

## PROSTATIC ARTERIAL EMBOLIZATION IN PATIENTS WITH BENIGN PROSTATIC HYPERPLASIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

### Hypothesis / aims of study

Transurethral resection of the prostate (TURP) is still gold standard surgical treatment for benign prostatic hyperplasia (BPH). However, it has some difficulties in patients with severe underlying diseases and it is associated with substantial morbidities. In several studies, prostatic arterial embolization (PAE) was reported with positive results as minimally invasive and alternative procedure. So, we assessed the efficacy of PAE in patients with BPH by systematic review and meta-analysis.

### Study design, materials and methods

Relevant articles were obtained by searching the PubMed and MEDLINE databases using the following keywords: 'benign prostatic hyperplasia' and 'prostatic artery embolization' or 'prostatic arterial embolization' up to February 15, 2015. The search results were limited according to the following inclusion and exclusion criteria: (1) Procedure was performed in human subject with BPH, (2) articles involved the follow up results at 3, 6, 12 months, (3) articles were made by English language, and (4) non-full-text articles were excluded. The primary outcome was the change of International Prostatic Symptoms Score (IPSS) from baseline at 3, 6, 12 months follow up. The secondary outcomes were the changes of prostatic volume (PV), peak flow rate (Qmax), prostatic specific antigen (PSA) level, quality of life score in IPSS (QoL), International Index of Erectile Function (IIEF), and post-void residual volume (PVR). Sensitivity analysis was conducted to assess the heterogeneity of eligible studies and impact of each study on the pooled effects. For assessment of publication bias, Begg's funnel plot and Egger's test were performed.

### Results

In primary searching the database, 132 reports were identified and 6 eligible studies were included in our meta-analysis (Figure 1). The number of total patients was 313. A significant improvement in mean IPSS at 3, 6, 12 months follow up on random-effect model (mean difference [MD] -12.78, 95% confidence interval [CI] -14.50 to -11.03,  $p < 0.001$ , MD -11.29, 95% CI -12.75 to -9.84,  $p < 0.001$  and MD -12.54, 95% CI -14.50 to -10.58,  $p < 0.001$ , respectively) (Figure 2, Table 1). There were significant heterogeneity between eligible studies in each follow up periods ( $I^2 = 87.2\%$ ,  $I^2 = 72.6\%$ ,  $I^2 = 88.0\%$ , respectively). There was no single study with a significant effect on the pooled IPSS. In Begg's funnel plot and Egger's test, definitive publication bias were not found in 3 and 6 months follow up. The assessment of publication bias at 12 months follow up could not be performed because included studies were only two studies. Secondary outcomes including PV, Qmax, PSA level, QoL, IIEF and PVR were improved significantly in 3, 6, 12 months follow up. In all secondary outcomes, there were no significant publication bias.

### Interpretation of results

There were significant improvement in subjective and objective parameters after PAE in meta-analysis. Although assessment of publication bias at 12 months follow up could not be performed due to a few studies, definitive publication bias were not found in all outcomes.

### Concluding message

PAE is relatively effective procedure with good short and medium-term follow up and may be an alternative procedure to another surgical treatment for BPH.

Figure 1. Flow chart for article searching and selection

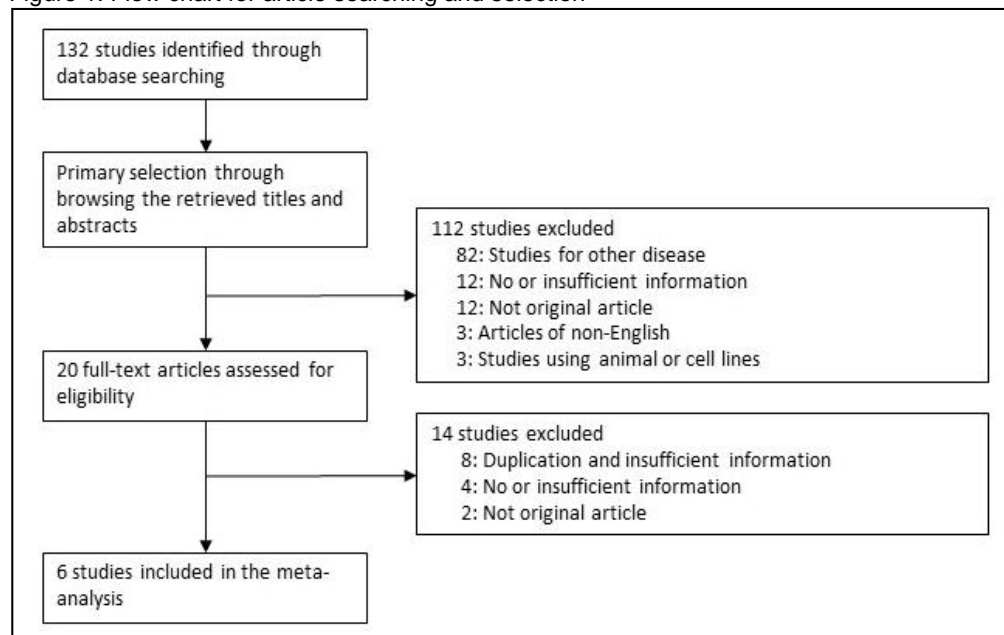


Figure 2. Forest plot diagram of International Prostatic Symptoms Score (IPSS)

