

# World Journal of *Clinical Cases*

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**ABOUT COVER**

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## Extreme venous letting and cupping resulting in life-threatening anemia and acute myocardial infarction: A case report

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## Abstract

### BACKGROUND

Wet cupping (WC) is a traditional therapy of skin suction-assisted bloodletting that is widely used in modern alternative medicine in Asia and the Middle East. Herein, we report the case of a male who presented with ST-elevation myocardial infarction (STEMI) and life-threatening anemia and underwent excessive WC.

### CASE SUMMARY

A 55-year-old male presented with chest pain (30 min) and dyspnea (3 wk). His initial electrocardiogram suggested STEMI in the anterior wall. Furthermore, his laboratory results showed severe anemia with a hemoglobin level of 4.1 g/dL. Of note, the patient underwent regular WC therapy for chronic back pain, which he had recently intensified. His WC practice resulted in life-threatening anemia and eventually STEMI. Percutaneous coronary intervention in the left anterior descending artery was performed to treat the STEMI. His dyspnea dramatically improved after the transfusion, and his hemoglobin level returned to 14.8 g/dL within 2 mo after discharge. He has been uneventful for the last seven years of follow-up.

### CONCLUSION

The current case demonstrates that excessive WC without adequate medical monitoring can result in severe anemia, which can further develop into STEMI.

**Key Words:** Bloodletting; ST-elevation myocardial infarction; Anemia; Cupping; Wet cupping; Case report

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**Core Tip:** Wet cupping (WC) is a traditional therapy for promoting bloodletting by applying subatmospheric pressure to a glass cup attached to a skin-pricked, bleeding lesion. Herein, we report a man who self-performed excessive WC and presented with ST-elevation myocardial infarction and life-threatening anemia.

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## INTRODUCTION

Wet cupping (WC) is one of the most widely used traditional therapies for musculoskeletal pain or headache that is performed in the Middle East, Asia, and Europe<sup>[1]</sup>. WC promotes bloodletting by applying subatmospheric pressure to a glass cup attached to a skin-pricked, bleeding lesion<sup>[1]</sup>. Herein, we report a man who self-performed excessive WC and presented with ST-elevation myocardial infarction (STEMI) and life-threatening anemia.

## CASE PRESENTATION

### Chief complaints

A 55-year-old male presented to the emergency department with chest pain and dyspnea.

### History of present illness

The patient had a history of smoking (30 pack years). He had been experiencing dyspnea for 3 wk prior and his chest pain started 30 min before arrival, with a numeric rating scale score of seven.

### History of past illness

The patient had a history of hypertension.

### Physical examination

The patient was pale and had anemic conjunctiva. His initial blood pressure was 90/60 mmHg with a heart rate of 114 beats per minute.

### Electrocardiogram

An electrocardiogram showed ST segment elevation in leads V1 to V3 and reciprocal changes in leads II, III, and aVF, suggestive of STEMI.

