



## Pacemakers are Contraindications for MRI No More

From the time I started my radiology residency, it was a rule drilled into us – MRI is **CONTRAINDICATED** in patients with electromagnetic devices, which if they stop in the MRI scanner, can harm or kill the patient.

For more than 25 years (1990 to 2018 or so), MRI was contraindicated if the patient had either a

1. Pacemaker, or a
2. Cochlear implant

Valves, stents, metal implants, rods, etc. have not been contraindications for more than 2 decades anyway.

Now, even pacemakers and cochlear implants are **NOT** contraindications. Not only have advances over the last few decades resulted in the manufacture of pacemakers/AICDs and cochlear implants that are MRI compatible, we have learnt that even so-called “MRI incompatible” pacemakers are safe in a controlled environment through serendipity and well-regulated studies.

Not only that, while most pacemakers and AICDs will give off some artifacts, we can also scan not just the rest of the body, but also the heart (Figs. 1, 2) to get adequate information for the questions to be answered.

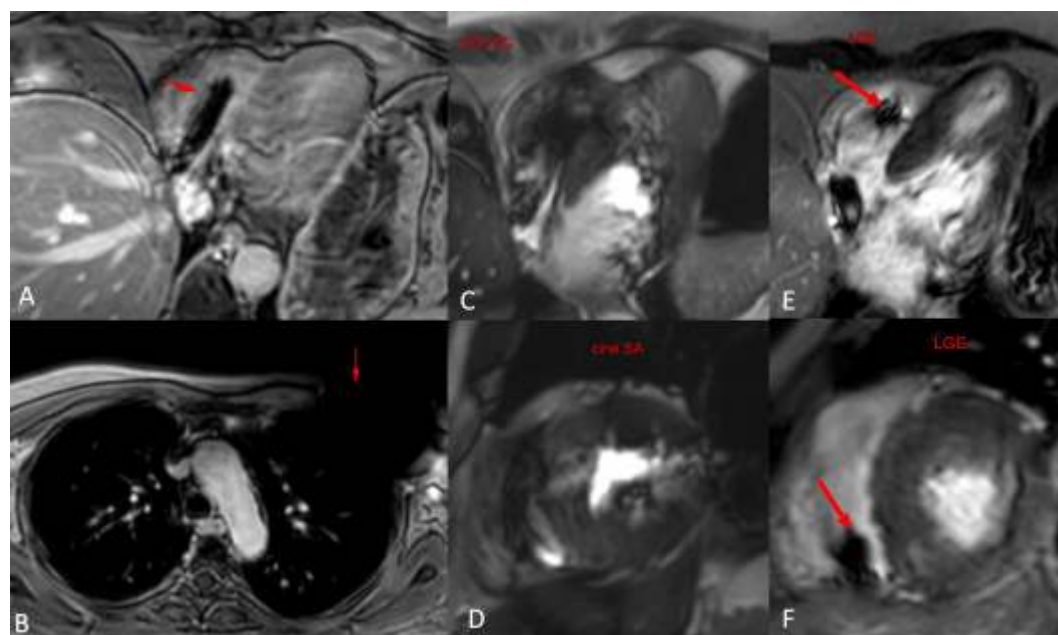


Fig. 1 (A-F): 74-years old with hypertrophic cardiomyopathy. Contrast enhanced images (A,B) show the pacemaker control unit (arrow in A) on the chest wall and the pacemaker lead in the right ventricle (RV) (arrow in B). The cine 4-chamber (C) and short axis (D) images show mild image degradation due to artifacts from the pacemaker lead in the RV. The 4-chamber (E) and short axis (F) late gadolinium (LGE) images show no artifacts despite the adjacent pacemakers leads (arrows).



**At a glance**

- ◆ Pacemakers and cochlear implants are no longer contraindications for MRI.
- ◆ Not just the rest of the body, but we can also do cardiac MRI in patients with AICDs/pacemakers.

