Palliative Radiotherapy We Can Actually Afford: A New Program Designed to Help Patients and Caregivers Save Resources

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Objectives

1) Describe 3 potential benefits of palliative radiation
2) Identify 3 obstacles to the use of palliative radiation in the hospice setting
3) Describe how a new program can make palliative radiation available to all hospice patients
My Background

• Internal Medicine - Washington University/BJH
• PhD Program, Clinical and Translational Science, University of Pittsburgh
• Co-Chief Medical Officer, University of Pittsburgh’s Hospice Program
• Chief Medical Officer, BJC Home Care

My Background

• MD, Saint Louis University
• Radiation Oncology Residency, Barnes-Jewish Hospital
• Assistant Professor, Department of Radiation Oncology Washington University in St. Louis

States Worse Than Death Among Hospitalized Patients With Serious Illnesses

Rubin EB, Buehler AE, Halpern SD. States Worse Than Death Among Hospitalized Patients With Serious Illness. JAMA Intern Med. 2016. PMID 24479808
Radiotherapy Basics

- Radiotherapy utilizes high energy radiation to damage DNA
  - X-rays, gamma rays, charged particles
  - DNA damage is not specific to cancer cells alone
- Radiotherapy may be delivered locally or systemically
- Local radiotherapy may be delivered externally or internally
- Radiation dose is prescribed in Gray and fractions
- Fractionation is utilized to:
  - Minimize normal tissue toxicity
  - Increase the likelihood DNA damage

Radiotherapy Basics

- Radiotherapy may be given with definitive OR palliative intent
- Nearly 50% of all radiotherapy is given with palliative intent
- Radiotherapy prescription dichotomy:
  - Locally advanced lung cancer: 60Gy/30 fractions
    - Locally advanced lung cancer: 60Gy/30 fractions
  - Palliative effect IS NOT impacted by dose
    - Bone metastasis: 8Gy/1 fraction

Historical Perspective

- “When the initial objective of radiation therapy is palliation, new ground rules must be applied. Possible serious complications or even slowly self-limiting side effects of treatment are no longer acceptable. Overall treatment time must be short. Cost must be minimized. Convenience of treatment must be considered.” - JAMA, 1964

Robert G. Parker
Palliative Radiotherapy

- Palliative radiotherapy:
  - Effective at improving symptoms
    - Pain
    - Dysphagia / odynophagia
    - Bleeding
    - Obstruction
  - Improves quality of life
  - Safe with limited side effects
  - Time-efficient
  - Cost-effective
  - Convenient

Palliative Radiotherapy Indications

- Primary Sites of Disease
  - Brain – headaches, neurologic dysfunction
  - Head and neck – pain, bleeding, dysphagia, SOB
  - Lung – pain, hemoptysis, SVC, post-obstructive PNA
  - GU – pain, hematuria, obstruction
  - GI – pain, bleeding, tenesmus, obstruction
- Secondary Sites of Disease
  - Bone – pain, cord compression
  - Skin, subcutaneous tissues
  - Spleen – pain, early satiety
  - Overlap with primary sites of disease

Palliative Radiotherapy Exclusions

- Patient
  - Imminent death
  - Inability to provide consent
  - Multiple progressive systems
- Treatment
  - Side effects > risks
  - Unsafe
- Health Care System
  - Cost
  - Transportation
Site Specific Treatment

Bone Metastases

Bone Metastasis

Palliative Radiotherapy Trials for Bone Metastasis: A Systematic Review
Chow, JCO 2007

- Meta-analysis including 16 randomized trials
- >5000 patients in total
- Randomized between single fraction vs. multiple fractions
  - 8Gy / 1 fraction vs 20Gy/5, 30Gy/10, etc
- Multiple pathologic types included
- Multiple outcomes assessed:
  - Overall response
  - Complete response
  - Re-treatment
Bone Metastasis

• Overall response
  – Single fraction: 58%, Multi fraction: 59%

• Complete response
  – Single fraction: 23%, Multi fraction: 24%

• Re-treatment
  – Single fraction: 20%, Multi fraction: 8%
Bone Metastasis: Re-treatment

