Clinical Safety & Effectiveness
Session # 12

“Reduction of T & O Treatment Cancellation Rate”
AIM STATEMENT

To reduce the rate of T&O* treatment cancellation at the CTRC Radiation Oncology Clinic by at least 10% (or absolute 10% improvement) in the next 6 months (December to May 2010).

*Tandem & Ovoids Intracavitary Brachytherapy
**Project Name:** UTHSCSA CTRC Project
**Reduction of T&O Treatment Cancellation Rate**

**Participants:**
Tony Eng, MD
Vanessa Magel, RN

**Team members:**
Jonathan Tinker, MBA
Kathleen Schwegmann, RN
Lupe Martinez, Edward Bustos, Diane Stewart, Kathy Scales, Luis Rocha, Liz Meyers

**CS&E Course Facilitator:**
Wayne Fischer, PhD
Amruta Parekh, MD
Major Responsibilities

• **Tony Eng, MD**
  – Project Leader
  – Oversee team progress
  – Analyze data

• **Vanessa Magel, RN**
  – In charge of patient coordinators
  – Patient education
  – Nurses and MA’s

• **Jonathan Tinker, MBA**
  – Administrative support
  – Problem solver
  – “Team Facilitator”

• **Kathleen Schwegmann, RN**
  – In charge of OR scheduling
  – OR resources
  – OR data
  – OR nurses
Team Organization

Vanessa Magel, RN
Team leader

Tony Eng, MD
Team leader

Jonathan Tinker, MBA
Facilitator

Kathleen Schwegmann, RN
Surgery Ctr

Edward Bustos,
Diane Stewart,
Kathy Scales
OR scheduling

David Fuller,
MD, Resident

Luis Rocha
CT

Lupe Martinez
Med assist

Lee Carlisle, MD
Surg Ctr Director

Vicky & Liz
Patient coordinators
BACKGROUND

• Cervical Cancer can be cured with radiation therapy.
• One of the important prognostic factors is overall treatment time.
• The duration of treatment from the first external beam treatment to the last brachytherapy has shown to decrease control rates up to 10-15% (See Ref).
• Therefore, any cancellation leading to delay in radiation therapy will ultimately affect patient survival or cure.
• The goal of this project is to find the causes of treatment cancellation, implement corrective actions, and ensure sustainable improvement.
9-week Treatment Plan

Consult

Pelvic Radiation 5 weeks

Break 5-7 days

Brachytherapy 5-6 treatment, 2/wk 3 weeks

Pelvic Sidewall Boost

Discharge

Chemo
RT duration > 9 wks correlates with ↓ LC

<table>
<thead>
<tr>
<th>Reference</th>
<th>Loss of pelvic control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girinsky et al.</td>
<td>1.0% /day</td>
</tr>
<tr>
<td>Petereit et al.</td>
<td>0.7% /day</td>
</tr>
<tr>
<td>Perez et al.</td>
<td>0.9% /day</td>
</tr>
<tr>
<td>Fyles et al.</td>
<td>1.0% /day</td>
</tr>
<tr>
<td>Lanciano et.</td>
<td>~1%/day</td>
</tr>
</tbody>
</table>
Secondary endpoint

Reduce treatment delays by 10% (treatment duration less than 9 weeks or <63 days)
Patient Process Flowchart

New Patient

Radiation ?

Yes

Treatment Planning

No

Back to Referring MD

Pelvic Radiation

Chemo

Brachy-therapy ?

Yes

Schedule for OR

No

Brachytherapy

Pelvic sidewall boost

More Treatments ?

Yes

Discharge & Follow up

No
Observation

• Treatment Cancellation
  – Pelvic external beam therapy-minimal delays
  – Chemotherapy-minimal delays
  – Brachytherapy-YES

• We have to look into the brachytherapy cancellation rate due to various reasons
### Base Data

#### Brachytherapy Cancellation Rates

<table>
<thead>
<tr>
<th></th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scheduled</td>
<td>24</td>
<td>6</td>
<td>18</td>
<td>9</td>
<td>12</td>
<td>35</td>
<td>30</td>
<td>134</td>
</tr>
<tr>
<td><strong>Cases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Done</td>
<td>20</td>
<td>5</td>
<td>11</td>
<td>7</td>
<td>7</td>
<td>29</td>
<td>19</td>
<td>98</td>
</tr>
<tr>
<td><strong>% Done</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>83</td>
<td>83</td>
<td>61</td>
<td>78</td>
<td>58</td>
<td>83</td>
<td>63</td>
<td>73</td>
</tr>
<tr>
<td><strong>% Cancelled</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>17</td>
<td>39</td>
<td>22</td>
<td>42</td>
<td>17</td>
<td>37</td>
<td>27</td>
</tr>
</tbody>
</table>
Base Data Control Chart

Cancellation rate

Ratio

Date/Time/Period

May
June
July
Aug
Sep
Oct
Nov

UCL
CL
LCL
28 patients received HDR for T&O treatment
43% completed the treatment on time (within 9 weeks or <63 days)
57% were delayed (over 9 weeks or >63 days)
Average number of days delayed: 10.5 days
Cause & Effect Diagram

Mother Nature

Environment
- Low Personnel Motivation
- Low Morale
- Low Patient Motivation

Patient
- Transportation Needs
- Poor Understanding
- Lack of Family Support

System
- Lack of Patient Reminder
- Poor Efficiency
- Lack of Patient Education

Scheduling
- Conflicts
- No Availability
- Too Many Schedulers

Resources
- Limited Physics Support
- CT Sim Conflicts
- Inadequate Nursing Support

