SCIENTIFIC FORUM
NUCLEAR SCIENCE FOR HEALTH

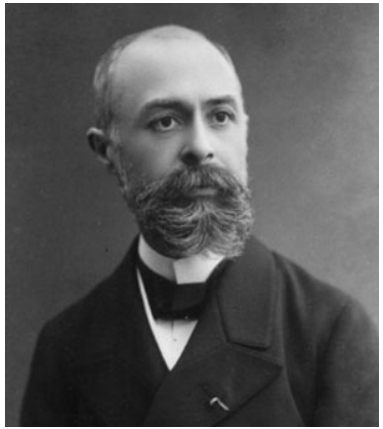
Innovations in cancer management

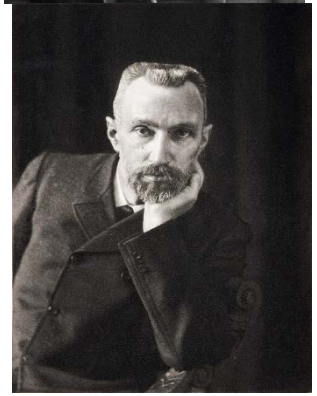
Lucyna Kępka

Military Institute of Medicine, Warsaw, POLAND

2022

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

Science **362** (6410), 13.
DOI: 10.1126/science.362.6410.13

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

VOLUME 33 · NUMBER 35 · DECEMBER 10 2015
JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

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

Wilson Ros, Lucyna Kepka, Narendra Kumar, Valery Smetka, Juliana Mastello, Darejan Lomidze, Delenda Hennari, Douglas Guedes de Castro, Katarzyna Dytnus-Cebulok, Suzanne Droge, Sunita Ghosh, Branislav Jeremić, Eduardo Rosenblatt, and Elena Fiderova

Radiotherapy and Oncology 148 (2020) 174–180

Contents lists available at ScienceDirect

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Original Article

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

Krzysztof Glinski [a], Joanna Socha [b], Ewa Wasilewska-Tesluk [a,c], Katarzyna Komosinska [b], Lucyna Kepka [b,*]

[a] Independent Public Health Care Facility of the Ministry of the Interior and Warmian & Mazurian Oncology Centre, Olsztyn; [b] Department of Radiotherapy, Military Institute of Medicine, Warsaw; and [c] Department of Oncology, University of Warmia & Mazury, Olsztyn, Poland

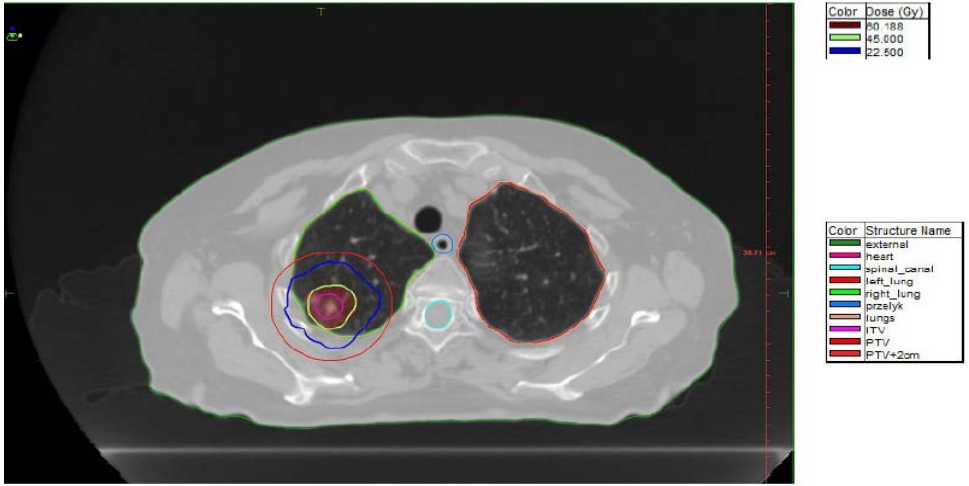
Shortening of treatment time

- 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

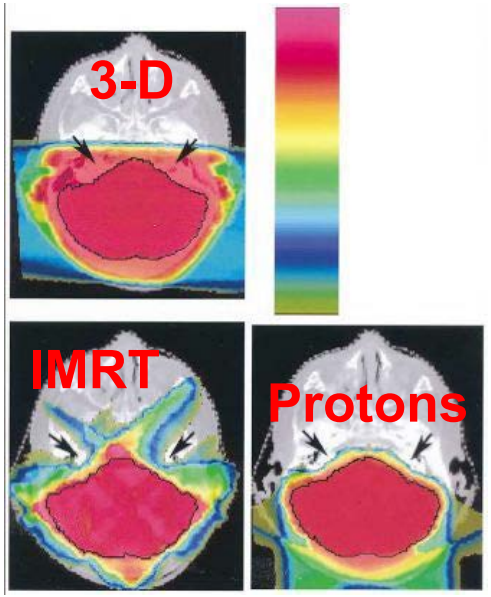
- Shorter treatment requires more precision
- Old equipment (machines, planning systems, calculation algorithms) as an obstacle for implementation and propagation of shorter treatment schedules

