Case Report

Prostatic Artery Embolisation for Refractory Haematuria in Advanced Prostate Cancer: A Case Report of PSA Normalisation

Mogaraj S (✉), Mohammad Hifzi Mohd Hashim, Lim Li Yi, Zulkifli Md Zainuddin

Urology Unit, Department of Surgery, Faculty of Medicine, Universiti Kebangsaan Malaysia, 56000 Cheras, Kuala Lumpur, Malaysia

Abstract

Prostatic artery embolisation (PAE) is a well-established minimally invasive procedure for the management of lower urinary tract symptoms secondary to benign prostatic hyperplasia. In patients with advanced prostate cancer, its primary role has been palliative, particularly for controlling refractory haematuria. However, emerging evidence suggests that PAE may offer additional cytoreductive benefits. We presented the case of an 85-year-old male with advanced prostate cancer and multiple comorbidities, including severe aortic stenosis and stage 4 chronic kidney disease, who developed refractory gross haematuria unresponsive to conservative management. Due to high surgical risk, bilateral PAE was performed via a single right femoral artery access. The procedure resulted in complete resolution of haematuria, allowing early catheter removal. Remarkably, his prostate-specific antigen (PSA) declined from 5.28 ng/mL to 0.45 ng/mL over seven months, in the absence of systemic therapy. The patient remained haematuria-free with improved voiding symptoms. This case highlights the effectiveness of PAE for haemostatic control in advanced prostate cancer and suggests potential cytoreductive effects, evidenced by sustained PSA normalisation. PAE may serve a dual role in symptom control and disease modulation in patients unsuitable for surgery or systemic therapy. Further studies are warranted to explore its oncologic impact.

Keywords: Minimally invasive therapy; palliative urology; prostatic artery embolisation; prostate cancer; PSA normalisation; refractory haematuria

Correspondence:

Mogaraj Sellapan. Department of Surgery, Faculty of Medicine, Universiti Kebangsaan Malaysia, Jalan Yaacob Latiff, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur. Malaysia. Tel: +6012 7747401 E-mail: mogaraj88@gmail.com

Date of submission: 06 Oct, 2025 Date of acceptance: 28 Oct, 2025

Introduction

Prostatic artery embolisation (PAE) is a minimally invasive with technique that is being used increasingly to manage lower urinary tract symptoms (LUTS) associated with benign prostatic hyperplasia (BPH), offering symptomatic relief through targeted ischemic reduction of prostatic tissue. Large prospective cohorts and meta-analyses report sustained improvements in International Prostate Symptom Score, prostate volume and quality of life, with favourable safety profiles compared to surgical alternatives (1).

In patients with prostate cancer, PAE has traditionally been reserved for palliation, primarily to control refractory haematuria. A systematic review identified that up to 67% of prostate cancer patients with treatment-resistant bleeding experienced resolution of haematuria following PAE (2). Another case report illustrated the successful use of super selective PAE to rapidly control severe haematuria due to neuroendocrine-differentiated prostate cancer (3).

Over the past decade, PAE has transitioned from an experimental approach to an established minimally invasive therapy. The European Association of Urology and American Urological Association guidelines acknowledge PAE as a palliative option in selected prostate cancer patients with persistent bleeding (4). Nevertheless, consensus guidelines

highlight the need for additional prospective studies to clarify its precise role in oncologic disease control. Furthermore, advancements in imaging guidance and embolic materials have refined procedural safety and technical success, broadening the potential indications of this intervention.

Here, we presented the case of an elderly patient with advanced prostate cancer and refractory haematuria who underwent bilateral PAE. Beyond achieving effective haemostasis and symptomatic relief, the procedure was associated with sustained prostate-specific antigen (PSA) normalisation, suggesting potential cytoreductive effects worthy of further investigation.

Case report

An 85-year-old male with multiple comorbidities, including type 2 diabetes mellitus, hypertension, prior cerebrovascular accident, aortic stenosis and stage 4 chronic kidney disease, was diagnosed with low-risk prostate cancer in 2013 (PSA 22 ng/mL; Gleason score 3+3). He received radiotherapy in 2015, followed by androgen deprivation therapy in 2016, achieving a PSA nadir of 0.03 ng/mL.

In 2022, his PSA rose to 5.28 ng/mL, but he declined further oncologic evaluation or treatment. In May 2024, he presented with persistent painless gross haematuria associated with blood clots. The haematuria persisted for over a week despite continuous bladder irrigation, and multiple episodes of bedside bladder flushing were required to evacuate retained clots. His haemoglobin dropped to as low as 7.0 g/dL, necessitating transfusion of four units of packed red blood cells.

Ultrasound revealed clots within the bladder and an enlarged prostate. Flexible cystoscopy showed diffuse oozing from raw prostatic surfaces, with no identifiable bleeding spurter. In view of the high anaesthetic risk posed by severe aortic stenosis, the patient was deemed unsuitable for surgical interventions such as clot evacuation, transurethral resection of the prostate or cystodiathermy under general anaesthesia.

