

Preoperative Embolization of Thoracic Spine Metastases

BY FLORIAN WOLF, MD, EBIR, EBCR

A 50-year-old man was sent to our department for preoperative embolization of a thoracic spine metastasis (Figure 1). The patient was undergoing treatment for renal cell carcinoma for 4 years. Three months before presenting to our department, a bone metastasis was diagnosed in the thoracic spine (T8 vertebra). One week before we received the patient for embolic therapy, he was symptomatic due to compression of the spinal cord. An open bone biopsy was performed 2 weeks earlier by the orthopedic surgeons, noteworthy for an intraoperative, life-threatening bleeding.

Bone metastasis is a very common finding in patients with renal cell carcinoma; those metastases are hypervascularized in the majority of cases. In the Austrian Bone and Soft Tissue Tumor Registry,¹ 20% of all patients with bone metastases showed renal cell carcinoma as a primary tumor; this is the second most common reason for bone metastases in the registry—only breast cancer metastases are more common (23%).

Clinical symptoms of bone metastases in this registry were pain (39%), fracture (27%), swelling (28%), and other (6%). In our patient, the symptoms consisted of

neurologic symptoms due to spinal cord compression.

Preoperative embolization of metastases leads to a significant reduction of blood loss during the operation. In 2008, Kickhut et al² published that the intraoperative blood loss during operation of hypervascularized metastases was reduced from 1,788 mL after partial occlusion to 1,119 mL with complete occlusion of the feeding vessels. At our hospital, almost all hypervascularized bone metastases are preoperatively embolized.

PROCEDURE DESCRIPTION

For the embolization procedure, the right common femoral artery was accessed, and a 6-F sheath was inserted. A 5-F sidewinder I catheter was used for diagnostic angiography of the intercostal arteries and guiding catheter purposes.

As a first step, the eighth intercostal artery was probed, diagnostic angiography showed a hypervascularization with a tumor blush (Figure 2), and there were large vessels feeding the diaphragm. For the embolization procedure, a steerable, Bern-shape Direxion™ Microcatheter with a 0.021-inch inner lumen was introduced. Another diagnostic angiogram via the microcatheter was obtained, which is possible using a 2-mL syringe or an



Figure 1. A contrast-enhanced CT scan of the spine metastasis with bone destruction and hypervascularized soft tissue.

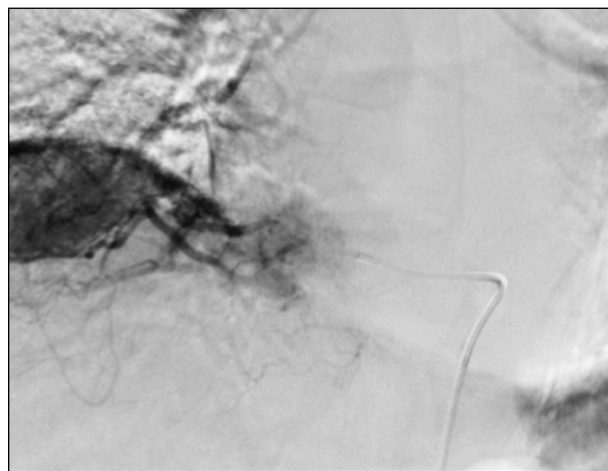


Figure 2. Hypervascularized metastasis of T8 vertebra as well as feeding vessels to the diaphragm, visualized by contrast injection into the feeding intercostal artery.

Results from case studies are not necessarily predictive of results in other cases. Results in other cases may vary.

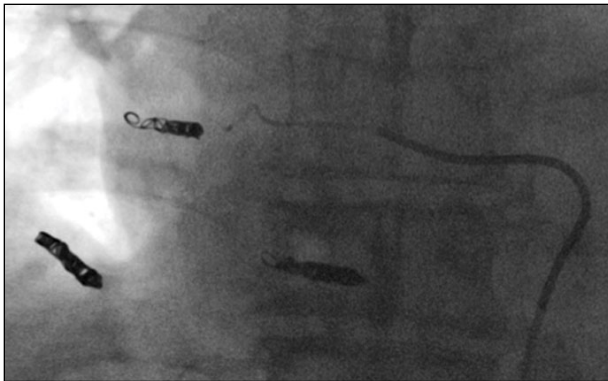


Figure 3. Multiple coils after embolization of two intercostal arteries.

automatic power injector. The right embolization position was reached using a Fathom®-16 Guidewire.

Distal to the hypervascularized tumor, three 2-mm Interlock™-18 Fibered Microcoils were placed via the Direxion™ Microcatheter in order to protect the diaphragm from particle embolization (Figure 3). Using this 0.021-inch microcatheter, delivery of the Interlock™ Fibered IDC Occlusion System is easy if the microcatheter is flushed with saline before particle or coil delivery.

Next, embolization of the tumor was performed with 100–300-µm particles until there was no more antegrade blood flow. Visibility of particles can be very low, even though they are mixed with contrast media. Especially in dangerous regions, such as the spine or the head/neck, I inject a very small amount of particles followed by a flush of contrast media in order to better visualize the particles and get an impression of the blood flow speed.

