

Guidelines for the Management of Patients with Vascular Access Ports

Referred for MRI Procedures*

Frank G. Shellock, Ph.D., FACR, FISMRM, FACC
Adjunct Clinical Professor of Radiology and Medicine
Keck School of Medicine, University of Southern California

Director of MRI Safety
USC Stevens Neuroimaging and Informatics Institute
University of Southern California

www.MRIsafety.com

In the clinical magnetic resonance imaging (MRI) setting, it is often necessary to manage patients with vascular access ports (1-6).

MRI labeling information exists for many vascular access ports. By following the pertinent MRI labeling information (i.e., presented in the *Instructions for Use*, Patient Identification Card, etc.), patients with vascular access ports have safely undergone MRI examinations, including those performed at 1.5- and 3-Tesla (1-6). Notably, there has never been an adverse event reported in association with performing MRI in patients with these particular implants.

Unfortunately, the standard policy that MRI labeling information is required before allowing the use of MRI in a patients with vascular access ports limits access to this important diagnostic imaging modality for those patients for which labeling information is unavailable. However, in consideration of the relevant peer-reviewed literature and other related information (1-6), it is acceptable and safe to perform MRI examinations in patients with vascular access ports by following specific guidelines developed by taking into consideration the primary safety concerns (i.e., magnetic field interactions and MRI-related heating) for these implants.

Notably, by adhering to these admittedly conservative MRI conditions, patients with vascular access ports can benefit from the diagnostic imaging information provided by one of the most important noninvasive imaging modalities.

Guidelines. The following guidelines apply to using MRI in patients with vascular access ports:

(1) Patients with all commercially available vascular access ports can be scanned at 1.5-Tesla/64-MHz or 3-T/128-MHz, regardless of the value of the spatial gradient magnetic field.

(2) Patients with all commercially available vascular access ports can undergo MRI immediately after placement of these implants.

(3) The MRI examination should be performed using the following parameters:

- 1.5-Tesla or 3-Tesla, only
- Whole body averaged specific absorption rate (SAR) of 2-W/kg (i.e., operating in the Normal Operating Mode for the MR system)
- Maximum imaging time, 15 minutes per pulse sequence (multiple pulse sequences per patient are allowed)

Important Note: Any deviation from the above MRI conditions requires prior approval by a radiologist or the supervising physician.

Important Note: These guidelines must be reviewed on an annual basis to confirm that no new vascular access port has become available that substantially deviates from the above MRI conditions or that is labeled, MR Unsafe (7).

***Important Note:** The *“Guidelines for the Management of Patients with Vascular Access Ports Referred for MRI Procedures”* should only be implemented for use after the careful review by the supervising radiologist or physician responsible for the MRI facility and with the adoption of the information as a written policy.

References

(1) Shellock FG. Biomedical implants and devices: Assessment of magnetic field interactions with a 3.0-Tesla MR system. J Magn Reson Imag 2002;16:721-732.

(2) Shellock FG, Nogueira M, Morisoli S. MR imaging and vascular access ports: Ex vivo evaluation of ferromagnetism, heating, and artifacts at 1.5-T. *J Magn Reson Imag* 1995;4:481-484.

(3) Shellock FG, Shellock VJ. Vascular access ports and catheters tested for ferromagnetism, heating, and artifacts associated with MR imaging. *Magnetic Resonance Imaging* 1996;14:443-447.

(4) Titterington B, Shellock FG. Evaluation of MRI issues for an access port with a radiofrequency identification (RFID) tag. *Magnetic Resonance Imaging* 2013;31:1439-44.

(5) Shellock FG. Reference Manual for Magnetic Resonance Safety, Implants, and Devices: 2019 Edition. Biomedical Research Publishing Group, Los Angeles, CA, 2019.

(6) www.mrisafety.com

(7) Shellock FG, Woods TO, Crues JV. MRI labeling information for implants and devices: Explanation of terminology. *Radiology* 2009;253:26-30.