Perspective: Prostatic Artery Intervention

Nigel Hacking, BSc, MBBS, FRCP, FRCR, shares his experience in treating benign prostatic hypertrophy using the latest interventional embolic techniques.

How frequently is benign prostatic hypertrophy encountered in routine practice, and how does it typically present?

This is a very common disease, as it occurs in 50% to 60% of men older than 50 or 60 years of age and gets more and more common as age increases. It is a very serious health issue for men, which they should watch for beginning at age 50.

There are a number of symptoms that are referred to as "lower urinary tract symptoms." However, there are bladder conditions that can be similar to benign prostatic hypertrophy, as well as prostate cancer, but prostate hypertrophy is by far the most common cause of these symptoms. The symptoms include difficulty passing urine, slow urinary flow, hesitancy, difficulty starting, urgency, frequency, and repeatedly waking up at night to urinate. All of these different symptoms eventually become intolerable.

By what process do these patients find their way to your practice?

As an interventional radiologist working in the United Kingdom, I see all of these patients within a team approach through a urology clinic. The patient may contact me or the general practitioner contacts me directly, and if the patient seems to be a candidate for treatment, I will refer him to a urologist. At that point, the urologist and I assess the patient together to decide if he is suitable for treatment.

What is your threshold for treating benign prostatic hypertrophy, and how do you select the appropriate candidates?

I recommend treatment for a patient who has tried drug therapy but his symptoms are becoming unbearable, he has become resistant to the drugs, or his disease has progressed beyond the point that the drugs are working. It comes down to the symptoms. When a patient comes to us saying he can't live with these symptoms, we have to look at intervention. Then, it's a question of surgery or embolization.

As far as the procedure itself is concerned, what challenges does this specific disease pose?

This is unlike uterine artery embolization, which we're very competent and confident in performing, because these patients are generally younger than those who require prostate embolization. The additional 20 or 30 years allow arterial disease to progress. The technical challenge is to safely and accurately identify and cannulate the prostatic arteries using microcatheters on both the left and the right sides.

What is your preferred imaging for these procedures?

We follow the Portuguese protocols and use CT arteriography as our final arbiter. If the patient seems suitable, and the urologist is content to move forward with the procedure, we'll perform a CT to assess the volume of the prostate, as well as the ultrasound if that's been done. We then use CT arteriography to identify the vessels requiring treatment and to rule out major atheromatous disease.

Is there any specific training that you would deem necessary before performing the first case?

Yes, I think the operator needs to be very experienced in embolization techniques. Whether he or she is performing embolization in the fibroid sphere, oncologically,

or in arteriovenous malformations, catheter (particularly microcatheter) expertise is certainly required.

How would you describe the current and emerging treatment options?

The usual first-line therapy for a man with the previously described symptoms is to introduce lifestyle changes (eg, drink fewer liquids at night, use the bathroom regularly, and so on). There are also various medications that undoubtedly improve symptom scores to a certain degree. If those medications fail to relieve the symptoms, and the patient is looking for another treatment option, then surgical transurethral resection of the prostate (TURP) is the gold standard procedure. However, it can only be used for prostates up to a certain size, and it has a well-recorded morbidity, with complications including retrograde ejaculation and blood loss during the procedure. Patients are admitted for 1 to 3 nights in the hospital, and there is a recurrence rate of approximately 20% in the 10 years after the procedure.

There are a number of other minimally invasive therapies that urologists have on hand (although none have really taken off); the GreenLight laser (American Medical Systems, Minnetonka, MN) is perhaps the most popular. Embolization might be used instead of drugs, which would be interesting to study to assess how they compare (ie, do you get the same symptomatic relief with embolization compared to drug therapy?). It may also help men who have been on these drugs but are still dealing with side effects (commonly, impotence and loss of libido) and are therefore looking for another treatment option. However, it's probably not as helpful for elderly patients (ie, the 80 years and older group), because arterial disease may well prevent us from performing this procedure.

There are two large centers, as well as our own in Southampton, that perform a significant number of prostate artery embolizations. The European experience is with Cook's polyvinyl alcohol (PVA) particles (Cook Medical, Bloomington, IN), and they seem to work very well. This is by far the largest experience in the world. I'm aware of a Brazilian group that has been using Embospheres (Merit Medical Systems, Inc., South Jordan, UT), and they're seeing good results as well. We've taken the European option in going down the PVA route, and our initial results are very promising.

Could you describe your study and some of your initial findings?

We commenced a carefully controlled clinical introduction or pilot study in 2012. We've gone through the National Institute for Health and Care Excellence, and although the results aren't fully mature, we're now seeing 3-month follow-up results from most of our first 20 patients. These results are similar to what other international groups have reported (ie, about 80% symptomatic improvement). In terms of the International Prostate Symptoms Score, it has gone from an average score of 26 at pretreatment, which equates to severe lower urinary tract symptoms (LUTS), to approximately 11 to 13 points at 3 and 6 months, which means a significant improvement in symptoms.

For volume reduction of the prostate, although that doesn't correlate well with symptoms, we are seeing an average volume reduction of 25% at 3 months, which again is very similar to previous findings.

How has the patient feedback been?

So far, it has been very good. Most have been performed as day cases, and that is a dramatic change from surgery. Actually, it's an improvement even from fibroid embolization, which can be very painful. This procedure is relatively painless; there's only a little bit of discomfort when sitting down and passing urine for about 2 to 5 days. However, a mild-to-moderate analgesia can relieve this.

