

Prostatepedia¹

¹ expert insight + advice

Imaging + Prostate Cancer

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In this issue....

Our ability to image prostate cancer metastases has improved dramatically over the past few years. CT and bone scans, which have been the standards for decades, typically image a cancer mass larger than 1 cm (0.4 inches). Newer imaging techniques have lower limits that approach 1-4 mm. Dramatic changes like these have a way of disrupting the status quo.

The current guidelines for the treatment of metastatic prostate cancer are based on clinical trials where metastases were detected with CT or bone scans. Do these treatment guidelines still hold for metastases too small to be found by CT or bone scan, but detectable with the newer, more sensitive imaging techniques? There are reasons to suspect we might begin to detect prostate cancer at a different stage in its evolution.

The concept of cancer dormancy is commonly used to explain a long interval between initial treatment with surgery or radiation and subsequent appearance of metastatic disease. For both breast and prostate cancers, more than 10 years can pass between treatment with curative intent and the appearance of detectable metastatic disease.

Several mechanisms have been identified that can lead to cancer dormancy. Two of these mechanisms might result in cancer masses potentially detectable by the newer imaging techniques. First, cancer dormancy can result when the cancer mass fails to attract a blood supply and thus is starved of both oxygen and food. The second is that cancer dormancy can result from ongoing immune attack on the cancer. Both mechanisms can allow cancer masses above 1 mm that overlap with the lower limit of the newer scans.

Cancer dormancy is associated with greater resistance to cytotoxic chemotherapy and hormonal therapy. The implication is that we may increasingly detect prostate cancer metastases that pose no immediate threat to the patient because they are dormant. Additionally, these metastases may respond poorly to standard treatment options.

All of these factors would argue for caution in making treatment decisions based on the newer generation of scans.

Charles E. Myers, Jr., MD 

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Publisher Commentary

This month, *Prostatepedia* is talking about newer imaging techniques for prostate cancer. As our ability to image prostate cancer becomes ever more precise, controversy over what to do with this newer information is coming to the forefront. Also at stake are whether or not American insurance companies will pay for newer scans. When a man's insurance doesn't cover an imaging study, many patients with the financial means are paying for the scans themselves and often traveling to sites within and outside of the United States.

When your PSA begins to rise after initial treatment, you have what is called a biochemical recurrence. If you're scanned with one of these newer imaging techniques—the Gallium-68 PSMA, for example—and discover 1 or 2 spots of metastases, you have what is called oligometastatic disease.

Prostate cancer experts are divided on how to treat men with only a few metastases. Traveling—and paying out of pocket—for a scan when doctors are still grappling over what to do with any information such a scan would reveal—may not be the wisest course of action. Unless,

of course, you understand that the scan results may just be interesting information for you and your doctor to consider and will not necessarily change your course of treatment immediately.

Drs. Thomas Hope and Stefano Fanti help us place PSMA imaging and the controversies mentioned above within the context of conventional prostate cancer imaging and treatment. Dr. Fanti's offers us the European perspective: imaging has been more widely available in the United Kingdom and continental Europe. Many Americans are now traveling to these countries to obtain newer imaging studies.

Dr. Nina Tunariu, of the United Kingdom, talks about whole body MRI as a way of staging prostate cancer. She also offers a note of caution for Americans traveling abroad for scanning.

Dr. Rodney Ellis talks about how newer imaging techniques are changing the treatment landscape at the community level.

UsToo offers the support group network and patient advocacy's view of how imaging impacts prostate cancer diagnosis, staging, and treatment.

And finally, Mr. John Moore talks about his prostate cancer journey and the experience of traveling from his home in North Carolina to California for imaging studies.

The bottom line is that more information is always useful. Newer imaging techniques are detecting cancer in smaller and smaller amounts. How to treat these small amounts of cancer is still under debate, especially since the side effects of prostate cancer treatment can be particularly difficult for many men. If you have the means to obtain a newer scan, do so: but understand that there are controversies over the meaning of their results within the global prostate cancer community. A frank and open discussion with your doctor about what you'll do with any information you learn *before* you get scanned is the wisest course of action. [Pe](#)



Thomas Hope, MD

New Directions in Prostate Cancer Imaging



Thomas Hope, MD, of UCSF and the San Francisco Veterans Affairs Medical Center, is keenly interested in novel imaging agents and therapies for prostate cancer and neuroendocrine tumors.

Prostatepedia spoke to him about novel imaging for prostate cancer.

Why did you become a doctor?

Dr. Hope: That's probably the hardest question in life. Why are you doing what you are doing? In all honesty, I don't know why I ended up being a doctor. It sounded like a good idea when I was in my 20s. The reasons why I am happy being a doctor now are certainly not the reasons why I chose to be a doctor 20 years ago.

What keeps you at the table now?

Dr. Hope: In the last five years, I have gotten more involved in molecular imaging and targeted therapy. That has been a great experience, getting closer to patients. I have a clinic where I see patients now, and I can see how what I do impacts patients more directly.

I am a radiologist by training. Typically, a radiologist sits in the dark room, does their thing on their own, and has minimal interaction

on the patient side. These last couple of years, on a day-to-day basis, I feel that the effort I put in has a direct outcome in terms of helping care for patients.

Have there been any patients who stand out in your mind, whose cases have changed how you see your own role as a doctor?

Dr. Hope: We cannot talk about specific patients, but I have definitely had specific interactions with patients struggling with all of their decisions, particularly so in the two diseases I work in: neuroendocrine tumor and prostate cancer.

What is available inside the United States is a challenge versus what is available outside the country, which is unique and unusual. It hasn't really been a problem previously, but now with radionuclide therapy and varying availability, our efforts can change what is available in this country. That is borne out in my interactions, talks, and relationships with patients.

What are some of the newer imaging techniques available across the globe? How do they work, and when are they used?

Dr. Hope: I do a lot of radiopharmaceutical imaging.

We inject radioactivity into people, and then we image it with a positron emission tomography (PET) scanner to locate where the radioactivity has gone. We label these small molecules (proteins) with the radioactivity and use those proteins to target different places in the body. In this case, we try to figure out where prostate cancer is.

There's been a whole host of developments over the past 20 years of increasingly improved detection strategies for prostate cancer. The old-school fluorodeoxyglucose (FDG) PET imaging technique has been around for 30 years in the United States, and they have used sodium fluoride worldwide for just as long. For bone imaging, sodium fluoride can tell you where obvious metastatic bone disease is. FDG is actually the stable for the majority of PET/CT imaging we do in the world, but it's used primarily for other cancer types that are hypermetabolic or use a lot of glucose. When prostate cancer is in the earlier stages, it typically does not use a lot of glucose.

There's been this hole in prostate cancer treatment for patients with biochemical recurrence. These are patients who have undergone definitive therapy and have a rising

PSA. Neither of those two imaging modalities really help them. But a couple of new agents have been developed.

Choline-based agents, such as fluorocholine and C-11 choline, have been used in the United States and Europe. The Mayo Clinic brought choline C-11 to market in the US. Those radiotracers are certainly better than FDG PET or sodium fluoride PET in localizing particularly soft-tissue metastases, but they fail at lower PSA values.

