Clinical and Experimental Radiobiology Course

Tutorial 6

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Tutorial 6

- **Lecture 16: Retreatment Tolerance of Normal Tissue**
  - ***Dr. Hanbo Chen***

- **Lecture 17: Tumor Microenvironment and the Oxygen Effect**
  - ***Dr. Bradly Wouters***

- **Lecture 18: Stereotactic and High Dose Radiotherapy**
  - ***Dr. David Shultz***

Lecture 16: Reirradiation

A patient was treated with 20 Gy in 5 fractions to a painful melanoma bony metastasis from T6 to T8. It is now 3 months later, and the patient presents with new cord compression within the field. The patient declined surgery, and the plan is for re-irradiation.

Which of the following statements is most true?

A. **Re-irradiation is safe using the same dose as before, as the patient is presenting with an emergency.**

B. **A two-field (AP-PA) approach is always preferred over a conformal approach (IMRT or VMAT) in re-irradiation, as it can be started sooner.**

C. **The patient should continue their carboplatin (an alkylating chemotherapy agent) throughout their re-irradiation treatment as the drug is keeping their disease at bay elsewhere in the body.**

D. **The risk of radiation myelopathy with re-irradiation would be lower if the cord compression developed after 12 months instead of after 3 months.**

E. **The patient should be referred for a neurological assessment, as it is clearly irrational to decline surgery in this situation.**

Lecture 16: Reirradiation

Which of the following is not typically a factor that affects the risks to normal tissues with re-irradiation?

A. Time interval from previous radiotherapy

B. Primary site pathology

C. Re-irradiation dose

D. Previous radiotherapy location

E. Re-irradiation volume

Lecture 17: Oxygen Effect

Hypoxia:

A. Is found primarily in the cores of large tumors

B. Is only found at large distances from tumour vessels

C. Can provide an environment for the selection of cells with mutations in the apoptotic process

D. Is relatively stable over periods of hours to days

E. Is similar from patient to patient within a particular tumour type

Lecture 17: Oxygen Effect

Tumor hypoxia:

A. Is important only in patients receiving radiotherapy

B. Arises when oxygen supply exceeds oxygen demand

C. Is associated with aggressive disease and a propensity to metastasize

D. Is uniformly distributed in tumors

E. Is caused mainly by anemia in the setting of advanced disease

Lecture 17: Oxygen Effect

The oxygen enhancement ratio is a ratio of…

A. Surviving fractions at the same dose

B. Oxygen tensions giving the same surviving fraction

C. Ratio of doses under anoxia and normoxia giving the same surviving fraction

D. None of the above

Lecture 17: Oxygen Effect

Oxygen enhances radiation efficacy because:

A.	**It reacts with primary DNA lesions**
B.	**It promotes enzymatic activity of DNA repair machinery**
C.	**It inhibits enzymatic activity of the DNA repair machinery**
D.	**It promotes mitochondrial activity**

Lecture 17: Oxygen Effect

The oxygen enhancement ratio in a tissue is at half-maximum at approximately

A. 7% O2

B. 0.7% O2

C. 0.07% O2

D. 0.007% O2

Lecture 18: Stereotactic and High Dose Radiotherapy

The LQ-L model is an option for modeling SBRT doses based on concerns that the LQ model

A. Overestimates BED

B. Underestimates BED

Lecture 18: Stereotactic and High Dose Radiotherapy

According to the LQ model, compared to tumors with a low alpha/beta ratio, the therapeutic ratio for tumors with a high alpha/beta ratio is expected to be

A. Greater

B. Less

C. The same

Lecture 18: Stereotactic and High Dose Radiotherapy

True or false, the rational for fSRS is improving local control while decreasing toxicity, which is most relevant for smaller lesions.

A. True

B. False