Background

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Abstract

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1   Medical context

1.1   10 cancer markers

- cell proliferation

- reprogram cellular metabolism

- stop cell growth arrest

- evade apoptosis

- escape immune system

- ability to undergo a sufficient number of successive cell cycles of growth and division to generate macroscopic tumors

- create new blog vessels to get nutriments

- allow cell escape and metastasis formation

- change cellular response phenotypic via plasticity

- senescence

1.2   4 cancer conditions

- mutation

- epigenetic reprogramming

- inflammatory context

- disruption of microbiota

1.3 phases of cancer

initiation

promotion

tumorigenesis + neoangiogenesis

evolution (local, regional, metastasis)

1.4 cancer classification:

tumor, node, mestastasis

stages classification:

1. stage 0 which corresponds to a so-called in situ tumor

2. stage 1 which corresponds to a single, small tumor

3. stage 2 which corresponds to a larger local volume

4. stage 3 which corresponds to invasion of the lymph nodes or surrounding tissues

5. stage 4 which corresponds to a wider extension in the body in the form of metastases

1.5 treatment types

surgery

RT

chemotherapy

combination

2 Patient Path

2.1 Detection / diagnostic

2.2 RT Prescription

2.3 CT scan

2.4 Contouring

2.5 Treatment Planning

2.6 Irradiation Sessions

2.7 Follow-up

3 Machines

3.1 Molds / 3D-RT

3.2 MLC-LINAC

3.3 Tomotherapy

3.4 CyberKnife

3.5 Brachytherapy

4 Irradiations techniques

4.1 IMRT

Step and Shoot

Sliding Window

4.2 VMAT

5 Treatment Planning Systems

5.1 Manufacturer

Eclipse (Varian)

ONE | Planning (Elekta)

Precision (Accuray)

5.2 Non-manufacturer

RayStation (RaySearch)

matRad (German Cancer Research Center - DKFZ)

AutoPlan (TheraPanacea - coming soon)

6 Dosimetry steps

Challenges

6.1 BOO

6.2 FMO

6.3 LF

7 Simulation