Patient approach during invasive electrophysiology procedures guided by magnetic resonance imaging

Ivica Benko[1,2]*, Mateja Lovrić[1], Marina Budetić[1], Mirela Adamović[1], Nikolina Slamek[1], Marina Žanić[1], Marija Grlić[1], Ivan Horvat[1], Mario Tomašević[1] Nikolina Gracić[1], Tomislav Delić[1], Ante Lisičić[1], Ivan Zeljković[1], Nikola Pavlović[1], Ana Jordan[1], Šime Manola[1]

[1]Dubrava University Hospital, Zagreb, Croatia
[2]University of Applied Health Sciences, Zagreb, Croatia

KEYWORDS: electrophysiology procedures, magnetic resonance imaging, multidisciplinary team.

CITATION: Cardiol Croat. 2024;19(11-12):623. | https://doi.org/10.15836/ccar2024.623

***ADDRESS FOR CORRESPONDENCE**: Ivica Benko, Klinička bolnica Dubrava, Avenija Gojka Šuška 6, HR-10000 Zagreb, Croatia. / Phone: +385-1-2902-542 / E-mail: ibenko@kbd.hr

ORCID: Ivica Benko, https://orcid.org/0000-0002-1878-0880 • Mateja Lovrić, https://orcid.org/0000-0003-1457-6521
Marina Budetić, https://orcid.org/0000-0002-1165-7097 • Mirela Adamović, https://orcid.org/0000-0003-4922-7436
Nikolina Slamek, https://orcid.org/0000-0002-2975-8793 • Marina Žanić, https://orcid.org/0000-0001-5123-8586
Marija Grlić, https://orcid.org/0000-0002-4288-9659 • Ivan Horvat, https://orcid.org/0000-0002-0480-7341
Mario Tomašević, https://orcid.org/0000-0003-0931-9272 • Nikolina Gracić, https://orcid.org/0009-0000-2806-8822
Tomislav Delić, https://orcid.org/0009-0005-9168-0615 • Ante Lisičić, https://orcid.org/0000-0002-4365-9652
Ivan Zeljković, https://orcid.org/0000-0002-4550-4056 • Nikola Pavlović, https://orcid.org/0000-0001-9187-7681
Ana Jordan, https://orcid.org/0000-0001-5610-6259 • Šime Manola, https://orcid.org/0000-0001-6444-2674

Conventional electrophysiology (EP) interventions are typically performed in specialized EP labs, where fluoroscopy is the main imaging method for catheter placement. Due to the risks of ionizing radiation, staff must wear protective equipment. In contrast, magnetic resonance imaging (MRI) -guided EP procedures present a novel, radiation-free alternative with superior anatomical visualization. Preparing patients for MRI-guided EP procedures requires a coordinated multidisciplinary team, including physicians, engineers, radiology technologists, and nurses. This team is responsible for conducting safety assessments, monitoring vital signs, and managing MRI-compatible medical equipment. Nurses and radiology technologists face specific challenges in the MRI environment, which demands expertise not typically required in conventional settings. Patient preparation begins with detailed education about the procedure and MRI safety protocols. The nurse ensures that there are no contraindications, such as metal implants, and carries out standard preparations, including intravenous line placement and setting up MRI-safe monitoring devices. During the procedure, continuous monitoring requires specialized MRI-compatible equipment. The nurse also manages emergency equipment, such as defibrillators and infusion pumps, positioned outside the magnetic zone. In case of emergencies, such as intubation or defibrillation, interventions must be performed outside the MRI suite. Given the invasive nature of these procedures, maintaining strict hygiene and aseptic conditions are crucial. Throughout the procedure, nurses collaborate closely with radiology technologists to ensure seamless communication with physicians inside the MRI room, using specialized optoacoustic headsets for synchronized execution of all steps. MRI-guided EP procedures, such as atrial flutter ablation, achieve comparable outcomes to conventional methods, with the added benefits of reduced radiation exposure and enhanced anatomical precision. However, performing these procedures outside the traditional fluoroscopy lab presents technical, practical, and safety challenges, which require the expertise of a dedicated and experienced multidisciplinary team.[1,2]

RECEIVED:
October 13, 2024
ACCEPTED:
October 31, 2024

LITERATURE

1. Bijvoet GP, Holtackers RJ, Smink J, Lloyd T, van den Hombergh CLM, Debie LJBM, et al. Transforming a pre-existing MRI environment into an interventional cardiac MRI suite. J Cardiovasc Electrophysiol. 2021 Aug;32(8):2090-2096. https://doi.org/10.1111/jce.15128
2. Paetsch I, Jahnke C, Hilbert S, Krueger S, Weiss S, Smink J, et al. Cardiovascular Magnetic Resonance-Guided Electrophysiological Interventions: Radiofrequency Ablation of Typical Atrial Flutter. Circ Cardiovasc Imaging. 2017 Jan;10(1):e005780. https://doi.org/10.1161/CIRCIMAGING.116.005780