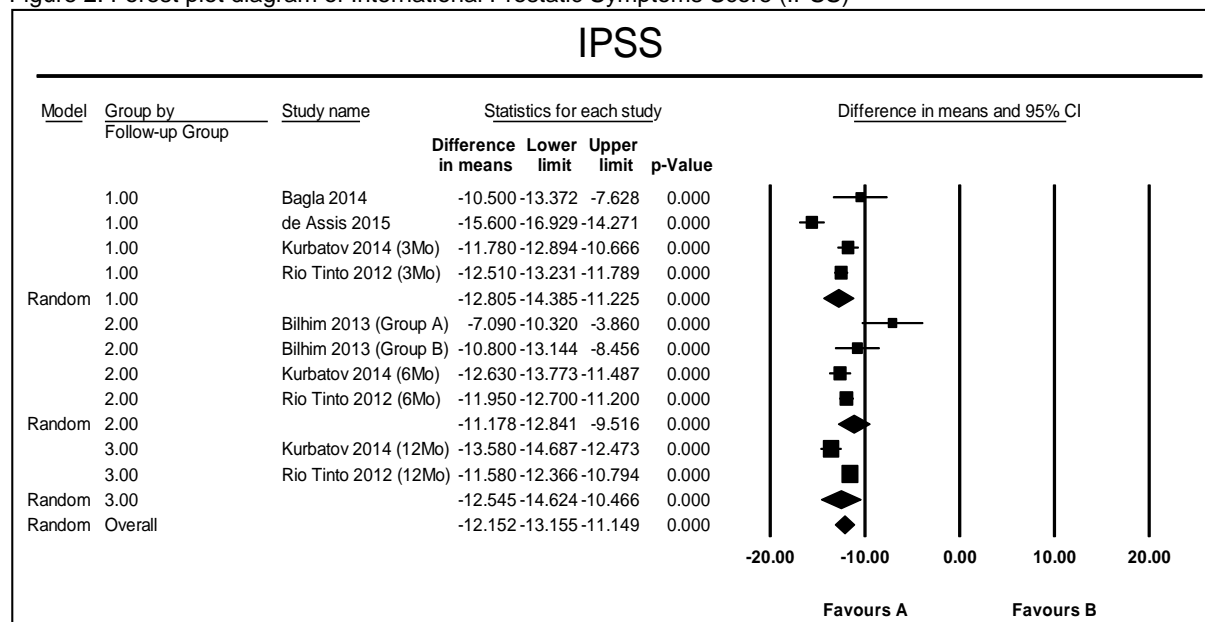


Table 1. Meta-analysis of prostatic arterial embolization in patients with BPH

	Follow up period		
	3 months [95% CI]	6 months [95% CI]	12 months [95% CI]
IPSS	-12.78 [-14.53,-11.03]	-11.29 [-12.75,-9.84]	-12.54 [-14.50,-10.58]
PV (cm <sup>3</sup> )	-28.33 [-40.10,-16.56]	-15.77 [-22.63,-8.92]	-20.54 [-24.58,-16.38]
Qmax (mL/sec)	6.54 [3.71, 9.38]	4.27 [0.74, 7.80]	6.81 [2.65, 10.97]
PSA (ng/mL)	-2.43 [-4.02, -.085]	-1.24 [-1.73, -0.76]	-2.00 [-3.26, -.074]
QoL	-2.50 [-2.93,-2.06]	-2.06 [-2.30,-1.83]	-2.50 [-3.29,-1.72]
IIEF	1.18 [0.78, 1.58]	1.27 [0.69, 1.85]	0.85 [0.31, 1.38]
PVR (mL)	-50.94 [-61.92,-39.95]	-50.38 [-59.66,-41.10]	-56.44 [-65.14,-47.73]

BPH : benign prostatic hyperplasia, IPSS : International Prostatic Symptoms Score, PV : prostatic volume, Qmax : peak flow rate, QoL : quality of life score, IIEF : International Index of Erectile Function, PVR : post-void residual volume

**References**

1. Carnevale FC et al. J Vasc Interv Radiol 2013;24:535-542
2. Kurbatov D et al. Urology 2014;84:400-404
3. Schreuder SM et al. Cardiovasc Intervent Radiol 2014;37:1198-1219

**Disclosures**

**Funding:** none **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** This study is systematic review and meta-analysis. **Helsinki:** Yes **Informed Consent:** No