Innovations in cancer management

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Nobel Prizes at the origins of Radiotherapy

- 1901: Willhelma Roentgen: X rays discovery
- 1903: discovery of RADIOACTIVITY and Marie and Pierre Curie for works on this phenomenon
- 1911: Marie Curie: radium and polonium discovery
XXI century: Nobel Prizes at the origins of Immunotherapy

Science

Cancer immunotherapy sweeps Nobel for medicine
Jocelyn Kaiser and Jennifer Couzin-Frankel

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Local treatment: leading form of cancer management

- About 50% of cancer cure based on the use of radiotherapy
- How to increase radiotherapy availability?
- Shortening of treatment time as one of the solutions
Shortening of treatment time: the IAEA activities

International Atomic Energy Agency Randomized Phase III Study of Radiation Therapy in Elderly and/or Frail Patients With Newly Diagnosed Glioblastoma Multiforme

Accelerated hypofractionated radiotherapy with concurrent full dose chemotherapy for locally advanced non-small cell lung cancer: A phase I/II study
Shortening of treatment time

- Equal efficacy of 5 x 5 Gy schedule vs 15 fractions for glioblastoma (IAEA trial)
- Equal efficacy of shorter and longer treatment schedules in breast cancer (15 vs. 25 fractions, and even 5 vs. 15 fractions)
- Equal efficacy of 5 x 5 Gy vs 25 x 2 Gy in preoperative radiotherapy for rectal cancer

- Shorter treatment requires more precision
- Old equipment (machines, planning systems, calculation algorithms) as an obstacle for implementation and propagation of shorter treatment schedules
Stereotactic techniques: SBRT

- Short radiotherapy (1-3 or 5 fractions) to small volume
- Ablative (high) doses with a rapid fall-off
- Local effect + initiation of immune response
Precision in radiotherapy requires the use of high technologies
Precision in radiotherapy requires an adequate imaging and high technologies.
Promising evolution of cancer management

- Development of new systemic treatment strategies (immunotherapy, targeted therapy; new cytotoxic drugs): systemic treatment combined with local strategies

- Ablative doses, shorter treatment time in many indications in immunotherapy

- More patients treated with shorter schedules; however higher requirements for QA

- High technologies: a prerequisite for the use of shorter radiotherapy schedule