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## **MRI Safety in Routine Clinical Practice: Common Implanted Medical Devices and Special Scenarios**

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MRI is the most versatile modality in modern diagnostic imaging, yet its safety management remains a central concern, particularly in patients with implanted medical devices. With the growing prevalence of implantable medical devices such as cardiac pacemakers, radiologists are increasingly faced with balancing diagnostic necessity against potential device-related risks.

In the MR environment, three magnetic fields—static magnetic field, gradient magnetic field, and radiofrequency pulse—can interact with implanted medical devices, and such interactions can sometimes result in severe patient injury.

Implantable medical devices are classified as MR Safe, MR Conditional, or MR Unsafe, and accurate categorization is the foundation of safe practice. They can also be classified as active implantable medical devices (AIMDs) or passive implantable medical devices (PIMDs), depending on whether they contain an independent power source. Most contemporary AIMDs are labeled MR Conditional, requiring strict adherence to manufacturer-specific guidelines, including SAR thresholds, coil selection, and device programming adjustments. PIMDs such as aneurysm clips also demand verification of MR compatibility. To reduce uncertainty, clinicians should rely on device databases, manufacturer documentation, and consensus guidelines.

Special clinical scenarios add further complexity. Pregnant women require careful counseling regarding maternal and fetal safety. Patients with tattoos or metallic foreign bodies must be screened before imaging, and appropriate precautions should be in place to promptly recognize and manage potential adverse events during scanning.

Ensuring safety in routine clinical practice depends on structured pre-scan screening, informed consent, and emergency preparedness. As MR safety leaders, radiologists should integrate updated evidence with institutional protocols and provide ongoing education for MR personnel.

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