Radiology

Letters to the Editor

Cardiac MRI and Clinical Follow-up in COVID-19 Vaccine–associated Myocarditis

From
Matteo Fronza, MD,*† Paaladinesh Thavendiranathan, MD, SM,*†‡ Gauri Rani Karur, MD,*† Husam Abdel-Qadir, MD,‡§ Jacob A. Udell, MD, MPH,‡§ Rachel M. Wald, MD,*†‡ and Kate Hanneman, MD, MPH*†
Department of Medical Imaging, Toronto General Hospital, Peter Munk Cardiac Centre, University Health Network (UHN), University of Toronto, 585 University Ave, 1 PMB-298, Toronto, ON, Canada M5G 2N2*
Department of Medical Imaging, Women's College Hospital, University of Toronto, Toronto†
email: *kate.hanneman@uhn.ca*
Division of Cardiology, Peter Munk Cardiac Centre, Toronto General Hospital, University Health Network (UHN), University of Toronto, Toronto‡
Cardiovascular Division, Women's College Hospital, University of Toronto, Toronto§

Editor:

We previously reported cardiac MRI findings in a cohort of patients with COVID-19 vaccine–associated myocarditis in an in-press article published online in *Radiology* in February 2022 (1). The majority of patients had mild imaging abnormalities at the time of acute symptoms. However, little is known about later evolution of the cardiac MRI abnormalities.

The institutional ethics committee approved this retrospective analysis and waived the requirement for written informed consent. Cardiac MRI examinations were performed at 1.5 T or 3.0 T (Siemens) and were analyzed blinded to all clinical information (Circle cmr42). Global longitudinal, circumferential, and radial strain was analyzed using feature-tracking analysis. Late gadolinium enhancement (LGE) was quantified by using a signal intensity threshold of 4 SD. Maximum native T1 and T2 were converted to *z* scores by using scanner-specific local reference values (1).

Thirteen patients underwent follow-up cardiac MRI (mean age, 33 years ± 14; 77% men) (Table). All patients presented with chest pain that followed mRNA-1273 in nine (69%) and BNT162b2 in four (31%) patients. Six patients (46%) required hospitalization. Six patients were treated with colchicine (46%), three were treated with aspirin (23%), and three were treated with ibuprofen (23%).

At follow-up MRI (median, 100 days after vaccination; IQR, 74–237), myocardial edema had resolved in all patients (Table). LGE had resolved in three of 13 (23%), decreased in eight of 13 (62%), and remained absent in two of 13 (15%) patients. In patients with residual LGE, the extent at follow-up was minimal (range, 1–2 g). Left ventricular ejection fraction increased and was normal in all at follow-up (56% ± 4 vs 60% ± 3; $P = .003$).

Median clinical follow-up duration was 159 days (IQR, 107–232 days). All patients were asymptomatic with normal troponin levels and no adverse cardiac events (death, sustained atrial or ventricular arrhythmia lasting ≥ 30 seconds, or heart failure hospitalization).

In summary, in our case series of 13 patients with acute myocarditis after COVID-19 vaccination, follow-up MRI showed resolution of myocardial edema, normalization of left ventricular function, and interval decrease in LGE. These findings are consistent with the typical rapid decrease in myocardial inflammation in other causes of myocarditis (2). However, minimal LGE without edema was present in 62% of patients at follow-up, likely reflecting myocardial fibrosis. In conjunction with lack of any

Baseline and Follow-up Findings

Parameter	Baseline (*n* = 13)	Follow-up (*n* = 13)	*P* Value
Age (y)	33 ± 14	…	…
No. of men	10 (77)	…	…
HsTnI (pg/mL)*	3021 (1519–5307)	2 (0–2)	.01
LVEDVI (mL/m2)	79 ± 14	74 ± 15	.28
LVEF (%)	56 ± 4	60 ± 3	.003
GLS (%)	−17 ± 2	−19 ± 2	.002
GCS (%)	−18 ± 2	−20 ± 2	.001
GRS (%)	31 ± 6	34 ± 6	.006
LGE presence	11 (85)	8 (62)	.08
LGE quantitative extent (%)	2.1 ± 2.0	0.7 ± 1.1	.003
LGE quantitative extent (g)	2.2 ± 1.8	0.7 ± 0.9	<.001
Hyperintense T2-weighted signal	9 (90)	0 (0)	.003
Maximum T2 *z* score	2.8 ± 1.2	0.2 ± 0.6	<.001
High T2	10 (77)	0 (0)	.002
Maximum native T1 *z* score	2.6 ± 1.4	-0.3 ± 1.2	<.001
High native T1	10 (77)	0 (0)	.002

Note.—Mean data are ± SD. Unless otherwise indicated, data are numerator with percentage in parentheses. Paired t test, Wilcoxon signed-rank, or McNemar test were used for comparisons of paired data as appropriate. GCS = global circumferential strain, GLS = global longitudinal strain, GRS = global radial strain, HsTnI = high-sensitivity troponin I, LGE = late gadolinium enhancement, LVEDVI = left ventricular end-diastolic volume indexed to body surface area, LVEF = left ventricular ejection fraction.
*Data in parentheses are IQR.

adverse events at 5-month follow-up, this raises the likelihood that vaccine-associated myocarditis might have a favorable prognosis despite the persistence of minimal LGE.

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