance; 15 patients in HH

+1cm Dmax <38y group, and 2 patients in HH +1cm D1cc <40Gy group. Nodal staging, use of boost, use of DIBH and treatment of IMN all showed similar frequencies in compliant plans and non-compliant plans.

### *Conclusion*

While compliance with DVCs within SLRON is high, further steps could be taken to achieve improved compliance, with the potential to further reduce morbidity of treatment. Further data analysis is needed to identify factors leading to higher humeral head DVCs. This audit suggests a role for inclusion of humeral head DVCs in standard breast clinical goals.

## **Clinical outcomes and patterns of recurrence in the treatment of locally advanced cervical cancer: A single institution experience**

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### *Aim*

In this study, we retrospectively evaluated the clinical outcomes of Locally Advanced Cervical Cancer (LACC) patients over a five year period, treated with External Beam Radiotherapy (EBRT) and MRI based Adaptive Brachytherapy (IGABT), with a focus on survival outcomes and patterns of recurrence

### *Materials and Methods*

We reviewed data from 71 patients with LACC in our institution between 2017 - 2021. All eligible patients were treated with CCRT and IGABT with 45Gy-50.4 Gy/25-28 fractions EBRT and 3-4 fractions of intracavitary brachytherapy. Histology, staging, dose-volume constraints (DVC), EBRT plans and sites of recurrence were analysed using electronic records, imaging and planning software and medical notes

### *Results*

The optimal treatment time of <55 days was achieved in 93% of cases. At a mean follow-up time of 36 months, 16 (22.5%) patients had recurred, with a mean time to recurrence of 21.3 months. Six patients (8.5%) had pelvic recurrences with 2 having local relapse at the cervix and 4 having regional-nodal recurrences. Five patients (7%) had distant metastasis and a further 5 had both loco-regional and distant progression. The D90% of the high-risk clinical target volume (HRCTV) was below the recommended 85Gy for the 2 patients with local cervical recurrence. Analysis of the 4 nodal failures were revealed to be above the cranial pelvic field.

### *Conclusion*

Our findings suggest that further improvements in LACC treatment are possible. The D90% is often limited by doses to the organs at risk however potential escalation of brachytherapy and introduction of interstitial brachytherapy could improve this. The 3 risk group classification for extending elective clinical target volumes may improve local control and overall survival.

## **Pelvic sarcoma following external-beam radiotherapy for prostate cancer (PCa)**

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### *Aim*

Second malignancies are a rare but clinically significant late consequence of treatment with external-beam radiotherapy (EBRT).

### *Materials and Methods*

An 84-year-old man presented with a 6/12 history of severe pelvic and perianal pain, PR bleeding, nocturia, dysuria and inability to sit, all which deteriorated acutely 1/52 before admission. On examination, he was haemodynamically stable, abdomen was soft and non-tender, with a large firm and exquisitely tender mass palpable anteriorly on DRE. Labs - WCC  $11.1 \times 10^9/L$ , Hb 11.1g/dl, CRP 23.7mg/L, urea 9.7mmol/L, creatinine 105umol/L. MRI pelvis demonstrated a 13.3 x 12.5 x 11.7cm infiltrating heterogenous soft tissue mass involving base of penis,/prostate/lower rectum/anus and extending into perineum/left ischium with marked restricted diffusion restriction and central necrosis; no adenopathy. Five years previously, he had been treated with short-term ADT and radical EBRT (77.4Gy/43#) for unfavourable intermediate-risk PCa.

### *Results*

Tissue biopsy, placement of supra-pubic catheter and diverting colostomy were carried out. Histopathology demonstrated a malignant spindle epithelioid neoplasm in keeping with high-grade sarcoma; he was discharged home with stoma education and community palliative care input.

### *Conclusion*

EBRT accounts for ~5% of treatment-related secondary malignancies (1). As expected, the risk of developing a secondary solid tumour after radical treatment for PCa is significantly greater after EBRT than after surgery, by approximately 6% (95% CI, 1–11%;  $p=0.02$ ) (2). Cancer outcomes for PCa patients treated with radical EBRT continue to improve. All patients undergoing radical EBRT should be counselled regarding the risks of secondary malignancy; additional data in this space is needed.

## **Proton beam therapy in treating rhabdomyosarcoma in children: A systematic review**

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### *Aim*

Rhabdomyosarcoma (RMS) is the most common soft tissue sarcoma in children requiring multimodality treatment with chemotherapy, surgery, and radiation therapy (RT) for curative intent. Proton beam therapy (PBT) presents a method of local therapy in paediatric RMS patients that has been associated with increased sparing of healthy tissue but with similar disease control. Despite this, the level of high-quality randomised evidence in the literature is lacking, especially in the setting of localised RMS disease. For this reason, a systematic review of the literature on PBT for paediatric RMS patients was conducted to determine its clinical efficacy and identify toxicities.

### *Materials and Methods*

A review protocol was developed as per PROSPERO guidelines. A search of five databases (PUBMED/MEDLINE, EMBASE, CINAHL, Scopus and Cochrane Library) was carried out according to PRISMA guidelines between January 2010 – December 2021. Eligible studies included paediatric and adolescent patients ( $\leq 18$  years) who received proton beam RT for localised RMS or metastatic disease and in whom clinical outcomes of local control (LC), overall survival (OS) or toxicity as graded by the common terminology criteria for adverse events (CTCAE) were reported.

### *Results*

198 publications were eligible for title and abstract screening by two reviewers with five studies eligible for inclusion (90 patients). All five studies were case series, four retrospective and one prospective. The majority of patients had embryonal subtype, median dose delivered was 47.7GyE (36 – 50/4GyE) and median follow-up was 37 (18 – 60) months. Local control (LC) and Overall survival (OS) were reported in three studies. 2-year LC and OS rates were reported as 88% and 89%, respectively in one publication and 5-year LC and OS rates of 83-97% and 83-100%, respectively in 2 publications. Acute (N=2) and late (N=5) CTCAE were reported, with no grade 4 or higher RT related toxicities. Cataracts were the most commonly reported late toxicity.

### *Conclusion*

PBT appears to be a safe and effective method of local therapy as part of the multimodality treatment of paediatric RMS patients with localised disease. However, a better quality of evidence is required.