Given the failure of conservative measures and elevated surgical risk, PAE was pursued. The risk of contrast-induced nephropathy was counselled before the procedure, and consent was obtained from the patient. Pre-procedure, the patient was put on intravenous hydration. The procedure was performed via a single right femoral artery access, and bilateral embolisation was successfully completed without complications (Fig. 1 & 2). Remarkably, irrigation was discontinued on postoperative day one, and the urethral catheter was removed the following day. Post procedure, intravenous hydration was continued, repeated renal profile noted no worsening derangement.

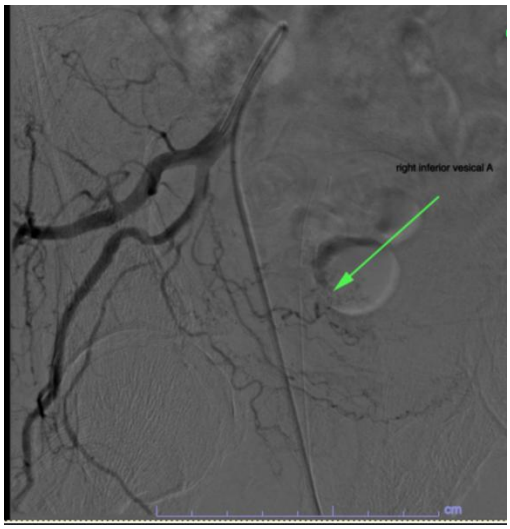

FIGURE 1: Embolisation of right inferior vesicle artery

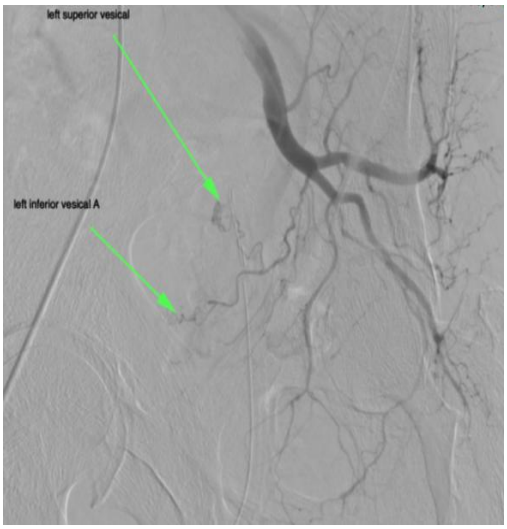

FIGURE 2: Embolisation of left superior and inferior vesicle artery

Pre-procedural computed tomography angiography was performed to delineate pelvic vascular anatomy and assess potential non-target embolisation risks. The procedure was conducted under local anaesthesia with conscious sedation. Selective catheterisation of prostatic arteries was achieved using a 2.0-French microcatheter. Embolisation was performed with calibrated microspheres measuring 300-500 μm until stasis was confirmed fluoroscopically. The entire procedure duration was approximately 90 minutes. Post-procedure, the patient was monitored overnight for haematuria recurrence, pain and signs of infection. Analgesia requirements were minimal, limited to oral paracetamol, and no peri-procedural complications occurred. He was discharged on postoperative day two with instructions for close outpatient follow-up.

At three-month follow-up, his PSA had decreased to 0.98 ng/mL, with further decline to 0.45 ng/mL at seven months. The patient reported significant improvement in voiding symptoms and remained haematuria-free.

Discussion

PAE is well-established for relieving LUTS in BPH and is increasingly applied for palliative management in prostate cancer (5,6). By occluding the arterial supply to the prostate, PAE induces ischemic necrosis, leading to symptomatic relief.

Beyond palliation, emerging studies and case reports suggest that PAE may have cytoreductive potential in prostate cancer (7-10). In a pilot study, Burkhardt et al. observed focal tumour necrosis in selected patients following PAE, although the decline in PSA levels was modest (8). Similarly, Mordasini et al. reported histological tumour regression in prostatectomy specimens post-embolisation, although viable malignant cells remained (9).

In the present case, PSA normalisation was sustained for more than seven months following bilateral PAE, in the absence of systemic therapy. This is particularly notable, as such responses are rarely documented post-PAE in patients with a history of radiotherapy and long-standing disease. While ischemic injury to the tumour's neovascular supply is the most plausible explanation, other mechanisms may also contribute (2). Some hypotheses suggest that PAE-induced ischemia may disrupt the androgenic microenvironment within the prostate, potentially modulating tumour growth indirectly through hormonal pathways, though this remains speculative.

Moreover, most existing studies on PAE in prostate cancer focus on symptomatic relief or haemostatic outcomes. Incorporating multiparametric magnetic resonance imaging (MRI) before and after PAE could provide objective radiological correlates of tumour perfusion, vascularity, and necrosis, potentially allowing better characterisation of its cytoreductive effects. A pilot study using multiparametric MRI in patients with advanced prostate cancer found significant tumour necrosis (≥50%) in one patient post-PAE, although most showed persistent viable tumour by 12-week follow-up [1]. In this case, the sustained PSA decline suggests that such imaging biomarkers could be valuable in future research.

