treatment starts, and treatment indications. Patient billing records and paging logs were reviewed to confirm self-reported cases and track the number of business days between simulation and the first fraction of treatment. A new inpatient consultation was defined as a novel encounter requiring independent evaluation; as such, patients admitted during an ongoing course of radiotherapy who continued the planned course while inpatient were not included.

Results: During the initial six months of tracking, on-call residents received a total of 607 pages with an average of 23.1 pages per week (range: 14-38). Of these pages, 212 were for new inpatient consultations with an average of 8.1 consultations per week (range: 2-15). Out of these 212 new consultations, 75 patients (35%) were treated on an inpatient basis. Nine patients (12%) received their first fraction of treatment on the same day as simulation, 13 (17%) on the next day, 11 (15%) two days after, 22 (29%) three days after, and 20 (27%) four or more days after simulation. The most common indications for urgent treatment were malignant spinal cord compression (27%), brain metastases (24%), tumor-related bleeding (8%), malignant obstruction of the airway or vasculature (8%), painful bone metastases (7%), and heterotopic ossification prophylaxis (7%). The most common primary sites of disease were leukemia/lymphoma (16%), gastrointestinal (13%), breast (11%), lung (9%), gynecologic (9%), sarcoma (9%), and benign (9%). Each individual resident's caseload differed greatly in quantity, indication, treatment site, and primary site over this six-month time period.

Conclusion: In this longitudinal analysis at a single academic institution, the radiation oncology inpatient consultation service experience was highly variable and diverse in clinical volume and treatment indication on a week-to-week and resident-to-resident basis. Exposure to radiation oncology emergencies is a vital component of residency training. However, the unpredictable nature of inpatient on-call scenarios can lead to variable educational experiences. Tracking inpatient on-call cases during residency may help identify areas needing improvement to enhance both patient care and residency training.

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Pharmacological Targeting of Interferon-Related DNA Damage Resistant Signature (IRDS) and XRCC4-Mediated DNA Repair Pathways ss a Novel Therapeutic Approach to DIPG Radio-Sensitization

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Purpose/Objective(s): Despite significant efforts to improve the outcomes of pediatric diffuse midline gliomas, such as diffuse intrinsic pontine glioma (DIPG), prognosis remains dismal with a 5-year survival of <1%. The standard of care treatment for DIPG is fractionated radiation, but the disease inevitably progresses in 6 months or less. There is a significant unmet need to improve the clinical outcomes for pediatric DIPG patients. Approximately 70-80% of DIPG tumors contain mutations in *TP53* tumor suppressor protein. These *TP53* mutations are associated with resistance to radiation treatments in DIPG patients. The mechanisms of increased radio-resistance of p53-mutant DIPG are poorly understood. The objective of this study was to identify novel pharmacological agents that would augment radiation sensitivity of p53 mutant DIPG cell lines, and to establish their molecular mechanism of action.

Materials/Methods: SF8628 pediatric DIPG cell line harboring p53 mutation was obtained from MilliporeSigma. CellRad benchtop X-ray irradiator (Precision X-Ray) was used for radiation sensitization experiments. ViCELL BLU cell viability analyzer was used for high-throughput screening of small molecule compound libraries with and without radiation treatments. Proteomics Core facility was utilized for mass spec analysis of protein targets of Compound-X.

Results: To identify novel drug candidates that would sensitize DIPG to therapeutic radiation, we carried out an unbiased screen of curated libraries of small molecules with diverse scaffolds in p53 mutant DIPG cells. This radio-sensitization screen yielded a single molecule, Compound-X, that was found to have profound growth-inhibitory and radiation-sensitizing effects in DIPG cells. Compound-X was found to induce a robust cell cycle arrest of DIPG cells in G2/M, the most radio-sensitive phase of the cell cycle. Furthermore, Compound-X elicited a massive apoptotic cell death of DIPG cells. An unbiased RNA sequencing approach revealed that Compound-X inhibits expression of the Interferon-related DNA damage Resistant Signature (IRDS), a sub-group of interferon-stimulated genes (ISGs) known to promote radiation and chemotherapy resistance in high-grade gliomas. To identify the target of Compound-X, we carried out affinity purification of Compound-X associated complexes from p53 mutant DIPG cell lysates. Mass spectrometry analysis of Compound-X-purified protein complexes identified XRCC4 as a protein that uniquely associated with Compound-X. RNAi knock-down experiments revealed that XRCC4 is required for cytotoxic effects of Compound-X. Importantly, Compound-X-mediated XRCC4 targeting caused a delay in DNA DSBs repair after radiation treatment.

Conclusion: An unbiased screen of small molecule drug candidates identified a novel XRCC4-targeting agent, Compound-X, as potent radiation sensitizer in p53 mutant DIPG cells. This work may lead to clinical trials investigating novel XRCC4-targeting agent in pediatric patients with DIPG.

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Results From a Multi-Institutional Pilot Study of iContour, an Interactive Online Platform with Real-Time Feedback to Improve Contouring Education for Radiation Oncology Residents

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Purpose/Objective(s): Numerous studies have shown that variability in contouring by radiation oncologists is common and associated with poor clinical outcomes. Contouring is taught via an apprenticeship model during residency with inconsistent results. Currently, there is no standardized contouring curriculum. We hypothesized that an interactive online educational platform for learners to practice contouring and receive real-time visual feedback would be a useful curricular tool.