## **The utility of a Stop-Motion Animation aid in providing information for patients undergoing radiation therapy treatment for thoracic cancers**

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Before radiotherapy (RT), approximately half of patients feel increased fear and stress. There is currently no standardised education tool for patients who receive thoracic RT treatment. In general, thoracic cancer patients receive information through verbal and written leaflets that often neglect to describe in detail what is to be expected in the RT treatment process. The aim of this study was to create a Stop-Motion Animation as a teaching aid for patients with thoracic cancers and to evaluate the utility of the new animation in aiding patient knowledge and reducing procedure-related anxiety.

### *Materials and Methods*

This prospective interventional study was conducted in a large teaching hospital with a Stop-Motion Animation as a complementary information provision method with no other changes to standard care. The video utilised 18-inch characters to demonstrate the planning computed tomography simulation, the potential requirement for a 4D-CT scan, immobilisation equipment, the treatment planning process, examples of common side effects, and general information specific to the Department. The Initial Radiotherapy Understanding (IRTU), Post Radiotherapy Understanding (PRTU) and the questionnaire for fear of radiotherapy (QAFRT) questionnaires were completed pre- and postintervention, and at the tenth fraction of RT treatment. Ethical approval was obtained from the University College Cork's (UCC) Clinical Research Ethics Committee (CREC).

### *Results*

Nine patients were included, 55% in the control group (n=5) and 45% in the intervention group (n=4). The intervention group had a complete understanding of treatment-related side effects (skin, swallowing, chest discomfort, tiredness, and nausea) post-intervention, as assessed by IRTU and post-IRTU scales. The control group showed understanding across 80% of the mentioned themes. The results showed a decrease in patient apprehension regarding starting treatment and in damage to organs not included in target volumes associated with RT in both groups, as measured by the QAFRT.

### *Conclusion*

The Stop-Motion Animation education video may be a valuable aid for thoracic cancer patients as a supplemental tool used in tandem with both verbal and written standard information. There may be a potential to create further site-specific videos for patients undergoing other RT treatments.

## **The effectiveness of an educational intervention on young adults' perception of Radiation Therapy**

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Cork University Hospital, Cork.

### *Aim*

With more than half of all cancer patients receiving radiation therapy (RT) as part of their treatment, promoting its importance is pivotal. This study investigates if an educational intervention may alter healthy young adults' perception of RT as a treatment and a career.

### *Materials and Methods*

This quasi-experimental study was conducted in two Irish all-female secondary schools. Pre- and post-intervention questionnaires were designed and distributed to 5th-year (n=58) and 6th-year students (n=32) to evaluate the impact of two educational videos. Students were aged between 16-18 years old. The first video focused on RT as a treatment, and the second on the educational pathway to becoming a radiation therapist (RTT). Ethical approval was obtained from the University College Cork's (UCC) Social Research Ethics Committee (SREC). Due to the age of the participants' consent was obtained from both the student and parent/guardian.

### *Results*

Most participants (93%, n=84) improved their knowledge by at least one point (out of 10). Participants' initial understanding of the difference between diagnostic radiography and RT was low, with 18 (20.2%) students stating, they knew the difference. This increased to 79 (88%) at post-intervention stage ( $p<0.001$ ). Pre-intervention, five (5.6%) participants stated they had considered RT as a career; post-intervention, this increased to 31 (29.6%;  $p<0.001$ ).

### *Conclusion*

The intervention successfully increased the cohort's awareness and knowledge of RT as a treatment and potential career pathway. The results highlight the importance of educational interventions. It forms a basis for future research to explore whether early educational intervention would improve RTT recruitment and attrition rates within degree programs.

## **A retrospective review of risk factors associated with the development of osteoradionecrosis in Head and Neck cancer patients**

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### *Aim*

Osteoradionecrosis (ORN) is a serious complication of radiotherapy (RT) in patients with head and neck cancer (HNC). This study aimed to investigate potential precipitating factors that may contribute to the development of ORN to aid in the identification of potential targets for prevention.

### *Materials and Methods*

Ethical approval was obtained from the local Clinical Research Ethics Committee (CREC). A database of 1,074 patients who received curative-intent radiation therapy treatment for HNC between 2010 and 2021 was reviewed. 47 patients who developed ORN as per the Notani classification were identified. Medical, dental and RT records of patients were reviewed retrospectively. Descriptive and statistical analysis was performed using SPSS.

### *Results*

The incidence rate of ORN was 4.4%. The majority of patients were smokers (76.6%), drank alcohol (89.4%) and had no history of bisphosphonate therapy, with primary cancer of the oral cavity (68%). 36.4% of patients underwent pre-RT surgery involving bone. All patients were assessed by the dental hospital prior to treatment. Treatment intent was adjuvant (51%) or definitive (49%) and the mandible received  $\geq 60\text{Gy}$  in 83% of patients. The median time for ORN development, which was predominantly in the mandible, was 21 (range 1 – 100) months. ORN was graded as Notani grade 1, 2 and 3 in 48.9, 8.5, 42.6% respectively. On comparison of patients with ORN who underwent pre-RT surgery versus no surgery, higher Notani grade (3 vs 1) ( $p < 0.02$ ), shorter time to development since RT ( $< 12$ -months) ( $p = 0.044$ ) and less likelihood of resolution ( $p = 0.019$ ) was statistically significantly associated with patients who underwent pre-RT surgery.

### *Conclusion*

This study is the first study to investigate the incidence of ORN in HNC patients in Ireland. These findings may further aid in the clinical management and prevention of ORN in HNC patients.

## **Health-Related Quality of Life in Long-Term Survivors of Childhood Medulloblastoma: A Systematic Review**

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## Aim

Treatment-related side effects from paediatric medulloblastoma treatment are associated with a negative impact on survivors' health-related quality of life (HR-QOL). Multiple factors are related to complications from treatment, including post-operative problems and radiation-induced side effects. The Aim of this study was to review the existing research to understand the impact of late effects of treatment on the HR-QOL for long-term survivors of childhood medulloblastoma.

## *Materials and Methods*

Systematic searches of the databases CINAHL, EMBASE, PsycINFO, PubMed, Web of Sciences and MEDLINE were completed. Eligible studies included participants who completed radiation therapy or proton therapy for medulloblastoma and were at least five years post-treatment when participating in the study. Six studies published between 1998 and 2018 reported the HR-QOL outcomes of young medulloblastoma survivors following radiation therapy treatment met inclusion criteria. This review was conducted by referencing the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) checklist, flow diagram, and a Population, Exposure and Outcome (PICOS) design framework.