OR Support
- Few Personnel Support
- Limited Room Availability
- Lack of Equipment

Treatment Cancellations
Brainstorming Team Meet
Common Root Causes Discussed

- Patient factors (understanding, motivation, education)
- Scheduling
- Logistics (Transportation, finance)
- Social Work
- Medical problems
- Resources/personnel cut
Affinity sort
Causes of Cancellations

- Patient=11
- Scheduling=7
- Resources=2
- Mother nature=1
- System=8
- OR support=2
- Environment=2
“80-20 rule” - roughly 80% of the effects come from 20% of the causes.
Brainstorm Team Suggestions

- Patient Education=19
- Patient Pre-op Instructions=13
- HDR Coordinator=12
- Patient Reminder=4
- Scheduling Conflicts=4
- Schedule checklist=4
- RX in Computer=3
- Social Work Consultation=0
Interventions

- Reminder calls-two
- Patient education
- Written info
- Scheduling check – Pre-op meet with surg center
- Promote Motivation
- Better Communication
Intervention Timeline

- Attending & Residents
  - Re-Emphasis To patients
    - December

- Head Nurse
  - Increase Patient Education
    - January

- Nurses & MAs
  - Written Info to patients
    - February

- Nursing & Surg Ctr
  - Reminder calls Communication pre-op pts meet surg ctr
    - March

- May
## Results

### Post-intervention Cancellation Rates

<table>
<thead>
<tr>
<th></th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled</td>
<td>9</td>
<td>22</td>
<td>17</td>
<td>19</td>
<td>2</td>
<td>4</td>
<td></td>
<td>73</td>
</tr>
<tr>
<td>Done</td>
<td>5</td>
<td>16</td>
<td>16</td>
<td>19</td>
<td>2</td>
<td>4</td>
<td></td>
<td>62</td>
</tr>
<tr>
<td>% Done</td>
<td>56</td>
<td>73</td>
<td>94</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td>85%</td>
</tr>
<tr>
<td>% Cancelled</td>
<td>44</td>
<td>27</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>15%</td>
</tr>
</tbody>
</table>
POST INTERVENTION CANCELLATION RATES

MONTHS
Dec Jan Feb Mar Apr May
RATES
0.000 0.200 0.400 0.600 0.800 1.000 1.200
CAN RATE UCL Average LCL
Treatment Cancellations Leading to Delays: Dec 2009-May 2010
Post-intervention Summary

• 10 patients received HDR for T&O treatment
• 50% (vs. 43%) completed the treatment on time (within 9 weeks or <63 days)
• 50% (vs. 57%) were delayed (over 9 weeks or >63 days)
• Average number of days delayed: 10.8 days (vs. 10.5 days)
Statistical Significance

- Cancellation rates: 27% (36/134) vs. 15% (11/73)
  - Z-test for 2 proportions, 95% Conf, 1-tail,
  - Yes, Z=1.763,

- Treatment Delay rates: 57% (16/28) vs. 50% (5/10)
  - No, Z=0.019
Return on Investment

- Reduction of manpower
- Less waste of resources
- Potential improved disease control
- $$ saved
Return on Investment

• Step 1.
Calculate Labor Cost to Schedule the Procedure
  – $489.24
  – 10.6 hours of staff time

<table>
<thead>
<tr>
<th>Title</th>
<th>Hours Per Case to Book</th>
</tr>
</thead>
<tbody>
<tr>
<td>XRT RN</td>
<td>1.5</td>
</tr>
<tr>
<td>MD</td>
<td>0.75</td>
</tr>
<tr>
<td>Resident</td>
<td>1</td>
</tr>
<tr>
<td>Patient Coordinator/Financial Clearance</td>
<td>4</td>
</tr>
<tr>
<td>Radiation Therapist</td>
<td>0.5</td>
</tr>
<tr>
<td>CT Technologist</td>
<td>0.25</td>
</tr>
<tr>
<td>Physicist</td>
<td>0.5</td>
</tr>
<tr>
<td>Medical Assistant</td>
<td>0.1</td>
</tr>
<tr>
<td>ASC RN</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Labor Cost</strong></td>
<td><strong>$ 489.24</strong></td>
</tr>
</tbody>
</table>
Return on Investment

• Step 2.
  Cost of Labor times 40 cases cancelled (May through Dec)
  – $19,570

• Step 3.
  Subtract Cost of Labor times 7 cases cancelled (Jan through May) extrapolated to forecast through August
  – $3,811
Return on Investment

- $15,758 cost savings over 9 month period
- $21,011 cost savings annualized
Summary

• Cancellation rate is substantially improved
• However, it has not translated into significant reduction of treatment delays
• Other Uncontrolled Factors: hospitalizations (DM, amp,..), unexpected side effects (bladder spasm,..)
• Limitations
  – small study, lacking statistical power
Future Direction

- Sustain current interventions
- Continue data collection
- Apply the method to other scheduled brachytherapy procedures
Thank God it snows. I get to leave early!


Pre and postervention Comparison

Baseline Data

Post Intervention Data

1st Intervention

Ratio

Months

May June July Aug Sep Oct Nov Dec Jan Feb March April May
p Chart: Showing % Cancellation at the CTRC Radiation Oncology Clinic: Post-Intervention data