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Oral Presentation Abstracts

Skull base and Vertebral Chordomas treated with Radical Radiotherapy: A retrospective analysis of clinical outcomes and toxicities.

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Purpose

Chordomas constitute 0.2% of CNS tumours, 2-4% of primary bone neoplasms and arise in anatomically complex locations; sacrum (50%), skull base (30%), and the spinal axis (20%). There is no clear consensus on the optimal treatment approach and patients with skull base chordomas are often referred for proton therapy. The aim of this study was to evaluate clinical outcomes and assess whether a combination of intensity modulated radiotherapy (IMRT) +/- stereotactic boost allowed safe escalation of radiotherapy (RT) dose.

Materials and Methods

An analysis of 17 patients with chordomas treated with radical RT and referred through the Neuro-oncology MDT between 2011 and 2017 was carried out. We excluded patients who had prior RT or who received RT outside our institution.

Results

Eleven patients were included in the study, 8 skull-base; 3 vertebral chordomas. Median age at diagnosis was 42 years. Median follow-up duration was 20.5 months. Median RT dose was 66 Gy in the skull-base group; 64 Gy in the vertebral group. Three patients with skull-base chordomas received a stereotactic boost, Acute toxicity ($n = 9$, 82% of all patients) was more commonly reported than late toxicity ($n = 3$).One-year and 2-year PFS was 87.5% and 72% respectively.One-year and 3-year OS was 87.5% and 70% respectively.

Conclusion

Our study showed that dose escalation utilizing photons is safe and provides comparable local control rates to proton beam therapy. Longer follow up is needed but hopefully this should support the efficacy and toxicity profile associated with dose escalation of photons with more modern planning techniques for this rare tumour.

Stereotactic Radiosurgery for Brain Metastases from Renal Cell Carcinoma: A single institution retrospective analysis

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Purpose

Between 4% and 17% of all patients with Renal Cell Carcinoma (RCC) develop brain metastases. The role of whole brain radiotherapy (WBRT) is limited by its potential neurotoxic effects and the relative radio-resistance of RCC. Stereotactic radiosurgery (SRS) is increasingly used with favorable response rates. We present a retrospective analysis of RCC patients with brain metastases treated with SRS at our institution.

Materials and Methods

Medical records were reviewed on patients who received SRS for brain metastases secondary to RCC between 2012 – 2017 to obtain patient data, SRS dosimetry and evaluate treatment response. The Kaplan-Meier method was used to estimate survival times for individual patients.

Results

Twenty-four patients (16 males; 8 females) were identified. The median age at diagnosis was 60.4 years. 50 metastases were treated. Forty-five metastases were in-situ; 5 resected. Ten patients had a solitary metastasis and 6 had $\geq$ 3 metastases. A single fraction was used to treat 40 metastases; 8 were treated with 3 fractions and 2 with 5 fractions. Median single fraction dose used was 20 Gray (range 16 – 24 Gy). For in-situ metastases median planning target volume (PTV) margin was 1 mm and median PTV volume was 1.05 cc. The median duration of imaging follow-up was 14.7 months. The estimated median overall survival (OS) was 14.5 months. The estimated median local progression free survival was 16.8 months.

Conclusion

Our analysis showed that SRS is an effective treatment option in patients with brain metastases from RCC and results in comparable OS as per reported literature.

Deep Inspiration Breath Hold versus Free Breathing Technique in Mediastinal Radiotherapy for Lymphoma; A single institution experience

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Purpose

Radiotherapy (RT) plays an important role in the management of lymphoma and many patients with lymphoma are cured with treatment. Risk of secondary malignancy and long term cardiac and pulmonary toxicity from mediastinal RT exists. Delivery of RT using a deep inspiration breath hold (DIBH) technique increases lung volume and has the potential to reduce dose to heart and lungs. We undertook a study to assess the dosimetric differences of DIBH versus free breathing (FB) in patients with lymphoma requiring mediastinal RT.

Materials and Methods

We performed both FB and DIBH planning scans on 25 patients with mediastinal lymphoma needing RT. Contours and plans were generated for both datasets and dosimetric data were compared with respect to doses to organs at risk (OAR). All patients were planned using intensity-modulated RT.

Results

Fifteen male and 10 female patients were included in the study. Median age was 25.3 years. Of the 25 patients, 17 were treated using DIBH plan. Dose schedules ranged from 30Gy/15 fractions to 50Gy/25 fractions (Median dose = 30Gy). DIBH improved mean lung dose, V5 and V20. There was no difference in heart dose. Mean breast dose and V3 were increased with DIBH.

Conclusion

While DIBH improved lung doses in our study, there were no other significant differences in OAR doses. Published data suggest significant improvement in OAR doses. This was likely not seen in our data due to varying patient population and contouring protocol.

Stereotactic Ablative Body Radiotherapy for the Treatment of Oligo metastases: A Single-Institution Experience

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Purpose

Stereotactic ablative body radiotherapy (SABR) is an emerging, non-invasive, low-morbidity treatment option for control of oligo metastatic disease. This study investigated the outcomes and prognostic factors in the treatment of pulmonary oligo metastatic disease at our institution.

Materials and Methods

All patients who underwent SABR for pulmonary oligo metastatic disease between October 2015 and July 2019 were included in retrospective data analysis. Patient demographics, pathology results, radiotherapy treatment plans and diagnostic imaging results were reviewed. Gross Tumour Volume (GTV) was categorized as either small volume disease (SVD) (GTV ≤ 10cc) or large volume disease (LVD) (GTV > 10cc).