When your PSA gets below one, you really don't see much disease, and the studies are also quite difficult to interpret. The next imaging agent, is Axumin (fluciclovine). Fluciclovine is another amino acid tracer, just like C-11 choline, that's used in biochemical recurrence. It was FDA-approved two years ago and has been used fairly frequently in the United States in patients with biochemical recurrence. It's probably, in my mind, equivalent to choline imaging.

Fluciclovine itself is not really used outside of the United States because, if you have the availability of other radiotracers, you wouldn't use fluciclovine. Yet in the United States, fluciclovine has become the mainstay because it is reimbursed by Medicare and readily available.

Prostate specific membrane antigen (PSMA) compounds have been developed by a number of groups and companies over about ten years. The big change came with the gallium PSMA-11 compound, which is a small molecule that was first developed at the University of Heidelberg in Germany.

Gallium PSMA 11 is a unique compound in that it wasn't patented.

No company controlled it, and so any site that wanted to use it could just sign up and get the precursor delivered to them. Very quickly, a large number of sites around the world started using PSMA-11 to image patients with prostate cancer. It is not approved in many countries, although technically, it is approved in Switzerland and Israel. Outside those countries, it is used on a compassionate-use basis. In the United States, it is being used under Investigational New Drug (IND) authorization from the FDA. The fact that it was so quickly adopted and widely used led to a huge number of articles in the literature.

In addition to PSMA-11, there is a whole host of other PSMA compounds. Gallium PSMA-R2 is being developed by AAA, DCFPyL is being developed by Progenics, PSMA-1007 is being developed by ABX Chem. There is a whole family of PSMA compounds coming to market on the back of the experience of PSMA-11. There are questions as to which is better, and although there is not a lot of head-to-head literature published, it's fairly clear that PSMA 11 is better than, for example, the choline radiotracers and fluciclovine. The question is: how do these other PSMA tracers rate against one another? In my mind, they're much better overall as a class, but I'm not sure there is a huge difference between them in terms of detection activity. We'll find more about that as things progress.

You said the PSMA compound is widely available because it was not under the auspices of a specific company but that it is not approved everywhere. Does that mean that patients can get access to it, but it is not necessarily covered by their insurance?

Dr. Hope: You have to go country by country, so it gets complicated. In the United States, for example, PSMA-11 is not owned by a company, and there's no company paying for clinical trials. Centers like ours are running trials through Investigational New Drug (IND) authorization, which means it's being studied in clinical trial aiming to get FDA approval.

In the United States, everything is done under a clinical trial. There are a couple of methods to pay for the studies. There are a few insurance companies that will pay for these imaging studies under a trial setting. But I would say that the majority do not, and patients end up having to pay out of pocket.

The FDA allows you to use a cost recovery mechanism if you are acquiring data to eventually support an NDA application, and that's how the majority of these studies are paid for. There are other institutions that use research funds in order to have a small number of studies performed. The two major institutions in the United States are UCSF and UCLA, and each uses cost recovery mechanisms and billing patients' insurance companies directly in order to perform the study.

Are the studies expensive?

Dr. Hope: Yes. I would say they range between \$3,000 to \$5,000 apiece, so they're quite expensive. There is clearly an ethical dilemma in having patients pay for an imaging study that's not FDA-approved. What do you do with that?

I think it is a reasonable approach as long as the institutions are actually using that data in the way

that they state they are, which means that it's up to us to use the data to get the agent approved. If the data isn't used productively to get the drug approved so that insurance companies will pay for it, then I have an issue with the ethical aspect of it. As long as I'm doing the work, then it may be reasonable, although different people might disagree.

I'm sure there is a wide range of opinions.

Dr. Hope: There's no right answer. For example, two weeks ago, we went to the FDA for our pre-NDA meeting and presented all of our data, which we are doing in collaboration with UCLA. The FDA was very positive and said that we had enough clinical data to support an NDA application, which is pretty exciting. Hopefully, we can get the drug approved within the next 6 to 12 months.

How have these newer imaging techniques impacted how we treated prostate cancer? We're detecting smaller and smaller amounts of cancer earlier and earlier. What do we do with that information? How is it changing how we treat patients?

Dr. Hope: These newer techniques are changing current patient care. But is that actually improving the outcome? For example, if you have a low PSA, and your PSA is 0.2 after radical prostatectomy, the standard treatment is to radiate the prostate bed and maybe the pelvic nodes. Now you get a PSMA PET, and it shows a node somewhere over here. So, now the radiation oncologist zaps that PSMA-positive node. Everyone thinks we did a good job, and maybe we did. But we just don't know.

What we don't understand fully is whether or not PSMA PET is the tip of the iceberg. If you have a PSMA-positive node, are there many nodes we do not see, or does it mean that those nodes are the extent of the patient's disease, which we can potentially cure if we hit it? Right now, the care is changed in maybe over 50 percent of patients who get a PSMA PET, but whether that change in care or treatment planning has improved outcomes, no one has a handle on that yet.

There are some clinical trials starting that use varying radiotracers. The question in the community is: how does PSMA PET impact this care, and does that change improve the outcome of the patient who we're imaging?

Is it just a matter of time before we answer this question?

Dr. Hope: Yes, but it is not that straightforward. You cannot take a cohort of patients who got PSMA PETs, check what happens to them, and conclude that things got better. You have to do it in a trial setting with a cohort of patients who do not get PSMA PETs and a cohort who did, and see if there's a difference between the two. Otherwise, there are a lot of biases if you have a one-arm study. You cannot tell if the patients have improved outcomes for other reasons or even how you compare the data. You really do need a randomized trial in order to demonstrate this improvement in outcomes.

That will come, but those trials will take a very long time to perform. These drugs will all be approved well before the length of time that these trials take to perform. This becomes a big issue. If you

have an imaging agent, and we all believe it's better than the previously existing ones, how do you randomize patients to not get it once it is FDA-approved? We are going to face difficulty showing that PSMA PET improves patient outcomes because we are going to be bottlenecked based on the availability of agents in the near future.

That's an interesting position to be in.

Dr. Hope: It has happened in imaging over the years. Take sodium fluoride PET, which was never approved. It was grandfathered into FDA approval. No one ever did any clinical trials showing impact and outcome, and that is why Medicare has chosen not to reimburse sodium fluoride PET CT. This has happened over and over again.

It is mainly because imaging trials are unique. Drug trials must have outcome benefits as the endpoint in order to obtain approval. Imaging trials only need to show that we saw something we thought we would see. For example: "I think there is prostate cancer, I looked at a cohort of patients, I biopsied them, and the biopsies came back as prostate cancer. Therefore, this imaging study is good." But that doesn't work in a therapy world. Therapy data is a lot stronger.

Do you have any thoughts for men considering travel to get one of these newer imaging techniques or participating in a clinical trial if it's not available in their community?

Dr. Hope: That is a hard position to be in right now. Think about it in a different setting. Let's say you were at your institution, and you were thinking about participating in a clinical trial for an investigational therapeutic agent. Most men would

not travel too far outside their institution for that therapy. With PSMA PET, patients are traveling all across the country for this agent and paying out of pocket for it. It's an unusual circumstance.

