

A Brief History of Prostate Cancer Diagnosis and Treatment

Stephen M. Scionti, MD
Director: Scionti Prostate Center
Sarasota, Florida

Introduction

This is the opening article in a series about High Intensity Focused Ultrasound (HIFU) as a rational, and in many cases preferred, treatment for prostate cancer (PCa). Many factors go into decision-making about detection, diagnosis, treatment, monitoring for – and even preventing – recurrence after treatment. We will look at several areas that affect PCa patients, those at risk for PCa, and their loved ones. Overall, we will cover topics that include understanding how PCa is diagnosed, how treatments can be matched to each patient's unique disease profile, and the advantages and risks of different treatments. In addition, readers may be surprised to discover information on evolving technologies such as better imaging and focal treatment, and even economic and regulatory issues that affect patients less directly. You may ask, "What do these have to do with HIFU?" Not only will we explain these connections, we will also provide answers to the question, "Is HIFU the logical choice for me?"

To lay the groundwork, this article provides an overview of the changing world of prostate cancer. Understanding the past and present sets the stage for seeing HIFU's increasing role in improving treatment outcomes and quality of life for patients. Let's begin with a brief history of PCa detection, diagnosis and treatment.

Thirty Years of Change

Traditionally, PCa was seen as an "old man's disease," thought to be slow-growing and multi-focal throughout the gland. Autopsies showed that at least 70% of men who died in their 80s or older had the disease and didn't even know it. Early stage PCa rarely has symptoms (for example, urinary or sexual difficulties), which can also signal non-cancerous conditions. As recently as 30 years ago, no one went looking for PCa because the tools (imaging, biomarkers) didn't exist. If symptoms appeared, a biopsy was performed using needles to withdraw tissue sample. Perhaps a digital rectal exam (DRE) would corroborate the presence of a tumor, but not all tumors can be felt that way.

If a biopsy proved positive for cancer, those not too old for surgery could have an operation to remove the prostate (radical prostatectomy or RP). They were fortunate if the cancer was caught in time, but surgery came with a price tag: risk of blood loss, 3-5 days in the hospital, average six weeks of recovery, probable temporary or permanent loss of urinary control, and probable impotence. Those less lucky went through all of that only to learn sooner or later that the cancer had already escaped and was now incurable. Still others, too old for surgical prostate removal, underwent many weeks of traditional radiation which brought delayed urinary, sexual and bowel complications. It was also less

effective against aggressive late stage disease, with up to 60% risk of recurrence.¹

Thankfully, this grim scenario began to change in the 1980s. A simple blood test was developed for Prostate Specific Antigen (PSA). PSA is a surface cell protein released into the bloodstream when prostate cells are stimulated by a variety of things such as cancer activity, noncancerous prostate enlargement with normal aging, infection, even sexual activity or bike riding. While PSA is imperfect because it is not specific just for cancer, when coupled with the DRE it was an important breakthrough that enabled significantly earlier PCa detection at a time when imaging could not distinguish tumors in the gland.

As prostate cancer screening became more broadly available in the late 1980s, identifying earlier-stage disease meant fewer cases of spread at the time of treatment, so success rates improved and recurrence rates decreased. In the U.S. over the past 20 years, prostate death rates have been reduced by close to 40% without substantial changes in surgical or radiation treatment strategies, attributable to early detection². However, treatment side effects were not substantially diminished throughout the 1990s, though treatment improvements such as nerve-sparing RP and new types of radiation were in development.

In addition to earlier detection, screening had a demographic impact. The overall prostate cancer incidence rate was stable from 2001 to 2007, but now younger men (ages 40-49) with high PSA were discovered at a greater rate, and detection dropped for ages 70-79+. Also, the type of cancer found by biopsy appeared worse; about 42% of localized prostate cancers diagnosed from 2004 to 2007 were poorly differentiated³ implying greater aggressiveness. A study that examined statistics on over 300,000 men diagnosed with PCa from 1988-2003 found that on average, younger patients had lower grade disease at diagnosis, and were more likely to be treated with RP than older men, with equivalent survival rates at 10 years. However, if diagnosed with higher grade (Gleason 7+) and locally advanced cancer (spread outside the capsule), the outlook for younger men is particularly poor.⁴

A younger patient population is more likely to be active in marriage/family, career, recreation and volunteer pursuits. As such, they are less likely to be satisfied with treatment trade-offs of effective cancer control vs. impact on quality of life. They want a quick return to their activities, and if there are side effects, they want as much assurance as possible that these will resolve quickly. Such patient desires are now being met with clinical and technologic evolutions that include robotic-assisted surgery; radiation therapies that take less time with more efficacious dosages and less scatter; minimally invasive ablation (tumor destruction therapies); and complementary or holistic preventive strategies for those wishing to defer treatment.

¹ Zlotecki R. External-beam radiotherapy in the management of carcinoma of the prostate. *Cancer Control* 2001;8(6):503.

² Scosyrev E, Messing EM. Reply to prostate-specific antigen screening for prostate cancer and the risk of overt metastatic disease at presentation: analysis of trends over time. *Cancer* 2013 Mar 1;119(5):1113-4.

³ Li J, Djenaba J et al. Recent trends in prostate cancer incidence by age, cancer stage, and grade, the United States, 2001–2007. *Prostate Cancer* 2012. Article ID 691380, 8 pages. doi:10.1155/2012/691380

⁴ Lin DW et al. Treatment and survival outcomes in young men diagnosed with prostate cancer: a population based cohort study. *Cancer* 2009 July 1;115(13):2863–2871.

A Personal Challenge

Such is today's world in which younger men are being diagnosed with prostate cancer at early stages. They and their families have a challenge that their fathers and grandfathers did not face. It arises from an abundance of information (books, internet, more openness among men to share their experience) and freedom of choice among more treatment categories. It puts more responsibility on the patient, raising multitudes of questions. To name just a few:

- Should I be screened for PCa, and if so, at what age do I start?
- My doctor wants to do a biopsy – is it really necessary?
- My biopsy is negative, but what if it missed hitting cancer?
- My biopsy is positive. Which treatment is most likely to succeed yet have the least side effects?
- If there are side effects from treatment, how long will they last? Can I learn to live with them? What about their effect on my wife/partner/girlfriend?

Faced with such challenges, a patient wants the most accurate diagnosis in order to understand the nature of his unique disease. This understanding can act as a compass, pointing him in the direction of the wisest decisions. These decisions have to do with whether or not to pursue immediate treatment; how to improve personal health in order to buy time if his disease is not aggressive and he can tolerate living with it; how to identify a treatment that will control his cancer with minimal-to-no impact on his lifestyle; how soon to schedule treatment; and how to follow up after treatment, both short and long term.

The next article will take a closer look at technologic improvements that facilitate precise diagnosis and guide minimally invasive ablation treatments such as HIFU.