Guidelines for the Management of Patients with Coronary Artery Stents Referred for MRI Examinations*

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In the clinical magnetic resonance imaging (MRI) setting, there is often misunderstanding associated with the management of patients with coronary artery stents, including confusion regarding stents labeled “MRI Safe" or "MRI Compatible” (i.e., due to labeling applied prior to the change in terminology, 2005) or “MR Conditional”, the timing of performing MRI following stent placement, and regarding what MRI limitations may exist (e.g., those related to the acceptable static magnetic field strength, maximum spatial gradient magnetic field, whole body averaged specific absorption rate or SAR, and other conditions)(1-3, 24). This may result in restricted access to MRI for certain patients, particularly those with coronary artery stents for which there is unknown labeling information.

The previous belief that it may be necessary for patients to wait six weeks or longer after implantation of certain coronary artery stents to allow for endothelialization or other mechanism to prevent migration has been refuted because there are no known coronary artery stents made from ferromagnetic materials (4-24).

By following the pertinent MRI labeling information (i.e., presented in the *Instructions for Use*, Product Manual, Patient Identification Card, etc.), patients with coronary artery stents have safely undergone MRI examinations, including those performed using MR systems operating at 3-Tesla (3-24). Notably, there has never been an adverse event reported in association with performing MRI in patients with these implants.

The standard policy that MRI labeling information is required before allowing the use of MRI in patients with coronary artery stents limits access to this important diagnostic imaging modality for those patients for which labeling information is unavailable. Taking into account the peer-reviewed literature and other related information (3-25), it is acceptable to perform MRI examinations in patients with all coronary artery stents by following specific guidelines developed by considering the primary safety concerns (i.e., magnetic field-related force, torque, and RF-induced heating) for these implants.

Guidelines. A patient with a with coronary artery stent (e.g., drug-eluting or bare metal version), including when there are two or more stents or two or more overlapping stents, may undergo MRI using the following guidelines:

- 3-Tesla or less
- No restriction on the direction of the static magnetic field
- No restriction on the value of the spatial gradient magnetic field

- For a coronary artery stent located *inside* of the area of the transmitted RF energy, use a whole-body averaged specific absorption rate (SAR) of 2-W/kg (i.e., operating the MR system in the Normal Operating Mode)

- For a coronary artery stent located entirely *outside* of the area of the transmitted RF energy, a whole-body averaged specific absorption rate (SAR) of 4-W/kg (i.e., operating the MR system in the First Level Controlled Operating Mode) may be used

- Maximum imaging time, 15 minutes per pulse sequence, multiple pulse sequences are allowed

***Important Note:** The *"Guidelines for the Management of Patients with Coronary Artery Stents Referred for MRI Examinations"* should only be implemented for use after the careful review by the supervising radiologist or other physician responsible for the MRI facility and with the adoption of the information as a written policy.

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

Important Note: These guidelines must be reviewed on an annual basis to confirm that no new coronary artery stent has become available that substantially deviates from the above MRI conditions or that is labeled, MR Unsafe.

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