Two years ago, it would not have occurred to people to do this. I think in the United States, you have to think about the cost and the marginal benefit. It really depends on your PSA. It depends on discussions with your oncologist or urologist in terms of where you are and what type of therapies you are thinking of. Outside of imaging studies, there are therapeutic aspects of PSMA targeted radionuclide therapy. That becomes a much bigger issue. Outside of the United States, the vast majority of sites that offer it do so outside of trial settings.

There are potential huge ethical issues with doing that. Sites are treating patients with therapies that have significant toxicities, and that data is not being collected prospectively, is not being reported, and the trial is not being done in a way that will lead to data that will help us determine what to do with patients moving forward. Centers should run clinical trials and publish results so that we learn, but there's a large number of centers around the world offering some of these agents out there to treat patients with limited to no follow-up.

It's really important that, if we're going to treat patients with a non-approved drug, the trial or the setting where it's administered does so in a way that leads to actionable, usable information for the community at large, and not just the individual institution or patient. ¹



Stefano Fanti, MD

Prostate Cancer Imaging



Dr. Stefano Fanti is a Professor of Diagnostic Imaging at University of Bologna, the Director of PET Center at Policlinico S.Orsol, and the Director of Nuclear Medicine Division at Policlinico S.Orsola.

Prostatepedia spoke with him about imaging prostate cancer.

Why did you become a doctor? What was it about medicine that attracted you?

Dr. Stefano Fanti: I have to admit this is the first time someone asked me this. Apart from my mother.

About 30 years ago, I was almost ready to start studying math at the university. At that time, informatics was a big thing. It was exploding. I had a passion for computing science and so on, but then I realized that I was even more enthusiastic about how the body works, and understanding the mechanism inside my body. I realized that I would've spent all my time just thinking and reading about that, and so I decided to make that my profession. That was the choice. And now I'm in a very technological specialty—nuclear medicine—that has a lot to do with innovation and technology.

Have you had any patients over the years who have changed how you see your role as a doctor or who have changed how you see the art of medicine?

Dr. Fanti: Honestly, I cannot remember one particular enlightening event or patient. Every single patient teaches me. Every patient has a story. Together, they drive how I behave and how I practice medicine. I deeply thank all of them. I'm a doctor with a lot of passion. I do that not for the money but for the pleasure and the reward of helping my patients. You establish a human connection that will hopefully last for a long time. But even if it cannot last—I'm in oncology, so I cannot pretend that every patient will have a happy ending—there is nonetheless a lot to learn every day from every patient.

What are some of the more promising new imaging techniques for prostate cancer?

Dr. Fanti: Essentially, we have well established but somewhat obsolete imaging techniques like CT and bone scintigraphy, which have been around for more than 30 years. They still provide us a lot of useful information, but we now have

two main innovative players: magnetic resonance imaging (MRI) and positron emission tomography (PET).

These two techniques, MRI and PET, are based on completely different mechanisms. MRI is mostly about anatomy, and performed by radiologist. It can provide very useful information, especially for primary diagnosis to find the cancer. It's also very useful for the staging, meaning to evaluate the extent of the cancer.

PET is a very functional approach and can be used for staging the high-risk patient. However the main indication for PET scans is biochemical recurrence—that is patients who were already operated on and who now have a rise in their PSA. You have to find where the recurrence has occurred. PET scans are usually performed and reported by nuclear medicine specialists, at least in Europe.

What impact does that have? Simply that patients need to see a different provider?

Dr. Fanti: The impact is really relevant in the management of the patient. My daily bread and butter is PET with new radiotracers

to evaluate biochemical recurrence. If you have been surgically treated with radical intent and your PSA dropped to zero, then you hope that you are cured. Unfortunately, after some years your PSA may begin to rise. The bad news is that your cancer is coming back somewhere in your body. Of course, you get very anxious and you want to know where the relapse is so that you can treat it. This is really traumatic from the patient's point of view. This is perfectly understandable.

If you are doing CT and bone scans, it's very unlikely that you will see reasonably early where the recurrence is. That is not good; you don't want to find it when it's too late for something to be done.

That is why you might want to use, for example, PSMA PET, which is a very innovative approach. PSMA PET has the highest sensitivity to identify where the recurrence is. You can see if it's local—so in the prostatic bed—in which case you may perform salvage external beam radiation therapy. You can also see if the recurrence is in the lymph nodes, or you can see if the recurrence is in the bone. Again, this helps you to take different approaches as a function of what you see.

So then using PET scanning, you can figure out where the metastases are earlier in people who have recurred?

Dr. Fanti: Not necessarily only the metastasis because you can see also the lymph nodal spread, and local recurrence, which is certainly not a metastasis.

Does that end up translating into a better survival for patients? If you figure out where the cancer has spread earlier after recurrence, does that mean that these men end up living longer?

Dr. Fanti: The principle is: if you can identify very early where the recurrence is, you can treat it right now more precisely and possibly live longer. But that needs to be demonstrated in a randomized multicenter trial based on PSMA PET measuring patient survival. This is not easily feasible for several reasons. If you have a new drug to register, it's very simple because all the big pharma companies are very used to doing this sort of trial. Let's just say you take the standard treatment in one arm of a trial and in the other arm you have your new drug. You demonstrate that the new drug will make patients live longer. It's very simple, though expensive. But if you just have a different imaging approach, and in particular a new radiotracer, there is no big pharma company money behind it.

Another factor is that imaging doesn't directly impact the survival, so after your two arms—scanning and not scanning—you have to add two or more arms: standard therapy and therapy targeted to the things seen by the scan. That makes the whole trial very expensive because you have to enroll something like 1,000 patients. But new radiotracers are usually in the hands of small companies that can't pay for that.

Those kinds of trials are therefore very uncommon in the imaging area. This is unfortunate, and usually we can only measure the detection rate of an imaging method. At the same time, the rationale for treating a metastasis as soon as you see it if you have an effective therapy is very strong. Thus more and more clinicians are keen to use the novel imaging technique as soon as possible. For example, PSMA PET is widely used in Australia, in patients with biochemical relapse.

Yes, there is a big difference in the availability of these newer imaging techniques in America and the availability in say Australia or Europe. Do you have any thoughts on what you're seeing in terms of the impact these techniques are having on patient care in those parts of the world?

Dr. Fanti: For some reason, the United States has been a little bit behind these new developments, compared to not only Australia or Western Europe, but also to India. The United States is now closing the gap, because there are a couple of companies trying to patent PSMA tracers. They are running trials to get FDA approval.

If you go through the scientific literature, the large majority of papers on PSMA PET are coming from Australia, Western Europe and a few other countries. In the United States, there are only five or six sites where you can get a PSMA PET and even there only within a trial. Thus it is very difficult to get it.

Do you have thoughts for American men who may travel to Europe for these newer imaging techniques? If, for example, a patient comes to you from New York and then brings the results back to his local oncologist, will the oncologist be able to understand and use the information?

Dr. Fanti: Absolutely. As mentioned there are few centers doing PSMA PET in the United States, and only a few patients can get into those clinical trials. Therefore the scan is not available at all to a majority of patients. But I am not suggesting to the patient to take a long and expensive travel to get the PSMA scan: it would be more important to promote the approval



and availability of the method in US. And in the meantime there are other good methods and good radiotracers that could be employed also in the United States.

