I will be presenting some recently published data on the quality of life after modern treatment options for prostate cancer. My name is Dr. Ronald Chen. I'm an Associate Professor in the Department of Radiation Oncology at the University of North Carolina at Chapel Hill.

I want to acknowledge the team of co-authors on this study, including a patient advocate collaborator, Mary Anderson.
Here is my disclosure slide.

Disclosures

- Research funding from PCORI, AHRQ, and NCI
- No relevant conflicts of interest to study
  - Consultant: Accuray, Inc.

Source: Contemporary Treatment Options for Prostate Cancer, PCORI.org

Here is my disclosure slide.

Learning Objectives

- Summarize the evidence regarding how modern radical prostatectomy and radiotherapy impact quality of life when compared with active surveillance
- Incorporate the evidence to help inform patient decision-making regarding prostate-specific antigen (PSA) screening and prostate cancer treatment


The learning objectives are to summarize the evidence regarding how modern radical prostatectomy and radiotherapy impact quality of life when compared with active surveillance and to incorporate this evidence to help inform patient decision making regarding PSA screening and prostate cancer treatment. Here is a citation of the quality of life data that I will be presenting.

Source: Contemporary Treatment Options for Prostate Cancer, PCORI.org

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Quality of Life After Modern Treatment Options for Prostate Cancer – Ronald Chen, MD, MPH

**Background**

- It is well known that prostate cancer treatments can adversely impact:
  - Sexual function
  - Urinary function
    - Incontinence
    - Irritation
  - Bowel function
- These issues significantly impact retreatment decisions among patients with prostate cancer.
  - PSA screening

As background, it is well known that prostate cancer treatments, including surgery and radiation, can adversely impact sexual function and cause urinary and bowel issues. It is also well known that these issues are very important in the decision-making process when a prostate cancer patient is choosing treatment, and these quality of life issues also have factored into guideline recommendations against PSA screening.

**Background**

- However, existing/published data are at least 10 years old and/or use treatment techniques no longer considered standard today.
- Treatments have evolved significantly:
  - Radical prostatectomy \(\rightarrow\) robotic
  - Radiation \(\rightarrow\) intensity-modulated radiation therapy (IMRT); brachytherapy
  - Active surveillance: a relatively new option; strongly recommended for low-risk prostate cancer
- Patients and clinicians need updated information to help inform their decisions.

However, patients and clinicians continue to have impressions about the quality of life impact of prostate cancer treatment based on old data using types of surgery and radiation that are no longer considered standard today, but these treatments have evolved significantly. Radical prostatectomy is now mostly done using a robot which is much less invasive than the open,
radical prostatectomy surgery, and radiation treatment has made dramatic changes as computer technology has changed in the past 10 to 20 years. Also, there is now wide acceptance of active surveillance, the idea that patients with low-risk prostate cancer can be monitored instead of immediately undergoing treatment. This option is strongly recommended for low-risk prostate cancer by the published clinical practice guidelines so that patients who don't need treatments do not suffer unnecessary side effects. With these new options, patients and clinicians need updated information to help inform their decisions, and this is the impetus for this study.

To be more specific, in the 1990s, radiation was designed using x-rays. CT technology was not available for radiation planning, and on x-ray film the radiation oncologist had to do their best to guess where the prostate was. On an AP film, you can see some contrast in the bladder, so the prostate is probably somewhere lower. On the lateral film, the prostate is probably somewhere in front of the rectum. It is not at all surprising that patients treated in those days have side effects related to inaccurate radiation treatment, which probably affected a large amount of bowel and bladder in this outdated treatment planning process, but many patients and clinicians continue to have impressions about radiation treatment from back in the 1990s.
Now, with intensity-modulated radiation, which is considered the standard type of radiation treatment for prostate cancer, we can much more closely see the prostate, use multiple radiation beam angles to target the prostate and lower dose to surrounding organs.

Another type of radiation treatment is called brachytherapy, where radioactive seeds are directly inserted into the prostate at an outpatient procedure. When radiation is directly inserted into the prostate, this is another way to minimize dose to surrounding structures, so we need updated information on the quality of life impact of modern treatments to inform decision making.
In this study, which we called the North Carolina Prostate Cancer Comparative Effectiveness and Survivorship Study, or NC ProCESS for short, we worked with the state's cancer registry to recruit patients with newly diagnosed prostate cancer. We designed this study this way in order to have real-world results. We did not just want to study patients through their large academic centers, but instead we wanted to recruit everybody across North Carolina. Most of the patients were treated in the community setting. We wanted racial diversity and also we wanted patients from both urban and rural areas. North Carolina's cancer registry had a unique rapid case ascertainment system where the cancer registry staff would call hospitals throughout the state every one to two weeks to get the names of patients with newly diagnosed prostate cancer. For this study, because we're studying the quality of life impact of treatment, it was absolutely important that every patient was contacted before they had treatment so we could collect their baseline quality of life information and the unique rapid case ascertainment of the North Carolina registry allowed us to be able to conduct this study.
We collected quality of life information before treatment and then again at 3 months after treatment, 12 months after, 24 months, and then every year after.