Single versus multiple fractions of repeat radiation for painful bone metastasis: a randomized controlled, non-inferiority trial
Chow, Lancet Onc 2014
• RCT of 8Gy / 1fx vs. 20Gy / 5 fx RT for re-treatment
• No difference in overall pain response
• Acute radiation related toxicities higher in multi-fraction
• No difference in cord compression or pathologic fracture

Bone Metastasis: End of Life

Efficacy of radiotherapy for painful bone metastases during the last 12 weeks of life: results from Dutch Bone Metastasis Study
Meeuse, CA 2010
• RTC of single vs multi fraction radiotherapy
• Cohort of patients who died within 12 weeks after randomization
• Results
  – Pain response 45% overall
  – Median time to relief 2 weeks
Bone Metastasis Conclusions

- For bone metastasis:
  - Radiotherapy is effective at improving pain
  - Single fraction is equivalent to multi fraction:
    - Overall response
    - Complete response
    - Re-treatment rates are 2.5 times with single fraction radiotherapy
- When re-treatment:
  - Re-treatment is effective at improving pain
  - Single fraction is equivalent to multi fraction
- Palliative radiotherapy is effective at the end of life

Spinal Cord Compression

8Gy single dose radiotherapy is effective in metastatic spinal cord compression: Results of a phase III randomized multicenter Italian trial
Maranzano, Rad Onc 2009

- RCT of 8Gy / 1 fraction vs 8Gy / 2 fractions for MSCC
- Patients with short life expectancy
- No difference in response
  - Pain
  - Motor and sphincter function
- No difference in duration of response
Other sites

Thoracic

Palliative Thoracic Radiotherapy for Lung Cancer: A Systematic Review
Fairchild, JCO 2007
- Meta-analysis including 13 randomized trials
- >3000 patients
- Randomized patients to short or long course
- Multiple outcomes assessed
  - Symptom palliation
  - Survival
  - Toxicity
  - Re-irradiation rate

Thoracic (Hemoptysis)
Thoracic (Cough)

Thoracic (Chest Pain)

Esophageal Stricture

Single-dose brachytherapy versus metal stent placement for palliation of dysphagia from oesophageal cancer: multicenter randomized trial
Homs, Lancet 2004

- Prospective randomized trial
- Randomized between stent and brachytherapy
- >200 patients
- Results:
  - Stent more rapid relief
  - Brachy more long relief, improved QOL
  - Brachy fewer complications
**Large Pelvic Masses**

Phase II study of multiple daily fractionations in palliation of advanced pelvic malignancies: preliminary report of RTOG 8502

Spanos, IJROBP 1989

- 152 pts with advanced pelvic malignancies
  - Gyn, colorectal, GU, misc
- 3.7Gy BID x 2 days, 3-6 weeks off, repeat x2
- Total of 44.4Gy
- After completion of 3 courses:
  - CR – 15%
  - PR – 32%
  - Stable - 35%

**Conclusions**

- Palliative radiotherapy is:
  - Effective
  - Safe
  - Time efficient

- Radiotherapy is useful for:
  - Primary and secondary disease
  - Multiple anatomic sites

- Single fraction radiation is often reasonable and appropriate means for palliation

**Barriers to Radiation Therapy in Hospice Care**

- Perception
  - Hospice Provider’s Perception
  - Radiation Oncologists Perception

- Barriers
  - Educational Barriers
  - Economic Barriers
  - Research Barriers

- Outcome
  - Less than 3% of hospice patients receive radiation therapy

### Barriers to Radiation Therapy in Hospice Care: Survey of Hospice Providers (Easy Questions)

<table>
<thead>
<tr>
<th>Question</th>
<th>% Yes</th>
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</thead>
<tbody>
<tr>
<td>1) Is radiation therapy (RT) important in palliative care?</td>
<td>87%</td>
</tr>
<tr>
<td>2) Do you feel sufficiently trained for when to use RT?</td>
<td>52%</td>
</tr>
<tr>
<td>3) Is RT available to your patients?</td>
<td>74%</td>
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<tr>
<td>4) Do you have access to a radiation oncologist to discuss your patients?</td>
<td>75%</td>
</tr>
<tr>
<td>5) Would you be willing to attend palliative RT lectures?</td>
<td>94%</td>
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</tbody>
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### Barriers to Radiation Therapy in Hospice Care: Survey of Hospice Providers (Hard Questions)

