WHEN TO PROPOSE A PATIENT TO THE RADIOTHERAPIST

Silvio Monfardini
Director Geriatric Oncology Program
Fondazione Don Gnocchi
Istituto Palazzolo Milano

and Fabio Volterrani
Radiotherapy Professor Emeritus
University of Milano
The Interest of Radiotherapists in the MGE

*Questions and answers:*

1. Is For Geriatrician useful to get some information on Radiotherapy?
2. When Radiotherapy alone can be curative?
3. Radiotherapy in association with other modalities?
4. Palliative Radiotherapy Primary and metastatic?
5. Acute and late side effects?
Difficult situations in Radiotherapy agitated aged patients: Geriatricians needed

- fear
- pain
- psychiatric illness

- possibilities available to calm the patients
- current adaptations of radiotherapy techniques

*Literature is extremely rare on this subjects*
RADIATION TREATMENT IN OLDER PATIENTS: A FRAMEWORK FOR CLINICAL DECISION MAKING

Radiotherapists are becoming progressively aware of the need of Geriatric assessment

Competing Risks of non cancer death

Functional reserve: degree of vulnerability in major organs, cognition, immunity, and psychological and nutritional status maintainance of IADL and ADL

(G.L. Smith and B D. Smith Journal of Clinical Oncology. August. 2014)
Functional reserve is likely to influence Radiation treatment, (treatment duration, dose and need for acute supportive care to manage toxicities)

Functional reserve (degree of vulnerability in major organs, cognition, immunity, and psychological and nutritional status, maintenance of IADL and ADL) is one domain evaluated by the Comprehensive Geriatric Assessment (CGA) for patients with cancer.

The role of a CGA in patients undergoing radiation treatment is the topic of ongoing investigation. (Example: Predicting tolerance to radiation therapy in older adults with cancer - http://clinicaltrials.gov/show/NCT017527514)
What ‘s the usefulness for a Geriatrician following old cancer patients to get some information on Radiotherapy?

5 good reasons
The reasons why

1) To participate to a tumor board
2) To know the situations where palliation through RT may be useful
3) To know the possible late effects of RT
4) To know the situations where surgery should be substituted by RT since the old patient is unfit
5) To embark in clinical research on Radiotherapy in the elderly cancer patients
What about acute and late side effects of Radiotherapy?
Acute side effects of Radiotherapy

Nausea and vomiting

Damage to the epithelial surfaces (skin, oral mucosa, pharyngeal, bowel mucosa and ureter)

Mouth, throat and esophagus sores
Late side effects of Radiation therapy

Depending on the area of the body treated, include:

1) Fibrosis
2) Damage to the bowels, causing diarrhea and bleeding.
3) Memory loss (brain irradiation).
4) Rarely, a second cancer caused by radiation exposure
When Radiotherapy alone can be curative?
Early stages

Hodgkin’s disease
Non –Hodgkin’s lymphomas
Ca prostate
Ca larynx
Ca cervix
Ca Skin
Malignant Lymphomas

Radiotherapy, more often associated with chemotherapy, remains an important treatment modality in lymphoma: Hodgkin's disease

Non Hodgkin's Lymphoma
Prostate carcinoma

Radiotherapy alone appears to give similar results to those obtained by surgery. Surgery is sometimes followed by radiotherapy if margins are positive. Hormonotherapy is associated to radiotherapy in locally advanced prostate cancer, with a clear increase in survival.
In proposing a case of prostate cancer (but also for other neoplasia) to the Radiotherapist should we be aware of the available Radiotherapy techniques?
New techniques in prostate cancer RT

- from old conventional via two-dimensional beams
- to conformal–3D, Intensity Modulated Radiation Therapy (IMRT), Image Guided Radiation Therapy (IGRT)
- Stereotactic Body Radiation Therapy (SBRT)
- Volumetric modulated arc therapy final evolution (VMAT)

repositioning techniques increased efficacy, decreased duration and toxicity

(a) automatic repositioning on the basis of bones density
(b) semi-automatic and manually refined on the basis of the markers
Can Radiotherapy be used in case of relapse of prostate ca.?
Salvage reirradiation for failure after RT
(local recurrence, limited nodal or oligometastatic disease)

