Title: Incidence of complications after radiotherapy for prostate cancer

Student: Gabrielle McLean

Supervisor(s): Dr Melissa James, Dr Steve Williams and Dr Brian Ko

Sponsor: Cancer Society

Introduction:

Prostate cancer is the most commonly diagnosed cancer of New Zealand men, and is the third largest cause of death. Around 3,000 men every year are diagnosed with Prostate cancer. The options for treatment include active surveillance, surgery (prostatectomy), radiotherapy/radiation treatment, hormone therapy, or a combination of them.

Radiation Treatment for prostate cancer is a very effective treatment for early prostate cancer, and local control and survival outcomes are excellent and well documented in the literature. Radiation however does have side effects, and these are less well described in the literature. Most of the side effects are related to the surrounding anatomy of the prostate. The prostate gland sits just beneath the bladder, in front of the rectum. Therefore radiation that is delivered to this region may inevitably also be delivered to parts of the bladder and rectum in order to ensure that the whole prostate receives the desired dose of radiation so that there is the highest chance of cure.

Recently there has been a study published in a medical journal, the Lancet, which reported the incidence of secondary complications after prostatectomy, and radiation treatment for treatment centres in Ontario, Canada. The results showed a higher incidence for secondary complications from radiation treatment than what was thought to occur at Christchurch Public Hospital.

Aims:

To study the incidence of radiation treatment related secondary urological complications (including the incidence of, minimally invasive complications, urological hospital admission, and open surgical procedures) post radiation treatment and secondary radiation induced malignancies, for patients treated with curative radiation therapy for prostate cancer in Christchurch hospital. We then aim to compare these with outcomes published in the Canadian paper.

Methods:

We performed an audit of patients who reside in Christchurch and received curative radiation treatment for prostate cancer at Christchurch Oncology service during 2002-2009. We created a database of the patients, which included information on their prostate cancer, their radiation treatment and any other treatment they may have had as well e.g. hormone therapy. We excluded those who had: follow-up outside of Christchurch, a radical prostatectomy, metastatic disease at diagnosis, and/or received radiotherapy with palliative intent. We then sought data regarding the outcomes from the Ministry of Health Cancer registry, and by searching the hospital coding database. This information was then independently reviewed by two clinicians to ascertain which entries were radiation treatment related. The time frame of interest for urological complications was from the patient's last day of radiation treatment, till death or the start of the audit (10 Nov 2014). We measured the development of secondary malignancies 5-9 years after their radiation treatment, which allows for sufficient time to

develop for any radiation induced malignancy to develop. Malignancies that were diagnosed earlier were not included as they were unlikely to be related to their radiation treatment. This is in concordance with the Canadian study.

Results:

439 patients received radiotherapy for prostate cancer between 2002 and 2009, and had follow-up at Christchurch Public Hospital. The age distribution of Christchurch patients (compared to Ontario, Canada) was 12% (13%) aged less than 60, and 45% (37%) aged between 60 and 70, and 43% (49%) aged more than 70 years old.

Using D'Amico scores (a risk classification method that is used to estimate the likelihood of the prostate cancer recurring) we classified Christchurch patients' prostate cancer using their pathology. Of the 439 patients, 85 were low risk, 209 were intermediate risk, 142 were high risk, and 3 were unknown.

There were 30 patients that developed secondary malignancies. As seen in the Canadian study, we reported the 1st malignancy that was diagnosed in the 5-9 year time frame. Of those, skin cancers made up 56.7%, lung 13.3%, genitourinary 10%, gastrointestinal 10%, and haematological 10%. Because of our smaller sample size (439 compared to 16595 in Ontario, Canada) and therefore small number of diagnoses, it would not be statistically appropriate to compare our results with Ontario, Canada. Our levels of skin cancer are however undeniably higher than Ontario, Canada – which is consistent with existing data on skin cancer. There were 47 secondary malignancies in total (30 initial and 17 subsequent diagnoses) that were reported during the 5-9 year time frame.

102 first presentations of urological complications were recorded. 54 of those were for minimally invasive urological procedures, and 48 were classed as admission to hospital. No open surgical procedures were found. Therefore 12.3% of the Christchurch patients had a minimally invasive urological procedure, 10.9% an admission to hospital, and 0% an open surgical procedure. Compared to Ontario, Canada who had 27.8%, 24.2%, and 0.8% of their patients undergo those outcomes, respectively.

Conclusion:

Through this audit on those prostate cancer patients who received radiation treatment during 2002-2009, we can gain some more insight into the incidence of potential complications of the particular treatment modality. We performed our audit using a method that was consistent with the Canadian protocol in order to obtain the consistency required for comparison. There was a relatively high level of secondary malignancies that were picked up when compared to Canada, but this may be due to differences in sample size, reporting of early stages of skin cancer, and environmental factors. Further investigation of the prostate cancer patients who did not receive radiation treatment is planned. This further investigation will help to better understand the influence of radiation alone on the development of secondary malignancies. The proportion of Christchurch Public Hospital patients who had urological complications was significantly lower in all three categories, compared to Ontario, Canada.

Accurate knowledge of the likelihood of these complications in the local setting will help to better inform the decision making process for the patients, so that they can choose a treatment modality with a better understanding of the complications that may occur.