A Practical Example of the Use of Root Cause Analysis in a Radiation Therapy Department

Gaylene Medlam MRT(T), B.Sc.

Carlo Fidani Peel Regional Cancer Centre
Credit Valley Hospital
Objectives

• Radiation Therapy context
• Practical example
  – Investigation
    • Use of the London Protocol
  – Actions and recommendations
• Conclusions
Carlo Fidani Peel Regional Cancer Centre

- 6 Varian linear accelerators
- 2 CT simulators
- Eclipse treatment planning system
- Radiation Oncology program
  - 50 Radiation Therapists
  - 10 Radiation Oncologists
  - 7 medical Physicists
  - 7 Oncology Nurses

- Treat approx. 200 patients per day
Radiation Therapy Treatment

• High energy x-rays used primarily to treat cancer

• Dose delivered on a daily basis
  - # of treatments depends on total dose to be delivered
  - Radical cases up to 39 treatments, palliative 1-10 treatments

• In-house CT scans are used to provide information for treatment planning

• Linear accelerators have imaging capability
  - Can provide an x-ray picture of treatment area to match with treatment plan from CT scan (can overlay images)

• Some patients come in for treatment on an emergent basis
  - SVCO, spinal cord compressions, bleeding

CPSI Forum April 13th 2010
Case Scenario

• Patient arrived late on a Friday afternoon as an emergency from another hospital

• Primary diagnosis: Prostate cancer with bone metastases

• Emergency situation: 2 spinal cord compressions at T2/3 and L2/3

• The patient had their CT scan and a radiation plan was completed

• Treatment for the Thoracic spine proceeded without difficulty
Case Scenario (cont)

• Treatment set-up for the Lumbar spine field was very difficult

• Treatment was delivered and the ambulance left at 7:30 PM to return the patient to the sending facility

• On Saturday morning, the Radiation Therapists realized that on Friday, they had delivered the lumbar spine treatment 10 cm inferior to the intended area

• Patient returned on Saturday for their second treatment
Investigation

• The report was reviewed

• Case appeared to be complex
  – Multiple process issues to investigate

• Contacted risk management to assist with a root cause analysis

• Decision to use the London Protocol
  – Simplified version of RCA
  – Identifies gaps in process
London Protocol

- Identification and decision to investigate
  Made by RT Supervisor in consultation with Patient Safety Facilitator

- Select people for the investigation Team
  Selected RTQA team to participate (representation of all RT roles)

- Organisation and data gathering
  RT Supervisor gathered data from discussion with staff involved

- Determine incident chronology
  Detailed chronology formed from Radiation Therapy patient chart

- Identify care delivery problems (CDP)
  CDPs and contributory factors were identified in one session with the team

- Identify contributory factors

- Making recommendations and developing an action plan
  Action plan outlined and responsible staff identified at a 2nd team meeting
Methodology

- Team met with facilitator
  - Explanation of process
- Presentation of history and chronological data
  - Discussion of the sequence of events
- Identifying issues and placing them in the appropriate “bucket”
  - Each individual wrote on labels and placed them where they thought best
- Group discussion of issues and clarification of placement
- Look for common ground
  - These are the contributing factors
### Chronological Timeline

<table>
<thead>
<tr>
<th>Time</th>
<th>Float Planner</th>
<th>Rotational Planner</th>
<th>CT Therapist</th>
<th>Prep Therapist</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td>Scan emergency patient</td>
<td>Treatment Planning and QA</td>
<td>Scan emergency patient</td>
<td>Pre-treat QA for case due to start Monday</td>
</tr>
<tr>
<td>5.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.19</td>
<td>Treatment planning for 2\textsuperscript{nd} patient</td>
<td>Mode up plan on RT5</td>
<td>Scan 2\textsuperscript{nd} pt</td>
<td></td>
</tr>
<tr>
<td>6.34</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.42</td>
<td>Mode up plan on RT5</td>
<td>Course #1 treated</td>
<td>Scan 2\textsuperscript{nd} pt</td>
<td></td>
</tr>
<tr>
<td>7.00</td>
<td>Course #1 treated</td>
<td>Course #2 treated</td>
<td>Scan 2\textsuperscript{nd} pt</td>
<td></td>
</tr>
<tr>
<td>7.22</td>
<td>MV imaging</td>
<td>Course #2 treated</td>
<td>Scan 2\textsuperscript{nd} pt</td>
<td></td>
</tr>
<tr>
<td>7.26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**O/T for RP & FP**