## *Results*

All studies included were retrospective in design. Five were cohort studies, and one was a case series. The number of participants across the studies ranged from 16 to 222. The HR-QOL assessments were conducted in several ways, (N=4) used self-administration questionnaires, and (N=2) studies used direct evaluation in health centres or by telephone by a trained professional. The quality-of-life assessments used in the six included studies comprised of the PedsQL, HUI3, HUI2/3, Farrans and Powers Quality of Life Index, IQ, education level, and social outcomes to report on their impact on long-term quality of life. Treatment-related outcomes significantly impacted HR-QOL in childhood medulloblastoma survivors in the studies. HRQOL was worse among those who suffered post-operative complications. Neurocognitive sequelae had the most significant impact on participating in activities of daily living.

## *Conclusion*

There was a lack of consistency in HR-QOL assessments, which reduced the ability to gather a reliable body of evidence to guide further QOL research and development. Clinical trial designs in the future should include standardised assessment tools to assess HR-QOL outcomes so that future developments of support after treatment can be implemented into health policy to meet the needs of medulloblastoma survivors toward living well and beyond cancer.

**Comparison of comparing free breathing and deep inspiration radiotherapy techniques in right- sided breast cancer: Is deep inspiration breath hold really necessary?**

### *Aim*

Deep inspiration breath hold (DIBH) radiotherapy is used routinely for cardiac avoidance in patients with left-sided breast cancer. Reports on the value of DIBH for those with right-sided breast cancer (RBC) remain conflicting with some suggesting that use of modern planning techniques negates much of the benefit of DIBH for organs at risk (OARs) in RBC. As delivery of DIBH can be resource and time consuming, departmental policies for DIBH in RBC should be based on evidence of benefit. This computer-based study quantified the potential benefit that would accrue from DIBH – in addition to a modern planning technique -in a specific subgroup of those with RBC requiring RT to the breast and all regional nodal levels-I-IV-in addition to the internal mammary chain nodes (IMC).

### *Materials and Methods*

The study database was formed from corresponding free breathing (FB) and Deep inspiration breath hold (DIBH) Computed Tomography (CT) datasets of 10 randomly selected patients, who had previously received surface guided, DIBH radiotherapy for RBC. All targets and OARs were re-contoured, in both corresponding sets, using ESTRO guidelines. These included ipsilateral breast, tumour bed and regional nodes levels I-IV and IMC in addition to the total lung, ipsilateral lung, contralateral breast, heart, liver, head of the right humerus (HH), spinal cord and thyroid. Plans were generated using a dynamic MLC, inverse planning technique, reviewed and results analysed statistically.

### *Results*

The total lung V20, V10 and V5 and the Ipsilateral Lung V17 all had statistically significant reductions in DIBH when compared to FB ( $p=0.005$ ,  $p=0.005$ ,  $p=0.001$  &  $p=0.005$ ) resulting in absolute decreases of 5%. The mean lung dose did not change. The mean heart dose was also statistically significantly reduced but was already below 2Gy in both FB and DIBH: 1.4Gy vs 0.9Gy. The heart V2 reduced from 8.9% to 5.9% with DIBH ( $p=0.008$ ) and the maximum dose to the heart was halved from 16.8Gy to 9.78Gy  $p=0.02$  by DIBH. The mean dose to liver was not significantly different but the maximum dose to the liver was

reduced by 25% and V20 and V10 also improved with the use of DIBH ( $p=0.005$ ) The mean dose to the HH increased by 2Gy with DIBH: 10.8Gy vs 12.9Gy,  $p=0.03$ . None of the following parameters were reduced by DIBH when compared to FB: the maximum dose to the cord, the maximum, mean and V20 of the thyroid and mean dose to the contralateral breast.

### *Conclusion*



This preliminary study suggests that modern planning techniques in FB may achieve target coverage with equal toxicity when compared to DIBH, in this specific subgroup of RBC. Further expansion of the study to look at this and the impact of other factors e.g. addition of tumour bed boost should be considered. The correlation between clinical toxicity and the reduction in dose parameters to OARs by DIBH should be undertaken e.g. dose to the liver in those who require hypo-fractionated, 1-week courses

## **Perceptions of radiotherapy**

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Radiation therapy (RT) is an essential intervention to improve outcomes for many cancer patients. However, several international studies have shown that the public's awareness of the benefits and risks of RT is low across all demographics. Of greater concern has been the finding that several misconceptions about the use of, and outcomes post, RT also exist amongst healthcare workers who do not work directly in oncology. This study aims to ascertain healthcare workers' and the public perception of radiation and radiation therapy within Ireland.

### *Materials and Methods*

A cross-sectional questionnaire was disseminated via social media, Facebook, Twitter, Instagram, and LinkedIn between January and March 2022 using Microsoft Forms. Twenty-one questions were selected from a previously published questionnaire to measure the extent of knowledge and misconceptions surrounding RT. Respondents were divided into groups – A - Those who previously received RT/had a cancer diagnosis, B – Those with a family member/close friend who had RT, C – no exposure to RT, D – healthcare worker not working in oncology. Data were analysed using Microsoft Excel; Chi-squared and Student t-tests were used to assess the statistical significance of the results. Ethical approval was obtained from the University College Cork's Social Research Ethics Committee (SREC)

### *Results*

Of the 332 responders, 280 were deemed usable (84%). The majority of respondents were in group B (63%, 176/280). 30% of answers demonstrated certain misconceptions about the use, benefit, and risks associated with RT. However, responders with experience of cancer had a statistically higher aggregate score than those without cancer experience ( $p=0.05$ ). Furthermore, healthcare workers performed statistically better than the public ( $P = 0.002$ ) but showed wide variation in answers to individual questions.

### *Conclusion*

There is an ongoing need for accurate informational resources, support services, and educational interventions for healthcare workers and the public, focusing on those undergoing RT treatment. The crucial role of the practitioner in guiding patients through treatment is highlighted, emphasising the duty of care involved in caring for those who may have limited understanding or inherent misconceptions surrounding their treatment.

## **Paranasal Sinus Carcinoma – A 10-year single institution experience in St Luke’s Radiation Oncology Network, Ireland**

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To characterize a single institution experience with management of paranasal sinus carcinoma during a 10-year period, to report long-term survival rates and identify prognostic factors.

### *Materials and Methods*

A retrospective analysis of patients with paranasal sinus carcinoma between 2012 - 2022 treated with surgery & adjuvant radiotherapy [RT], definitive RT or palliative RT +/- chemotherapy. Overall survival [OS] and local progression free survival [PFS] were calculated using Kaplan-Meier analysis. Multivariate analysis for prognostic factors was performed using Cox regression.