### Laboratory examinations

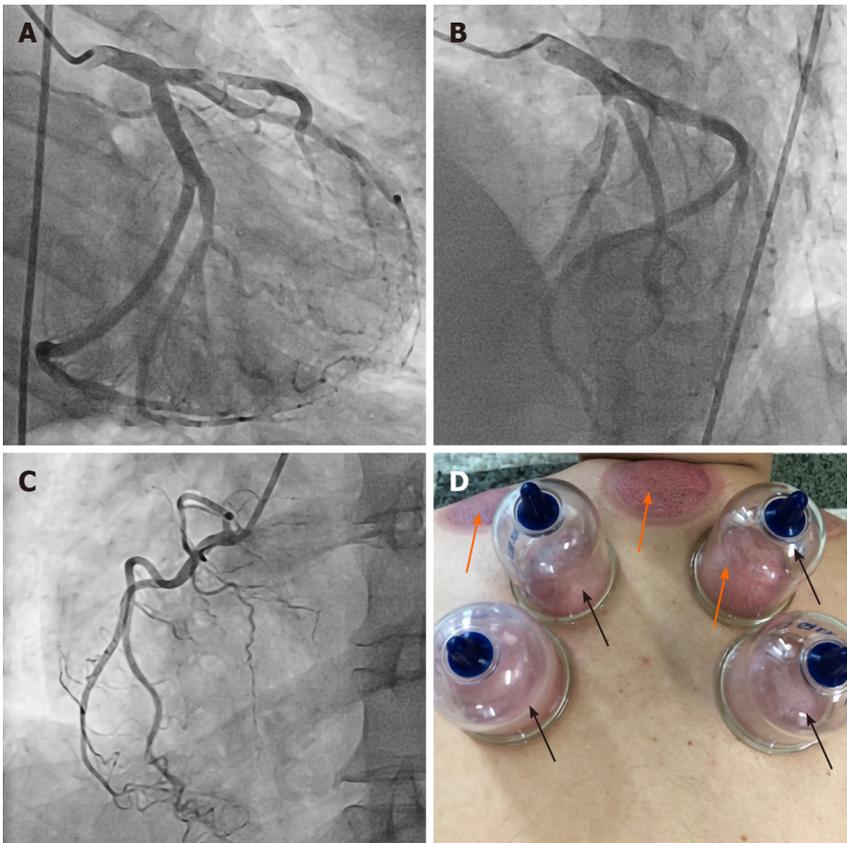
The patient was moved to the catheter lab for emergent percutaneous coronary intervention (PCI) before the laboratory results were available because of the strict door-to-balloon time regulations in Korea.

### Imaging examinations

Coronary angiography revealed 99% stenosis of the proximal left anterior descending (LAD) artery caused by a ruptured plaque, with distal thrombolysis in myocardial infarction flow 3 (Figure 1A-C). A drug-eluting stent (Cilotax™ 3.5 mm × 15 mm) was inserted into the LAD lesion without complications. Consistently low blood pressure was noted during and after PCI.

### Further diagnostic work-up

After PCI, the patient's chest pain was improved, although his dyspnea remained. The lab results were reported after PCI, and cardiac markers were increased as expected.



**Figure 1 Images of coronary angiography and an illustration of wet cupping.** A-C: Coronary angiographic images of the left and right coronary arteries; A and B: A ruptured plaque is observed in the proximal left anterior descending artery; D: A picture of cupping; plastic cups (black arrows) are attached to skin using air suction to create subatmospheric pressure. Skin pricking precedes this process in wet cupping (WC), which facilitates bloodletting. Bruises (orange arrows) develop after WC.

Strikingly, however, the hemoglobin (Hb) level was 4.1 g/dL. Rectal digital tests and nasogastric tube aspiration examinations were negative, ruling out gastrointestinal tract bleeding. Furthermore, his low-density lipoprotein cholesterol level was only 66 mg/dL. Upon careful history taking, we learned that the patient regularly self-performed WC therapy. He had recently intensified his WC routine by implementing it more frequently, which may have led to an excessive loss of blood. We further checked his iron and ferritin levels and total iron binding capacity (TIBC), which showed a typical pattern of iron deficiency anemia (iron, 16  $\mu\text{mol/L}$ ; ferritin, 2.3  $\mu\text{g/L}$ ; TIBC, 374  $\mu\text{mol/L}$ ). The initial echocardiography showed akinetic regional wall motion abnormalities in the LAD territory, although the contractile motion of other territories was hyperdynamic.

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## MULTIDISCIPLINARY EXPERT CONSULTATION

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**Junshik Hong, MD, Associate Professor, Department of Hematology, Seoul National University Hospital**

We consulted with Dr. Hong, who determined that the patient should be immediately transfused and given iron supplements for iron deficiency anemia.