Stasis was reached quickly, and the inflow of the feeding artery was occluded using two 2-mm Interlock™-18 Fibered Microcoils. Control angiography showed a satisfying result with no remaining blood flow or tumor blush (Figure 4).

At the end of the procedure, four intercostal arteries had been embolized with particles (100–300 µm) and 15 total microcoils (diameters between 2 and 4 mm). The Direxion™ Microcatheter had to be repositioned many times in order to reach the optimal embolization position.

After the embolization procedure, there was no hypervascularized part of the tumor left (Figure 5). The patient had the operation the next day with radical resection of the thoracic spine metastases, including the metastatic soft tissue. The orthopedic surgeons reported that the tumor was “dry,” with no significant intraoperative blood loss. ■

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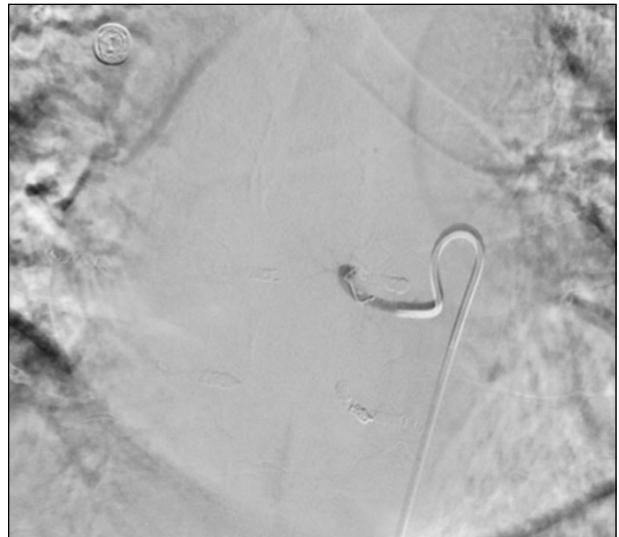


Figure 4. Control angiogram after embolization of the last of the four treated intercostal arteries.



Figure 5. No hypervascularized area visible in the present intercostal artery.

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1. Toma CD, Dominkus M, Nedelcu T, et al. Metastatic bone disease: a 36-year single centre trend-analysis of patients admitted to a tertiary orthopaedic surgical department. *J Surg Oncol.* 2007;96:404–410.
2. Kickuth R, Waldherr C, Hoppe H, et al. Interventional management of hypervascular osseous metastasis: role of embolotherapy before orthopedic tumor resection and bone stabilization. *AJR Am J Roentgenol.* 2008;191:W240–W247. doi: 10.2214/AJR.07.4037.

Embolization of an Internal Iliac Artery Aneurysm

BY DAVID L. SMOGER, MD

An 85-year-old man presented to the emergency department complaining of diffuse abdominal pain. After appropriate workup, a contrast-enhanced CT abdomen/pelvis scan showed a distal esophageal tear. Figure 1 shows an incidental finding of a 7.4-cm X 6.9-cm right internal iliac artery aneurysm. The patient was admitted to the hospital for management of his distal esophageal tear and follow-up with another vascular service for management of the aneurysm. Before presenting to the interventional radiology department, the patient was treated with a covered stent across the origin of the internal iliac artery. Approximately 1 month later, a follow-up CT angiogram of the abdomen/pelvis showed an interval enlargement of the aneurysm, which had grown to 7.9 cm X 7.4 cm, with some increased mural thrombus (Figure 2). The sac was being backfed by the obturator artery.

PROCEDURE DESCRIPTION

Under ultrasound guidance, a 5-F needle/sheath system was used to percutaneously access the aneurysm sac via the right anterior pelvis. Once the sheath was confirmed to be in place, a diagnostic angiogram was obtained (Figure 3). Exchange was made for a 5-F, Berenstein-shape Imager™ Angiographic Catheter. Eight 0.035-inch Interlock™ Coils were deployed within the sac until no further contrast flow was demonstrated (Figure 4).

DISCUSSION

This case illustrates the concept of closing the “front door” as well as the “back door.” The covered stent closed the “front door” (origin of the internal iliac artery), but in the face of a contributing obturator artery, the “back door” was left open, allowing for continued, pressurized growth of the aneurysm sac. Because access



Figure 1. A 7.4-cm X 6.9-cm aneurysm in the right internal iliac artery.



Figure 2. A follow-up CT angiogram of the abdomen/pelvis approximately 1 month later showing interval enlargement of the aneurysm, now 7.9 cm X 7.4 cm, with some increased mural thrombus.

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Figure 3. The initial angiogram after the sheath was confirmed to be in place.

to the sac via the traditional endovascular method was excluded by the presence of a covered stent, percutaneous access was successfully employed. The use of long, detachable Interlock™ Coils allowed for precise and quick deployment and obviated the use of many pushable coils in an aneurysm of this size. This decreased procedure time, procedural cost, and radiation exposure to both the patient and the operator. ■



Figure 4. Eight 0.035-inch Interlock™ Coils were deployed within the sac until no further contrast flow was demonstrated.

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