### *Results*

Eighty-six patients were identified between 2012-2022 and eligible for analysis. Sixty-eight patients received radical treatment [44 surgery & adjuvant RT, 24 definitive RT] and 18 received palliative RT. Thirty of 68 radical patients progressed after RT [two thirds had locoregional progression]. Median duration of follow up was 21 months. Median local progression free survival was 70.0 months in the radical patients. The median OS from start of RT was 99.8 months (CI: 61 – 139; Radical). In those who received radical RT the median local/nodal PFS was 70.0 months. For the whole group (n=86), median OS was 62.2 months; 99.8 months in those who received adjuvant RT, median was not reached in those who received definitive RT, and 4.6 months in those who received palliative RT.

### *Conclusion*

Positive survival data was reported in the radically treated patients that is comparable with other major institutions. Whilst surgical excision followed by adjuvant RT is associated with the best clinical outcomes, treatment should be individualized.

## **Total Neoadjuvant Therapy (TNT) For Locally Advanced Rectal Cancer: South East Experience**

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Evaluating the outcome of our patients with locally advanced rectal cancer undergoing TNT in the South East against international standard.

### *Materials and Methods*

All patients are discussed at MDT and selected for TNT based on having  $\geq 1$  of involved mesorectal fascia, clinical tumour (cT) stage  $\geq cT3b$ , clinical nodal (cN) N2, extramural vascular invasion or enlarged lateral lymph nodes<sub>1,2</sub>. Suitable patients between February 2021 to October 2022 are enrolled into the TNT programme and followed prospectively. Primary endpoint is complete response. Secondary endpoints will be analysed as our data continues to mature.

### *Results*

12 patients were enrolled. All had at least 2 of the inclusion criteria outlined. 10 completed upfront chemoradiotherapy and was followed by consolidation chemotherapy. Of these, 1 discontinued early due to toxicities and is now awaiting surgery. 2 are still undergoing consolidation chemotherapy. 2 patients received induction chemotherapy. Of these, 1 developed metastatic disease and switched to palliation, and the other completed the course and proceeded to chemoradiotherapy. Of the 12 patients, 1 did not complete TNT due to development of metastatic disease during induction chemotherapy and switched to palliation. All patients receiving chemoradiotherapy completed the course. In total, 8 patients completed TNT and restaged. 1 patient achieved complete clinical response and proceeded to surveillance alone due to co-morbidities. 1 patient is awaiting surgery. 6 had surgery. 83% (5) of patients achieve T downstaging. All (100%) patients achieve N downstaging. All (100%) patients achieve R0. 1 patient achieve complete pathological response.

### *Conclusion*

In total, 29% (2/7) patients achieved complete response (1 clinical, 1 pathological). Our data shows consistency with results of published international trials<sub>1,2</sub> in TNT.

## **Streamlining Thyroid Cancer Surveillance: Enhancing Service Quality and Workflow through Virtual Phone Consultations**

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Post treatment surveillance of Thyroid cancer plays a crucial role in monitoring patients for recurrence or progression of the disease. By exploring the feasibility and effectiveness of virtual phone consultations, we seek to enhance the efficiency of follow-up care for thyroid cancer patients. This audit will provide valuable insights into the potential benefits and challenges of adopting virtual consultations in this patient cohort ultimately aiming to improve patient outcomes and optimize healthcare delivery.

### *Materials and Methods*

Retrospective e-chart review of scheduled virtual consultations for thyroid cancer surveillance in 2022. Clinical notes and blood results available from the scheduled appointment were analysed, including subsequent entries related to initial phone consultation.

### *Results*

Sixty virtual consultations for the Aim of thyroid cancer surveillance with tumour markers were scheduled in 2022. Twenty five consultations (41%) had required results available on the scheduled day. Ten patients (16%) required a re-scheduled appointment following repeat bloods and 9 (15%) required bloods done at another institution which had to be located and reviewed after the consultation. Ten (16%) consultations required bloods to be done after the appointment and 6 (10%) consultations did not have the required blood results.

### *Conclusion*

Our results show that 59% of scheduled appointments did not have the required surveillance results. These required additional follow up by the team including unscheduled phone consultations, or did not meet surveillance guidelines. In a busy service, it is imperative to adequately utilise available resources, including personnel time, while maximising quality of patient care. Our audit highlights the unnecessary additional work and time requirements from teams if a clinic is not efficiently managed. Implementation of a new appointment letter including a reminder to attend for bloods and email address to send available bloods to the team secretary prior to a scheduled appointment would increase efficiency of the service.

## **An Audit of Thromboprophylaxis Prescribing in Radiation Oncology inpatients in St. Luke's hospital**

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### *Aim*

Venous thromboembolism (VTE) represents a critical and preventable cause of morbidity and mortality

among inpatients. Oncology patients are at a significantly elevated risk, accounting for approximately 20% of all VTE cases. Careful assessment of VTE and bleeding risk of inpatients is imperative.

### *Materials and Methods*

We carried out a review of thromboprophylaxis assessment forms and prescribing in St. Luke's hospital inpatients. Patient charts were reviewed to check for completed risk assessment forms. Each corresponding patient kardex, bloods and weight was then assessed to review appropriate thromboprophylaxis prescribing.

### *Results*

26 inpatients were reviewed. 15 patients had an assessment form in their chart but only 2 were completed. Four patients were on a direct oral anticoagulant (DOAC). Two patients were on therapeutic clexane. The remaining 20 patients met criteria for pharmacological thromboprophylaxis. One patient was not prescribed thromboprophylaxis despite meeting criteria. Another patient, was initially on the incorrect dose of low molecular weight heparin (LMWH), although this was subsequently corrected. No adverse events were noted. Two patients were on the incorrect dose for their renal function. All others were correctly prescribed.

### *Conclusion*

A comprehensive risk assessment for VTE and the appropriate prescribing of preventive measures play a crucial role in averting adverse outcomes and mortality. Incorrect prescribing of VTE prophylaxis occurred in approximately 15% of inpatients, which is a preventable error. Furthermore, 92% of patients did not undergo a VTE risk assessment. These findings highlight the urgent need to prioritize and emphasize the significance of VTE prevention to ensure accurate and appropriate prescribing practices.

## **Radiotherapy in the elderly; do they receive and tolerate the same treatment as younger patients with cancer?**

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### *Aim*

To establish if elderly patients receive and tolerate the same radiotherapy regimes as younger patients with cancer.