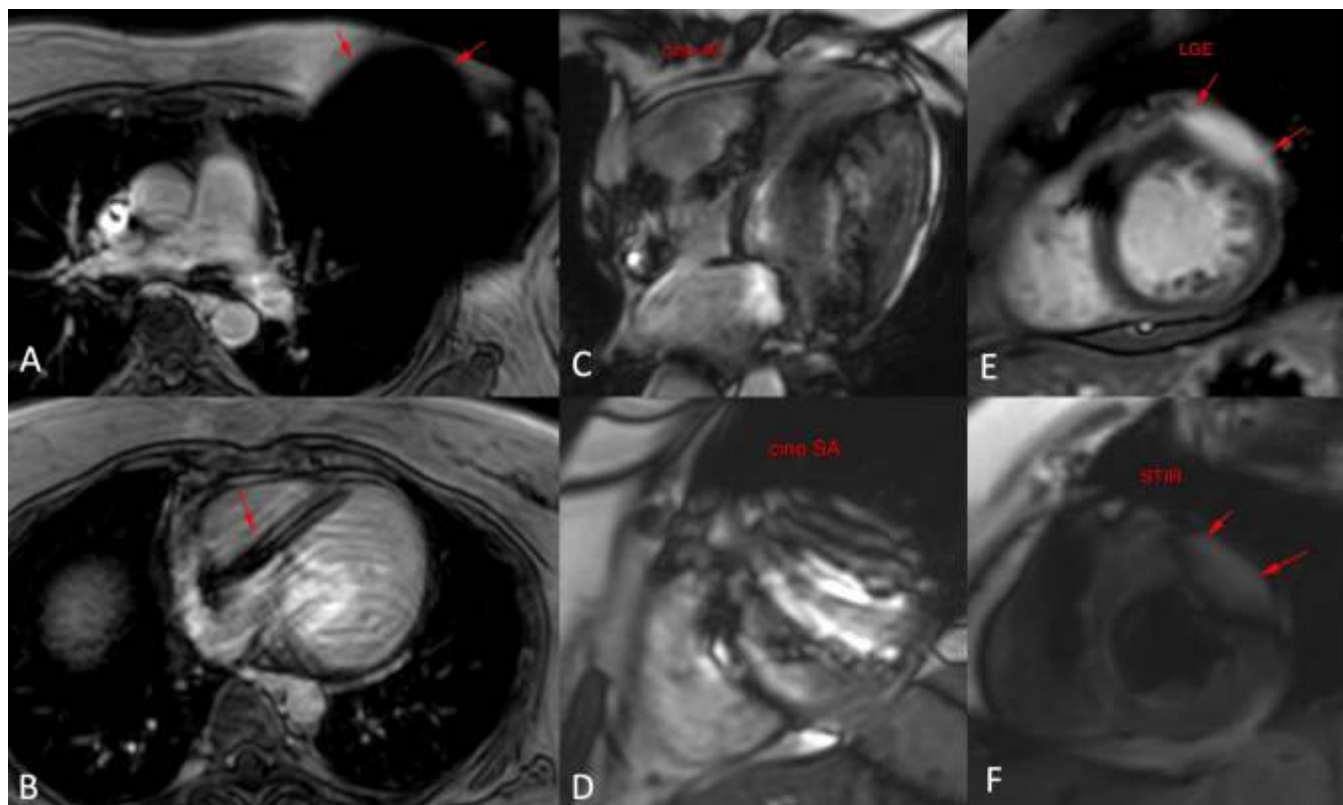


Fig. 2 (A-F): 48-years old with cardiac sarcoidosis presented with worsening of symptoms. She had a pacemaker placed 3 years prior. Contrast enhanced images (A,B) show the pacemaker control unit (arrow in A) on the chest wall and the pacemaker lead in the right ventricle (RV) (arrow in B). There is degradation of image quality in the cine 4-chamber (C) and short axis (D) images, though it was possible to assess wall motion with moderate confidence. The short axis late gadolinium (LGE) image (E) however shows the abnormal enhancement in the basal anterior wall and anterolateral segment well (arrow) while the short axis STIR (F) image shows edema (arrow), both of which were new compared to an earlier 2020 MRI, suggesting acute exacerbation of inflammation and fibrosis.

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