



Time-Resolved Contrast Enhanced MR Angiography of Deep Pelvic Arterio-Venous Malformation

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Clinical Image

The diagnosis of arterio-venous malformation (AVM) hinges on demonstration of arterial feeders, nidus and early draining vein. Non-invasive imaging diagnosis however can be challenging at times due to the location, complex morphology and variable flow rate of AVMs.

A 65 year old man recently diagnosed with descending colonic carcinoma underwent a staging CT scan prior to surgery. Besides liver metastases, CT revealed a vascular lesion measuring 5.3 x 3.5 cm in the region of the left obturator canal (Figure 1A and B). Differential diagnosis included that of a internal iliac branch aneurysm or a nidus of deep pelvic AVM.

He underwent time-resolved contrast enhanced MR angiography (time-resolved imaging of contrast kinetics (TRICKS), Siemens Healthcare, Erlangen, Germany). On time-resolved MR, arterial supply from the left obturator artery was demonstrated with early arterial enhancement of the lesion (nidus) (Movie 1, 3 seconds) and (Figure 2A). This was followed by early enhancement of the left iliac vein (Movie 1, 6 seconds) due to early venous drainage through the nidus which persisted on delayed imaging (Movie 1, 20 seconds) and (Figure 2B). The early venous drainage was diagnosed in comparison to the lack of enhancement of the contralateral right iliac vein within the imaged time frame. Review of the multiplanar images confirmed the left obturator arterial

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Figure 1: A: axial (arrow) and B: coronal CT showing a vascular lesion (**) in the region of the left obturator canal.

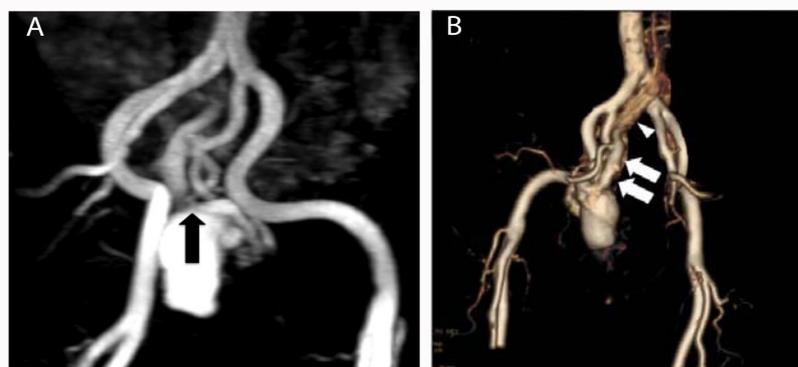
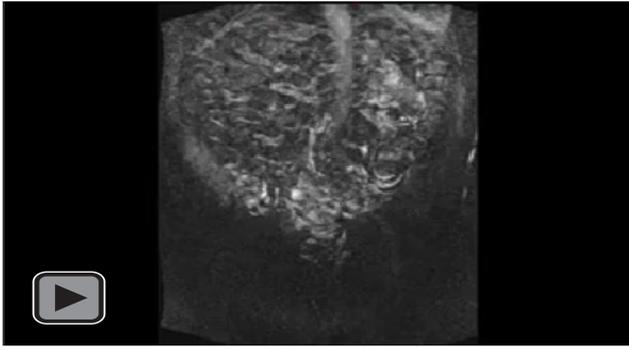


Figure 2: A: Right anterior oblique maximum intensity image (MIP) B: left posterior oblique view of the volume rendered image of the MR dataset showing arterial supply from the left obturator artery (A, white arrow) and the early draining veins from the nidus into the anterior division of the left iliac vein (B, white arrows) and into left common iliac vein (B, arrowhead).



Movie 1: Time-resolved contrast MR angiogram of the pelvic AVM. Note the arterial supply from the left obturator artery (3 seconds, reference Figure 2A) and early and persistent enhancement of the nidus (from 3 seconds). Early enhancement of the left iliac vein (from 6 seconds and “arrow”) compared to non-enhancement of the right iliac vein throughout the imaged sequence is consistent with an early draining vein. The findings supported the diagnosis of an arterio-venous malformation.

supply to the nidus (Figure 2A) and direct drainage in to the anterior division of the left iliac vein through small draining veins (Figure 2B), confirming the diagnosis of a deep pelvic AVM.

The usefulness of time-resolved MR in the diagnosis of AVM hinges on its ability to provide temporal flow information similar to that of catheter angiography, in addition to multi-planar reconstruction and various image manipulation for problem-solving (Figure 2A and B), averting the need for invasive catheterization and ionizing radiation. It is a robust technique has been utilized for assessment of AVM in various body regions with complex vascular anatomy [1,2].

References

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