What is RADIOTHERAPY

tcrn

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- Discuss in a Multidisciplinary Clinic
Treatment of a Cancer Patient

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- Supportive Care
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- XRT
- Chemotherapy
- Combinations

← Local, Regional, Distant !!
Treatment of a Cancer Patient

Primary Micro LN Distant Mets

\{ Surgery \} \{ RT \} \{ CT \}
What is a Radiation Oncologist
What is a Radiation Oncologist

Radiation Oncologists

What my mum thinks I do...

What my mum thinks I do...

What surgeons think I do...

What the government thinks I do...

What I think I do...

What medical oncologists think I do...

What I really do...

We need $8.7 billion dollars for a new linear accelerator and HDR unit....

...and a coffee!
What is a Radiation Oncologist

- Staff Specialist
  - Administration
What is a Radiation Oncologist

- Staff Specialist
  - Administration
  - Academic
    - Teaching
    - Clinical Research
NEOADJUVANT CHEMORADIATION (MODIFIED EILBER PROTOCOL) COMPARED TO ADJUVANT RADIOThERAPY IN THE TREATMENT OF EXTREMITy SOFT TISSUE SARCOMA

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KEY POINTS
- Modified Eilber protocol utilizes neoadjuvant doxorubicin + 50 Gy in 20 fractions radiotherapy prior to resection of extremity soft tissue sarcoma.
- Retrospective study of 48 patients.
- First study to compare modified Eilber protocol vs standard adjuvant radiotherapy.
- Provides similar local control and wound complication rate.
- May result in less significant radiotherapy related late toxicity.

Introduction

- Majority of treatment for extremity soft tissue sarcoma is surgical resection, and standard approach is to improve local control with the addition of radiotherapy (XRT), either preoperatively to 50 Gy or postoperatively to 60-70Gy.1,3
- The modified Eilber protocol utilizes a lower than standard dose of XRT (30Gy in 20 fractions bd in 2 weeks) but adds a radiosensitizer (doxorubicin) and has been reported as enabling higher rates of local control.1,4
- Little information on its late toxicity and no comparison with standard XRT available.
- In this original study, we retrospectively compared this Eilber protocol with standard XRT (60-66Gy).
- Our hypothesis was that it would lead to less late toxicity whilst maintaining equivalent local control and acceptable wound complications.

Results

- 17 patients received modified Eilber protocol and 31 patients received adjuvant XRT.
- Baseline characteristics are similar for both groups except for depth of tumour and follow-up. [Table 1]
- Local control rate was 88% (Eilber) and 87% (Adjuvant).
- Disease free survival was significantly different at 83% (Eilber) and 52% (Adjuvant) [p=0.028] [Figure 1]
- Overall survival was 94% (Eilber) and 61% (Adjuvant) which was not statistically significant [p=0.60] [Figure 2]
- Major acute wound complications were noted in 2 patients (12%) in the Eilber group and 4 patients (13%) in the Adjuvant group. [Figure 2]

Discussion

- Severe late toxicities (grade 3-4) developed in 2 of the Eilber group at 1 year compared to 5 of 31 (16%) patients in the Adjuvant group; however, this did not meet statistical significance [p=0.05] [Figure 3]
- Univariate and multivariate Cox regression analyses were performed with regards to local control:
  - Grade of tumour (3 vs 1,2) and a hazard ratio (HR) of 4.21 (2.28 – 7.76), p=0.001
  - Positive margin had a HR of 4.35 (2.33 – 8.15), p=0.001
- The modified Eilber protocol provided good local control rate, comparable to the Adjuvant group and to the existing literature.
- It is important to note that acute surgical complications were similar between the 2 groups, as one of the known disadvantages of neoadjuvant radiotherapy alone to a standard higher dose (50Gy) is an increase in the rate of wound complications.1
- The modified Eilber protocol provided a very good outcome in terms of late toxicity with no patients experiencing significant late toxicities at 2 years. This may be explained by a smaller total XRT dose and dose per fraction.

Conclusions

- Neoadjuvant chemoradiation (modified Eilber protocol) provided similar local control rate, when compared with standard adjuvant radiotherapy in the treatment of extremity soft tissue sarcoma.
- It has similar acute wound complication rates, and resulted in less, though not statistically significant, severe (Grade 3 or 4) late toxicities.
"Initial and Ultimate Local Control of Desmoid Tumours with Multimodality and Salvage Treatments: 40 Years Experience of the Prince of Wales Hospital Soft Tissue Sarcoma Service"

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Prince of Wales Clinical School, University of New South Wales, Randwick, NSW.

