Diagn Interv Radiol 2026; DOI: 10.4274/dir.2026.264411

INTERVENTIONAL RADIOLOGY

LETTER TO THE EDITOR

Reply: "Single-center retrospective comparative study of 40–120 µm versus 100–300 µm trisacryl gelatin microspheres as the main embolic agents for prostatic artery embolization"

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Received 18 August 2026; accepted 19 August 2026.

Epub: 14.09.2026

DOI: 10.4274/dir.2026.264411

Dear Editor,

We would like to thank Dr. Kaba for his kind and insightful comments[1] on our article "Single-center retrospective comparative study of 40–120 µm versus 100–300 µm trisacryl gelatin microspheres as the main embolic agents for prostatic artery embolization",[2] which was recently published in Diagnostic and Interventional Radiology.

We fully agree with Dr. Kaba that, during prostatic artery embolization (PAE) with small (Embosphere 40–120 µm or equivalent) microspheres, a delicate balance must be maintained between efficacy (strong local ischemic effect) and safety (ischemic complications). As noted in the letter, the operator has to decide between maximal prostatic ischemia (potentially associated with severe intraprocedural pain and harmful, non-target embolization) and sufficient ischemia (with lower respective risks). But how can we measure and define maximal and sufficient prostatic ischemia? Regarding maximal ischemia, our experience with utilization of small microspheres and contrast-enhanced ultrasound (CEUS) for early post-PAE measurement of the percentage of prostatic ischemia (pPI)[2,3] shows that up to 80% of the total prostate volume can be devascularized and appear as non-enhancing areas on CEUS or as extensive hyperdensity of prostate parenchyma on non-enhanced computed tomography (CT) (Figure 1). Such extensive ischemia is usually associated with significant prostate shrinkage (up to 65%, 3–6 months post-PAE) and with durable clinical improvement. Unfortunately, there is scarce evidence regarding sufficient prostatic ischemia. In patients with an indwelling bladder catheter (IBC), it has been demonstrated that successful removal of the catheter could be achieved only in patients with pPI > 10% (measured by CEUS 1 day post-PAE).[3]

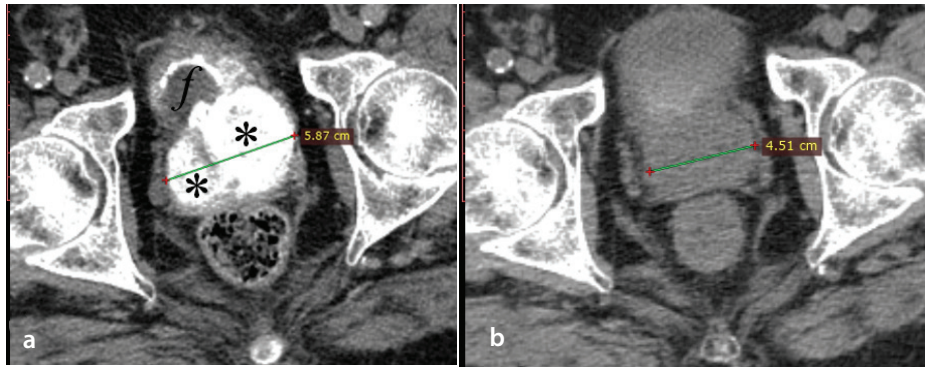

Figure 1. (Images published after patient's informed consent). **(a, b)** Representative axial computed tomography (CT) images from a successful prostatic artery embolization (PAE) case in the comparative study (patient with an indwelling bladder catheter). CT immediately post-PAE with 40–120 µm Embosphere microspheres **(a)** shows extensive, dense accumulation of the contrast-microsphere mixture in both prostatic lobes (*). The balloon of the bladder catheter is noted by "*f*". Contrast-enhanced ultrasound 1 day post-PAE (not shown) demonstrated extensive prostatic infarction (percentage of prostatic ischemia: 80%). Forty months post-PAE, the patient remains catheter- free, and CT **(b)** shows significant, durable prostate shrinkage.

You may cite this article as: Moschouris H, Mouroukis A, Şentürk Ç. Reply: "Single-center retrospective comparative study of 40–120 µm versus 100–300 µm trisacryl gelatin microspheres as the main embolic agents for prostatic artery embolization". *Diagn Interv Radiol*. 14 September 2026 DOI: 10.4274/dir.2026.264411 [Epub Ahead of Print].

Interestingly, a similar conclusion was reached by a magnetic resonance (MR) study of prostatic infarction post-PAE in patients with an IBC.[4] Another MR study reported better 12-month clinical outcomes in patients with infarction of > 5%;[5] however, infarction was assessed 3 months post-PAE. Intraprocedural evaluation of infarction with CEUS performed in the angio-suite shortly after injection of the embolic agent[6] is an advantage of CEUS over MR and probably deserves further investigation and clinical correlation. Such an evaluation could be used to guide on-site treatment decisions and help the operator maintain the aforementioned delicate balance.

We also agree that cone-beam CT should be systematically applied during PAE with small microspheres in order to reveal communication of the prostatic artery with the middle rectal artery and other small (but potentially important) neighboring splanchnic pelvic branches. As additional measures to reduce the prevalence and severity of intraprocedural and postprocedural complications, we propose: 1) strong intravenous analgesia (e.g., 50 mcg fentanyl + 1 mg midazolam administered 10 minutes before arterial puncture) and intraarterial administration of lidocaine hydrochloride through the microcatheter just before injection of the microspheres; and 2) use of a balloon-occlusion microcatheter when there is a concern for reflux of embolic agent into the superior vesical, internal pudendal, or middle rectal artery.

Finally, we would like to provide some histologic evidence for the distal penetration of 40–120 µm microspheres (Figure 2) and to underline the need for additional relevant studies, with longer follow-up, that could reveal a clinical benefit for this type of microsphere.

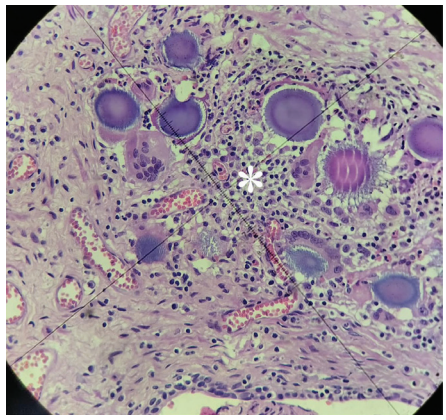

Figure 2. (Images published after patient's informed consent). Microscopic image of material from the comparative study (original magnification: 40 ×), from histologic examination (hematoxylin–eosin stain) of specimens obtained after transurethral resection of the prostate following prostatic artery embolization with 40–120 µm Embosphere microspheres. It shows several microspheres filling the lumen of small intraprostatic branches (diameter ≤ 100 µm). Foreign body giant cell reaction (*) is noted adjacent to the occluded arteries.

Footnotes

Conflict of interest disclosure

The authors declared no conflicts of interest.

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