<table>
<thead>
<tr>
<th>Question</th>
<th>% Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Do you feel radiation oncologists are sufficiently trained in palliative care to render opinions regarding treatment of hospice cancer patients?</td>
<td>56%</td>
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<tr>
<td>2) Are radiation oncologists resistant to prescribing single-fraction treatments?</td>
<td>76%</td>
</tr>
<tr>
<td>3) Would you be willing to recruit hospice patients into trials measuring the worth of palliative radiotherapy in certain circumstances?</td>
<td>59%</td>
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### Educational Barriers

- Lack of formal palliative care training for radiation oncology residents
- Lack of radiotherapy training for palliative care professionals
- Minimal protected time at national meetings for palliative oncology topics
- Lack of training for hospice clinicians in identifying situations where radiation therapy may improve QOL

Economic Barriers

- Economic incentives to prescribe protracted courses of radiation therapy
- Radiotherapy costs several times the average hospice per diem
- Transportation costs are often borne by hospice organizations and may even be more expensive than the radiotherapy itself
- Caregivers may not be able to take the time off work to complete protracted course of radiation therapy


Economic Impact of Single-fraction Versus Multi-fraction Radiotherapy

International Variation in Practice Patterns Comparing Single-Fraction to Multi-fraction Radiotherapy
Research Barriers

- Paucity of experienced research teams in hospice and palliative care programs
- Missing data points because of declining health or death of accrued patients
- Lack of federal funds dedicated to end-of-life studies
- Paucity of clinical trials comparing different radiation regimens for many conditions (outside of painful bone metastases)


Improving Access to Radiotherapy

- More focused collaborations between radiation oncologists and hospice/palliative care physicians
- Emphasis on hypofractionated courses for patients with poor prognoses
- Formalized training for both radiation oncology residents and palliative care fellows on the nuances of palliative radiotherapy
- Formation of more radiotherapy overuse guidelines and quality measures and increased accountability

Hospice / Palliative Logistics for New Palliative Radiotherapy Clinic at CHNE
New Palliative Radiation Oncology Clinic

**Who**- Any hospice patient with painful bone metastases or spinal cord compression regardless of hospice provider

**What**- Palliative radiation clinic specializing in single fraction radiotherapy

**Where**- Christian Hospital Northeast in Saint Louis

**When**- Now!

**Why**- Need for inexpensive, single fraction radiation therapy to help improve quality of life while reducing the burdens on patients and caregivers

What Makes This Radiotherapy Practical

- Reduced Professional Fee-Washington University Radiation Oncology has agreed to bill only a 99203 ($290.52) which is a level 3 visit with low complexity
- Christian Hospital will allow a single fraction without a CT simulation or additional imaging to keep costs ($328.13) minimal.
- Total costs for the technical fee and professional fee and imaging will be **$618.65 (adjusted for Medicare Fee Schedule)** and the entire process will typically be conducted in one visit!
- This could result in reduced ambulance costs, lower caregiver burden, decreased transportation discomfort, longer hospice LOS, etc.

Information Needed From the Referring Hospice

- Is the patient able to lie flat?
  - (okay if not but need to know)
- Is the patient able to follow instructions, can the safely be placed on a treatment table?
- Is the patient decisional to sign consent for treatment?
  - if not POA must be present for consult and treatment to give consent.
Logistics

Logistics

Hospice determines radiotherapy need
Case discussed with Radiation Oncology
Formal referral rendered
Continued assessment of need
Radiation Oncology assessment
Simulation
Pre-medication
Quality Assurance
Delivery of single fraction radiotherapy
Transportation

References


References (continued)