### *Materials and Methods*

This study includes patients aged  $\geq 70$ , with a cancer diagnosis within the central nervous system, head and neck, lung, gastrointestinal and gynaecological categories. We specifically focussed our study population to include patients with diagnoses within these 5 tumour groups, as these cancers are typically associated with significant disease and treatment related morbidity. Patients seen for initial consultation in 2015 in our national cancer centre were included. Data on treatment intent and outcomes were prospectively collected via an automated database. A subset of patients aged  $<70$  were analysed for comparison.

### *Results*

501 patients over 70 years of age were seen for radiotherapy opinion. The majority (85%) were treated inclusive of both radical and palliative radiotherapy. 286 patients (57%) were treated with radical intent. Of the total population seen,  $<5\%$  were not recommended for treatment because they were deemed unfit. Breaks in treatment due to illness or toxicity were observed in  $<5\%$  and treatment was discontinued in 2%. Patients under 70 ( $n=104$ ) had similar overall treatment patterns and completion rates.

### *Conclusion*

The majority of older patients who were referred for consideration of radiotherapy were treated and completed treatment in a similar manner to younger patients. This demonstrates the successful treatment of older patients without exerting a burden of delayed or incomplete treatment and provides useful evidence to support the provision of tumour directed treatment for older patients.

## **An Audit of Cardiopulmonary Resuscitation and DNAR Decision-Making and Documentation in Radiation Oncology Inpatients**

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### *Aim*

Advance care planning is an important component of good clinical practice, especially in the oncology setting. Open, honest discussion about prognosis and goals of care is essential for guiding appropriate treatment while avoiding unnecessary interventions. Decision-making on Do Not Attempt Resuscitation (DNAR) orders should be made in conjunction with patients on a case-by-case basis to ensure patient dignity and autonomy in the palliative and end-of-life setting.

### *Materials and Methods*

An audit of DNAR decision-making and documentation was carried out on radiation oncology inpatients in St. Luke's hospital. All inpatient charts were reviewed to assess if the level of care had documented in the medical notes and DNAR form.

### *Results*

28 charts were reviewed. 21 patients were undergoing radical treatment while 7 were undergoing palliative radiotherapy. 4 patients had their resuscitation status documented (3 palliative and 1 radical). Of these, only 3 had their transfer status separately documented. DNAR decisions were discussed with 2 of the 4 patients. Of the 2 with whom the decision was not discussed, one patient had severe cognitive impairment and the other patient had a order from their previous hospital prior to transfer.

### *Conclusion*

Decision making regarding DNARs and level of care is an important aspect of cancer management. It prevents unnecessary or invasive investigations and patient distress in the event of an acute deterioration. It is essential to engage in DNAR discussions during the patient's initial admission, fostering open and honest conversations that take their preferences into account. Further emphasis should be placed on initiating timely and appropriate discussions.

## **Management of a positive sentinel lymph node in breast cancer – patterns of care**

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### *Aim*

Management of the axilla in patients with breast cancer has changed significantly over the last ten years. The use of axillary lymph node dissection for those with a positive sentinel lymph node (SLN) has declined with the publication of randomised trials testing the omission of dissection and the use of axillary radiotherapy (RT). We designed a retrospective study analysing patterns of care in a cohort of Irish patients.

### *Materials and Methods*

Patients receiving RT for breast cancer between January and June 2019, with a positive SLN were eligible. A total of 224 patients were referred for RT in this period, 49 (22%) of whom had a positive SLN. Patient, disease and treatment details were recorded.

### *Results*

Of those with a positive SLN, 17 (35%) had ALND. Higher T stage, grade 3 primary, presence of LVI, and triple-negative disease were not more common in those who went on to have ALND. For those not having ALND, the nodal RT target is summarised below.

Nodal Target	ITC's or Micrometastases.	Macrometastases
Nodes not treated	3	
High Tangents Fields	8	
Only S/C Treated		1
S/C and Lower Axilla		1
S/C and Entire Axilla	2	16
Total	13	19

(S/C supraclavicular nodes)

### *Conclusion*

The omission of ALND has been widely adopted - a majority of patients with a positive SLN avoided ALND. This is likely to result in significant reductions in treatment toxicity for Irish breast cancer patients.

## **Analysis of the challenges surrounding the delivery of cancer care to Ukrainian refugees – An Irish Hospital Experience**

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### *Aim*

Cancer care has not been spared by the war in Ukraine. Many Ukrainian cancer patients have fled their

homeland to continue their life saving care abroad. As of February 12<sup>th</sup> 2023, 74,458 Ukrainian refugees have arrived in Ireland.(1) To the best of our knowledge, how best to approach these patients has not been studied in Ireland to date.

### *Materials and Methods*

We identified Ukrainian refugee cancer patients from Cork University Hospital's Oncology MDT lists. A retrospective chart review was undertaken. Data encompassing patient demographics, diagnosis, MDT outcome, staging, treatments, and availability of clinical information from Ukraine was gathered. Using this data, we generated descriptive statistics. Following informed consent, we undertook a qualitative interview of a sample of Ukrainian patients to ascertain the experiences of this cohort. We undertook a survey of clinicians involved in the cancer care of these patients to outline the challenges faced. Clinical Research Ethics Committee approval was granted in May 2023.

### *Results*

Forty Ukrainian refugees with a new/known cancer diagnosis have been identified and discussed at MDT between March 2022 - 2023. Descriptive data collection has been completed and analysis will be finalised in the coming weeks. Qualitative data to follow.

### *Conclusion*

The coordinated whole of Government approach for patients fleeing conflict serves as an exemplar for other patients fleeing crisis. Review of the lessons learnt from our experience suggests that care would be enhanced through designated coordinators at cancer centres for this and other cohorts. Reflective learning from our experience can be used to ensure holistic care to these vulnerable groups.

## **Implementation of New Electronic Clinical Tasks to Improve Patient Care**

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### *Aim*

Electronic medical records have the capability to improve the organisation of clinical tasks and reduce errors. Medical teams in the St Luke's Network are already familiar with electronic tasks on ARIA. We

aimed was to improve patient safety by creating an electronic system to organise clinical tasks.

### *Materials and Methods*

We created 3 new task categories on ARIA which were; (1) Clinical Task (routine jobs), (2) Urgent Clinical Task (requires rapid action) and (3) Radiology Action (ordering and reviewing routine scans). Any member of the team could review, edit or mark the tasks as complete. Afterwards, we asked users to complete a questionnaire comparing their previous methods of organizing tasks with the new clinical tasks.