- HDR prostate brachytherapy
- pelvic and/or L-A Image Guided Radiation Therapy (IGRT)
- with elective nodal irradiation
- focal nodal or bone stereotactic body RT

- improvements performed by 18F-choline PET
18F-PET in a case with biochemical relapse from prostate adenocarcinoma

fluorocholine-PET helped deciding for salvage radiotherapy in ≥ 30% (only centropelvic relapse after radical surgery)

71-year-old-patient (PSA = 1,2ng/ml)
fluorocholine MIP image (1)
transverse axial PET (2A)
CT (2B)
PET/CT fusion (2C)

local relapse at the posterosuperior part of anastomotic area rescued by RT
Ca Larinx

Radiotherapy can be used *alone* in order to preserve this organs
Cervical cancer

Primary treatment of early stage cervical cancer is Surgery or Radiation therapy.
Skin tumours

Surgery is most often carried out.

However, radiotherapy allows complete sterilisation with very aesthetic results.

It should be preferred in the case of surface or in-depth cancer spread.
Which are the other neoplasia amenable with Radiotherapy in association with other treatment modalities?
Breast cancer
Lung cancer
Head and neck cancer
Malignant glioma
Rectal carcinoma
Anal cancer
Esophageal carcinoma
(Pancreas carcinoma)
Radiotherapy for breast cancer

- after conservative surgery reduces local recurrences
- "boost" increase local control
- after mastectomy reduces loco-regional recurrences
- in elderly several hypofractionation schemes developed
- several techniques of "partial breast" irradiation
Head and neck cancer

Radiotherapy can be used alone (in order to preserve organs: Larynx)

or in association with surgery (either pre-operatively)

or more often post-operatively treating both the primitive tumour and the satellite nodes

or with induction and/or concomitant CT in advanced III & IV stages
Lung carcinoma

RT can be used in association with chemotherapy

Apart from a some exceptions, lung tumours cannot be cured by radiotherapy alone
RT instead of Surgery: Sterotaxic BRT for Stage I-II NSCL lung cancer

- unfit for surgery
- operable, but refusing

a), c), e) pretreatment pictures
b), d), f) pictures at 2 years
Stereotactic ablative irradiation (SBRT) for lung cancer (NSLC)

- now well established technique
- optimal for clinical Stade I & II (T1, T2a)
- Ø ≤ 5 cm
- actually ≥ 50% of patients are over 70 years old
Radical Radiotherapy for (NSCLC) in older patients (Stuart Lichtman Post ASCO2015)

Stereotactic body radiation therapy, which delivers higher-than-conventional doses to small-target volumes in much fewer treatments, is transforming the management of non–small cell lung cancer (NSCLC) in older patients, particularly those for whom comorbidities preclude the use of radical surgery.
Rectal carcinoma

Pre-surgical irradiation of the pelvis improves the local control of rectal tumours.

Post-surgical radiotherapy is used in the case of positive margins
Preoperative RT-CT for rectal cancer

- standard of care for T3-T4 N0 or TxN1
- defining target volumes relies on the patterns of failures
- lower limit depends on the type of surgery
- MR & 18F-PET/TC improved staging and RT planning
Oesophageal cancer

The results of radiotherapy alone or in association with chemotherapy are identical to those obtained with surgery,

without the risks and drawbacks of oesophagectomy.

Survival remains modest
RT in anal cancer treatment

• rare, but increasing incidence

• management based on concomitant chemoradiotherapy (but causes important morbidity)

• 18F-PET/CT important place for staging & targeting

• improved RT techniques to reduce toxicities and improve control
Management of malignant gliomas

• Surgery followed by the concomitant chemo-radiotherapy (Temodal) is the standard treatment
• Intensity Modulated Radiation Therapy (IMRT) useful to reduce neurocognitive late effects
• Accelerated RT (40 Gy/15 fr) in elderly patients
• Stereotactic re-irradiation for recurrent gliomas
Pleural Mesothelioma: Surgery, Chemotherapy, but also use of RT

- rare, but increasing incidence

- in this setting "do not forget RT"
Pancreas tumours

Results are very poor even when RT is associated with chemotherapy
In which situation Radiotherapy can be useful to palliate symptoms?