Is there anything else that you think patients should know about what's happening in the world of prostate cancer imaging?

Dr. Fanti: The world of prostate cancer imaging is incredibly active, also due to the availability of many therapeutic options. Modern imaging, either with MRI or PET may drive the choice of treatment, thus making a great difference for the patients. MRI is already incorporated into the guidelines for driving biopsies and staging, while PET is recommended in case of biochemical recurrence.

But I wouldn't want to raise patients' expectations too much. Especially in the setting of relapse, PSMA PET can really make a difference, but at the same time you should determine with your oncologist or your urologist if you really need it.

You're saying just because your PSA starts to go up, that doesn't mean you should run out and get this test?

Dr. Fanti: Don't run to Australia just for a PSMA PET scan. Run there if you want to see the coral reef. PSMA PET is interesting. It is growing very rapidly. It has great potential. At the same time, like everything in medicine, it has to be evaluated with attention and care because not every patient will benefit from it. ¹⁶

Nina Tunariu, MD

Whole Body MRI

Dr. Nina Tunariu is a radiologist at The Royal Marsden in London. She specializes in whole body MRI for metastatic prostate cancer and is a leader in prostate cancer imaging clinical trials.

Prostatepedia spoke with her about whole body MRI's role in prostate cancer staging and treatment.

Why did you become a doctor?

Dr. Nina Tunariu: It was more of an intuitive choice. I just like helping people, I guess. Like any doctor, when I first see a patient, I spend a few seconds looking at their body language, the way they are, and then try to adapt myself to how the patient is. I realized when I was younger that it was easy for me to do this, and I thought it would be nice to use this skill to help other people rather than becoming a lawyer or an architect.

I became a nurse first. I really enjoyed helping in any way I could. And then I thought about how I could take it further. So, I became a doctor. I worked several years as a clinician in hospital before I went into radiology, which means I am quite clinical in my approach to patients. I'm slightly unusual as a radiologist in that patients know

that it's me who reports. I meet many of the patients as I do the imaging guided patients' biopsies. I always try to understand the person behind the scan, and not just the scan.

Do you think your years as a nurse have affected how you approach your role as a doctor?

Dr. Tunariu: I think so. I try to be part of the patient's entire journey, not just for those 20 minutes in which I look at the scan.

Have you had any particular patients over the years whose cases have changed how you see your role or how you see the art of medicine?

Dr. Tunariu: Yes, one particular patient's scans have signaled to me how whole body MRI could improve dramatically imaging in metastatic prostate cancer.

It started eight years ago, when I met a patient with prostate cancer who was in his 60s. We didn't have a lot of choice of therapies then. I worked in a unit that did a lot of clinical trials for prostate cancer. The only way to enroll prostate cancer patients for our trials was to see the cancer

on a CT or bone scan in order to prove that they had metastatic disease. His was a typical story: a man who worked all his life and suddenly, at 65, found himself with prostate cancer. We did a CT and bone scan, both of which were normal.. His PSA was low—only 7 ng/ml—so we said come back in three months, and we'll talk again.



“It's a quest of mine to bring whole-body MRI, which is a new imaging technique, to manage patients with prostate cancer.”



He came back in three months. He was still very well, but his PSA was now 34 ng/ml and he was becoming very worried. We did another CT and another bone scan, which showed no cancer. We said, “We have another technique, which could show us why is his PSA rising.” He agreed, so we did a whole-body MRI.

We were really at the beginning of our journey with this technique. I was completely shocked. He had multiple bone metastases on MRI, but the CT and the bone scans didn't show anything. Together with the treating physician consultant we showed the pictures to the patient: “This is what this scan shows, but it's a new technique, still a research method and we do not know enough. We did not expect to see so much more.”

We were not sure how to take this further. We could not enroll the patient on a trial base. That's when on a new imaging technique, because we didn't know too much about whole-body MRI yet. We were at the beginning. There was no published evidence that could teach me how to do whole-body MRI because the technique was still at its beginnings. He came back three months later, and this time, his PSA was 100. The CT and bone scans showed one new bone lesion. We repeated the whole body MRI which showed increased number and size and we said this makes sense. Obviously, this man had bone metastatic prostate cancer and we explained this to the patient. The clinician and patient decided to start treatment based on the research.

What ended up happening?

Dr. Tunariu: This happened eight years ago. He responded initially, and then regrettably, he died before we had all these lines of therapies we have now. Eight years ago, we had only Taxotere (docetaxel). Today, it's a completely different game.

Back then we were only able to give him another year of life. I'm sure he had quite an aggressive

prostate cancer. The difference between the CT/bone scans and the whole body MRI was just a shock. I could not believe it. I knew that the whole-body MRI would be a better technique, but I did not expect that I would see such a discrepancy. This is why I agreed to talk to Prostatepedia.

Whole-body MRI is an amazing technique for patients. I will do anything I can to increase awareness and show that we need to use this imaging technique to help patients.

Whole-body MRI is a very good technique for bone and soft tissue disease, and it's also good at showing the local tumor. It is similar to the MRI that is currently used for detection of prostate cancer,



“Whole-body MRI and PSMA PET are currently the most promising imaging techniques.”



and a combination of anatomical sequences called T1 and T2 and a sequence called diffusion-weighted imaging that is used widely in cancer imaging. Diffusion weighted imaging can be done by any MRI scanner, and it looks at the movement of water in the tumor and how freely the water moves. If the water cannot move freely, then you know you are in an environment that has a lot of cells.

Ten years ago, a group of Japanese have discovered how you can use

this technique to image the entire body and not only for the brain, liver or the prostate

We scan the patient from the top of the head (vertex) to mid-thighs. You can scan the patient from the top of the head to the toes, but prostate cancer rarely goes below the knee. We always think of the comfort of the patient, as he will need to stay still on the scanner bed for around 45 minutes. We try to find the best compromise between getting all the imaging we need and the patient's comfort. If we are worried or we know that the patient has symptoms or disease in other areas, we can always scan more.

We call whole body MRI a one-stop technique. We can replace the CT and bone scans, the two imaging techniques used in advanced prostate cancer imaging with this one technique. Another major advantage is that patient spends less time in the Radiology department. The total visit time including preparation and injections is three-four hours for a bone scan and 3-45 min for a CT. For Whole body MRI patient spends an hour, and there is no need for an injection or contrast. That's a major advantage from my point of view, especially when the patients have advanced disease. Patients need to spend more time with the people they love and less in hospital for imaging tests.

It is important to remember that MRI is the gold standard for bone marrow imaging and that we have been using this technique for decades. Imaging bone metastases is very important in advanced prostate cancer. Up to 90% of patients with advanced prostate cancer will have bone metastases,



and half of these patients will only have bone metastases.

We can use Whole Body MRI to detect bone metastases, as with the patient in my story, but we can also use it to evaluate response to therapy. It is a good technique to tell you early if you respond or not to treatment so the clinician can switch treatment in a timely fashion, before clinical progression. In this way, it may be that a patient has a better chance to undergo all the new therapies.

