Abstract ID: 17521   Title: Biologically based radiation treatment planning

SAM Question Set from Allen Li

Q1: A major limitation for treatment planning based on dose-volume criteria is that

1. Plan generated is not optimal.
2. Dose-volume metrics are merely surrogate measures of treatment outcome.
3. Dose-volume metrics are not related to treatment outcome.
4. It requires inverse planning.
5. It requires forward planning.

Answer: 2

Refs:
1. Ling and Li, “Over the next decade the success of radiation treatment planning will be judged by the immediate biological response of tumor cells rather than by surrogate measures such as dose maximization and uniformity,” Med. Phys. 32, 2189–2192 (2005).
2. TG-166 Report

Q2: Why is it desirable to use outcome models in biologically based treatment planning?

1. Because they are required by optimization algorithm.
2. Because they are simple to use.
3. Because they can improve dose calculation accuracy.
4. Because they can describe dose response.
5. Because they are available.

Answer: 4

Refs:
2. TG-166 Report.

Q3: Incident rate of pneumonitis for lung V20 < 30% is approximately:

1. 1%
2. 5%
3. 20%
4. 50%
5. 80%

Answer: 3


Q4: A biological cost function most likely includes:

1. Maximum dose
2. Minimum dose
3. Mean dose
4. V20
5. EUD, TCP and/or NTCP

Answer: 5

Refs:
1. Ling and Li, “Over the next decade the success of radiation treatment planning will be judged by the immediate biological response of tumor cells rather than by surrogate measures such as dose maximization and uniformity,” Med. Phys. 32, 2189–2192 (2005).
2. TG-166 Report

Q5: Why biologically based treatment planning can lead to less toxic plans as compared to dose-volume based planning?

1. Because biological cost functions directly associate with tissue biological property and treatment outcome.
2. Because dose-volume cost functions directly associate with tissue biological property and treatment outcome.
3. Because dose-volume cost functions are incorrectly formulated.
4. Because biologically based treatment planning is easy to perform.
5. Because dose-volume based treatment planning is difficult to perform.

Answer: 1

Refs:
2. TG-166 Report