Primary tumors

Metastases
Palliative Radiotherapy to Primary sites of disease for cancer symptoms

- **Brain**: headaches, seizures, neurologic dysfunction
- **Head and neck**: pain, bleeding, dysphagia, shortness of breath
  - **Lung**: pain, cough, hemoptysis, postobstructive pneumonia, superior vena cava syndrome
  - **Esophagus**: dysphagia, odynophagia, bleeding, obstruction
- **Gynecologic**: pain, bleeding, urinary outlet obstruction, hydronephrosis
- **Genitourinary**: pain, hematuria, urinary outlet obstruction
- **Rectum**: pain, bleeding, tenesmus, rectal obstruction
Palliative Radiotherapy to Secondary sites of disease (metastases) for cancer symptoms

**Brain**: headaches, seizures, neurologic dysfunction

**Bone**: pain, spinal cord compression

**Orbit**: pain, double vision, blindness
Treatment of brain metastases

- major therapeutic challenge in the elderly
- major impact on survival and quality of life
- all new radiation technologies available

- whole brain RT

- concomitant CT & targeted therapies always possible

- supportive care, cognition & life quality should be evaluated
Do not forget RT for bone metastases

- an important part in the treatment in the elderly
  1 fr (6-10 Gy) or multifraction (mainly 30 Gy in ten fr)
- partial or complete response on pain
  bone recalcification (prevention or collapse & spine compression)
- improvement of quality of life & performance status
Radiotherapy and chemotherapy combination: problems of tolerance in the elderly

anal cancer
cancer of the cervix
cancer of the head and neck
oesophageal cancer
Aside from Conventional Radiotherapy which are the new Radiotherapy modalities?
Radiotherapy modalities

1. Conventional Radiotherapy

Conventional, or fractionated, radiotherapy is a form of external beam radiotherapy (EBRT) that delivers a fraction of the complete radiation dose over many sessions.

Conventional external beam radiotherapy (2DXRT) is delivered via two-dimensional beams using linear accelerator machines.
Three-dimensional Conformal Radiation Therapy (3D-CRT)

The radiation beam is absolutely tailored to the shape and configuration of the tumor to avoid nearby normal critical structures.
Stereotactic Radiosurgery (SRS) and Stereotactic Body Radiation Therapy (SBRT)

High doses of tightly-focused radiation beams can destroy tiny tumors or lesions intracranially (SRS) or extracranially (SBRT) with pinpoint precision, often in just a few treatments.
Intensity Modulated Radiation Therapy (IMRT)

IMRT allows to customize the *shape* and the *intensity* of the radiation. The radiation beam can not only be shaped but also *modulated*, giving higher doses to the tumor and lower doses wherever sensitive structures are nearby.
VMAT (Volumetric Modulated Arc Therapy)

Sophisticated tools further enhance precision by monitoring the treatment in real time to ensure that the dose is delivered as precisely as the radiation oncologist prescribes it.
CT-based image guidance equipment mounted directly on the linear accelerators allows fine-tuned adjustments of radiation
Brachytherapy

Placing low-dose or high-dose radiation sources inside the body, either temporarily or permanently, can boost the radiation dose to the tumor.

During brachytherapy, a small device is placed close to or inside the tumor, most often during an outpatient procedure.

The device is later afterloaded with radioactive sources which remain in place for a period of time.
Brachytherapy
2015 state-of-the-art

• Permanent implant in prostate cancer
  more than 25-years experience using I-125 seeds
  valuable alternative for localized low-risk over 70-years
  an addition to external-RT for dose escalation in intermediate- and high-risk

• High dose (HD) rate prostate brachytherapy

• HD-rate Brachytherapy of breast cancer
  high dose delivering in a small volume & increasing local control
  breast partial irradiation focused on initial tumor bed
  second conservative treatment in ipsilateral recurrence

• HD-rate Brachytherapy for head & neck cancers
  lip, nose pyramid
  limited tumours of the oral cavity, oropharynx and nasopharynx
  exclusive & associated with external-RT
  second localizations in previously irradiated areas

• HD-rate Brachytherapy for anal cancers
  "boost" after concomitant chemo-external-RT