Whole body MRI also detects some of the complications of prostate cancer before the patient becomes symptomatic. For example, the metastatic bone disease goes into the spinal canal and can damage the spinal cord. With whole body MRI we can detect disease going toward the spinal canal before the patient has any symptoms. Similarly, it can also show blockages of the kidneys by the tumor before renal function is affected.

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“We are still at the beginning.”

What are some of the barriers right now to the technique being more widely adopted worldwide?

Dr. Tunariu: As with any other imaging technique, it is not perfect. You'll always need to adapt the imaging techniques to the clinical question. If your question is about small nodal metastases less than eight - 10 mm, then it's better to

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“Even if you add the flight cost, it will still be cheaper than in America.”

do a PET technique using OSMA or other tracer available. Each imaging technique needs to be put in the right place for the patient.

The barriers are mostly that the MRI machines are expensive, and specifically in Europe, the waiting list for scans is six to eight weeks, so we need more machines. Secondly, the radiologists are very busy right now. The demand for radiology in oncology has increased dramatically, which means the hospitals would like to use this technique, but they don't have enough capacity.

Thirdly, it's the cost. In Europe, the cost of whole-body MRI is a little more expensive than CT. To give you an example from London, a bone scan costs 80€, a CT is about 360€, a whole-body MRI is 500 €, and the PSMA PET is around 1,500€.

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In the United States, because of the way that the cost for these scans is done, there is no cost code for whole-body MRI. So, the cost includes an MRI of the thorax, an MRI of the abdomen, an MRI of the pelvis, and an MRI of the spine, which means that in America, whole-body MRI can cost \$5,000.

It takes around two hours to scan the patient this way. This is the biggest barrier in the United States.

With Radiology colleagues in United States, we are trying to convince the community that they need to implement a unique imaging code for whole body MRI. So the cost goes down

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That's a huge barrier for some patients.

Dr. Tunariu: It is, yes and some patient will fly to Europe just to have the scan.

They can just pay for it out of pocket? Do they pay the same price that UK residents pay?

Dr. Tunariu: No, probably not as the scan is done on NHS, but even if you add the flight cost, it will still be cheaper than in America.

However, we need to remember that there is still work to be done and clinical trials to prove that use of Whole body MRI makes a difference in patient's management

For the first time, we've published a paper this year about standardization of the technique. We suggested a common protocol, together with our American, Italian, and Belgium colleagues who are doing this technique now.

We are trying to encourage the radiology community to use standardized acquisition and reporting protocols. It is important that we have this standardization so a patient that has an MRI in London or in New York then is reported in comparable ways. [Pp](#)

Rodney Ellis, MD

Imaging In Community Practices



Dr. Rodney J Ellis is a Professor of Radiation Oncology at the University Hospitals of Cleveland and a radiation oncologist at Case Comprehensive Cancer Center.

He spoke with *Prostatepedia* about how prostate cancer imaging is used in community settings and how it is impacting patient care.

Why did you become a doctor?

Dr. Ellis: I was seven when I told my parents I was going to be a physician when I grew up. They said, “Oh, Rod that’ll be really nice.” No one else in my family had gone to college, so they didn’t really expect that it was likely to happen.

I thought it was cool that my family doctor, who delivered my brother and me, had his wife in his office; they ran the office together. I thought that’d be really nice to work with my wife and run our own business.

Once I got to medical school, I realized that doctors do a lot of work that’s controlled by the insurance companies, and I became less enamored with primary care medicine.

When my grandfather and an uncle developed cancer, I became more interested in oncology. It made

me focus on how cancer impacts families. I had an opportunity to do a rotation in radiation oncology and met the mentor who taught me so much, which changed what I wanted to do in life.

That’s how I ended up in radiation oncology, initially working with monoclonal antibodies to image cancer and direct where you place radiation, either in the operating room with brachytherapy or intraoperative radiotherapy.

Over the last 20 years, as the field has blossomed, we’ve developed even better techniques for dose painting and giving high doses in regions. Largely, that’s been the focus of my academic career.

Have you had any patients who stood out in your mind as having changed either how you see your role as a doctor or how you practice the art of medicine?

Dr. Ellis: Yes, especially since advanced imaging has come out and over the 20 years that I’ve been doing it. Sometimes, when I see a patient in long-term follow-ups, I think, “Wow, the advanced imaging we used actually predicted death from prostate cancer the day I saw him, but I just didn’t know it those ten years ago.” When I look at the new imaging

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“We’ve been very image-based in our approach to treat prostate cancer for many years.”
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today and how it’s changing what we’re doing, I think we’re truly personalizing medicine.

I’ve seen numerous patients where I could determine whether their cancer was curable based on an image. If it is curable, does it change how you may image that patient? More often than not it may. For maybe one in three cases, it does nothing for you. You do the image, and the good news is it didn’t show any spread of disease. The bad news is it didn’t show any localization of the disease either. The test didn’t really help us; it just didn’t resolve the questions we had. For about two-thirds of my patients, it adds to their care. New data from ASTRO this last week shows in the Locate trial that even negative studies may have significant changes though, such as staying in surveillance versus aggressive local therapy if a study is negative.

What kinds of imaging studies do you use currently with your patients?

Dr. Ellis: I use standard imaging, whether that’s bone scan, CT scan, or MRI. We’ve been very image-based in our approach to treat prostate cancer for many years. Currently, we use a lot of MR-based imaging and the functional imaging of MRI to look at these within the prostate gland. The dilemma for patients is whether there is any disease outside of the prostate gland.

Much of the literature that I’ve published over the last two decades worked with the previous imaging agent that was FDA-approved for looking for spread of prostate cancer called ProstaScint. We’ve published on that with ten-year data showing that it was able to predict deaths from prostate cancer. It was useful for helping to select where to give higher doses within the prostate gland, when giving radiation to improve cure rates. That’s been largely improved upon with newer imaging agents, both the Axumin PET scan that is currently FDA-approved and the C-11 Choline that’s available at Mayo Clinic.

Worldwide, there’s a lot of interest in PSMA-based PET imaging. That is the same molecule that ProstaScint looked at years ago, only now the marker is looking on the surface of the cell rather than on the cytoplasmic, or internal surface, of the cell. This has greatly improved the PET agent over the previous generation products.

What are some of the limitations that you face?

Dr. Ellis: Prostate cancer is non-uniform. All the cells are not going to be alike. They’re going to metastasize

or develop different traits at different times. We can image some cells nowadays with Axumin PET. That looks at the synthetic amino acid that gets picked up more commonly by prostate cancer, but it may be applicable for some other cancers as well.

On the other hand, some cancers express PSMA, and may show up with a PSMA-based PET. Not all cancers show up with one or both, so we don’t know which agent is best for which particular patient.

The biggest limitation right now is that the only one that’s FDA-approved is Axumin PET. As a member of the National Comprehensive Cancer Network (NCCN) Prostate Board, I’ve looked at it and made recommendations to add that for standard imaging. The board has also made recommendations that, as newer agents come out, they should be considered as well.

How are these newer imaging studies impacting treatment?

Dr. Ellis: Well, I can give a great example. We had an add-on patient today who had been treated with hyperthermia in Germany, which progressed locally. We had treated him with proton therapy into the prostate, and for a while, he had responded to therapy, but his PSA had started rising.

