

What is proton therapy?

Proton therapy is a type of external beam radiotherapy which uses a beam of proton particles to irradiate diseased tissue, most often in the treatment of cancer.

What is the primary advantage of proton?

The primary advantage of proton therapy is the ability to more precisely localize the radiation dosage multi-dimensionally. As a result, the payload is delivered at the tumor site; very little is lost going in; the tumor site receives the bulk of the power of the proton beam (referred to as the Bragg Peak); and it is less likely that damage to surrounding healthy tissue will occur. When compared to all other forms of radiation, proton is the only type of radiation doctors can direct to the tumor with pinpoint accuracy.

Proton therapy for prostate cancer involves the use of a focused beam of proton particles to destroy cancerous tissue. The treatment is capable of delivering precise, high-energy radiation doses to destroy cancer cells *without causing damage to healthy tissue* surrounding the prostate.

Contrast this with traditional radiation where the bulk of the X-ray is spent at the entry point and damages all tissue in its path—both on the way in and on the way out.

What are the side effects of proton?

The side effects associated with proton therapy are typically lower than with any other treatment option. Proton centers report that 30–40% of their patients *may* experience “changes” in sexual function, but that doesn’t necessarily mean impotence. The BOB conducted a survey of several thousand of our members in 2009 and only 4% reported impotence. We suspect the number is higher, but certainly not 30 – 40%.

Incontinence is typically a non-issue after proton. The percentage of men in our group with incontinence is no higher than the general population of men who were not treated for prostate cancer.

Contrast this with surgery, where 60–80% are left impotent and a third, incontinent.

What is the treatment process like?

It varies by facility, but there is typically a pre-treatment consult. An image of the prostate is produced by a scan. Some centers implant two or three gold fiducials (seeds). An immobilization device is fitted to the patient during the consult.

Treatments are painless and non-invasive. They are administered five days a week for about 8 ½ weeks (44 treatments). Each individual treatment takes about 15 to 20 minutes, including prep time.

What is the cure rate with proton?

Generally speaking, all prostate cancer treatments have roughly the same long-term cancer cure rates. And, for early stage disease, it’s well above 90% at ten years. Recent studies show 93–94% disease-free survival rates for low risk patients.

Proton cures cancer at least as well as any other treatment option, and the quality of life after treatment is best by a wide margin. There is not much published recent data on any of the treatment alternatives, but studies are underway.

The BOB 2009 survey of several thousand former proton patients shows outstanding disease control and quality of life after treatment. For a copy of the survey, e-mail DHickey@protonbob.com.

How does proton compare to surgery?

There are two major reasons not to have surgery:

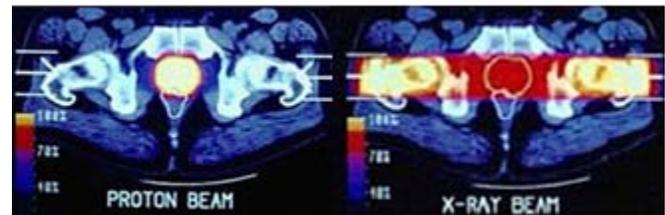
1) With all cancers, there is a chance of microscopic disease in the margins. With more aggressive cancer, the likelihood of cancer in the margins is high (this does not mean metastasis). It cannot be seen by MRI or by the naked eye during surgery. The Partin tables will show the probability of margin cancer. One big advantage to radiotherapy, especially proton, is that the margins are treated. Any cancer in the margins is destroyed.

2) All studies show that proton therapy cures cancer AT LEAST as well as surgery (we would argue BETTER, because the margins are treated), and it is painless, non-invasive, does not add risk of complications from anesthesia or infection, AND . . . quality of life after treatment is much better .

- Approximately 35% of surgery patients will develop a prostate-specific antigen (PSA) recurrence within 10 years after surgery. (JAMA, July 27, 2005 Vol 294, No. 4)
- Overall, 93.2% of proton patients are free from biochemical failure at 5 years.
- Low risk (PSA<10, Gleason score <7, T1, T2) patients: 97.8% free from biochemical failure at 5 years. - JAMA, 2005;294[10]:1233-1239, JAMA, February 27, 2008-Vol299, No. 8
- According to BMJ and JAMA, 60 to 80% are impotent after surgery

How does proton compare to IMRT?

IMRT is very good, but, it's still photon (X-ray) radiation. This means that most of the radiation is *deposited on healthy tissue*. This can cause collateral damage and secondary cancers later. With proton, almost all of the radiation is deposited on the tumor volume. This can only mean fewer side effects and better quality of life after treatment.



Proton cancer treatment: Proton left, IMRT right

This image on the right shows the proton beam (left) vs. IMRT (right) in the treatment of prostate cancer. The oval in the center of the scan is the prostate target. The area in bright yellow is receiving the highest level of radiation dosage. Note the significant difference in the two scans:

What are the risks of secondary malignancies?

A study from MD Anderson Cancer Center (IJROBP 2009): MGH Study shows patients treated with protons alone had zero secondary malignancies.

Isn't proton therapy experimental?

No. The first treatments were used in 1954 in Berkeley, CA. The first hospital-based clinical proton facility was in Loma Linda, CA in 1990. There are currently 10 proton facilities in the U.S. alone: CA, MA, IN, FL, TX, OK, IL, PA, VA, and NJ. There are 18 others in development in CA, WA, MI, TN (2), MN, AZ, MD, NY (2), NJ, MO, GA, OH, OK, TX (2) and SC. There are 33 proton centers worldwide and 83,000 patients have been treated with protons worldwide. Proton therapy has been FDA approved since 1988.