

## Hiccups as an unusual symptom of coronary heart disease

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### Abstract

Hiccups are generally benign and self-limiting, but attention should be paid to the underlying medical conditions when hiccups persist. We herein report a rare case of hiccups as the initial symptom of coronary heart disease. A 54-year-old man presented with a few-day history of hiccups. Computed tomography with administration of contrast material demonstrated multiple splenic infarctions close to the diaphragm. Subsequent echocardiography revealed wall motion abnormalities in the left ventricle with an apical thrombus. Continuous intravenous heparin followed by warfarin was administered, and the patient later underwent stent implantation for severe stenoses in the left anterior descending artery and circumflex artery.

### Keywords

coronary heart disease; hiccups; thrombus

### Introduction & Background

Hiccups, medically termed singultus, are involuntary, myoclonic contractions of the diaphragm with a sudden inhalation and subsequent spasmodic closure of the glottis [1]. Hiccups are generally benign and self-limiting, but can be associated with underlying medical conditions [2]. We herein report a rare case of hiccups as the initial symptom of coronary heart disease.

### Case Report

A 54-year-old man presented to the emergency department of our hospital with persistent hiccups. The patient had been well approximately one week before presentation when he stopped taking routine medication because he forgot it on a short trip. A few days before presentation, the patient noticed hiccups in a sitting position but not in a supine position. The hiccups gradually increased in frequency and sharp pain in the lower abdomen later developed.

On examination, he was alert and not lethargic. His blood pressure was 151/78 mmHg, heart rate was 120 beats per minute and irregular, body temperature was 36.8°C, respiratory rate was 14 breaths per minute, and oxygen saturation was 97% while breathing ambient air. A gallop rhythm without murmurs was noted on cardiac auscultation, and the abdomen was flat and non-tender with no guarding or rigidity. The remaining examinations were normal. The patient had a medical history of hypertension,

hyperlipidemia, atrial fibrillation, cerebral infarction, chronic hepatitis C virus infection, fatty liver, and mental retardation. Medications included 10 mg of olopatadine hydrochloride daily, 10 µg of limaprost alfadex daily, 10 mg of pravastatin daily, 15 mg of lansoprazole daily, 15 mg of rivaroxaban daily, 10 mg of carvedilol daily, 80 mg of valsartan daily, 5 mg of amlodipine daily, 10 mg of zolpidem daily, and 7.5 g of TSUMURA Daikenchuto Extract Granules. The patient drank and smoked occasionally, did not use illicit drugs, and had no known allergies.

Electrocardiogram demonstrated atrial fibrillation with a heart rate of approximately 120 beats per minute, an axis of 104 degrees, low voltage in limb leads, and inverted T waves in leads V<sub>4</sub> and V<sub>5</sub>. Left ventricular hypertrophy, left atrial enlargement, and right atrial enlargement were also present. A cardiothoracic ratio of 47% was observed on chest radiography with no evidence of pulmonary congestion or pleural effusion. The white cell count was 13,100 per cubic millimeter with 75.4% neutrophils and the C-reactive protein level was 9.18 mg/dL. Levels of lactate dehydrogenase, total bilirubin, and creatinine were 371 U/L, 1.4 mg/dL, and 1.17 mg/dL, respectively. The prothrombin time was 19.7 s, with an international normalized ratio of 1.61, and the activated partial thromboplastin time was 72.8 s; the D-dimer level was 3.68 µg/mL and brain natriuretic peptide level was 157.6 pg/mL (reference value, ≤18.4). Thyroid function tests, such as free T4 and thyroid stimulating hormone, were normal, as were the electrolytes and cardiac enzymes such as troponin and creatine kinase. Computed Tomography (CT) of the chest and abdomen with contrast material demonstrated multiple, non-enhanced areas in the spleen, as well as increased CT values in the tissue between the spleen and the diaphragm (Figure 1), consistent with splenic infarction affecting the diaphragm. No other findings suggestive of causes of hiccups or abdominal pain were detected. Echocardiography revealed akinesis extending from the mid-anteroseptal wall to the apex of the left ventricle with an ejection fraction of 40% and a mobile mass (15 mm x 6 mm) attached to the apex (Figure 2). A tentative diagnosis of multiple infarction of the spleen due to left ventricular thrombus was made.

The patient was admitted and continuous intravenous heparin, which was later replaced by warfarin, was administered. The thrombus had gradually decreased and disappeared on follow-up echocardiography one week after admission without any other thromboembolic or hemorrhagic events. Severe stenoses in the proximal portions of the left anterior descending artery and circumflex artery were found on coronary arteriography, and were both treated with stent implantation because of myocardial viability on myocardial perfusion imaging with thallium-201. The postoperative course was uneventful and he was discharged in a stable condition three weeks after admission. The patient was readmitted for heart failure two months after discharge and for cerebral infarction one month later due to poor adherence to medication. He was later transferred to another hospital for rehabilitation.