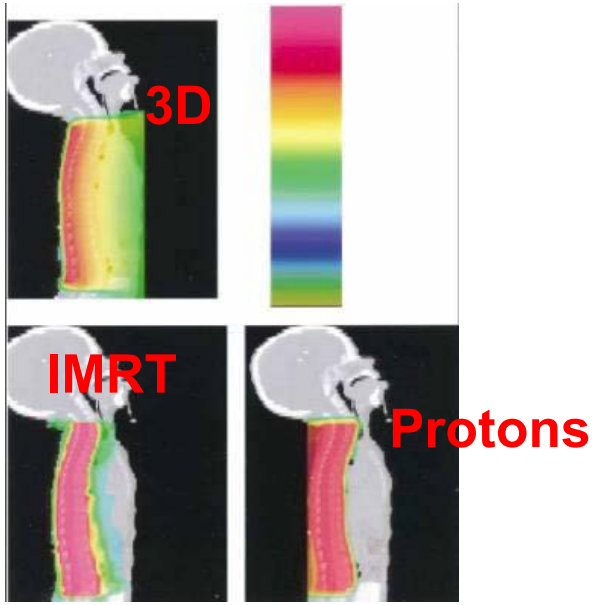
Stereotactic techniques: SBRT

- Short radiotherapy (1-3 or 5 fractions) to small volume
- Ablative (high) doses with a rapid fall-off
- Local effect + inititation of immune response

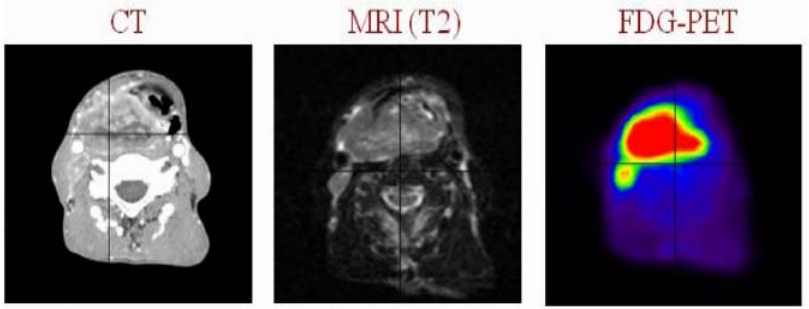


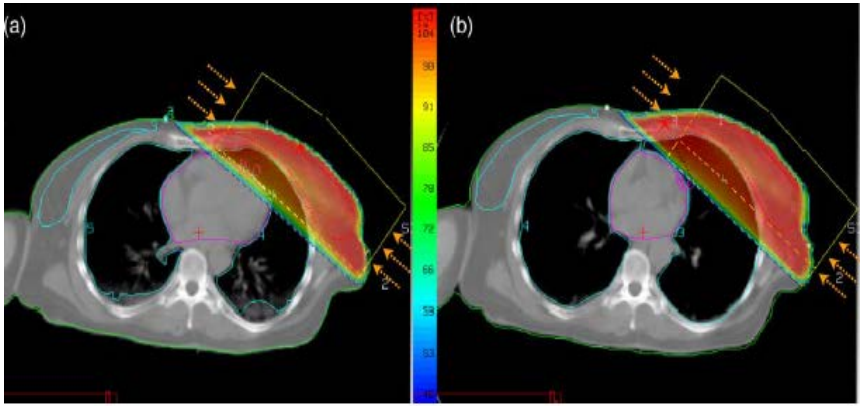
Precision in radiotherapy requires the use of high technologies

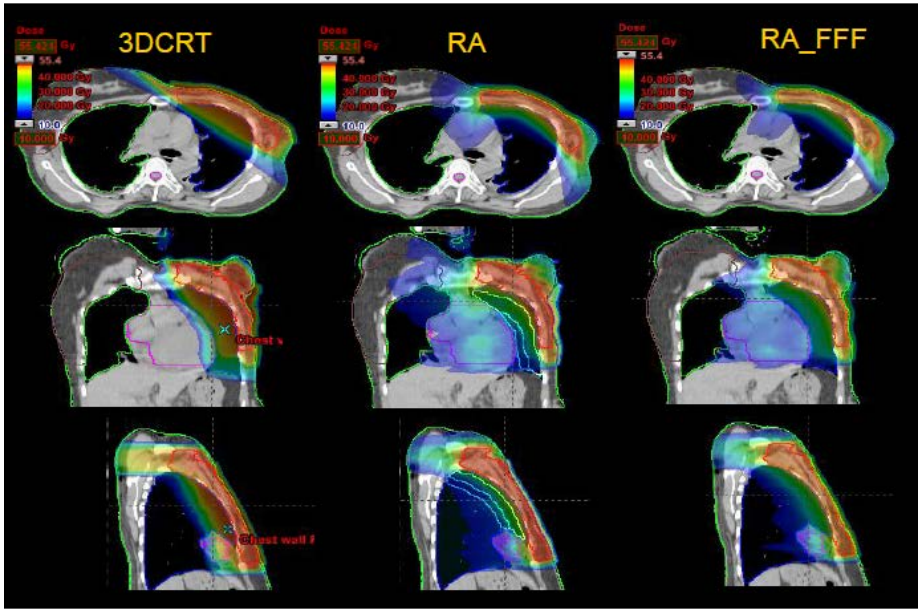




Precision in radiotherapy requires an adequate imaging and high technologies







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