

# Planning Ahead Makes All the Difference for a Successful PAE

---

Glen Schlaphoff, Director of Interventional Radiology, Liverpool Hospital, Sydney, Australia, speaks about his pre-intervention planning for prostatic artery embolization (PAE) as part of a series of articles with experts on this procedure.

Text: Urmila Kerslake

**Dr. Schlaphoff, how well is this treatment accepted in Australia?**

**Schlaphoff:** We started the prostatic artery embolization programme for carefully selected patients with benign prostatic hyperplasia (BPH) about three years ago at Liverpool Hospital. We receive patients who are self-referred, referred by general practitioners, or by urologists, who particularly refer patients who are unable to undergo transurethral resection of the prostate (TURP),

or those who are still symptomatic after TURP and/or UroLift. Our PAE programme complements the treatments offered by our urology colleagues.

**How relevant is treatment planning in PAE?**

**Schlaphoff:** Careful treatment planning is of particular importance as this ensures a good outcome. This includes careful consideration as to the indications and inclusion

criteria for this procedure. The patient is assessed for general medical conditions, anticoagulation, family history, allergies, and renal function. Urological evaluation, a urodynamic study (or Qmax) and a prostate specific antigen test are also done at the time of consultation. After the consultation, the patient undergoes assessment for vascular access, and assessment of the gland itself. We take great care in assessing the radial access portal as well as the vascularity of the pelvis and prostate.



Glen Schlaphoff,  
Director of Interventional  
Radiology, Liverpool  
Hospital, Sydney, Australia  
.....

We also want to assess the gland for possible underlying pelvic disease, including cancer of the prostate or bladder abnormalities.

**What kind of pre-interventional imaging do you use for assessing the disease and planning your PAE procedures?**

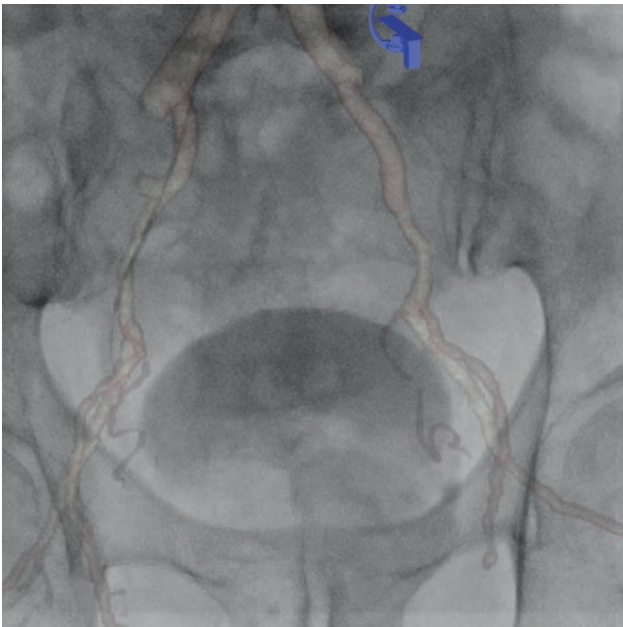
**Schlaphoff:** Once the decision to embolize is made, the patient will have a duplex Doppler ultrasound assessment of the left upper limb;

a CT angiogram of the lower abdomen and pelvis; as well as an MRI of the prostate.

The ultrasound provides a detailed assessment of the upper limb for a well-planned programme of radial artery access. Next, CT angiography (CTA) allows visualisation of the prostate arteries. We assess basic normal anatomy, prostate artery and variance, or anomalous supplies. CT gives us excellent image, spatial resolution, and 3D data that can

be fused to the digital subtraction angiography (DSA).

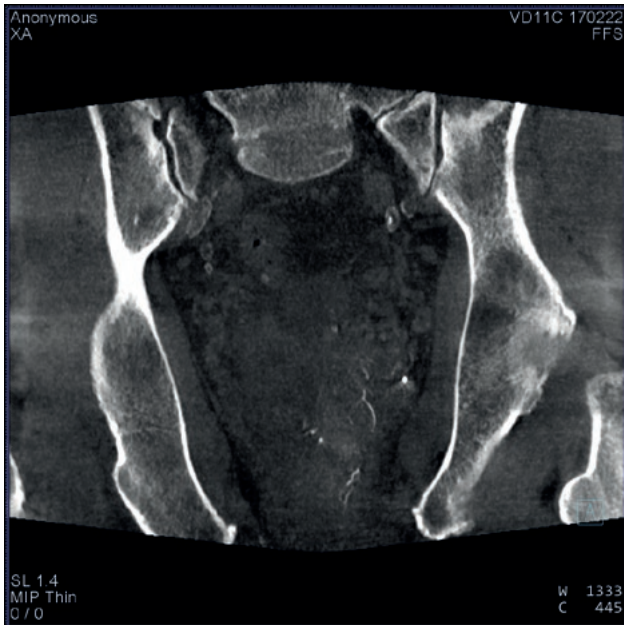
The most important aspect is to assess access to the prostatic arteries. We look for general atheromatous disease; the bifurcation of the aorta and the common iliac arteries; gauge tortuosity and examine whether a radial or a femoral approach may be required. We also use the CT to decide on the catheters and actually plan the entire path before the procedure and the dataset is then uploaded into