Today, he came in for follow-up, and we did an Axumin PET this morning. I’m waiting for the results to be read by the radiologist. But on my review, it looks like he’s got a solitary metastatic focus that lights up in the right chest, adjacent to his airway. The question now is what to do in that setting. If you’ve got one site of metastatic disease that’s a clear

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“there’s a lot of interest in PSMA-based PET imaging.”
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distance from the prostate, the standard of care is to go on to hormonal therapy and give additional agents either orally or systemically for metastatic prostate cancer.

One of the opportunities these new agents may open up for us is to treat limited metastatic disease—or oligometastatic disease, which means that mets are present in only one, two, or a few sites—with radiation or other techniques to ablate that tissue and potentially prolong life for those patients.

Are these newer imaging studies, such as Axumin PET, available in every community?

Dr. Ellis: I think that Blue Earth, the company that’s been promoting that agent, is doing a great job of getting it out further into the community. The limitation with most nuclear medicine studies is the half-life of the agent. In other words, from the time you make it to the time you use it, it decays. The second it’s made, its half-life is in minutes, so it can only be used locally in the facility where it’s made. In Axumin’s case, it’s about three hours from the time before it becomes too weak to use in imaging.

They’ve got to start producing it in more areas and be able to get everyone who needs the image within a three-hour radius. The reality is that they may never

be able to reach everywhere in the United States with that kind of a radius.

Well until that happens, do a lot of patients travel to you or other locations in the United States to get the scan? Are they coming on their own, or are they being referred by their doctors?

Dr. Ellis: It's a little bit of both. It's a fairly new agent, so I don't think there's a lot of patients who are aware of it yet. I'm a member of their speakers bureau, so I've got a bias. I can be honest and say yes, I've been working with the company to promote and let people know about it. They are still getting the word out, so a lot of patients don't know about it yet.

I have started to see patients come specifically to ask if we do the test. I don't know how many are coming directly to me versus how many are coming to our nuclear medicine department, where the test is done, but we are certainly using it much more frequently today than we were using previous imaging studies.

What about the doctors? Are they routinely referring patients to you? Is there any trouble finding people who can read the results of these scans?

Dr. Ellis: Urologists, the primary caretakers for many of these patients, are becoming acutely aware of all the data that's coming up worldwide on PSMA-based imaging with PET scan. They're interested in nuclear medicine scans and cutting-edge technologies to image their patients. What people aren't really sure of is what to do with that information yet, so there's more work that needs to be done to categorize the patients for the appropriate treatment.



Medical oncologists are starting to become aware now; certainly, the radiation oncologist is aware. Yes, there's more work to be done teaching the physicians. *So, we're gathering more information, but we're still not sure what to do with that information?*

Dr. Ellis: Right. And we're not sure whether it'll impact every patient, that's the problem. Is it going to be useful for every patient? Of course not. Will it change it in a large majority of patients so it becomes clinically significant? We think so.

Right now, it's only FDA-approved in patients that have had prior therapy. They have had prior radiation, surgery, or systemic therapy, and we have a reason to think that the therapy failed. Then, you image them.

But it is even more interesting to know, in the patient who is newly diagnosed, will these agents be used to help us see exactly where the cancer is located and to make a decision between surgery or radiation, and whether they will be used to make a decision about where to radiate.

Are there any studies now looking at Axumin PET in newly diagnosed patients?

Dr. Ellis: I believe the company is certainly interested in investigational studies in answer to that question. I would have to defer to them about which studies are currently open and active.

Do you still educate patients about imaging studies?

Dr. Ellis: That is a huge part of what I do. And the best way to do that is publications. Publications

get out there, and they don't go away. People read them, and they learn about these studies from trusted sources. But until publications can get done, going out and doing person-to-person education or webinars are other ways to get the word out.


Do many patients ask about imaging studies, or is it something that you tell them about?

Dr. Ellis: Both. I think there's an educated group of patients out there now, more so than 20 years ago, when I started my practice. It's probably information from the internet. Everyone has access to the internet. If you search for prostate cancer and start spending some time, you'll come across the imaging data. They bring those questions in.

If you look at the changes in diagnostic medicine, imaging, and genomics, we have all this new information, but we're still grappling with what to do with it and what it means.

Dr. Ellis: Yes. We're wrestling with all the information that's coming and how to best assimilate all that information for an individual patient.

Do you have any last thoughts about imaging studies, either for people newly diagnosed or facing recurrence?

Dr. Ellis: I would like to see more people lobby to get advanced imaging approved for newly diagnosed patients. Unfortunately, many of those patients don't have access to it, and I'd like to see the people who are doing clinical research present their data to help support that, if there is emerging data to do so. 

Patients Speak

John Moore:

Traveling For Imaging Studies



John Moore talks to *Prostatepedia* about his prostate cancer journey and his experiences in traveling across the country for the Gallium-68 scan.

How did you find out that you had prostate cancer?

John Moore: I had been getting annual physicals. I was reviewing my lab results and I noticed that my PSA was 3.28. It was in the normal range at that point; they used to say from 1 to 4 was normal. I called my family doctor and said I just thought it was a little bit high and could I see an urologist. She said yes and sent me to an urologist. We did

some PSA tests to see if it would go down, but it didn't.

I did a 12-core needle biopsy and it came back one core 100%, Gleason 6, 3+3. I think there were two cores with smaller amounts. I don't recall what they were, but they were also Gleason 6. That's how I found out.

The urologist said, "I have some bad news, but it's not terrible news." That's how he phrased it. It's interesting how you remember the actual words when you're told you have cancer. It feels like a trauma, so you remember exactly how they phrased it: it's embedded in your mind.

Anyway, I took about three months trying to learn a little bit about the disease in order to make treatment decisions. At that point in time, which was back in the end of 2010, active surveillance was an option but it really was underplayed. The main choices that were being presented to me were surgery or radiation. Radiation was probably the seeds. My father had had prostate cancer and had the seeds; it didn't work. He had metastatic cancer and lived to 87, which was a long time. He did fairly well until about the last two years.

I decided on surgery. There was a lot of discussion at that time about robotic surgery. It's always

tempting to choose the latest thing—you think that's going to be the solution to all your problems. I did elect for robotic surgery and I don't regret that. I tolerated it well. The surgeon had done over 500 of these so I felt that he was one of the better robotic surgeons in my area. He said, "We got it right before the horse has left the barn," or some sort of phrase like that. What he meant by that was that I had two areas of extracapsular extension, but we had negative margins.

I also had extensive perineural invasion noted both in the biopsy and in the pathology after surgery. Also, my pathology came back as 3+3, which seemed to be pretty reassuring. I had exceedingly good urinary control after the catheter was taken out. I didn't have any leaking. I had two days of a sense of urgency, but I attributed that to my line of work. (I did physical work, which involved bending and picking up things. I think those muscles are just very, very toned, so I didn't have any problems with that.)

I went ahead and put myself on a penile rehab program that I had seen on the Memorial Sloan Kettering website—they had a video presentation of a doctor presenting this program. I talked to my urologist about it and he agreed to prescribe TriMix, which is a three drug penile injection. I did that for about six months until I was able to get erections without either the TriMix or Viagra. I felt normal, to tell you the truth. It was quite a remarkable realization. The capacity to have an erection was a bit of normalcy that was important to me.

