SMRT Student Scope Submission

Title and Author(s)

Title: MRI for the evaluation of Dural Arteriovenous Fistula when used in conjunction with Conventional Angiography.

Author: Francesca M. Giuntoli RT (R)

Supervisor Name/Affiliation: Anthony Festa, RT, (R) (MR); University of Pennsylvania Medical Center

Date of Submission: February 2, 2007

☐

Introduction or Patient History

A 49-year-old male with a history of a thoracic spinal Arteriovenous Malformation was scanned at the University of Pennsylvania Medical Center. Patients complaints included numbness in both legs and severe back pains. Previous imaging included routine spine x-rays and MRIs of the thoracic and lumbar spine. An abnormality was identified and a contrast enhanced MRA was suggested for further evaluation. The referring physicians were looking for the specific location of the dural arteriovenous fistula in the spine, focusing on the thoracic spinal cord.

Patient Preparation and Scan Set up

The patient was screened for past medical history to insure the MRI safety of the patient. All paper work was signed before the patient was brought into the room. All MRI safety and procedure guidelines were followed in a normal fashion. The procedure was explained to the patient including information about the contrast that was going to be administered during the procedure. An IV was placed in the patient for the dynamic contrast enhanced portion of the procedure. In this particular study 30ml of Omniscan were administered. The patient was scanned on a 1.5 Tesla General Electric Signa scanner. The patient was placed supine, head first on the scanner table. At this time earplugs were given to the patient to protect the patient's ears from the noise. Blankets were given to the patient to increase his comfort. The patient was placed on top of the phased array spine coil. The importance of holding still during the entire procedure was stressed to the patient. The patient was land marked at the manubrium and was advanced into the scanner.

MR Imaging Parameters

SEQUENCE	TR (ms)	TE (ms)	FOV	S/T	MATRIX	NX	BAND
Sag T2	4600	103.3	36	3	512x512	4	81.38
Sag 3D PRE	4.9	1.3	36	1.2	512x512	1	244.1
Sag 3D SP	4.9	1.3	36	1.2	512x512	1	244.1
Sag 3D POST	4.9	1.3	36	1.2	512x512	1	244.1
Axial SPGR	150	1.8	20	7	256x256	4	244.1
Axial SPGR	250	1.4	20	7	256x256	4	244.1

Findings and Discussions

AccThe MRI found T2 prolongation in the cord, most prominently from T8/9 to T12/L1, consistent with hyperemia related to venous hypertension. Prominent vessels along the cord surface from level of T2/3 to the distal cord are consistent with type 1 dural arterio-venous fistula. There is a suggestion of direct arteriovenous connection at level of left T10/11 neuroforamen between the radiculomeningeal artery and the medullary vein. However, correlation with spinal aniography was still suggested.

Dural Arteriovenous Fistulas (DAVF) are usually located in the lower half of the spine. A DAVF is an area of abnormal connectivity between arteries and veins. The fistula is typically supplied by the radiculomeningeal artery, and drains into the venous plexus. These patients are predominantly men in the ages of 40 to 60 with a thoracic myelopathy. Typical symptoms of DAVF are: slow but progressive loss of function in the limbs, bowel and bladder dysfunction including incontinence, and progressive erectile dysfunction in males. A standard MRI can be used to see the presence of the fistula.

For a more accurate diagnosis an MR angiography of the spine with contrast can be performed to see the fistula fill. This will insure that the radiologists will be able to see the precise location of the DAVF while performing the conventional angiogram. Conventional angiograms are often used to confirm the diagnosis of DAVF as well as treat the disease. Since the CEMRA can localize the DAVF, the MRA will reduce the amount of fluoroscopy time and iodinated contrast used during the embolization of the DAVF.

Conclusions

In conclusion, MR angiography can be very beneficial for spinal DAVF patients. The MRA can correctly and precisely localize the spinal DAVF. This technique will enable patients to feel more confident in the diagnoses and treatment of this disease. Also, patients will not have to undergo large amounts of ionizing radiation or iodinated contrast. The MRA allows for a noninvasive procedure, a reliable conformation of the diagnoses of spinal dural arteriovenous fistula and a precise identification of its location.

References

www.ncbi.nlm.nih.gov

www.radiologyinfo.org

www.mr-tip.com

www.brain-aneurysm.com

www.medcyclopaedia.com

http://radiology.rsnajnls.org

Richard I. Farb, MD, Jae K. Kim, MD, PhD, Robert A. Willinsky, MD, Walter J. Montanera, MD, Karel terBrugge, MD, J. Andrew Derbyshire, PhD, J. Marc C. van Dijk, MD and Graham A. Wright, PhD. Spinal Dural Arteriovenous Fistula Localization with a Technique of First-Pass Gadolinium-enhanced MR Angiography: Initial Experience[1]. Radiology.March2002.p.843-850.

Images