Results

35 patients were treated for pulmonary oligo metastatic disease at our institution. More than one site of disease was treated in nine patients. Colorectal adenocarcinoma was the most frequent primary malignancy (46%, n=16). The majority of lesions treated (84.8%, n=39), were located in the periphery of the lungs. 39.1% (n=18) of lesions were LVD. The median follow-up was 9.8 months. Follow-up data was available in 94% of cases. Complete response (CR) was observed in 15 (32.6%) lesions. There was a statistically significant difference in the volumes of the iGTV in patients who had a CR (p=0.026). These lesions had a mean iGTV of 4.6cc (95% CI: 2.9cc to 6.3cc). The mean iGTV was >10cc in lesions with partial response (PR), stable disease (SD) and progressive disease (PD). Progression free survival was 67% at 12 months (95% CI: 47% to 87%).

Conclusion

SABR achieved good results in our patient cohort. In our experience, SABR provides a viable, low-morbidity treatment option with promising treatment outcomes in the management of oligo metastatic disease.

Hypofractionation in Prostate Cancer: Just how do we contour Organs at Risks and Target Organs?

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Purpose

Profit and CHIIP are major trials that demonstrate the non-inferiority of hypo-fractionation in prostate radiotherapy. Contouring the target organ and organs at risk (OAR) accurately in the modern era of RT is vital. Our aim is to demonstrate the efficacy of both methods when meeting constraints and the difficulties encountered when trial protocol is not adhered to.

Materials and Methods

Ten intermediate risk prostate cancer cases were selected from a single service over 6 months. We looked at each case referencing the target organ, rectum and bladder. We contoured cases as per A) CHIIP, B) Profit, C) Profit + Seminal Vesicles (SV) and D) Profit target organ (+ SV) using CHIIP contours for OAR's. We assessed each for ability to meet constraints as per the trial. We also performed an audit of prostate plans approved over one month to assess methods used when treating with 60Gy/20Fr at our institution.

Results

All cases met constraints for Profit and CHIIP guidelines (A+B).No case met the criteria for seminal vesicle inclusion as per Profit trial.80% of cases failed to meet profit OAR constraints when delineated as per Profit (+SV) (C) Using CHIIP DVCs for OARS, 100% of cases made constraints. (D) As per audit, 100% of cases included SV and used CHIIP OAR contours, irrespective of method used to contour target organ.

Conclusion

It is important to adhere to study approved methods for delivering safe hypo-fractionated therapy. Without a large randomized study proving efficacy and safety, it is not safe to combine different contouring methods for OARs and target organ.

Stereotactic Radiosurgery for Brain Metastasis in Malignant Melanoma: A retrospective study

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Purpose

Metastatic Melanoma to brain is an aggressive cancer and typically associated with a poor prognosis. Stereotactic radiosurgery (SRS) is an increasingly used treatment with good effect. We present a retrospective review of patients with malignant melanoma metastasis to brain treated with SRS.

Methods

Patients who received SRS for Malignant melanoma metastasis between August 2013 and November 2016 were identified and data on age, SRS dosimetry, BRAF status, side effects and overall survival was collected. Overall survival (OS) was calculated from the day SRS was completed to the date of last follow-up or death.

Results

Twenty-Nine patients were identified, 15 Female and 14 Male. Five Patients had prior WBRT. Sixty-two metastasis were treated, with 51 treated in a single fraction, 4 treated with three fractions and 7 treated with five fractions. Eleven patients had BRAF mutation of nine were Wild Type and nine were unknown. Treatment was well tolerated. The most common toxicity documented was effect on memory and fatigue. Twenty-one patients out of 29 died (72%). Median overall survival for the 29 patients was 8.8 months (95% CI: 0–20.8 months). An estimated 44.4% (95% CI: 25.6–63.2%) and 29.6% (95% CI: 12.4–46.8%) were surviving at 1 and 2 years respectively.

Conclusion

The data shows that SRS is an effective treatment option in the management of brain metastasis from malignant melanoma with results comparable to those published in literature and better when compared to whole brain radiotherapy

Pathological and Radiological Effects of Pre-Operative Radiotherapy for Extremity Soft Tissue Sarcoma.

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Purpose

In patients requiring radiotherapy (RT) for the management of extremity soft tissue sarcoma (ESTS), delivering this pre-operatively has become common practice in Ireland since 2014. This review assesses the pathologic and radiologic impact of pre-operative RT.

Materials and Methods

All patients who underwent pre-operative radiotherapy for ESTS between 2010-2019 in the St Luke's Radiation Oncology Network were reviewed. Analysis included demographics, RT regimens, pathologic characteristics and tumour maximal diameter (TMD).

Results

54 patients were identified. Median age at diagnosis was 56 years and 61% were male. Primary tumour site involved the: thigh/groin (61%); buttock (7%); calf/knee (11%); shoulder (13%); arm (7%). The RT regimen was 50Gy in 25 fractions for 98% of patients. All patients underwent an MRI before and 4 weeks following RT. In 59%, the tumour reduced in TMD (median reduction: 20%). In 37%, the tumour increased (median increase: 22%). In 4%, TMD was unchanged. Analysis of the surgical specimen revealed 96% had a pathological response post RT.The median post-operative tumour necrosis was 50%. The median post-operative residual viable tumour was 30%.At a median 22 month follow up, 78% were disease free alive and there were no local recurrences.

Conclusion

Neoadjuvant RT is associated with a marked pathological response in ESTS. While most patients experienced a post-RT decrease in TMD, some patients experienced an increase in TMD and this may be due to oedema, necrosis or hemorrhage rather than disease progression. Changes in tumour size did not appear to impact on local control.