Things were going well. I was getting my PSA tested pretty frequently, about every three months or every month. I started to get some readings that were a little bit concerning.

One time it would be 0.015 and then the next one would be below 0.015. Then I'd get 0.018. Then I'd start getting 0.02. Everybody said that maybe I had a little left over prostate tissue.

About three years after the surgery, my PSA was 0.35. At that point, I went to a medical oncologist, because I just thought that was the right person to continue my care. When it reached 0.38, he suggested that I start radiation. I thought, well there goes my erections!

I decided to go see Dr. Charles Snuffy Myers. Dr. Myers saw a lot of people in my support group. He thought I was a good patient for a growth-arrest program, partly because of my Gleason 6 and relatively slow doubling time and so forth. I enjoyed my work with him.

We had trouble getting my DHT low enough. My biology was such that I needed to take four Avodart (dutasteride) a day plus one Proscar (finasteride). My DHT just wouldn't go down. I continue to this day on that program. Anyway, during the work with Dr. Myers, I didn't respond as well as he was anticipating. At one point, he said there are some cases he can't solve. That really threw me for a loop when he said that! You put all your hope in your doctors; he's such a talented man who knows so much.

We kept on trying. Then we did a Decipher test on my tissue. It came back with some troubling signs—a PTEN loss of 90% and some other things that I didn't really quite understand, but made sense to Dr. Myers. We added some other medications. He put me on Celebrex, the statin Crestor, and Metformin.

I was also doing some other herbal approaches—dehydrated sweet

potato greens, rosemary, and ginger in a concoction I mixed up every day. We would grow the sweet potato greens because you can't find them in any commercial products. There were quite a few in our group that were becoming farmers and growing sweet potatoes to harvest the greens. Some members had a response to some of these approaches, so I did them also.

My PSA continued to rise slowly. At one point, it went to about a nine months' doubling time, but my PSA is still below 0.2.

I had read about the Gallium 68 scan when I was looking through an Us Too forum discussion. They talked about different imaging techniques. Some of the others under consideration required a PSA of 1 to 1.5 before it would be likely that they could find anything. The Gallium 68 scan imaging technique, which was developed in Germany was now available in a few places in the United States.

Dr. Myers had the idea that less cancer is better than more cancer. If we knew where it was, maybe it could be surgically removed. Maybe it could be spot radiated. I didn't know what I would find and what might be the next step, but I thought it might be worth pursuing.

I brought it up with my doctor. He had actually referred someone for that scan, but that somehow didn't come to fruition. I would really be his first patient to have the Gallium 68 scan.

I contacted the site and of course I needed to be at 0.2. My darned PSA, when I need it go up, it started to go down. I was at 0.198, two 1,000ths away from meeting their criteria to have the scan. That was back in March.



In the meantime, I had come across an article about propranolol, a beta blocker that could possibly be used as a way to slow down the spread of cancer. There was a short two-page article that my brother had sent me. My brother is a retired gastroenterologist.

I brought that article to my medical oncologist. Even though I do have unusually low blood pressure, he put me on a low dose and am now up to 20 milligrams twice a day. It has slowed down. It has worked, I think, really well. My PSA before was a nine-month doubling time, and since I started the propranolol it's now doubling every 19 months, so that's a pretty dramatic change.

I did meet the criteria so off I went to LA to get the Gallium scan. I was able to do it in one day. I left Raleigh–Durham at seven in the morning; I was in LAX by 09:00 am. My scan was scheduled for 2:30 pm. I took an Uber to the medical center. I had quite a long time to wait, because you couldn't eat anything. I waited and waited and watched people walk along the sidewalks for quite a long time.

The radioactive material is made on campus and travels from one part of the campus to the treatment area through vacuum tubes. You hear the big rumble, rumble, rumble as it travels and arrives with a big clunk. You're sitting waiting for this to come in. They wear gloves. It comes into a metal unit. They inject 5 milliliters or something like that into you and then they put a little extra saline in to make sure you get all of it. You take contrast for an hour and then you're supposed to have the scan.

They're casual in LA. I thought that I was supposed to get the scan

right at 60 minutes, but actually I got it at 72 minutes. When no one showed up, I went down the hallway looking for someone. There was somebody else in the scanning room that they had snuck in before me. It just seemed like they could have had a tighter schedule. I traveled across the country and no one explained what was happening to me. That was a negative. I'm paying out of my pocket for this thing—\$2,648 and the air fare, which was about \$700—so it's a lot of money. Today, I paid for my first co-payment of Zytiga (abiraterone) and that's \$2800. You get used to these large numbers.

Anyway, I chose UCLA because I thought that it's not just the scan, it's the reading interpretation of the scan that's so important. You want somebody who's looked at a lot of these, so they know what they're looking at. Of course, they'd had a clinical trial, but I was not in the trial. They'd offered to put me in a clinical trial where I wouldn't have to pay for the scan. I believe it was a Choline-11 scan. I would have to get the Choline-11 and Gallium-68 scans within one week. I guess they were comparing these two different scans. I just didn't want to do it. They said I may have trouble getting insurance to pay for the other scan. I decided to just pay for it and not try to do any more than I felt I wanted to do.

I got the scan done. I flew back that same night. They said I would still be radioactive enough to set off the metal detectors. Indeed, I did set off the alarm, but I was prepared. I had a letter from UCLA. The letter stated that I wasn't still radioactive and that I wouldn't be any danger to anyone I might sit next to.

When I got the scan results I saw that they had found a small focus of mildly increased low-level trace or uptake in the right perirectal region immediately posterior to the bladder, distinctly separate from the bladder. So, between my rectum and the bladder there was a tiny little spot that lit up. They described this as a node, which then makes me metastatic.

I think there are these moments in your life with cancer that you come to grips with reality. The first one is when they use the word cancer. You have to get used to that word, whether it's the hospital, the great big cancer center, or parking for cancer patients. Eventually, you get over that. Then there's that moment of acceptance when you realize the cancer has recurred.

Then the next one is when they tell you that you're metastatic. Everybody's trying to avoid becoming metastatic. You start to wonder how long will you really live? The good news about being metastatic is that then one of the drugs that I wanted to go on, Zytiga (abiraterone), was now available to me. I was hormone-naive but metastatic, so apparently my insurance company will cover it. Even though I have to pay the \$2800 co-pay. That's the good news.

I had a conversation with my radiation oncologist yesterday. She said, "I'm not sure it's a node. It's hard to really tell." She thought maybe it could be just local disease. I also went to see a surgeon on Monday. He said there's no way they can surgically remove this thing. He looked at it, and he also said it wasn't clear that it was a node.

I am going to treat it aggressively. I start my Zytiga (abiraterone) tomorrow. I take Firmagon (degarelix) tomorrow. I'm doing a six-month run of heavy-duty ADT. In two months, I'll do radiation to the prostate bed. If I have to move for two months in the wintertime, I can certainly do that.

The results of this scan have got me into this mindset. I'm focused again on treatment. There seems to be these periods of time when you're actively in treatment and then you can just maintain. Then you go back into active treatment. I'm entering into at least six months of active treatment now.