## Discussion

The current patient presented with hiccups and was found to have an abnormal mass in the left ventricular apex, which disappeared after the administration of heparin followed by warfarin. Pathological examination of the mass was not performed, but apical thrombus is the most likely diagnosis. This speculation is consistent with his medical history of temporary cessation of rivaroxaban a week before admission, significant stenosis supplying the wall motion abnormality in the left ventricle, and response to anticoagulants. We may safely consider that the apical thrombus was the cause of

multiple infarction of the spleen, although left atrial thrombi associated with atrial fibrillation cannot be completely ruled out.

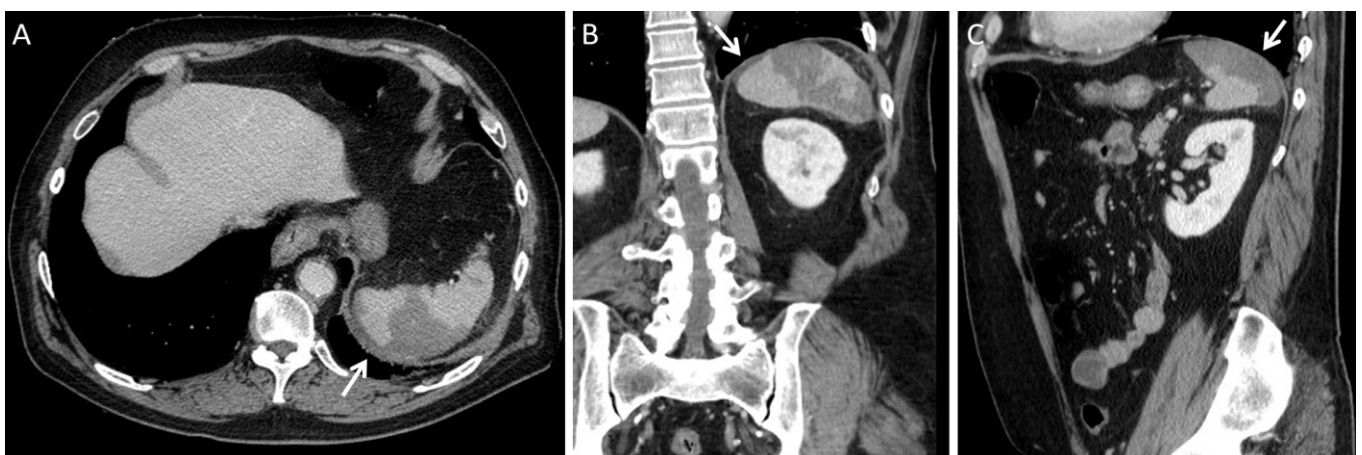
Hiccups were an initial symptom that led to the final diagnosis of coronary heart disease. Hiccups are classified according to duration: Acute attack for less than 48 h and persistent hiccups for more than two days [3]. Hiccups are often underestimated, but can negatively impact the quality of life when persistent [2]. Causes of persistent hiccups are diverse, including the central nervous system (e.g., trauma, surgery, tumor, meningitis, encephalitis, multiple sclerosis, cerebrovascular accidents, and psychogenic), gastrointestinal tract (e.g., gastritis, peptic ulcers, gastric distension, achalasia, esophageal rings and strictures, and pancreatitis), abnormal masses (e.g., aneurysm, tumor, and goiter), infections (subdiaphragmatic abscess, cholecystitis, and pleurisy), irritative stimuli (heartburn and spicy food), and metabolic aberrations (uremia and drugs) [2,4]. The hiccups in the present patient were likely a result of stimuli to the diaphragm provoked by thromboembolism in the spleen, which was associated with coronary artery disease and left ventricular thrombus.

Hiccups can be generated by a reflex arc with afferent, central, and efferent components that include the vagus nerve, phrenic nerves, sympathetic nerve fibers (the 6th to 12th thoracic vertebra), and upper spinal cord (the 3rd to 5th cervical vertebra) [1,5]. As nerves associated with the heart are part of the reflex arc, hiccups can develop in patients with heart diseases, such as myocardial infarction, angina, and pericarditis [6-8], although the incidence is considered to be extremely rare. In the current patient, the reflex arc of hiccups was likely stimulated by the diaphragm attached to the infarcted spleen but not directly by the heart because there was no evidence suggesting acute coronary heart disease. He had been asymptomatic for coronary artery disease, which may be explained by his comorbidities such as diabetes and mental retardation.

