A Canadian Radiation Oncologist’s Perspective on Re-Irradiation

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I have no conflicts of interest to disclose.
LN recurrence 10 years after prior RT for endometrial cancer
Clinical Considerations

Key Consideration: Tumor control vs. toxicity

- Patient’s perspective (goals of care)
- Other medical problems
- Performance status
- Clinical evidence of normal tissue injury
- Current target size, shape, position
- Prior treatment prescription
- Prior dose to critical OARs
- Interval since prior treatment

[Graph showing therapeutic effect and toxic effect with ED50 and TD50 points]
Canadian Re-Irradiation Patterns of Practice

Survey of 185 Canadian radiation oncologists

- Wide practice variation
- Goal: Local control or QoL
- Clinical Considerations: Good PS, long interval from 1st RT, no side effects, ‘radiosensitive’ tumor
- Dose based on clinical judgement (83%) and BED calculations (43%)
- Close monitoring for disease progression or side effects
Head/Neck Re-Irradiation

Competing risk model of late toxicity after re-irradiation

Multivariate Competing Risk Model
• Prior RT dose (Gy)
• Organ dysfunction (Y/N)
• Age (years)
• Recurrence vs. 2nd primary
• HN site (OPX, larynx, HPX, other)
• Any surgery (Y/N)

Warde, Multi-Institutional Re-Irradiation Collaborative, 2019
Pathophysiology of Late Radiation Toxicity

O’Sullivan and Levin, 2003
Macrophage recruitment impairs primary tumor response

CXCL12/CXCR4 Chemokine Pathway

Immune suppression

Hypoxia

HIF

Macrophages

Immune cells

CXCL12

Vascular recovery after radiation treatment

CXCR4 expressing Immune populations
Better primary tumor response with a CXCL12/CXCR4 inhibitor

Lecavalier and Milosevic, 2019
Macrophage Exclusion after Radiation Treatment (MERT)*

Less acute and late gut injury with a CXCL12/CXCR4 inhibitor

Acute jejunal injury

Late rectal injury (90 days)
(Vascular sclerosis, fibrosis ...)

Lecavalier and Milosevic, 2019
The Way Forward: *Learn from our patients*

Clinical trials, comparative effectiveness research, molecular and biologic data

Evaluation of outcomes

Information-rich, patient-focused data

Transformation of subsequent care delivery

Data aggregation, evidence generation

*Abernethy, JCO 2010*
Canadian Partnership for Quality Radiotherapy (CPQR)

Canadian Association of Radiation Oncology (CARO)

Canadian Organization of Medical Physicists (COMP)

Canadian Association of Medical Radiation Technologists (CAMRT)

Canadian Partnership Against Cancer (CPAC)
To support and promote the universal availability of best-practice radiotherapy for all Canadians through initiatives to harmonize practice, improve quality and mitigate risk.
CPQR Key Programs

- National RT accreditation
- National RT incident reporting system (NSIR-RT)
- Technical (equipment) quality control guidelines
- Patient engagement and PRO guidelines
- ‘Big data’ harmonization

www.cpqr.ca or www.pcqr.ca
CPQR Vision for 2020 and Beyond

• Universal access to radiotherapy in Canada
• Pan-Canadian collection of patient-reported outcomes, linked to
• Detailed radiation treatment dosimetry

Motivation: Quality improvement, system performance improvement and research
There is variation in RT prescribing practice and plan nomenclature across Canada

Standardized RT plan nomenclature (TG-263) is foundational

Standardized RT plan nomenclature will improve quality and efficiency and enable data sharing for research
Summary and Conclusions

• Re-irradiation can provide real clinical benefit.
• Clinical benefit hinges on balancing efficacy and safety.
• Patient selection is critical ...
  ... just because we can, doesn't mean we should ...
• Learning and practice harmonization though collaboration is the way forward.
• Funding for re-irradiation research needs to be prioritized.