Cite as: Surmacz-Rzepka EM, Krzesiński P, Foryś M, Betkier-Lipińska K: Hiccups as an atypical manifestation of coronary artery disease – a case report. Pediatr Med Rodz 2025; 21 (3): 163–166

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Received: 18.01.2025
Accepted: 10.07.2025
Published: 15.10.2025

Hiccups as an atypical manifestation of coronary artery disease – a case report

Czkawka jako nietypowy objaw choroby wieńcowej – opis przypadku

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https://doi.org/10.15557/PiMR.2025.0024

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Abstract

Hiccups is most often a mild, self-limiting symptom associated with rapid overfilling of the stomach. We present a case of a 68-year-old patient with multiple internal conditions in whom hiccups persisting for more than two years ceased after coronary angioplasty. The patient was hospitalised in the Department of Cardiology for coronary angiography before qualifying for aortic valve replacement. Dyspnoea for 2 years (NYHA II) and persistent hiccups were the main manifestations. Gastrological and neurological diagnosis (including computed tomography of the chest, gastric emptying scintigraphy, gastroscopy, head computed tomography, electromyography, tests for neuroborreliosis) was performed and pharmacological therapy was initiated without effect. The symptoms resolved after angioplasty of the left anterior descending branch. Based on the anatomical and pathophysiological picture of the nervous system and cardiac vascularisation in patients with chronic hiccups, ischaemic heart disease should be considered in the differential diagnosis.

Keywords: hiccups, coronary artery disease, coronary angioplasty

Streszczenie

Czkawka to najczęściej łagodny, samoograniczający się do kilku minut objaw związany z szybkim, nadmiernym wypełnieniem żołądka. W artykule omówiono przypadek sześćdziesięcioośmioletniego chorego z licznymi obciążeniami internistycznymi, u którego czkawka trwająca ponad dwa lata wycofała się po angioplastyce wieńcowej. Pacjent był hospitalizowany w Klinice Kardiologii w celu przeprowadzenia koronarografii przed kwalifikacją do leczenia wady zastawki aortalnej. Głównymi objawami były trwająca od dwóch lat duszność wysiłkowa (NYHA II) oraz uporczywa czkawka. Przeprowadzono diagnostykę gastrologiczną i neurologiczną, m.in. tomografię komputerową klatki piersiowej, scyntygrafię opróżniania żołądka, gastroskopię, badanie radiologiczne z kontrastem górnego odcinka przewodu pokarmowego, tomografię komputerową głowy, elektromiografię, badania w kierunku neuroboreliozy, włączono również terapię farmakologiczną, jednak bez efektu. Objawy ustąpiły po przeprowadzonej angioplastyce gałęzi przedniej zstępującej. Na podstawie obrazu anatomicznego oraz patofizjologicznego układu nerwowego i unaczynienia serca u chorych z przewlekającą się czkawką w różnicowaniu należy brać pod uwagę chorobę niedokrwienną serca.

Słowa kluczowe: czkawka, choroba wieńcowa, angioplastyka wieńcowa

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Authors: Surmacz-Rzepka EM, Krzesiński P, Foryś M, Betkier-Lipińska K. Translation by Translation Agency Lingua Line.

INTRODUCTION

The diagnosis of coronary artery disease (CAD) remains a major challenge in modern medicine, largely due to its rising incidence in the general population. Mortality associated with CAD is strongly linked to delays between the diagnosis and treatment. Crushing, oppressive, or constrictive chest pain, typically radiating to the neck, mandible, or upper limbs, is the hallmark symptom of angina pectoris, most commonly occurring after physical exertion and subsiding either after several minutes of rest or within 1–3 minutes of nitroglycerin administration[1]. Atypical manifestations of CAD include pain in the neck, throat, back, craniofacial region, or epigastrium, as well as symptoms such as nausea and reduced exercise tolerance[1,2]. These presentations are more common in older adults, particularly in individuals with diabetes mellitus. A CAD patient with multimorbidity requires careful consideration of all reported symptoms, not only those directly related to cardiovascular function. Among these, hiccups may represent a clinically relevant manifestation, as demonstrated in the case described below.