Materials/Methods: The *iContour* platform displays anonymized DICOM data and allows for input and analysis of user contours in a web-based interface. Nine cases are available from the Head/Neck (H+N), Gynecologic (Gyn), and Gastrointestinal (GI) disease sites. The system presents users with a case and asks them to contour representative slices from 2-3 target volumes or OARs. Upon submission, users are shown several forms of feedback. These include immediate visual comparison with expert contours on

the same dataset (all cases), customized feedback based on overlap with prespecified "avoidance" and "inclusion" structures that highlight common mistakes (Gyn cases), and tumor control probability models to estimate the clinical impact of a user's contour variations on patient outcomes (H+N cases). Some cases include short videos outlining anatomy and contouring principles which are shown before the user contours. A pilot study was performed to evaluate technical performance and educational utility. Pre- and post-surveys with Likert-type questions (1-5 scale from strongly disagree to strongly agree) were used to assess user satisfaction and preferences regarding feedback.

Results: A total of 9 residents participated (median PGY3, range PGY2-5) from 5 institutions in 2 countries. Each participant completed 2 cases from a single disease site (n = 3 each for H+N, Gyn and GI), one with educational videos and one without. 67% of users had completed a prior clinical rotation in their disease site. Overall, residents felt the system was a useful educational tool (mean Likert score 4.67 +/- 0.47) and were interested in using it during clinical rotations (4.89 +/- 0.31). Most participants (7/9) felt *iContour* was more useful than existing resources for contouring education. Residents unanimously (9/9) found direct visual comparison with expert contours the most useful type of feedback, and that cases with videos before contouring were more educational.

Conclusion: The *iContour* platform is a useful educational tool for radiation oncology residents. Participants felt receiving immediate visual feedback on contours was a valuable learning experience. Short instructional videos before contouring can be utilized to provide "just in time" teaching. A randomized study to formally assess the platform's impact on contouring skills is planned.

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Feasibility and Workflow Efficiency in MRI-Based HDR Brachytherapy for Cervical Cancer at a Community-Based Practice

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Purpose/Objective(s): Image-guided brachytherapy (IGBT) has seen widespread use in high-volume centers around the country in the last ten years. GEC-ESTRO recommendations stipulate that the dose be prescribed to the high-risk clinical target volume, which includes the residual tumor present at the time of brachytherapy. This practice has resulted in lesser normal tissue toxicity and improved local control. We introduced MRI volumetric planning at our center three years ago to confer this advantage to our patients. Based on a practice pattern survey by the American brachytherapy society in 2014, IGBT with MRI-based planning was grossly underutilized due to challenges associated with the work stream and availability of MRI. The combined mean procedure time for MR imaging and planning reported at a high-volume brachytherapy center was 63.2 minutes. Our study aimed to identify the time required for MRI-based IGBT for the first HDR fraction for cervical cancer patients at our institution. We aim to understand how we differ from a typical high-volume center and how we may improve our efficiency and workflow.

Materials/Methods: Between 2020 and 2023, 14 patients were treated with HDR brachytherapy for a diagnosis of cervical cancer. Of these individuals, 7 patients were treated with MRI-guided IGBT during the first HDR fraction. The following time intervals were recorded:

1. Time from applicator insertion to completion of MRI imaging
2. Time from completion of MRI imaging to start of CT simulation
3. Time from start of CT simulation to completion of treatment delivery Materials and methods: Between 2020 and 2023, 14 patients were treated with HDR brachytherapy for a diagnosis of cervical cancer. Of these individuals, 7 patients were treated with MRI-guided IGBT during the First HDR fraction. The following time intervals were recorded: 1. Time from applicator insertion to completion of MRI imaging 2. Time from completion of MRI imaging to start of CT simulation 3. Time from start of CT simulation to completion of treatment delivery.

Results: The mean total procedure time was 582 minutes (Range 494-665). The mean time and ranges for each phase were as follows. The mean time from the implant insertion to MRI completion was 157.7 minutes (Range 70-307), and the time from MRI completion to the start of CT simulation was 114.7 minutes (Range 17-173), and the time from the start of CT simulation to the treatment delivery was 310 minutes (Range 251-476).

Conclusion: Our study demonstrates that MRI-based HDR brachytherapy with a skilled multidisciplinary team in a small community-based practice with an MRI imaging facility is a feasible approach similar to a high-volume center but differs in the total treatment time. Considering high treatment time in the community-based practice, the department is taking a team approach to improve efficiency. This includes establishing a dedicated brachytherapy suite closer to the MRI imaging and incorporating artificial intelligence to assist planning.

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Maintenance Therapy for Recurrent or Metastatic Cervical Cancer: A Multicenter, Cohort Study

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Purpose/Objective(s): Maintenance therapy with alternative agents after chemotherapy was shown to improve the overall survival in some advanced cancers such as breast cancer, lung cancer, ovarian cancer and so on. However, maintenance therapy is not accepted as the standard treatment for recurrent/metastatic cervical cancer. Aim of this study is to elucidate the efficacy of maintenance therapy in cervical cancer and to explore the factors associated with the prognosis of recurrent or metastatic cervical cancer.

Materials/Methods: In this multicenter cohort study, we retrospectively collected patients with a diagnosis of either recurrent or stage IVB cervical cancer to receive first-line chemotherapy with or without maintenance therapy. Patients did not have disease progression with first-line chemotherapy and were divided into maintenance therapy group (Arm A) and conventional chemotherapy group (Arm B). Information on clinical characteristics, metastasis information, treatment outcome and survival of patients was collected using an electronic medical record system. The