From a clinical standpoint, this case is also relevant for real-world practice. Frail elderly patients with advanced prostate cancer often fall into a therapeutic gap, deemed unfit for surgery or systemic therapy, yet suffering from complications such as refractory haematuria. In such scenarios, PAE offers a minimally invasive, well-tolerated option that may improve quality of life and even influence disease trajectory (1,2).

This case contributes to the growing body of evidence suggesting that PAE may offer benefits beyond palliation, particularly in select patients who are unsuitable for conventional treatments. While the precise oncologic role of PAE remains unclear, our findings support the need for prospective studies with long-term follow-up to validate its potential dual function, as both a haemostatic and cytoreductive intervention, in the management of prostate cancer.

Notably, the degree of PSA decline in this patient exceeded that typically reported in similar contexts. In the prospective study by Burkhardt et al., median PSA reduction was modest, highlighting the uniqueness of this case (1). However, limitations must be acknowledged, including the lack of histopathological confirmation of tumour necrosis and the inability to exclude other factors contributing to PSA suppression. Moreover, as a single case report, these observations are hypothesis-generating rather than definitive evidence. Incorporation of functional imaging modalities, such as multiparametric MRI and Positron Emission Tomography–Computed Tomography (PET-CT), in future studies could improve characterisation of tumour viability post-embolisation. Ultimately, consensus guidelines still consider PAE primarily as a palliative measure for haematuria control, and its oncologic implications remain to be conclusively determined.

Conclusion

PAE is a safe and effective option for controlling refractory haematuria in patients with advanced prostate cancer who are unfit for surgery or systemic therapy. In this case, bilateral PAE not only achieved rapid and sustained haemostatic control but also was also associated with PSA normalisation lasting beyond seven months. While the cytoreductive potential of PAE remains to be fully elucidated, this case highlights its possible oncologic implications. PAE may offer dual benefits, symptom relief and disease modulation in selected patients. Further prospective studies are warranted to better define its role in the management algorithm of advanced prostate cancer.

Funding: The authors received no financial support for this study.

Conflict of Interest: The authors declare that there was no conflict of interest.

Ethics Statement: Informed consent was obtained from the patient for publication of this case report.

References

1. Burkhardt O, Abt D, Engeler D, Schmid HP, Müllhaupt G, Zumstein V. Prostatic artery embolization in patients with prostate cancer: A systematic review. Eur Urol Focus 2024; 10(3): 387-99.

2. Naidu SG, Narayanan H, Saini G, et al. Prostate artery embolization - Review of indications, patient selection, techniques and results. J Clin Med 2021; 10(21): 5139.

3. Deng L, Li C, He Q, et al. Superselective prostate artery embolization for treatment of severe haematuria secondary to rapid progression of treatment-induced neuroendocrine prostate cancer: A case report. Onco Targets Ther 2022; 15: 67-75.

4. Moramarco L, Grande AM, Vertemati M, Aseni P. Prostate artery embolization in the treatment of massive intractable bleeding from prostatic neoplasms: A case report and systematic review. J Clin Med 2024; 13(1): 65.

5. Malling B, Røder MA, Lindh M, Frevert S, Brasso K, Lönn L. Palliative prostate artery embolization for prostate cancer: A case series. Cardiovasc Intervent Radiol 2019; 42(10): 1405-12.

6. Kozyrakis D, Konstantinopoulos V, Papaspyridakos P, et al. Prostate artery embolization as an effective treatment for clinically significant prostate cancer-related hemorrhage: A case report. Exp Ther Med 2025; 29(2): 26.

7. Chen JW, Shin JH, Tsao TF, et al. Prostatic arterial embolization for control of hematuria in patients with advanced prostate cancer. J Vasc Interv Radiol 2017; 28(2): 295-301.

8. Burkhardt O, Abt D, Hechelhammer L, Schmid HP, Müllhaupt G, Zumstein V. Prostatic artery embolization in patients with advanced prostate cancer: A prospective single center pilot study. Cardiovasc Intervent Radiol 2024; 47(5): 771-82.

9. Mordasini L, Hechelhammer L, Diener PA, et al. Prostatic artery embolization in the treatment of localized prostate cancer: A bicentric prospective proof-of-concept study of 12 patients. J Vasc Interv Radiol 2018; 29(10): 1-9.

10. Golzarian J, Antunes AA, Bilhim T, et al. Prostatic artery embolization to treat lower urinary tract symptoms related to benign prostatic hyperplasia and bleeding in patients with prostate cancer: Proceedings from a multidisciplinary research consensus panel. J Vasc Interv Radiol 2014; 25(5): 665-74.