Introduction
- Desmoid Tumours are soft tissue neoplasms that do not metastasize, but locally invade and can cause significant morbidity or even be fatal.
- Management options include:
  - Surgery (Sx) with extensive or more limited resection
  - Chemotherapy
  - Radiation Therapy (RT)
  - Combination treatment
  - Observation only
- There may be a high rate of recurrence after initial treatment.

Aim
- The aims of this study were to:
  - Evaluate the long-term outcomes for patients treated in our unit
  - Compare the outcomes after Sx alone vs. Sx+RT
  - Identify factors impacting on Local Control

Methods
- Retrospective review of 63 patients with Desmoid Tumours from 1977 to 2008. Patients identified from the Prince of Wales Hospital medical records, Radiation Oncology and surgical files. 3 patients who did not undergo surgery were excluded from analysis.
- Primary endpoint: 3-year Local Control (LC)
- Secondary endpoints: Ultimate Local Control* and Overall Survival (OS)

Results
- Treatment: 40 patients were treated with Sx alone, 20 with Sx+RT, 2 with definitive RT and one with chemotherapy alone.
- Baseline characteristics were similar except Sx+RT patients were older (Table 1).
- 3-year LC was 73% for all patients, 71% for Sx alone vs 76% for Sx+RT (p=0.15) (Table 2). 7
- Ultimate LC was 65%.
- Median time to relapse was 17 months (95% CI: 5-25 months)
- Overall Survival was 96% at 3 years and 91% at 5 years.
- OF five patients who died, only one death was due to progressive HAN desmoid.

<table>
<thead>
<tr>
<th>Predictor of LC</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative margins</td>
<td>0.01</td>
<td>*0.001</td>
<td>0.03</td>
</tr>
<tr>
<td>Positve RT</td>
<td>0.02</td>
<td>*0.001</td>
<td>0.03</td>
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Discussion
- Desmoid tumours are rare and their management is based on single institutional retrospective series similar to this one and on meta-analyses of these series.
- We demonstrated 3-year LC of 73%, consistent with the published data.
- Margin status and age, but not RT, significantly impacted on LC.
- Younger age may have been related to poorer LC due to less aggressive treatment.
- Although margin status was a predictor of LC, achieving negative resection margins should be less prioritized than maximizing acceptable function and cosmetic; given the high rate of Ultimate LC (65%).

Conclusions
- Local Control rates were consistent with the published literature with individualized Surgery and RT.
- After all salvage therapies, Ultimate LC is very high.
- Treatment should be individualized based on patient and tumour factors, aiming to attain LC without excess morbidity.
- Therefore treatment of desmoids should be delivered within the context of a Multidisciplinary Sarcoma Unit.
What is a Radiation Oncologist

- Staff Specialist
  - Academic
    - Teaching
    - Clinical Research
  - Administration
- Clinical
  - Sarcomas, Gynaecological, GIT, Lymphoma
Role of XRT

- 52.3% of all cancer pts will have an indication for XRT at some stage during the course of their illness

- ~ 1/3 in NSW receive XRT

- About 1/2 will be palliative treatment

- Other 1/2 will be curative
Role of XRT

- “Radical”
  - “Conventional” dose is 60–70Gy in 30–35#
  - Given over 6–7 weeks

- Palliative
  - Symptom Relief (50–80% response)
  - Tend to be:
    - Smaller total doses
    - Shorter Treatment Time
    - Less SFX
Role of XRT
Some things to remember

- The side effects that occur during radiation therapy are manageable

- The radiation passes through the body and does not remain in the person; they are not radioactive

- Only the body part in the field of radiation is affected
What is XRT Physics

- Uses high energy (ionising) x-rays or electrons
- From linear accelerators (EBRT)
- Or radioactive isotopes (BT)
- The treatment takes just a few minutes and is painless
What is XRT Physics
What is XRT Physics
What is XRT Radiobiology

- The radiation destroys the cells by injuring the DNA
- Tumour cells can no longer continue to divide or multiply
- With each treatment, more of the cells die and the tumour shrinks
The double strand DNA break is the lethal event in the cell induced by radiation.
How Do We Deliver XRT?
How Do We Deliver XRT – how it was....
Three Steps

Simulation
Planning
Treatment
Patients are placed in the optimal position for treatment.

Equipment is used to help stabilise and immobilise the patient.

Every portion must be documented carefully.
Planning
Prostate Planning
Treatment
Questions?

- Thanks to Marylyn Emanuel