### *Results*

In total 113 tasks were created between 15/11/2022 and 20/1/2023. Results of the questionnaire showed a higher proportion of users said that the new tasks were superior in patient safety, ease of use, handover communication and time efficiency. All users said they are likely or very likely to continue using the new tasks and are still actively using them.

### *Conclusion*

We implemented new electronic clinical tasks that users said were superior to how they previously organised tasks and they are still actively using them. Data relating to the number of tasks can be easily obtained facilitating audits and resource allocation. The consensus amongst users is the new clinical tasks will improve overall patient safety. We rolled out the new tasks to the whole St Luke's Network in May 2023 and plan to reassess via questionnaire after 3 months.

## **Use of Radioactive Iodine in the management of thyroid cancer in those with Stage IV / V Chronic Kidney Disease; A single-centre experience**

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### *Aim*

Radioactive iodine (RAI) is an important treatment option in the management of well-differentiated thyroid cancer for remnant ablation, adjuvant therapy, or treatment of known disease. Iodide-131 (131I) is an important radioisotope of iodine used in RAI treatment. It is predominantly cleared by the

kidney, therefore administering RAI can pose clinical complexities amongst patients with low clearance chronic kidney disease (CKD) and end-stage kidney disease (ESKD) due to prolonged circulation of <sup>131</sup>I. This requires advanced planning in relation to isotope exposure and clearance rates. This abstract presents the first case in Ireland of a RAI patient requiring haemodialysis whilst in isolation for an underlying diagnosis of ESKD secondary to IgA nephropathy.

### *Materials and Methods*

The patient is a 50 year old man who presented in 2017 with pT2pN1b papillary thyroid cancer and underwent RAI ablation. He re-presented with recurrent nodal disease and underwent a bilateral neck dissection. A structured multidisciplinary care pathway was created involving nephrology, radiation oncology, medical physics, and biomedical engineering.

### *Results*

The patient underwent thyrotropin treatment with 50% reduction on thyroxine (0.9mg) 48 hours prior to RAI. Dialysis was arranged immediately prior to treatment to familiarise staff with the new unit. He received a 50% reduction in RAI with a dose of 2.850 GBq. Following treatment, he underwent dialysis at 24 hours then q48hourly. His levels were reduced by >50% with each dialysis session. His levels reduced to < 30MBq (1.5uSv/hr) and was discharged with future dialysis planned without the need for isolation

### *Conclusion*

This case has demonstrated that RAI can be safely administered to patients with low clearance CKD/ESKD through a collaborative approach from the multidisciplinary team. Future directions will include the implementation of a national referral pathway for patients low clearance CKD/ESKD requiring RAI in the management of thyroid cancer.

## **Unmasking the potential limitations of Mean Heart Dose in Cardiotoxicity Prediction**

P. Sharma, J. Nicholson, G. Rangaswamy, O. Boychak  
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### *Aim*

There is increasing evidence that dose to the left anterior descending coronary artery (LADCA) results in increasing risk of coronary stenosis requiring intervention. This retrospective analysis assesses the mean heart dose (MHD) and dose to LADCA for women receiving adjuvant left-sided breast

radiotherapy (RT) to their regional lymph nodes (RLN) including internal mammary nodes (IMN) and aims to clarify whether the MHD reflects cardiac substructure exposure.

### *Materials and Methods*

In this single institutional retrospective analysis, RT plans on ten women who received adjuvant left breast RT with RLN including IMN were retrospectively evaluated. All patients received 3D-conformal hypofractionated RT (40 Gy in 15 fractions of 2.67 Gy  $\pm$  boost of 13.35 Gy). LADCA was contoured and dosimetric data was analysed

### *Results*

The median age of the patient cohort was 51 years (29-84). The MHD was 2.3Gy (1.28-4.43Gy). The LADCA Dmean/Dmax was 8.37 Gy (4.29-12.36Gy)/26.89 Gy (7.2-36.13Gy). Using Pearson's correlation coefficient, there was no significant correlation in this dataset between MHD and LADCA Dmean ( $r=0.51$  ( $p=0.13$ )) and between MHD and LADCA Dmax ( $r=0.43$  ( $p=0.22$ )).

### *Conclusion*

It is essential to routinely contour and evaluate the dose to the left anterior descending coronary artery (LADCA) as a separate organ at risk, in addition to considering mean heart dose (MHD), for optimal heart sparing in left breast radiotherapy. Long-term follow-up is crucial, encompassing patient-specific cardiac risk factors, to assess the correlation between dosimetric parameters and the occurrence of cardiotoxicity. By incorporating these measures, we can enhance our understanding of the intricate relationship between radiation dose and cardiac health, ultimately improving patient outcomes and minimizing the risk of cardiotoxicity.

**Radiation Oncology Annual Scientific Meeting 2023**  
**Faculty of Radiologists and Radiation Oncologists Royal**  
**College of Surgeons of Ireland**

# September 28<sup>th</sup> – 29<sup>th</sup> 2023

## Abstracts – Oral Presentations

### **Simultaneous integrated boost in breast radiotherapy: Comparison of delineation methods**

J. Trousdell, F. Duane, O. McArdle  
St. Luke's Radiation Oncology Network, Dublin.

#### *Aim*

Sequential boost to the tumour bed is associated with reduced risk of recurrence in high-risk breast



cancer treated with breast conserving surgery. Two large randomised controlled trials have recently demonstrated acceptable toxicity profiles for simultaneous integrated boost. These trials used varying methods of delineating boost volumes.  $D \geq 40\text{Gy}$  predicts risk of grade 2/3 induration. We designed a study to assess the boost volume treated using various delineation protocols.

### *Materials and Methods*

Twenty consecutive patients who received radical breast radiotherapy with boost were identified from January 2022. Data were collected for patient baseline tumour and treatment characteristics. Breast boost volumes were delineated according to four protocols; Current SLRON guidelines, (Clips + seroma) + 5mm = CTV + 5mm = PTV, Import High Trial, (Clips + seroma) = CTV + 5mm = PTV, NRG Trial, (Clips + seroma) + 1cm = CTV + 7mm = PTV, Proposed boost volume within SLRON, (Clips + seroma) + 5mm = CTV + 7mm = PTV.

