

CASE REPORT

Embozene Loaded Prostatic Artery Embolization

Ezamin Abdul Rahim¹, Ridzuan Abdul Rahim², Azzam Baseri Huddin¹, Nik Azuan Nik Ismail³, Mohd Naim Mohd Yakob¹

¹ Department of Imaging, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

² Department of Radiology, National Cancer Institute, Jalan P9, Pusat Pentadbiran Kerajaan Persekutuan Presint 7, 62250 Putrajaya, Malaysia

³ Department of Radiology, Hospital Canselor Tuanku Muhriz UKM, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia

ABSTRACT

Herein is a case report of a 70 years old man with a tenacious benign prostatic hyperplasia (BPH). The aim of this manuscript is to briefly discuss the usage and advantage of Embozene™ Microsphere in embolization of the prostate arteries in the treatment of failed medical and surgical therapy for BPH.

Keywords: Radiology, Interventional, Embolization, Prostate hyperplasia

Corresponding Author:

Ezamin Abdul Rahim, MMed (Radiology)

Email: drezahar@gmail.com

Tel: +603-97692512

INTRODUCTION

Benign prostatic hyperplasia is a common disease of men 50 years and above. Medication is the most popular and effective treatment. There are groups of patients who failed oral medications and unfortunately not suitable for standard Transurethral resection of the prostate (TURP) treatment. The most common reason is due to poor cardiac status. These cohort of patients may ended up with long term CBD due to acute urinary retention. Prolong bladder catheterization is always associated with urinary tract infection, bladder calculi, prostatitis and later possible bleeding of the prostate gland (1).

There are other alternative therapy other than surgery. It is worth to mention alternative treatment which is popularly known as Minimally Invasive Surgical Therapy (MIST) such as Urolift (prostatic urethral lift) and Rezum (water vapor thermal therapy). Other than MIST, another definitive therapy for example; tissue removal using HoLEP (Holmium Laser enucleation of the Prostate) is considered as minimally invasive. It is debatable that this new kind of treatment fared better than the previous standard surgical treatment.

Prostate artery embolization (PAE) is one out of many minimally invasive procedure treatment. PAE is recommended for patients who are not suitable for anaesthesia or surgery and the procedure is considered

as minimally invasive. The rationale of PAE is to block the right and left corresponding prostatic arteries using embolic particles. The biggest advantage of this treatment is only require local anaesthesia. It is worthy to note that the prostate gland is a walnut size organ; thus, generating less cytotoxic symptom during the ischaemic phase compared with other organs such as liver which the post-embolization syndrome symptoms are more severe.

CASE REPORT

A 75-year-old man who was diagnosed with a longstanding BPH was presented with a 4- month's history of gross haematuria secondary to bleeding prostate gland. He has been on a long-term bladder catheterization for 3 months. The documented prostate size were varied during ultrasound follow up but we estimated the prostate size to be at about 60mls. He has been unresponsive to medication despite on long term medical therapy. He had an International Prostate Symptom (IPSS) score of 26. He was not fit for TURP due to unfavourable cardiac status. He was then offered to be treated endovascularly.

The procedure was done under local anaesthesia with a single puncture at the right femoral artery. A 5Fr sheath inserted followed by a 4Fr C1 Cobra (Cook Medical) catheter for left internal iliac artery cannulation and Robert's uterine catheter (RUC) for right internal iliac artery cannulation. Super selective cannulation of the prostate arteries is done using a 2.0Fr Progreat (Terumo) micro-catheter with a Fathom (Boston Scientific) 0.014" steerable micro-guidewire. Angiogram of the prostate

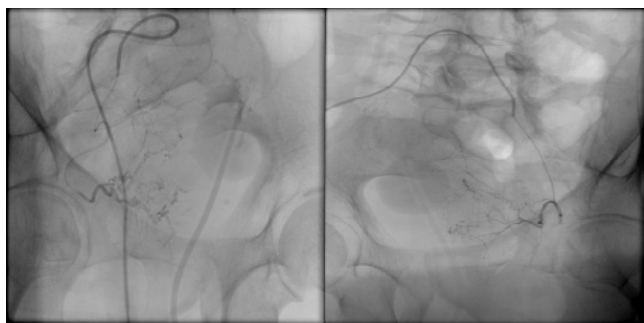


Figure 1a

Figure 1b

Figure 1: (1a) Super selective cannulation of right prostate artery showing right prostate artery vasculature. (1b) Super selective cannulation of the left prostate artery showing its vasculature.

arteries was done to check for collateral circulation and to confirm prostate gland supply (Figure 1). It is good to note any presence of non-targeted vessel, or artery arterial variant at the region of interest. A trial of injection using half contrast strength is advisable. This is for the operator to gauge the amount of pressure needed to administer the particles.

A single vial of Embosphere TM Microsphere (Boston Scientific) microspheres (300 µm) mixed with contrast material was used. The microsphere was administered by using the “PErFecTED” technique (1). This technique involves two stages; the proximal then follow by distal embolization of the inferior vesical artery. The particles are delivered in a slow injection from a 1cc syringe followed by slow saline and fast saline injections via a 1cc and 3 cc syringes repetitively. This special embolization technique maximizes particle impaction into the deep prostate gland arteries with the aim of total embolization of the prostate arteries.