I discuss with the patients what they can expect from the procedure at great length beforehand. I would do this normally, but part of the study protocol is informing them of potential risks and what outcomes to expect. We have been guided, particularly by the Portuguese team, to explain that some men might have a small amount blood in their urine (approximately 10%) or in the seminal fluid (an even less frequent occurrence), which can be quite alarming if you haven't been warned.

Is this procedure more cost effective than the previous options, including surgery?

It's probably a bit premature to know this for certain. We are assessing the radiation costs, which are low if you have an experienced operator who has performed a lot of cases, as screening times and radiation doses are dropping. In terms of the procedure cost itself, it is about two-thirds of the cost of surgery, but this of course depends on the recurrence rate. It is too early for us to say, but the larger studies are estimating a 4% or 5% recurrence rate at 3 years.

Can you describe the utility of PVA particles and why they work particularly well in these challenging cases?

We've performed a 20-case monitored clinical introduction. We use a very small quantity of one of the

smallest PVA particles, and we're finding that it does not clump catheters, which has always been a concern with some of the larger PVA particles. We haven't seen any microcatheter clumping, the results so far have been very good, and the safety profile is excellent. There are no comparative studies that have been performed to date to show that one type of particle is better than the other, but certainly, PVA works very well.

Are there any specific characteristics, other than the size, that you would say lend it to successful treatment?

The lack of microcatheter occlusion is vital. It takes a long time to get the microcatheter into the prostatic vessels, and if we lose the position because of a blocked microcatheter, that would lead us to change the agent.

How do you prepare the PVA and decide on particle size?

The way we use the PVA at the moment is determined by the size and the vascularity of the prostate. The smaller and less vascular it is, the more likely we are to use the smaller, 100-µg PVA. We dilute the PVA with 40 mL of half contrast and half saline, and that reduces clumping. For a moderate-to-large prostate, we'll upsize to 200 µg to complete the embolization.

I have not used anything larger, but if it were a very large, very vascular prostate, I might consider going larger. However, I don't think we've seen the evidence yet to say that bigger is necessarily better. Generally, I would start small and move up.

Nontarget embolization is something urologists are just beginning to learn about, as there are concerns about damaging the bladder, rectum, or genitals. That's where operator experience and training is of critical importance.

Is there anything specific that you've learned from case 1 to case 20 that you would now do routinely if you were to start case 1 again today?

Yes, I think that the ideal candidates for embolization are closer to 60 years of age than 80, with large prostates, which surgeons do not like to treat. With large vessels and large prostates, we're likely to be able to gain access in virtually all cases and achieve shrinkage (and therefore, symptomatic improvement).

We didn't perform urodynamics in the first one or two cases. In retrospect, I think in the second case, although his prostate was large, it wasn't causing obstruction, and the symptoms weren't all that severe. Therefore, although we achieved volume reduction in the prostate, there was no improvement in symptoms. I think had we done urodynamics in that patient, we might have excluded him from the trial.

I believe that a very accurate diagnosis is vital to success.

How would you describe your routine follow-up procedure?

As part of the study, we evaluated the patients at 1, 3, 6, and 12 months. I think that when this procedure becomes clinically established, we won't need to see them quite that often—perhaps one follow-up visit at 6 months, as usually all symptomatic improvement has been seen by 3 or certainly 6 months. A 6-month evaluation would be best and again if and when symptoms recur down the line.

What markers for success are you looking for on completion angiography?

We are looking for stasis or near-stasis in the artery. When we initially inject the contrast, it will fly down into the prostate. Toward the end, we have lost all the little branch vessels within the prostate, and the main prostatic artery has either static or very sluggish forward flow. This would be the ideal endpoint.

Without microcatheters, would these outcomes have ever been possible?

No, I don't think they would. With fibroid embolization, the microcatheters are optional, and you only need them in some cases. With prostate embolization, microcatheters are almost invaluable. Occasionally, you'll see a large vessel that does not require a microcatheter, but I think that in 80% to 90% of cases, the use of at least one microcatheter would be needed.

This is why you sometimes need a second pair of hands. We're working with two interventional radiologists, as they do in Portugal. If it's a straightforward case, it requires only one person, but if it's challenging, you may need a third or even a fourth hand to manipulate.

Who is on your team?

At the moment, there's one urologist and two interventional radiologists. The urologist sees all of the patients beforehand and at follow-up, and the two interventional radiologists work together as a team on the vast majority of cases.

Do you have any advice for others who would like to set up a team like yours?

My advice would be to speak to your urologist early. I don't think this is necessarily going to reduce the overall surgical rate, but it may delay it for a younger man for

5 or even 10 years during a time when they're perhaps most sexually active and aren't ready for the possible complications that the surgery implies (eg, retrograde ejaculation and possible impotence).

We assess erectile function both before and after the procedure, and in the European studies, Brazilian studies, and our own, we haven't noticed any reduction in erectile function with this embolization procedure. Again, for these younger men with the large prostates, that's vital.

Which areas of study do you plan to focus on next?

In the United Kingdom, we're working on a combined interventional radiology/urology registry with the National Institute for Health and Care Excellence and the British Society of Interventional Radiology and British Society of Urological Surgeons. This is a joint venture, and we are meeting in the next few weeks in hopes of getting that up and running later in the year.

Many people will want to see randomized, controlled trials. I personally believe that the data is still a bit immature to compare against the surgical option (TURP), and they are slightly different animals. I think a comparison with drug therapy or a comparison with surgery in patients with large prostates would be something urologists would like to see. This would help them to decide whether to start a patient on drugs or offer him an interventional solution without the complications of the side effects of the drugs. It would also address how to treat very large prostates and if it is possible to manage them definitively with embolization. ■

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