CPSI Forum April 13th 2010
Care Delivery Problems

- **Gaps and process issues**
  - Not enough staff to complete all tasks
  - Not enough time to complete all tasks

- **Issues in general**
  - Imaging on the unit
  - Communication between staff
  - Communication to nursing
  - Patient related problems
Lack of P&P for independent double check
Image unclear
Not all staff can perform KV images
Multiple urgent complex tasks
No verbal or written confirmation of tattoos
Staffing constraints
Inconsistent use of checklist
New process for checking plans – “checking” not followed
No process for calculating ambulance time frame – too early
Multiple sites to treat
Lack of KV knowledge
Pressure from timeline
Unwell staff member
Same person performing multiple roles
Shift pattern (after hours, Friday)
Timeline too tight
Multi-tasking
Immobile
Large
Full bowel
Same person performing multiple roles
### Contributing Factors

<table>
<thead>
<tr>
<th>Lack of knowledge of KV imaging</th>
<th>1. Tips &amp; tricks for imaging. Provide in-services for staff. Add to on call training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of independent double check</td>
<td>Policy and procedure update - planner cannot do pre-treat QA</td>
</tr>
<tr>
<td>Tattoo and documentation</td>
<td>1. Discussion with the planning team to develop process. Can use photos or skin renderings as needed</td>
</tr>
<tr>
<td>Staffing and workload</td>
<td>1. Develop guideline for booking ambulance return. Assess all tasks to be completed before assigning # of staff to stay</td>
</tr>
</tbody>
</table>

### Actions to Address Factors

<table>
<thead>
<tr>
<th>Lack of knowledge of KV imaging</th>
<th>1. Tips &amp; tricks for imaging. Provide in-services for staff. Add to on call training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of independent double check</td>
<td>Policy and procedure update - planner cannot do pre-treat QA</td>
</tr>
<tr>
<td>Tattoo and documentation</td>
<td>1. Discussion with the planning team to develop process. Can use photos or skin renderings as needed</td>
</tr>
<tr>
<td>Staffing and workload</td>
<td>1. Develop guideline for booking ambulance return. Assess all tasks to be completed before assigning # of staff to stay</td>
</tr>
</tbody>
</table>

### Level of Recommendation (Individual, Team, Directorate, Organization)

#### By Whom

- Imaging IHE & Leadership
- Policy & procedure committee
- Planning team and leadership
- Leadership

#### By When

- September 1st, 2009
- October 1st, 2009
- September 1st, 2009
- Next meeting of Planning team- July 24th
- Mid September 2009
- Guidelines completed and under final review
- Time for IHE to develop document
- Document developed and reviewed by planning team
- To be added to the QA Process
- Discussed with Resource RTs

### Resource Requirements

- Guidelines completed and under final review
- Time for IHE to develop document
- Document developed and reviewed by planning team
- To be added to the QA Process
- Discussed with Resource RTs

### Evidence of Completion

- Guidelines completed and under final review
- Time for IHE to develop document
- Document developed and reviewed by planning team
- To be added to the QA Process
- Discussed with Resource RTs

### Completion Sign-Off

- Guidelines completed and under final review
- Time for IHE to develop document
- Document developed and reviewed by planning team
- To be added to the QA Process
- Discussed with Resource RTs
Follow-Up

- Nursing staff now contact the Prep desk for an estimate of time required before booking CMS

- The decision for # of staff required after hours is based on tasks to be completed and safety needs

- Imaging training and guidelines are now in place

- This case has been presented and discussed in a multidisciplinary setting within the Oncology Program
Conclusions

• Protocol is easy to follow and user friendly

• Practical and not time consuming

• Turns negative into a positive experience

• Able to get to the real issues and identify process gaps without assigning blame

• Develop solutions that will benefit our patients and the department as a whole
Thanks to

• Pat Overholt RN, B.ScN, Patient Safety Facilitator, Credit Valley Hospital

• Members of the Radiation Therapy QA Team for their participation and feedback
  Kristal Bozzo       Lisa Bruce
  Karolina Karwat    Robin Larocque
  Deborah Marshall   Natasha Moran
  Monica Van Larkin  James Varghese
Reference and Contact

Systems Analysis of Clinical Incidents
The London Protocol

*Sally Taylor-Adams & Charles Vincent*
*Clinical Safety research Unit*
*Imperial College London*

Gaylene Medlam
Email: gmedlam@cvh.on.ca