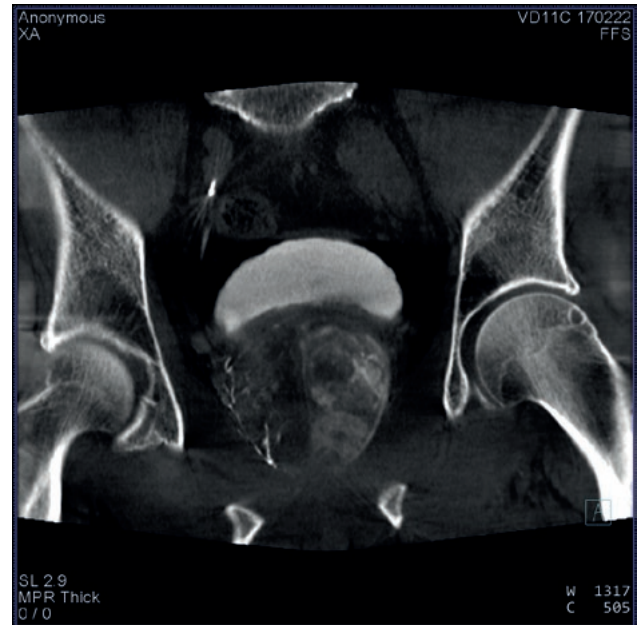
3D roadmap for guidance during catheter navigation. Here a processed (ie, one that has bone removed and irrelevant vessel structures cropped) pre-interventional CT angiography volume is overlaid on live fluoroscopy.



Low dose 2D acquisition showing left vessel anatomy.



syngo DynaCT before release of embolic material to left prostatic gland with catheter in therapy position shows potential non-targeted embolization.



syngo DynaCT with catheter in right prostatic artery shows distal feeders to the gland. In addition, tissue enhancement of left prostatic gland confirms coverage of prior left prostatic artery embolization.

the Siemens angiography system for procedure road mapping. Then, we also get an MRI which forms the basis of the pre-imaging volume. From the MRI, we get a volumetric assessment on a work station, as well as excellent tissue characteristics for benign disease, including any unilaterality of the benign growth. In addition, the MRI helps us determine whether we are likely to get a good embolization based on the vascularity of the gland. Finally, we obviously need to exclude tumours of the prostate or bladder and the MRI also allows us to evaluate the bladder.

### **What are the major imaging requirements to perform PAE in the angiosuite?**

**Schlaphoff:** The first requirement is for a dedicated interventional unit that has access to nursing pre-operatively, peri-operatively and during recovery. We then need an angiography system, preferably an Artis zeego\*, which allows total body coverage without moving the table.

We have found this to be really important, having used a couple of different systems in the past. In my opinion, this robotic angiography system is highly suitable for prostatic artery embolization as it allows total body coverage from the radial artery to the groin, without having to move the table. This is crucial because there are very delicate catheter positions that can be altered if the patient moves. We also need access to a good workstation, rapid 3D assessment, rapid synchronisation of datasets, both CT and angiography, during the procedure. A DynaCT run (cone-beam CT performed on the angiography system) must be efficient. And we need a very good arm support in the radial position.

### **When is acquisition of a DynaCT run advisable for PAE procedure planning?**

**Schlaphoff:** We use *syngo* DynaCT to confirm the catheter position. Also, it allows us to do some problem-solving if we are missing an artery, it shows where to look for another one and how to further navigate tortuous vessels in the prostate region. *syngo* DynaCT also helps define the arteries that feed the peripheral and central parts of the gland and is an essential part of the workflow.

Our whole procedure is designed around keeping radiation as low as possible, so we use *syngo* DynaCT with cranial-caudal collimation (ie in “slab mode”). A couple of things to note: anteroposterior (AP) view is far less dose intensive than oblique angles, so we make every effort to utilise or watch our embolization in the AP position. Also, the fluoroscopy and the acquisitions are set at a frame rate that maximises clinical safety but also minimises radiation. With regard to Artis zeego’s specific *syngo* DynaCT protocols that are useful for PAE, we can use actually relatively short, fast acquisitions so that we minimise the amount of radiation.

**Dr. Schlaphoff, thank you for taking the time to talk with us. ●**

**Urmila Kerlake** is a Bristol-based journalist. She is the Digital Education Lead and Senior Editor of the specialist quarterly newspaper, *Interventional News*, with which the content of this article first appeared as part of a supplement.

\* The current product is ARTIS pheno.

The statements by customers of Siemens Healthineers described herein are based on results that were achieved in the customer’s unique setting. Since there is no “typical” hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

### **Contact**

Simone Henrichs  
simone.henrichs@siemens-healthineers.com