CASE REPORT

A 68-year-old patient with severe aortic valve stenosis, chronic heart failure with a reduced left ventricular ejection fraction (LVEF) of 21%, type 2 diabetes mellitus (T2DM) managed with oral agents and complicated by sensorimotor polyneuropathy, hyperlipidaemia, nicotine dependence, hiatal hernia, gastroesophageal reflux disease with oesophagitis, as well as a history of colonic polyps and sigmoid diverticulosis, was admitted to the Department of Cardiology and Internal Medicine of the Military Institute of Medicine – National Research Institute for diagnostic evaluation prior to qualification for transcatheter aortic valve implantation (TAVI).

The patient reported a two-year history of reduced exercise tolerance and fatigue corresponding to New York Heart Association (NYHA) functional class II, with no episodes of chest pain. He also complained of nausea, recurrent heartburn, and persistent hiccups lasting approximately two years, unresponsive to pregabalin, baclofen, ondansetron, and omeprazole. Other than that, the patient was cachectic. In 2022, he underwent gastroscopy, colonoscopy, chest and abdominal computed tomography (CT), and gastric emptying scintigraphy due to persistent gastric symptoms. No abnormalities other than gastroesophageal reflux with oesophagitis were identified. Oesophageal, gastric, and duodenal biopsies showed no evidence of hyperplasia or dysplasia, and continuation of the previously recommended treatment was advised. Contrast radiography of the upper gastrointestinal tract excluded sliding hiatal hernia and oesophageal diverticula. The patient also underwent an otolaryngological consultation, which resulted in a diagnosis of laryngitis. CT of the central nervous system revealed no abnormalities that could account for the chronic hiccups. However, electromyography performed in January 2023 confirmed sensorimotor polyneuropathy. Further diagnosis in February 2023 revealed positive IgG antibodies to *Borrelia burgdorferi*, which were confirmed in May 2023 by Western blot. Suspected central nervous system neuroborreliosis was ruled out by a lumbar puncture. Given the unclear aetiology of the symptoms and the coexistence of polyneuropathy, antibiotic therapy with cefuroxime was initiated, with an expectation that it might also alleviate the persistent hiccups.

The patient additionally underwent cardiological evaluation. During his hospital stay at the Provincial Infectious Diseases Hospital in Warsaw in May 2023, echocardiography detected the following major pathologies: severe

Fig. 1. Coronary angiography of the right coronary artery (RCA), Military Institute of Medicine – National Research Institute, Warsaw, June 5, 2023

Fig. 2. Coronary angiography of the left coronary artery (LCA), Military Institute of Medicine – National Research Institute, Warsaw, June 5, 2023

DOI: 10.15557/PiMR.2025.0024

Fig. 3. Coronary angiography of LCA, Military Institute of Medicine – National Research Institute, Warsaw, June 5, 2023

Fig. 4. Coronary angiography of the anterior descending branch after angioplasty, Military Institute of Medicine – National Research Institute, Warsaw, June 5, 2023.

low-gradient aortic valve stenosis (planimetric valve area: 0.5 cm^2; continuity equation: 0.54 cm^2; maximum/mean gradients: 45/28 mm Hg), impaired segmental left ventricular contractility, including akinesia of the mid anteroseptal wall and the basal, mid, and apical segments of the posterior and inferior walls, with hypokinesia of the remaining segments, LVEF of 21%, and impaired right ventricular systolic function. Further urgent diagnosis and qualification for aortic valve replacement were recommended at the Military Institute of Medicine – National Research Institute. Echocardiography performed in our institution in August 2024 confirmed severe low-gradient aortic valve stenosis. Electrocardiogram demonstrated a regular sinus rhythm at 75 bpm, with a normal cardiac axis and Q waves in leads II, III, and aVF. Laboratory findings showed no clinically significant abnormalities: haemoglobin 13.0 g/dL, creatinine 0.8 mg/dL, potassium 82.8 mg/dL, and thyrotropin (TSH) 0.00079 mIU/mL. Coronary angiography demonstrated multivessel disease (Figs. 1–3), with 80% stenosis in segments 6 and 7 with severe calcifications in the left anterior descending artery (LAD); 70% stenosis in the obtuse marginal artery (OM); and completely occluded segment 2 of the right coronary artery (RCA). Cardiac case conference was held and the patient was ultimately qualified for TAVI preceded by LAD angioplasty, and followed by OM angioplasty. Elective cardiac scintigraphy was also recommended to assess perfusion in RCA-supplied area before final qualification for revascularisation of this chronically occluded artery.