Right and later left (non-contrast) Cone beam CT scan were commenced immediately after each embolization. The findings showed good persistent contrast stasis in the entire prostate gland cumulatively suggestive of internal blood flow stasis (Figure 2). No CT scan evidence of non-target embolization of surrounding tissues was detected. Total procedure time is approximately 3 hours. The

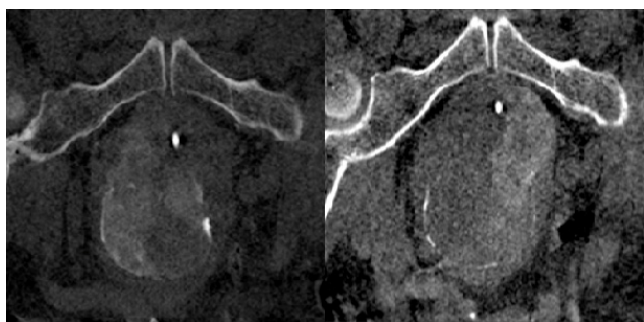


Figure 2a

Figure 2b

Figure 2: (2a) Non-contrast cone beam CT of right prostate gland post embolization showing contrast stasis (opaque area). (2b) Non-contrast cone beam CT of left prostate gland post embolization showing contrast stasis (opaque area)

haematuria was stopped immediately. The indwelling catheter was removed a week later. The patient was then able to void normally at 10 days post procedure. He did not turn up for subsequent follow up and cited that the reason was he was already normal.

DISCUSSION

BPH is not a life-threatening but a debilitating disease. Global modernization has contributed to the prolonged human life expectancy causing the prevalence of BPH to be increasing in trend. It is postulated that the prostate gland may grow as much as 1.2 gram per year (for men ages 50-90 years old) (1).

Under normal uncomplicated circumstances, the treatments of choice are oral medications, transurethral resection of the prostate (TURP) and radical prostatectomy in suitable cases. However, there are group of patients who responded poorly to oral medications and are not suitable for invasive procedures such as TURP / surgery, mostly due to underlying poor cardiac status.

Prostate artery embolization (PAE) is an alternative treatment in a patient with “recalcitrant” BPH who are not suitable for invasive therapy. The most profound advantage is this procedure is that it is performed under local anaesthesia and it is minimally invasive. The procedure involves catheterizing both internal iliac arteries and selective cannulation of the prostatic arteries using suitable micro-catheters. Small particles were injected through the microcatheter, to embolize the selected prostatic arteries and hence resulted in infarction of both lobe of the prostate gland. The “super-selectiveness targeted” therapy is making this alternative treatment popular. It is worthy to mention that, other trial treatments that are still controversial for recalcitrant BPH such as intra-prostatic urethral stenting which may be complicated by stent migration, Botulinum toxin A injection which the efficacy is still in question and ethanol injection procedure that may cause severe prostate necrosis.

In regards with PAE, the procedure was first described in 2000, of a reported case of bleeding enlarged prostate gland which was effectively controlled by embolization of bilateral prostate arteries. The procedure was also able to reduce the prostate gland size resulting in improvement of LUTS for the patient. Further improvement of the procedure was done by Carnevale et.al in 2016, with super- selective cannulation of deep prostate arteries prior to embolization to achieve significant improvement of LUTS as well as reduction of prostate gland size (1).

Preceding studies have shown that PAE is not superior to TURP in BPH, but it does significantly reduce the hospital stay duration. It has been suggested that PAE is less likely to cause retrograde ejaculation (2). The

selection of treatment must be based on the best clinical and imaging outcome which reduces the chances of a possible complication. A study by Wang et al suggested that PAE is advantageous in the treatment of large prostate (>80mls) as compared to the intermediate volume of prostate (50-80) (3). Thus, it is important for the clinician to choose the "correct" candidate suitable for PAE. In our institution, the treatment is offered for those who have prostate volume more than 80mls, who have failed medical therapy or who are medically unfit for more invasive TURP or prostate surgery regardless of its size. Our target is for the patient to achieve International Prostate Symptom Score (IPSS) to be lesser than 18. Most of post PAE treatment showed clinical improvement of the peak urinary flow rate (Q_{max})>10 ml/s (2) and (Q_{max})>4ml/s (3).

Embolic agents used in prostate artery embolization include gel foam, polyvinyl alcohol (PVA) and microspheres. PAE is a fairly new procedure, there are no studies done to suggest which embolic agent that is more superior for the procedure. However, a study done by Hwang et.al has suggested that using microspheres as embolic agents for PAE results in a larger reduction in prostate gland size than PVA. This is due to the ability of the microspheres to deform within the small blood vessels causing more effective blockage. Although, a study by Fernandes et.al mentioned that there are not much differences in complication and pain severity after PAE by using either 300-500 µm microsphere or 100+200 µm PVA particle (4).

The synthetic nature of Embolene claimed to be lesser susceptible to an allergic reaction. A study done by Laurent et.al on sheep kidneys showed Embolene microspheres were able to occlude arterial vessels more distally due to its ability to deform and reduced its size (5). This ability is probably beneficial to effectively occlude distal small arteries as within the prostate gland.

CONCLUSION

Prostate artery embolization (PAE) is another alternative treatment for patients contracted with recalcitrant BPH who are not suitable for surgery. The usage of microspheres as an embolic agent is presumably superior to PVA particles in achieving good results of PAE. Further

studies with a larger cohort need to be done to address the question of which size of the embolic agent is the best.

ACKNOWLEDGEMENT

This case is part of a study that was supported by grant (GP-IPS/2018/9663600) from Universiti Putra Malaysia. The authors like to thank the patient the kind permission in the publishing of this case report.

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