### *Results*

PTV volumes as per various delineation methods were as follows; SLRON current guidelines: Mean = 104.725cc (40.2 – 273.4), IMPORT High: Mean = 52.335cc (14.3 - 167.7), NRG: Mean = 203.21cc (90.6 - 450.6), SLRON proposed Trial 7mm volumes: Mean = 125.66cc (49.1 – 313.1)

### *Conclusion*

Comparison of boost volume delineation methods show significant variation in the volume of breast tissue irradiated. Delineation methods used in published trials, result in a four fold difference in boost volumes. This has potential implication for the risk of long term breast fibrosis.

## **Salvage LDR Prostate Brachytherapy for Local Recurrence Following External Beam Radiotherapy: A Single Institution Retrospective Study**

R.L. Geary, M. McNulty, G. O'Boyle, A. Zuchora, L. Berrigan, N. Ibrahim, C. Small  
University Hospital Galway, Galway

### *Aim*

The aim of our study was to evaluate the safety and efficacy of salvage low dose rate (LDR) brachytherapy in locally recurrent prostate cancer after external beam radiotherapy.

### *Materials and Methods*

A retrospective analysis was performed on all patients who underwent salvage LDR prostate brachytherapy between January 2009 and May 2021 at University Hospital Galway. The primary endpoint was the rate of acute and late toxicities. Secondary endpoints included overall survival, progression free survival, biochemical-recurrence free survival and androgen-deprivation-therapy free survival which were calculated using the Kaplan-Meier method.

### *Results*

23 patients received salvage LDR brachytherapy. The median age was 65. The median follow-up was 57 months. The median time from completion of external beam radiotherapy to LDR brachytherapy was 86 months. All patients had a biopsy proven recurrence and all had an MRI pelvis and bone scan prior to proceeding with brachytherapy. All patients were prescribed a dose of 120Gy. Acute and late gastrointestinal (GI) toxicities were observed in 6/24(25%) and 14/24(58%) of the cohort respectively. There were no observed grade 3 or higher GI toxicities. Acute grade 1, 2 and 3 genitourinary(GU) toxicity was reported in 10/24(42%), 8/24(33%) and 3/24(8%) respectively. Late grade 1, 2 and 3 GU toxicity was reported in 7/24 (29%), 15/24(62%) and 1/24(4%) respectively. The median biochemical-recurrence free survival, androgen-deprivation-therapy free survival, radiological-progression free survival and overall survival were 42 months, 76 months, 108 months and 115 months respectively.

### *Conclusion*

LDR brachytherapy is a safe and effective salvage treatment option for locally recurrent prostate cancer.

## **Optimal dose of radiotherapy for patients with confirmed internal mammary lymph node metastasis in breast cancer in the adjuvant setting: a systematic review**

M. Colfer, O. McArdle  
St.Luke's Radiation Oncology Network, Dublin

### *Aim*

Breast cancer is the most common malignancy worldwide, accounting for 1 in 8 of all cancer diagnoses.

Adjuvant radiotherapy is an essential component of treatment. This systematic review was performed to identify the optimal dose of radiotherapy to involved internal mammary lymph node metastases (IMN) in the adjuvant setting.

### *Materials and Methods*

A systematic review was carried out using Pubmed and Prospero databases. Studies examining radiation doses administered to involved IMN in the adjuvant setting between 1993 and 2023 were included. Doses administered and number of fractions was our primary endpoint. IMN size, chemotherapy, surgical methods and disease free survival (DFS) were also reviewed.

### *Results*

23 out of 221 papers were included. The median IMN dose was 57.7Gy (range of 43.5Gy – 72Gy) delivered in an average of 25 fractions. One study compared size of IMN, delivering a higher dose to IMN >1cm vs <1cm, and identified an improved DFS in the >1cm IMN group who received a higher dose (69.3% vs 33%)(2). The most common chemotherapy was taxane-based regimes and surgery was mastectomy. Diagnostics of IMN involvement consisted of breast US, MRI, chest CT, and PET-CT (2).

### *Conclusion*

Optimal doses of radiotherapy to IMN in the adjuvant setting remain unclear with no current guidelines for treating clinicians. This review shows a median dose of 57.7Gy was associated with a DFS of >65% when given to involved IMN. There is a role for further research to establish treatment guidelines in the setting of IMN metastasis in adjuvant breast cancer.

## **A Retrospective Analysis of Clinical Outcomes of Patients with Hepatocellular Carcinoma Diagnosed in the South of Ireland**

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C. Ó Súilleabháin J. Sammon, P. MacEneaney, A. Barry  
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### *Aim*

The multi-disciplinary management of hepatocellular carcinoma (HCC) is evolving. Understanding

patient demographics, tumour aetiology and risk factors, and treatment related outcomes are important in this population to continue to advance and improve clinical outcomes. This is the first study examining patients with primary liver cancer in the south of Ireland, and aims to retrospectively gather data of patients diagnosed with HCC in Ireland, to build a profile to better understanding this population, and inform the development of treatment pathways.

### *Materials and Methods*

A research ethics board approved retrospective chart review of patients diagnosed with HCC in Cork University Hospital and Mercy University Hospital was conducted between 2008 - 2023. Data collected included patient demographics, liver function, tumour details, risk factors, previous treatments, date of death or last follow up.

### *Results*

One hundred and forty-eight patients with HCC were identified, diagnosed radiologically and/or pathological diagnosed. Median Overall Survival was 21.5 (0-183) months and median age at diagnosis was 67 (18-85) years. Two-thirds (66.6%, N=98) of patients were Child Pugh Class (CPC) A, 25% (N=37) CPC B and 6.4% (N=9) CPC C. 40% (N=59) of patients had multifocal disease at diagnosis. Further staging details, aetiology, BCLC stage, MELD, and treatment delivered will also be presented.

### *Conclusion*

Understanding the patient and tumour profile of HCC in Ireland is vital to inform prevention, diagnosis and guide the evolving use of multi-disciplinary treatment modalities.

## **Clinical outcomes following Stereotactic Radiosurgery for EGFR mutated Lung Cancer Brain Metastases: A Retrospective Analysis**

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St. Luke's Radiation Oncology Network, Dublin

### *Aim*

Lung cancer often metastasizes to the brain, and patients with EGFR mutations represent a distinct subgroup. Understanding the local control (LC) rate in this specific population can provide valuable insights into the effectiveness of SRS as a treatment option. We present our institutional experience and clinical outcomes following SRS in EGFR mutated lung cancer patients.

### *Materials and Methods*

We retrospectively reviewed medical records, MDM outcomes and imaging on patients treated with SRS for brain metastases in SLROC Beaumont Hospital from 2018 to 2021. From this cohort of patients we determined the LC rates for EGFR positive mutation lung cancer brain mets and compared them to existing literature.

