Prostate Artery Embolization via Transradial or Transulnar versus Transfemoral Arterial Access: Technical Results

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ABSTRACT

Purpose: To compare safety and feasibility of prostate artery embolization (PAE) via transradial/transulnar access (TR/UA) and transfemoral access (TFA).

Materials and Methods: A retrospective analysis was conducted for 3 cohorts: the first 32 consecutive PAE procedures performed via TFA (initial TFA, January 2014 to August 2015), the following 32 procedures performed via TFA (advanced TFA, August 2015 to February 2016), and the first 32 procedures performed via TR/UA (February 2016 to July 2016). Indications included lower urinary tract symptoms (n = 68), urinary retention (n = 24), and preoperative embolization before prostatectomy (n = 4). A single operator performed all procedures at a single institution.

Results: Technical success was achieved in 29/32 (90.6%) initial TFA procedures, 31/32 (96.9%) advanced TFA procedures, and 30/32 (93.8%) TR/UA procedures. Mean procedure time was 110.0 minutes in TR/UA group, 155.1 min in initial TFA group, and 131.3 minutes in advanced TFA group (P < .01 and P = .03 relative to TR/UA); mean fluoroscopy time was 38.8 minutes in TR/UA group, 56.5 minutes in initial TFA group, and 48.0 minutes in advanced TFA group (P < .01 and P = .02 relative to TR/UA). Access site-related and overall adverse events did not vary significantly among study cohorts (P > .15 and P > .05, respectively).

Conclusions: TR/UA represents a safe and feasible approach to PAE with a comparable safety profile to TFA. Reduced procedure and fluoroscopy times might be attributable to the learning curve or method of arterial access.

ABBREVIATIONS

DAP = dose area product, PAE = prostate artery embolization, TFA = transfemoral access, TRA = transradial access, TR/UA = transradial/transulnar access

Transradial access (TRA) is an increasingly common method of arterial access for interventional radiology procedures (1–3). A recent retrospective analysis of 1,500 patients who underwent diverse procedures, including chemoembolization and radioembolization, renal/visceral interventions, uterine artery embolization, and peripheral interventions, via TRA reported a major complication rate of 0.13% and concluded that TRA was safe and well tolerated in a heterogeneous patient population (3). Prostate artery embolization (PAE) is an emerging therapy for lower urinary tract symptoms attributable to benign prostatic obstruction (4–7). PAE procedures have previously been performed via transfemoral access (TFA) and require meticulous technical execution with special attention to tortuous or variant vascular anatomy (8,9). TRA has been investigated as a potential alternative to TFA for PAE
procedures in a case report and case series in which embolization was technically successful (bilateral) in all cases (10,11). The authors of both reports concluded that PAE via TRA was technically feasible and proposed advantages over PAE via TFA ranging from immediate PAE via TRA was technically feasible and proposed experience, patients treated via TFA were separated into 2 transradial access (TR/UA) and TFA. To control for operator comes of PAE procedures performed via transradial/transulnar access. The 3 study cohorts differed significantly in mean baseline Sexual Health Inventory for Men score, LUTS due to BPO (n = 68), urinary retention (n = 24), and preoperative embolization before radical prostatectomy for prostate cancer (n = 4). Of the 68 patients treated for lower urinary tract symptoms, 3 patients presented with a history of recurrent urinary tract infection due to benign prostatic obstruction. This was not considered a contraindication for PAE. None of the patients had acute urinary tract infection at the time of the treatment. Mean baseline age was 67.8 years ± 9.9 among initial TFA patients, 70.5 years ± 10.8 among advanced TFA patients, and 66.8 years ± 6.8 among TR/UA patients (P > .20). The 3 study cohorts differed significantly in mean baseline Sexual Health Inventory for Men score, which varied across the 3 cohorts (P < .01) and was significantly lower among TR/UA patients than initial TFA patients (13.1 ± 7.1 vs 21.2 ± 9.9; P < .01) (12,13). Prevalence of urinary retention (37.5% of initial TFA patients, 25.0% of advanced TFA patients, and 9.4% of TR/UA patients; P = .03) and indication for PAE (P < .01) also differed significantly between cohorts. Baseline characteristics of the 3 study cohorts are presented in Table 1.

### MATERIALS AND METHODS

#### Patients

An institutional review board–approved retrospective chart review was conducted for patients who underwent PAE at a single institution in 3 cohorts: initial experience with PAE procedures performed via TFA (treated between January 2014 and August 2015), advanced experience with PAE procedures performed via TFA (treated between August 2015 and February 2016), and PAE procedures performed via TR/UA (treated between February 2016 and July 2016). Initial experience with PAE via TFA was defined as the first 32 consecutive procedures, and advanced experience with PAE via TFA was defined as the following 32 consecutive procedures. The TR/UA cohort was defined as the first 32 patients to undergo PAE via TR/UA. The initial TFA procedures comprised the first PAE procedures the operator had ever performed, and the TR/UA procedures comprised the first procedures the operator had ever performed via TR/UA. At the time of treatment, 10 patients were enrolled in Investigational Device Exemption G120141, and 4 were enrolled in Investigational Device Exemption G130237.

Indications for PAE included lower urinary tract symptoms (n = 68), urinary retention (n = 24), and preoperative embolization before radical prostatectomy for prostate cancer (n = 4). Of the 68 patients treated for lower urinary tract symptoms, 3 patients presented with a history of recurrent urinary tract infection due to benign prostatic obstruction. This was not considered a contraindication for PAE. None of the patients had acute urinary tract infection at the time of the treatment. Mean baseline age was 67.8 years ± 9.9 among initial TFA patients, 70.5 years ± 10.8 among advanced TFA patients, and 66.8 years ± 6.8 among TR/UA patients (P > .20). The 3 study cohorts differed significantly in mean baseline Sexual Health Inventory for Men score, which varied across the 3 cohorts (P < .01) and was significantly lower among TR/UA patients than initial TFA patients (13.1 ± 7.1 vs 21.2 ± 9.9; P < .01) (12,13). Prevalence of urinary retention (37.5% of initial TFA patients, 25.0% of advanced TFA patients, and 9.4% of TR/UA patients; P = .03) and indication for PAE (P < .01) also differed significantly between cohorts. Baseline characteristics of the 3 study cohorts are presented in Table 1.

#### Transradial/Transulnar Arterial Access

Pulse oximetry and plethysmography were used to confirm normal ulnar arterial supply of the left hand (14). A eutectic mixture of local anesthetic cream (EMLA Cream; Akorn,