

## BACKGROUND

Lightning strikes are an uncommon cause of morbidity and mortality. Cardiac effects may include benign or life-threatening arrhythmias, cardiac ischemia, aortic injury, or myocardial injury including cardiomyopathy with associated ventricular failure.

# INVESTIGATION

A 55-year-old female with a history of essential hypertension presented to the emergency department following a lightning strike. She was holding an umbrella over her students while it was raining when she noted a sudden "pop/flash" near her right hand and developed numbress primarily to her fingers, which extended proximally into her right arm.

She later developed chest pressure, which prompted her to go to the hospital. She has no history of myocardial infarction or coronary artery disease.

## MANAGEMENT

High-sensitivity troponin was 85 upon admission without any notable EKG changes. A transthoracic echocardiogram was obtained, which demonstrated a moderately decreased left ventricular (LV) ejection fraction of 40% with mid-anterolateral and inferolateral wall hypokinesis.

The patient underwent left heart catheterization, which demonstrated no angiographic evidence of coronary artery disease. However, the left ventriculogram demonstrated dyskinesis of the LV as well as hypokinesis of the mid-LV cavity. The patient was started on goal-directed medical therapy and subsequently discharged.

## DISCUSSION

Thrombotic occlusion secondary to vascular injury as well as coronary vasospasm have both been proposed as mechanisms leading to decreased coronary blood flow with electrical injuries.<sup>1</sup> While coronary vasospasm may cause transient ST segment changes, coronary angiography will demonstrate patent vessels with no signs of stenosis.

Catecholamine surge can also contribute to non-ischemic cardiomyopathy, which can cause transient regional wall motion abnormalities in the absence of angiographic evidence of obstructive coronary disease, as seen in this case.<sup>2</sup>

initiating guideline-directed medical therapy, a repeat After echocardiogram following one month demonstrated normal LVEF and resolution of previously seen wall motion abnormalities.

# Struck Through the Heart: A Case of Lightning Strike-Induced Cardiomyopathy

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Cardiac effects of lightning strikes can include life-threatening arrhythmias, cardiac ischemia, myocardial contusion, pericardial disease, aortic injury, and cardiomyopathy with associated ventricular failure

Catecholamine-mediated cardiotoxicity or ischemia due to coronary vasospasm may explain the findings of lightning strike-induced cardiomyopathy



(A) A lightning scorch/burn mark noted on the patient's footwear.

(B) M-mode echocardiography on parasternal long-axis view demonstrates mild to moderately reduced left ventricular systolic function.



Cardiac effects of lightning strikes are a rare but significant form of morbidity and mortality. Catecholamine-mediated cardiotoxicity or ischemia due to coronary vasospasm associated with lightning strikes may cause transient regional wall motion abnormalities in the absence of angiographic evidence of obstructive coronary disease.



Coronary Findings: Left Main: Patent vessel without any focal disease giving rise to LCx and LAD. Left Anterior Descending: Type 3 vessel, patent without any focal disease and severely tortuous. Gives rise to diagonal and septal branches which appear patent. Left Circumflex: Patent vessel without any focal disease and severely tortuous. Gives rise to OM1 and OM2 which appear patent.



without any focal disease with moderate tortuosity.

The authors have no disclosures

<sup>1</sup> Christophides, Theodoros et al. "Cardiac Effects of Lightning Strikes." *Arrhythmia* & *electrophysiology review* vol. 6,3 (2017): 114-117. doi:10.15420/aer.2017:7:3

<sup>2</sup> Said, Samir M et al. "Takotsubo Cardiomyopathy: What we have Learned in the Last 25 Years? (A Comparative Literature Review)." Current cardiology *review*s vol. 12,4 (2016): 297-303. doi:10.2174/1573403x12666160211125601



### CONCLUSION

### FIGURE 1



Right Coronary Artery: Dominant vessel giving rise to postero-lateral and posterior descending arteries. Patent vessel

### DISCLOSURE