

## PROSTATIC ARTERY EMBOLIZATION TO FACILITATE INTERMITTENT CATHETERIZATION IN ELDERLY PERSONS WITH SPINAL CORD INJURY

### Hypothesis / aims of study

Prostate volume reduction following prostatic artery embolization (PAE) was first reported in 2000 and has since been developed as a minimally invasive alternative treatment for benign prostatic hyperplasia (BPH). In older population of spinal cord injured persons (SCI) is common to find BPH and bladder outlet obstruction as obstacle to perform intermittent clean catheterization (CIC). In this case series, we assessed the safety and efficacy of PAE for reducing prostate volume in four elderly patients with spinal injury that experienced complicated CIC due to concurrent BPH.

### Study design, materials and methods

Case series: *Patient 1*: 80-year old patient with paraplegia due to spinal cord compression at T10-L1 by a cavernous angioma AIS B presented with concurrent arterial hypertension, hepatitis C, stage II sacral decubitus ulceration, and history of aortic valve replacement with a biological prosthesis. *Patient 2*: 72-year old patient presented with C4 tetraplegia AIS A following a cycling accident that had required respiratory support and intensive care. *Patient 3*: An 88-year old patient with impairment following a backward fall due to pathology at C7 AIS B and with a history of renal calculi, coronary artery disease requiring placement of multiple stents. *Patient 4*: 66-year old patient presented with impairment due to trauma C5 from a fall off of a ladder AIS B. All patients experienced hematuria and/or urethral trauma during CIC due to BPH. Embolization was performed under local anesthesia with superselective catheterization of the prostatic arteries, and technical success was defined bilateral embolization. Prostate volume was assessed before and after PAE by a single operator. Unilateral femoral access was used to perform embolization from positions in the inferior vesical artery (IVA): an initial proximal position just beyond any collateral branches to adjacent structures, and then from distal positions within the intraprostatic branches of the IVA. Progreat 2.0 microcatheters (Terumo, Tokyo, Japan) and Phantom 0.016 (Boston Scientific, Boston, MA, USA) or BMW Hi-Torque Balance Middleweight Elite 0.014 (Abbott Vascular, Abbott Park, IL, USA) guide wires were used to superselectively catheterize arterial branches to be embolized, and 300-500µm Embosphere Microspheres® (Merit Medical, South Jordan, UT, USA) were used to occlude the prostatic arteries. Procedure technical success was defined as bilateral embolization.

### Results

Three of the four PAE procedures were technically successful (75% bilateral PAE, 25% unilateral PAE), and all four patients experienced significant prostate volume reduction. Prostate volume decreased from 41mL to 10mL (75.6% reduction) in the first patient, 42mL to 8mL (80.9% reduction) in the second, 105mL to 26mL (75.2% reduction) in the third, and 39mL to 4mL (89.7% reduction) in the fourth, for a mean prostate volume reduction of 80.4%. All patients were able to transition from indwelling bladder catheters to CIC, and no procedure-related adverse events occurred.

### Interpretation of results

The results of the current case series are consistent with those in the PAE literature, with the notable exception of the magnitude of prostate volume reduction. Previous investigations have reported mid-term prostate volume reductions ranging from 19.2% to 52.7% in the 3 to 6 months following PAE, with a trend toward improved volume reduction and symptom relief following bilateral rather than unilateral embolization. Among our patients – three of whom received bilateral embolization and one of whom received unilateral embolization – mean volume reduction following PAE was 80.4%. PAE is thought to address both the static and dynamic components of BPH by debulking the enlarged gland and reducing intraprostatic innervation; it is possible that the increased volume reduction observed in our patients arose due to the synergistic effects of prostate ischemia due to embolization and the absence of trophic stimuli due to SCI.

### Concluding message

PAE is a safe and feasible method of reducing prostate enlargement due to BPH in order to facilitate CIC for bladder management in patients with spinal injury. Prostate volume reduction following PAE appears to be greater in these patients than previously reported cohorts, possibly due to the lack of neurotrophic influence that occurs following spinal injury.

### Disclosures

**Funding:** no grant **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** is an approved procedure **Helsinki:** Yes **Informed Consent:** Yes