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## FINAL DIAGNOSIS

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The final diagnosis of the presented case was anemia due to excessive WC. The patient also developed STEMI, which was possibly induced by vigorous heart contractions compensating for the poor blood supply caused by life-threatening anemia.

## TREATMENT

A transfusion was immediately initiated, while concurrent iron supplementation was performed after consultation with hematology. Four packed red blood cells were transfused. After transfusion, the patient's dyspnea was dramatically ameliorated and his hypotension recovered to normal blood pressure (120/80 mmHg). His Hb was 7.9 g/dL when he was discharged 2 d post-PCI. We also educated the patient regarding the consequences of unmonitored WC. Iron supplementation was maintained for the next 2 mo. Dual-antiplatelet therapy, angiotensin-converting enzyme inhibitors, beta-blockers, and statins were also given.

## OUTCOME AND FOLLOW-UP

Two months after PCI, during his outpatient department visit, the patient's Hb level had increased to 14.8 g/dL and his symptoms were completely alleviated. He no longer performs WC to this day and has been uneventful for the last seven years. A timeline of the patient's disease course is shown in [Table 1](#).

## DISCUSSION

WC therapy is the application of subatmospheric pressure to a skin-attached glass or plastic cup after pricking precise acupuncture points or painful areas ([Figure 1D](#))<sup>[1]</sup>. The intensity of bruises and the amount of suctioned blood are dependent on the strength of the negative pressure applied. Such practices were traditionally performed in Asia, the Middle East, and Europe with great popularity because they were thought to remove harmful blood or toxins that were causative of diseases<sup>[1]</sup>. Even today, WC is widely performed in Asia and the Middle East in the field of alternative medicine for chronic musculoskeletal pain. Although several small, modern studies have investigated the therapeutic efficacy of WC, the benefits remain relatively unknown<sup>[2]</sup>.

The patient in our study practiced regular WC for his chronic upper back pain. He also stated that as his shortness of breath developed, he had more frequently performed WC during the 3 wk prior to admission because he thought that it would improve his symptoms. Considering that his dyspnea may have developed with decreased cardiac output due to blood loss, his intensified bloodletting may have aggravated his heart failure to a further extent. Furthermore, vigorous heart contractility to compensate for the loss of preload may also have facilitated the imbalance between the patient's myocardial supply and consumption.

Anemia is a well-established risk factor for future adverse events in patients with acute coronary syndrome, stroke, and heart failure<sup>[2,3]</sup>. Although whether anemia leads to the formation of atherosclerosis is relatively undiscovered, an intravascular ultrasound study revealed that anemia was independently associated with thin-cap fibroatheroma, which is thought to be impending plaque rupture<sup>[4]</sup>. The mechanism of this finding has not been elucidated; however, it has been demonstrated that hypovolemia-induced hypernatremia leads to chronic inflammation and the development of atherosclerosis<sup>[5]</sup>. Considering that the patient had relatively low levels of low-density lipoprotein and triglycerides, it is conceivable that other mechanisms, anemia in this case, may have played a major role in the development of atherosclerosis and the rupture of plaque. The dehydrated state of the patient may have promoted systemic inflammation, further leading to the formation of a vulnerable plaque and the subsequent rupture that caused the STEMI<sup>[5]</sup>.

## CONCLUSION

The current case demonstrates that excessive WC without adequate medical monitoring can result in severe anemia, which can further develop into life-threatening myocardial infarction.

**Table 1 A timeline of events: Symptoms, diagnosis, and treatment**

Event	Timeline
Chest pain and ER presentation	Day 1
PCI to proximal LAD	Day 1
Initial Hb level checked (4.1 g/dL)	Day 1
Transfusion and iron supplementation	Day 1
Discharge (Hb: 7.9 g/dL)	Day 3
Outpatient department visit (Hb: 14.8 g/dL)	Day 63

ER: Emergency room; PCI: Percutaneous coronary intervention; LAD: Left anterior descending; Hb: Hemoglobin.

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