Here is a map of North Carolina showing that patients were enrolled throughout the state.
In this publication, we reported results from over 1,100 patients. There was diversity in race and socioeconomic factors like education and household income.

Here are the main results. This first slide shows the sexual function scores for the four groups of patients. I should note that this is not a randomized trial. This was an observational study. Patients chose their own treatment, active surveillance, radical prostatectomy, external beam radiation, or brachytherapy and simply allowed my team to assess their quality of life using a validated questionnaire over time. For sexual function, five questions were asked about erection, orgasm, and ejaculation. The responses to these questions were converted to a 0 to 100-point
Quality of Life After Modern Treatment Options for Prostate Cancer – Ronald Chen, MD, MPH

where a higher score represents worse function. What we can see on this graph is that radical prostatectomy, which is a red line, these patients had worse sexual function from baseline to immediately after treatment where average scores went up from about 40 points at baseline to 80 points after surgery. There was some improvement by 12 months and 24 months. The worsening of sexual function for brachytherapy, the purple line, and external beam radiation, the green line, were less dramatic. For patients who pursue active surveillance, their sexual function worsened over time. This may be partly due to aging and probably partly due to the fact that cancer will progress on active surveillance for some patients, so some patients ultimately had surgery or radiation treatment which impacts sexual function. At the 24-month time point, active surveillance, brachytherapy, and external beam radiation patients had similar average sexual function scores. The red asterisk showed that at 3 and 12 months, sexual function scores of the radical prostatectomy patients are far enough from active surveillance that this is probably a clinically meaningful difference.

For urinary incontinence, which included three questions, patients who had radical prostatectomy had more incontinence than the other three groups at each of the follow-up time points.
Urinary obstruction and irritation assessed ease of flow, nighttime urination, urinary frequency, burning with urination, and urgency. For brachytherapy, the purple line, and external beam radiation, the green line, these patients had an increase in these symptoms at three months after treatment, but these improved subsequently. There did not seem to be a significant difference in the four groups of patients at 12 and 24 months.

For bowel problems, which is traditionally associated with radiation treatment, the scores for all four groups are very low on this 100-point scale. External beam radiation had somewhat higher scores at three months, but at 12 and 24 months all 4 groups had similar bowel scores.

Source: Contemporary Treatment Options for Prostate Cancer, PCORI.org
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This is a summary slide of the results from this large study. We assessed four domains of quality of life, how each treatment compared to active surveillance.

It is notable that at two years after treatment, most of the quality of life domains were not significantly different between patients who had treatment versus active surveillance. The exception was that radical prostatectomy patients had more urinary incontinence.
One important limitation of the study was that the publication only included patients through 2 years of follow-up, and it is possible that with longer-term follow-up, say 5, 10, or 15 years, there may be unexpected changes in quality of life over time.

First, this study continues, and we are currently collecting 5- and 6-year quality of life data in the NC ProCESS patients.
Also, some of the other published studies do give us insight on whether long-term follow-up changes quality of life results. Here are the results from the ProtecT trial, which randomized patients to active surveillance, radical prostatectomy, and external beam radiation. Because this trial started in 1999, the surgery and radiation treatments are not what we consider to be modern standards, but it is important to note that there were no surprises in bowel, sexual, or urinary quality of life from 2 years through 6 years of follow-up. In these plots, the blue line was active surveillance, yellow line radiation, and red line surgery. In this particular questionnaire used by the ProtecT trial, a higher score represents better quality of life.
Here are data published by Dr. Resnick in the Prostate Cancer Outcomes Study. In the mid-1990s, the radiation treatment technology was what I showed earlier with x-rays, and there was no active surveillance back then. This study has follow-up through 15 years comparing surgery to radiation patients, and of course, patients were 15 years older and some of the function is expected to decline with age, but again, there did not appear to be surprising changes in quality of life with long-term follow-up.

To wrap up, data from the current study directly informed patient decision-making in prostate cancer. For these men, the most common top priorities are curing the cancer and quality of life.

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For most patients, surgery and radiation offer equally effective treatments to cure the cancer. In terms of quality of life, men may have different priorities regarding whether they care most about protecting sexual function, urinary or bowel issues. Data from this study and the one from Dr. Barocas in the same issue of JAMA provide patients with updated information for modern treatment that can help inform their decisions on treatment.

The data from these two studies also has important implications on decisions regarding PSA screening. Two of the main reasons for guidelines recommending against PSA screening relate to the fact that PSA is not a perfect test and so there are false positives, and the adverse quality of life impact on prostate cancer treatment. The fact that PSA can provide false positives and that prostate cancer biopsy has some risks, including infection, is not unique to prostate cancer. These risks relate to many other forms of cancer screening. In terms of the harm from prostate cancer treatment, for low-risk prostate cancer all published guidelines from professional societies recommend active surveillance, which is the best way to avoid unnecessary side effects from treatment. On active surveillance, if the cancer progresses, then treatment is offered. For patients with more aggressive, intermediate, or high-risk prostate cancer, treatment can improve overall survival, so screening catching these cancers can benefit these men. The relatively favorable quality of life results of modern treatment helps improve the benefit-harm balance compared to 10 to 20 years ago.

Thank you.