### *Results*

204 patients were treated with SRS for brain metastases originating from the lung from 2018 to 2021. 12 patients from this cohort had EGFR mutated tumours. A total of 31 EGFR positive brain mets were treated with SRS. The LC rate for EGFR positive brain mets was 90.3%. 3 mets (2 patients) progressed by final follow up, with median follow up time of 17 months (range 4-35). Median time to local failure for EGFR positive brain mets was 11 months (range 5 - 11). This is similar compared to the published literature for EGFR positive lung cancer brain mets and appears better than EGFR negative brain mets (LC - 79%).

### *Conclusion*

The available literature on local control rates of EGFR mutated lung cancer brain metastases treated with stereotactic radiosurgery (SRS) is limited. Our study findings reveal an improvement in local control for EGFR-positive brain metastases compared to the published data available for EGFR-negative tumours. This suggests that SRS holds promise as an effective treatment modality in this patient cohort. Further research is warranted to validate and expand upon these results.

## **Treatment of oropharyngeal cancer during lockdown – outcomes for patients treated during the pandemic**

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O. Boychak, O. McArdle  
St. Luke's Radiation Oncology Network, Dublin

### *Aim*

The onset of the COVID-19 outbreak caused major interruptions to the entire healthcare network

affecting referral, diagnosis and treatment pathways with the potential to affect cancer treatment outcomes. We designed a retrospective study analysing treatment outcomes for patients with oropharyngeal cancer treated before and during the COVID pandemic.

### *Materials and Methods*

All patients receiving radical radiotherapy for oropharyngeal cancer pre-COVID (July 17 – July 18) and during COVID (Mar 20 – Mar 21) were included. Patient and disease characteristics, diagnostic timelines, treatment delays and disease outcomes were extracted from patient records.

### *Results*

159 patients were suitable for assessment, 76 in pre-COVID group and 83 in COVID group. When comparing the pre-COVID and COVID groups: TNM overall stage were as follows: Stage 1: (25% vs 45.8%), Stage 2: (28.9% vs 18.1), Stage 3:(21% vs 15.7%), Stage 4a:(21% vs 20.5%), Stage 4b: (4% vs 0%). Use of hypofractionated regimen (65Gy/30fr) increased during the pandemic (2.6% to 10.8%). There was no change in overall treatment times between groups with COVID related sepsis accounting for one significant delay and one death during treatment. There was no statistically significant difference in overall survival or disease free survival between the 2 groups (mean survival pre-COVID 48.3 months [95% CI 43.4-53.3 months], during COVID mean 30 months [95% CI 27.9-32 months]) with median follow up times of 48 months and 23 months respectively.

### *Conclusion*

In spite of challenges related to the COVID-19 pandemic, we have demonstrated that oropharyngeal cancer patients' treatment standards and outcomes were maintained. We did not demonstrate any difference in overall survival and disease free survival at 2 years when compared to a similar group prior to the pandemic.

## **Radiation-Induced Pelvic Insufficiency Fractures and Sacro-iliac Joint Optimisation in Pelvic External Beam Radiotherapy**

E. Herlihy, G. Kennedy, M. Murphy, J. Nicholson, G. Rangaswamy, O. Boychak  
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### *Aim*

Pelvic insufficiency fractures (PIF) are a well-known risk factor of pelvic radiotherapy (RT). They cause significant pain and impairment in quality of life and the incidence is as high as 14% of patients

undergoing radical pelvic RT. The majority affect the sacro-iliac joint (SIJ) and more than half of patients are symptomatic. Studies show that reducing the maximum dose (Dmax) from 50Gy to 45Gy can reduce the risk of PIF. We analysed the dose to the SIJ in order to assess if reduction in the dose received by the SIJ could help prevent PIF without compromising tumour coverage.

### *Materials and Methods*

The radiotherapy plans of 10 patients undergoing radical pelvic RT were reviewed. Two separate plans were created; one in which treatment was optimised to avoid the SIJ and the other where SIJ optimisation was not performed. The right and left SIJ were contoured as separate structures as per guidelines. Coverage of disease (defined as PTV V95%), Dmax and Mean dose to the SIJ and volume of the SIJ receiving 40Gy (V40Gy) were analysed and compared.

### *Results*

All patients underwent treatment for gynaecological malignancies. The minimum prescribed dose was 45Gy and the maximum was 57.5Gy. Coverage was not compromised by optimisation of the SIJ. Mean dose and V40 were found to be lower in optimised plans. There was no significant additional time burden for planning staff with SIJ optimisation.

### *Conclusion*

Risk of PIF is multifactorial including both patient and therapeutic modifiable and non-modifiable risk factors. Literature has shown that a V40 less than 60% can reduce the risk of PIF from 34% to 5%. Avoidance of the SIJ for pelvic radiotherapy is a time efficient method of reducing the SIJ dose without compromising therapeutic benefit.

## **Review of oropharyngeal cancer recurrences- how do they present?**

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### *Aim*

Oropharyngeal squamous cell cancers have a locoregional recurrence rate range of 17.3-32.5% and a distant metastatic rate of 6.5-17% at 3 years. Structured follow up is of paramount importance to facilitate early diagnosis and salvage treatment. We examined a cohort of patients with oropharyngeal cancer experiencing recurrence to better understand this clinical presentation in order to optimise outpatient follow up following radical treatment.

### *Materials and Methods*

A cohort of oropharyngeal patients treated radically between 2012 and 2020 were included. For those with recurrence: details of clinical presentation and diagnosis were recorded.

### *Results*

In total, 259 patients were included. Of these, 70 experienced recurrence: 13 locoregional failure, 13 local + distant failure, 25 distant failure and 19 with persistent disease post treatment. Of the 13 locoregional failures- 92% were symptomatic: pain (92%) and neck lump (8%). One recurrence was diagnosed during routine outpatient review, the remainder following patient contact after onset of symptoms. Of the 13 local + distant failures- 69% were symptomatic and 15% were diagnosed during routine clinic review. Of the 25 distant failures: 60% were identified at time of first post treatment imaging, 20% presented with respiratory symptoms and 20% were diagnosed on routine imaging.

### *Conclusion*

Locoregional recurrence of oropharynx cancer is almost always associated with patient symptoms: most commonly pain. Patients typically present with symptoms outside of routine review appointments. Diagnosis of recurrence in an asymptomatic patient during routine review is rare. This study highlights the importance of outpatient communication pathways that facilitate prompt review and investigation of new symptoms.