Hello, I'm Karen Hoffman, Assistant Professor in the Department of Radiation Oncology at The University of Texas MD Anderson Cancer Center. This presentation is on the Late Effects of Radiation Therapy and Surveillance after Treatment.

Upon completion of this lecture, participants will be able to: identify common side effects of prostate radiation therapy; describe factors that can contribute to the development of more severe radiation side effects; and explain patient surveillance after radiation treatment for prostate cancer.

The extent and severity of side effects vary depending on patient factors and radiation treatment design. The majority of side effects occur within the radiation treatment field. Early radiation side effects develop during radiation treatment and most improve within a few weeks after completion of radiation therapy. However, late effects can develop months or years after completion of radiation treatment.

Side effects of radiation therapy for prostate cancer are generally mild or moderate and are well tolerated. Early side effects can include mild fatigue, urinary frequency, dysuria, urinary retention, hemorrhoidal irritation, rectal urgency, and for men treated to the pelvic lymph nodes, diarrhea. Late effects of radiation therapy for prostate cancer can include persistent urinary side effects, hematuria, rectal bleeding, and erectile dysfunction.

Patients can develop fatigue while receiving radiation therapy. The mechanisms that produce fatigue are not well understood. However, there are several theories, including that fatigue occurs because energy is needed for normal tissue cellular repair after radiation, and that coming in for daily radiation treatments five times a week is tiring in and of itself.

Factors that can contribute to fatigue include concurrent administration of androgen-deprivation therapy, non-cancer medications, emotional or psychological stress, disturbed sleep patterns, and poor nutrition.

Patients are educated that mild fatigue is possible and are encouraged to exercise daily as regular exercise may reduce symptoms of fatigue. They also are counseled to maintain adequate fluid intake and eat well during treatment.

Because the prostate is located next to the bladder and rectum, and because the urethra passes through the prostate, men can develop urinary and bowel symptoms from radiation treatment.

Urinary symptoms include urinary frequency from prostate swelling that obstructs urethral outflow and bladder emptying, as well as frequency from bladder irritation that results in increased contractility. Men can also develop dysuria from irritation of the lining of the urothelial tract.
For men receiving external beam radiation therapy, if urinary symptoms develop, they accumulate gradually over the course of treatment and usually develop several weeks into radiation treatment. However, for men receiving brachytherapy, the side effects are more pronounced and start at the time of the implant. Rarely, these men have urinary retention after the procedure, requiring Foley catheter placement.

Factors that impact severity of urinary symptoms include the total radiation dose and radiation treatment target and technique. Brachytherapy has more intense symptoms than external beam radiation. Presence of urinary symptoms prior to radiation treatment also impact the severity of urinary symptoms. Men with urinary symptoms at baseline are expected to have more urinary symptoms during treatment.

To manage these urinary symptoms, patients are educated on the potential urinary symptoms that could develop. Urinary symptoms are assessed weekly during external beam radiation therapy and after completion of radiation treatment. And urinary symptoms are assessed immediately after the brachytherapy implant procedure and after completion of treatment during regular follow-up.

Treatment of obstructive urinary symptoms can include alpha-blockers to improve urinary flow; nonsteroidal anti-inflammatory drugs to reduce inflammation. Or, in rare cases, if there is acute urinary retention, Foley catheter placement.

Urinary urgency or frequency can be treated with anticholinergics or antispasmodics. And patients are counseled to avoid bladder-irritating foods and beverages. Dysuria also often improves from drinking cranberry juice or taking cranberry tablets, or numbing medi --- medications can be used. And if we suspect that there’s a urinary tract infection, a urinalysis and culture is sent.

Bowel symptoms can also occur during radiation treatment, including perianal or hemorrhoidal irritation, rectal urgency, which is uncommon, or for men receiving radiation therapy directed at the pelvic lymph nodes, loose stools or diarrhea. After radiation treatment men are evaluated for the possible development of rectal bleeding.

Factors that impact the severity of bowel symptoms include total radiation dose and radiation treatment technique. The amount of high-dose radiation to the bowel impacts the risk of developing bowel symptoms. Older patients are also known to be at increased risk for developing bowel symptoms. And men with certain comorbid medical conditions or hemorrhoids are more likely to develop bowel symptoms. Those men with diabetes are more likely to notice symptoms. And we generally do not treat men with inflammatory bowel disease, such as Crohn's disease or ulcerative colitis because of the risk of severe symptoms.

Treatment of perianal or hemorrhoidal irritation includes the prevention or treatment of constipation with diet modification or stool softeners. Men are advised to avoid straining and to avoid excessive wiping. And topical or suppository steroids can be used.
The treatment of rectal urgency or diarrhea is treated with diet modifications, hydration, and, if necessary, antidiarrheal medications.

If rectal bleeding develops, it’s important to evaluate the cause of rectal bleeding, which could be a radiation proctitis, irritation of the rectum, or also could be from hemorrhoidal irritation. Treatment includes prevention or treatment of constipation with stool softeners, diet modification, hydration. And men are educated to avoid straining.

A steroid-based suppositories can also be used to treat the bleeding. And if the bleeding is refractory to conservative management, the patient is referred to Gastroenterology to evaluate the cause of the bleeding for consideration of argon plasma coagulation or other procedure. For select patients, we also consider stopping anticoagulants.

Erectile dysfunction can develop months or years after completion of radiation treatment. And it’s difficult to distinguish radiation-induced erectile dysfunction from the natural aging process.

Several factors can impact erectile function after radiation treatment, including erectile function prior to radiation treatment, the use of androgen-deprivation therapy, and comorbid medical conditions including diabetes. This is a study that looked at factors that predicted erectile function after radiation treatment. And as you to --- can see, the likelihood of recovering erectile function after treatment was highly correlated to the pre-treatment sexual function prior to delivery of radiation therapy.

Treatment of erectile function includes educating patients so that they have realistic expectations in the use of penile rehabilitation. Men are encouraged to get and maintain erections. And erectile dysfunction from radiation treatment is often responsive to phosphodiesterase inhibitors. Some patients benefit from vacuum erectile devices or referral to an erectile function specialist.

Surveillance after treatment includes clinic visits to evaluate for resolution of acute symptoms and development of any late side effects, including assessment of urinary function, bowel function, and sexual function.

Surveillance after treatment includes PSA and digital rectal examination to evaluate disease control. This includes clinic visits and PSA testing every three to six months for the first five years, then to 12 months --- six to 12 months for five years, and then annually, with digital rectal examinations every six to 12 months.

In summary, radiation therapy for prostate cancer is usually well tolerated with few side effects. Patient comorbidities, function prior to treatment, and radiation treatment design impact the likelihood of developing side effects and the severity of side effects. Urinary symptoms are expected during treatment and are usually mild or moderate urinary frequency or dysuria.
Rectal bleeding can occur months or years after radiation treatment. And erectile dysfunction can develop months or years after radiation treatment. Surveillance after treatment includes evaluation for development of any late side effects as well as assessment of disease control by PSA testing and digital rectal examination. Thank you for your attention. We welcome your feedback.