I think I'm ready for it. A lot of the treatments seem primitive and drastic. On the other hand, you're trying to eliminate something that presumably can kill you. I'm 65. I don't feel like I'm 45, but still, I want to keep on going.

Sixty-five is young.


John: I think it is. I'm on Medicare, so I'm apparently officially elderly now, but I don't feel like it. It's a journey. I try to learn as much as I can before meeting with my medical oncologist so that we can talk about the pluses and minuses of various treatments. Then we collaborate on a plan. I don't just want to put myself in the hands of my doctors and blindly follow what they say. I have learned that it's better to know as much as you can when you go into those meetings. Be prepared to ask questions that might get your doctor to look at things a little bit differently.

For example, I asked my doctor the other day about adding leukine injections to my protocol if I'm going to be taking the ADT. The idea

is that the radiation is going to make my immune system more able to recognize cancer cells that were before blocked by checkpoint inhibitors. Would it make sense to boost up my immune system while this is all going on? Other people in my group have done that with success. We have one person in our group who's out 48 months after doing this type of protocol and is still undetectable. They're getting good results with challenging cases with treatments that are maybe not exactly standard but make some sense.

Do you have any advice for other men in a similar situation?

John: I read too much. That's what my doctor said to me the other day. The current issue of US Too has a small article about the PSMA scan. The title is: "Experts Find Flaw in Prostate Cancer PET Imaging Technique." It said that researchers have discovered the potential for misdiagnoses by relying solely on prostate-specific membrane antigen (PMSA) PET imaging and prostate cancer staging. The authors found that there was this ligand update in cervical, coeliac, and sacral ganglia. I guess the bottom line is that the person reading these scans really has to know what they're doing so that they don't have false-positives.

Imaging has really helped with my treatment decisions. I'm doing it a little bit earlier than I would have otherwise. Maybe that will ultimately offer a better outcome. The radiation oncologist said that she thought there was a 70% chance that I could be cured by ADT plus radiation. It's always very powerful when a doctor uses the word cure. It's very easy to accept that and awfully hard to resist. I'd be happy with a durable, long remission. 

Prostate Cancer Imaging from US TOO

Educational resources and support services provided by Us TOO focus on providing content for informed decisions about prostate cancer testing, the option of active surveillance for newly diagnosed men, treatment options throughout the disease, and management of treatment side effects. Central to these topics are various types of imaging for the prostate that can provide valuable information for disease detection and treatment decisions. The following content from the Us TOO website can help facilitate a discussion about imaging between prostate cancer patients and their physicians.

Perhaps the most familiar type of imaging for prostate cancer is the transrectal ultrasound (TRUS). This technique uses sound waves for imaging to guide the placement of needles to biopsy the prostate or radioactive seeds for brachytherapy.

Imaging scans beyond the prostate aren't usually needed for newly diagnosed prostate cancers that are likely to be confined to the prostate gland based on other factors considered by the physician. Imaging to detect and help treat prostate cancer includes the use of x-rays for computed tomography

(CT) scan for detailed, cross-sectional images of the body. It's also known as computerized tomography and computerized axial tomography (CAT) scan.

While typically not part of an initial diagnosis of prostate cancer, a CT scan may help determine if prostate cancer has spread into nearby lymph nodes. It can also be used to determine whether or not the cancer has spread beyond the prostate. A CT is rarely helpful for men with newly diagnosed prostate cancer unless there is a high likelihood the cancer has spread, which can be estimated based on the PSA, digital rectal exam and Gleason score on the prostate biopsy.

CT scans are not as useful as magnetic resonance imaging (MRI) for looking at the prostate gland itself. MRI scans use radio waves and strong magnets to generate detailed images of soft tissue that a radiologist can examine to diagnose tissue abnormalities. The non-invasive technology involves various magnetic coils placed on the body. To improve the accuracy of the MRI, a probe called an endorectal coil may be placed inside the rectum when scanning the prostate.

MRI technology can guide biopsies, determine cancer stage, and identify if the cancer is contained in the prostate gland. Multiparametric MRI provides a detailed image of the prostate anatomy as well as shape and location of cancerous tumors – even those that are very small.

Dr. Stacy Loeb, Assistant Professor of Urology and Population Health at the New York University School of Medicine and Manhattan VA, discussed imaging during her presentation at the Us TOO Prostate Cancer Pathways event and webcast in Englewood, NJ, on September 29. "I think that multiparametric MRI is one of the most transformative advances in prostate cancer detection in the past decade," noted Dr. Loeb. "The combination of MRI and biomarkers provides a better indication when clinically significant prostate cancer is present and biopsy is needed."

Undergoing an MR or MRI is a relatively simple process in which the patient lays on a table that is inserted into a large scanner. The process usually takes between 15 and 60 min. It is a painless process, and those who undergo it should be able to return to their regular activity as soon as it is over.

Lying still in the machine may cause some discomfort for those prone to claustrophobia. But because it is important to remain as still as possible to get the clearest image, patients may be given a drug to calm their nerves during the process. In some cases a dye will be injected prior to the scan to make the images easier to read. The procedure does not expose the patient to ionizing radiation or any potentially allergy-inducing, iodine-based materials (such as used in x-rays or CT [computed tomography] scans).

Those with metal implants of any sort (such as a pacemaker) might not be eligible for the MRI test. Those with tattoos should talk to their doctors about how those inks, which may contain metal, can affect MRI accuracy. Those with liver or kidney problems should also talk to their doctors about how this might affect the possible need for any injection of ink or other contrast agents.


Positron emission tomography (PET) scans typically use a form of radioactive sugar which is absorbed by cancer cells making them visible on the image. Unlike a CT scan or MRI, a PET scan can detect metabolic changes earlier in an organ or tissue at the cellular level. This test usually is done when a patient has recurrent disease after primary local therapy.

A common site of metastasis for prostate cancer is the bones. A bone scan begins with an injection of low-level radioactive material that collects where bones are damaged. A special camera detects the radioactivity to create the image which can be used to help diagnose bone metastases. The bone scan is used much less often for two

reasons. The first is that men with a PSA under 20 ng/ml, a Gleason score under 8 and a DRE showing localized disease rarely have bone mets so the test is not useful. Secondly, a PET scan is now better at detecting bone metastases than the bone scan.

Image-guided technology is a good option for someone who has an increasing PSA (prostate-specific antigen) number and negative biopsy; or someone who has a rising PSA after undergoing a prostatectomy. While it can help inform those with a detectable prostate cancer, it may not help those with microscopic levels of prostate cancer. Not all cancer can be detected by a scan.

While there can be many positive aspects to the use of imaging technology, there are also some negative aspects that should be addressed. Depending upon the scan, it can be an expensive process that may not be covered by insurance companies. As for the results of the images related to diagnosis, false negatives and positives can each run at about 30%.

For more information on imaging technology and other prostate cancer educational resources and support services, visit www.ustoo.org, call 1-800-808-7866, or email ustoo@ustoo.org. To sign up to receive free prostate cancer news, including information and videos of the Prostate Cancer Pathways for Patients and Caregivers event and webcast series, visit <https://ustoo.org>. 



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