Safety and Outcomes of Prostate Artery Embolization in Patients with Standard and Non-Standard Anatomy

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Introduction

- Prostatic artery embolization (PAE) is a recognized treatment for lower urinary tract symptoms (LUTS) associated with benign prostatic hyperplasia (BPH).
- Variations in prostatic artery anatomy have been linked to increased procedural challenges.[1,2]
- However, the effects of anatomic variation on clinical outcomes remains uncertain.

Purpose

This study evaluates the clinical differences between patients with non-standard anatomy (NSA) and standard anatomy (SA).

Methods

- Study Design: Single-center, retrospective analysis of 145 male patients with LUTS caused by BPH treated with PAE (2020–2023).
- Patient Groups:
  - Standard Anatomy (SA): Carnevale Types 1–4.
  - Non-Standard Anatomy (NSA): Type 5
- Procedure Details:
  - 300–500 µm embolic particles used.
  - Performed under angio-CT
  - Pelvic angiography and cone-beam CT verified catheter placement and embolization success.
- Statistical Analysis: Student's t-test with $p<0.05$ as significance threshold.

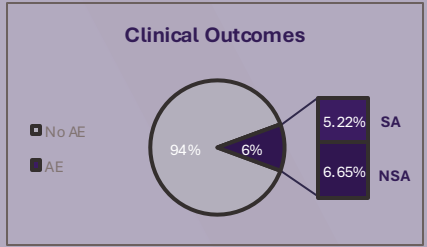
Results

Prostate Artery Type	Origin	Anatomy classification	Patients	Age (years)	Technical Success
Type I	Common trunk with SVA	SA	114	68.56 ± 7.71	97%
Type II	Anterior division of IIA, inferior to SVA				
Type III	Obturator Artery				
Type IV	Internal Pudendal Artery				
Type V	Other Anatomical Variations	NSA	30	65.40 ± 8.02	93%

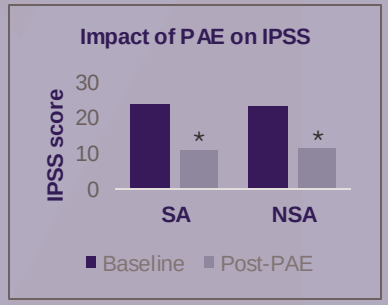
Table 1. Classification of Prostate Artery Anatomy, Patient Age, and Technical Success in PAE. Summary of prostate artery anatomy classification as SA/NSA based on Carnevale's system, average patient age at the time of PAE treatment, and technical success rate, defined as bilateral embolization success.

Anatomy classification	SA	NSA	
Fluoroscopy time (min)	64.36 ± 25.10	64.01 ± 8.03	P=0.94
Procedure time (min)	191.75 ± 49.06	195.77 ± 45.75	P=0.69

Table 2. Comparison of Fluoroscopy and Procedure Times Between SA and NSA Groups



Graph 1. Clinical Outcomes Post-PAE in patients with NSA and SA. Adverse events (AE) were reported in 6.65% of NSA patients and 5.22% of SA patients. All were Grade 1.



Graph 2. Impact of PAE on IPSS. Both groups (NSA/SA) showed significant improvements ($p<0.0001$) in IPSS from baseline (NSA: 23.17 ± 5.40, SA: 23.46 ± 6.12) to follow-up (NSA: 11.07 ± 7.54, SA: 10.73 ± 7.63).

Conclusion

PAE is a viable and effective treatment for LUTS caused by BPH, with a 96% technical success rate and similar results in both SA and NSA patients, demonstrating its safety across various anatomical differences.

References