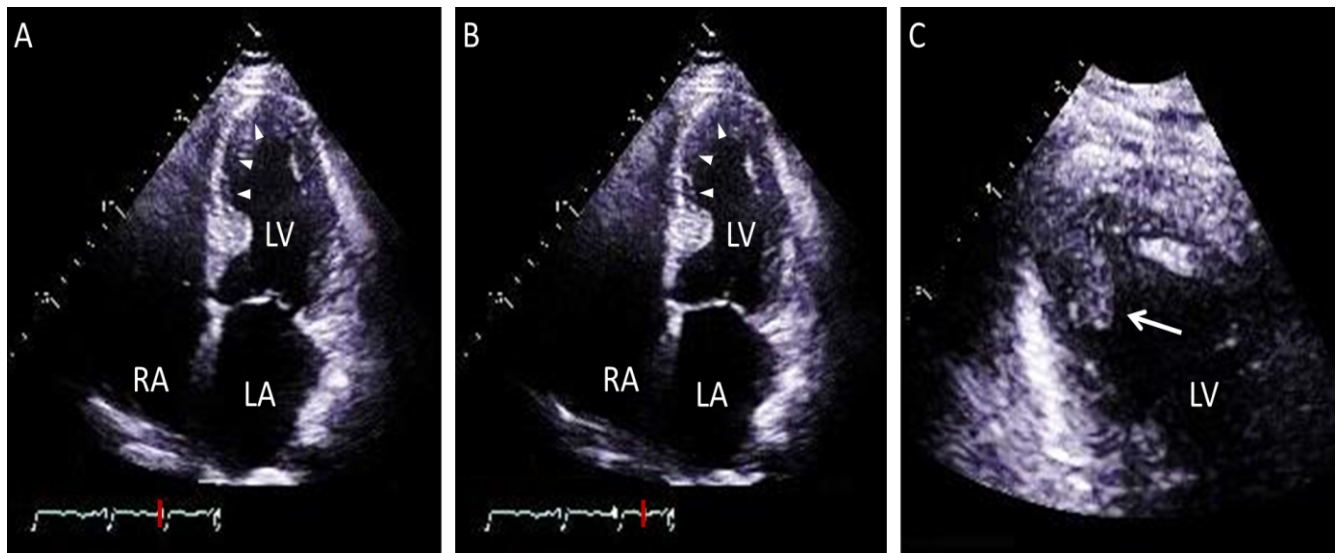
## Conclusion

In conclusion, our case highlights the importance of understanding that not only direct stimuli to the reflex arc of hiccups but also indirect stimuli from serious conditions, e.g., thromboembolism due to cardiac disease, can produce hiccups.

## Figures



**Figure 1:** An axial image (A), coronal image (B), and sagittal image (C) of CT scan of the abdomen obtained after the administration of contrast material showing multiple regions without enhancement in the spleen, consistent with splenic infarction. Note the increased CT values in the tissues between the spleen and the diaphragm (A and B, arrows) without clear delineation (C, arrow).



**Figure 2:** Echocardiographic apical four chamber views demonstrate wall thinning in the mid-anteroseptal to apical areas of the left ventricle at end diastole (A, arrowheads) and lack of systolic thickening at end systole (B, arrowheads). An apical two-chamber view shows a low echoic mass protruding from the apex into the left ventricular cavity (C, arrow). LA: left atrium; LV: left ventricle; RA: right atrium.

## References

1. Steger M, Schneemann M, Fox M. Systemic review: the pathogenesis and pharmacological treatment of hiccups. *Aliment Pharmacol Ther.* 2015; 42: 1037-1050.
2. Kohse EK, Hollmann MW, Bardenheuer HJ, Kessler J. Chronic Hiccups: An Underestimated Problem. *Anesth Analg.* 2017; 125: 1169-1183.
3. Kolodzik PW, Eilers MA. Hiccups (singultus): Review and approach to management. *Ann Emerg Med.* 1991; 20: 565-573.
4. Kahrilas PJ, Shi G. Why do we hiccup? *Gut.* 1997; 41: 712-713.
5. Friedman NL. Hiccups: A treatment review. *Pharmacotherapy.* 1996; 16: 986-995.
6. Zhang F, Tongo ND, Hastings V, et al. ST-Segment Elevation Myocardial Infarction with Acute Stent Thrombosis Presenting as Intractable Hiccups: An Unusual Case. *Am J Case Rep.* 2017; 18: 467-741.
7. Krysiak W, Szabowski S, Stepień M, Krzywkowska K, Krzywkowski A, Marciniak P. Hiccups as a myocardial ischemia symptom. *Pol Arch Med Wewn.* 2008; 118: 148-151.
8. Souadjian JV, Cain JC. Intractable hiccup. Etiologic factors in 220 cases. *Postgrad Med.* 1968; 43: 72-77.

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