On June 6, 2023, percutaneous coronary intervention (PCI) was performed under intravascular ultrasound (IVUS) guidance with LAD rotablation, followed by the implantation of two drug-eluting stents (XIENCE Pro 3.0/48 mm and XIENCE Pro 3.5/28 mm). The procedure was uneventful (Fig. 4).

The patient reported hiccups resolution, which persisted throughout the six-month follow-up period, already one day postoperatively.

DISCUSSION

The discussed patient, who underwent extensive differential diagnosis for persistent hiccups, was ultimately diagnosed with CAD as the most probable aetiology, as supported by the clear correlation between angioplasty of one of the epicardial arteries and symptom resolution.

Hiccups refer to a sudden, involuntary contraction of the diaphragm and intercostal muscles accompanied by a sudden closure of the larynx at the glottis level, which prevents air from being continuously drawn into the lungs[3]. Persistent hiccups can significantly reduce the quality of life, leading to insomnia and eating disorders. The patient in question presented a significant degree of malnutrition, which required temporary parenteral nutrition.

Disorders affecting the gastrointestinal tract, nervous system, as well as diseases of the neck and chest organs are the most common causes of hiccups[4]. However, the reflex can also be triggered by CAD. The first case of hiccups associated with myocardial infarction was reported in 1958, and since then several more cases have been described in the literature, most often in the context of acute coronary syndromes[4–8]. There are also reports describing patients with chronic coronary syndrome who presented with persistent hiccups that resolved following coronary angioplasty and were retrospectively considered an atypical manifestation

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of CAD[9,10]. In 2021, a case report was published describing a patient with persistent hiccups and a history of T2DM, hyperlipidaemia, and an ascending aortic aneurysm[9]. The initial gastroscopy was unremarkable. Similarly, echocardiographic findings were within normal limits. Treadmill stress test was subsequently performed, during which the patient reported exertional dyspnoea; however, no electrocardiographic changes were observed. Given the family history of CAD and the presence of comorbidities (diabetes and hyperlipidaemia), coronary computed tomography angiography (CTAA) was performed, revealing a high calcium score. The patient was qualified for elective coronary angiography, which revealed a 99% stenosis in the mid-segment of LAD – managed with simultaneous angioplasty. The patient remained free of hiccup episodes over one-year follow-up.

Several hypotheses have been proposed to explain the relationship between hiccups and CAD, most of which are based on anatomical and neurophysiological mechanisms. In his 2013 paper, Coote provided evidence for the presence of dense parasympathetic innervation in the ventricular myocardium, demonstrated through acetylcholinesterase staining and modern imaging techniques, which suggested the presence of parasympathetic ganglia within the epicardium as well as in the interatrial and interventricular septa[11]. These structures are innervated by the vagus nerve, which provides both parasympathetic and sensory innervation to the heart. Hiccups arise from the activation of a reflex arc mediated by afferent fibres of the phrenic, vagus, and sympathetic nerves; therefore, one proposed mechanism is that myocardial ischaemia stimulates sensory receptors within these nerves, including vagal fibres, thereby triggering hiccups[5,6,8–13].

Other researchers have suggested that LAD stenosis, leading to myocardial necrosis, may be associated with the release of inflammatory mediators or other factors that stimulate the vagus nerve, thereby triggering the hiccup reflex arc[5].

CONCLUSIONS

The case of our 68-year-old patient with CAD and persistent hiccups, unresolved despite extensive gastroenterological, neurological, and laryngological evaluations, highlights a rarely recognized yet potentially important association between myocardial ischaemia and hiccups. Cardiac innervation by sensory and autonomic fibres of the vagus nerve may contribute to the occurrence of hiccups through sensory activation of the reflex arc. Our observations suggest that cardiological evaluation should be considered in patients with persistent hiccups of unknown aetiology, particularly those with risk factors for coronary artery disease. This case highlights the broad spectrum of possible CAD symptoms.

Conflict of interest

The authors do not report any financial or personal associations with other persons or organisations that might affect the content of this publication of claim any rights hereto.

Author contribution

Original concept of study: EMSR, KBL. Collection, recording and/or compilation of data: EMSR. Analysis and interpretation of data: EMSR, PK. Writing of manuscript: EMSR, PK, KBL. Critical review of manuscript; final approval of manuscript: PK, MF, KBL.

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