Case report

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# Traumatic gastric injury as a complication of the Heimlich maneuver

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**Abstract**

**The Heimlich maneuver is an effective first aid procedure to dislodge a foreign body, causing airway obstruction. However, it is associated with potentially rare and fatal complications. Herein, the authors present a case of a traumatic gastric injury as a complication of the Heimlich maneuver in a 70-year-old female patient who lost consciousness due to airway obstruction while eating tangerines. We have also reviewed relevant literature.**

**Key words**: Heimlich maneuver, foreign body, airway obstruction, complication, gastric injury.

## Introduction

Obstruction of the airway by food or foreign bodies can cause asphyxia, leading to hypoxic brain damage and even death. In such cases, the Heimlich maneuver is one of the best methods that can be tried immediately at the scene before emergency medical support arrives. The maneuver involves applying strong pressure to the upper abdomen to expel food or foreign bodies. (1-3) However, there are rare reports of unwanted fatal complications following a properly performed Heimlich maneuver. (4) We report a recent experience of treating a patient with traumatic gastric injury caused by the Heimlich maneuver in a patient who lost consciousness due to airway obstruction, and also discuss various complications caused by the Heimlich maneuver from previous reports.

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## Case

A 70-year-old woman with a history of asthma lost consciousness due to obstruction of the airway while eating tangerines. Her son attempted the Heimlich maneuver and dislodged some of the tangerines, obstructing the airway before emergency services arrived at the scene. Upon arrival at the scene, the emergency medical service staff noted drowsiness with 89% oxygen saturation. After being transported to the hospital, her blood pressure was 111/51 mmHg, heart rate was 79 beats/minute, respiration rate was 18 breaths/minute, body temperature was 36.5 °C, and oxygen saturation was 94%. To check the presence of a foreign body in the airway, we performed intubation using a video laryngoscope. However, no foreign body was suctioned. Chest computed tomography to confirm aspiration did not reveal aspiration in the lung field; however, a wall disruption of the lesser curvature of the stomach and a large amount of free air was confirmed in the retroperitoneal cavity (**Figure 1**). A 2

cm-sized wall disruption of the lesser curvature of the stomach was confirmed during emergency laparotomy; contamination with food material was not observed (**Figure 2**). Primary suturing was performed, and the abdominal cavity was irrigated and closed. The patient was discharged without any complications two weeks after surgery and is being followed up on an outpatient basis.

## Discussion

The Heimlich method, first announced in 1974, when properly implemented, induces an increase in intrathoracic pressure of about 30 mmHg or more, and the effect can be expected through the following mechanism. (1,3,5) Generally, 4/5 cycles of normal breathing exercises are performed through the diaphragm. Following an increase in the abdominal pressure, the diaphragm rises upward, increasing intrathoracic pressure. A rapid increase in intrathoracic pressure dislodges the material obstructing the airway. This series of processes is possible because patients that lose consciousness due to airway obstruction also lose muscle tone. (6) However, improper implementation of the Heimlich maneuver can cause various complications. (4) It often occurs when untrained individuals apply pressure on the chest cavity alone without applying pressure to the epigastric region below the costal margin while performing the Heimlich maneuver. (7) Even when trained individuals, such as nurses, practice the Heimlich maneuver, organ damage in the abdominal cavity may occur due to the application of excessive pressure to the abdomen. (8)

The injuries reported so far due to the Heimlich method include rib fracture, diaphragm rupture, pneumomediastinum, acute thrombosis of abdominal aortic aneurysm, mesenteric rupture, gastrointestinal tract injury, spleen injury, and retinal detachment. (4,8-16) Among these, the most frequently damaged organ is the lesser curvature of the stomach, which is judged to be the place that sustains the greatest pressure when the abdomen is pressurized. (17)

In the present case, an elderly patient with impaired muscle development due to a history of severe asthma received a Heimlich maneuver from her son, who did not have any medical training to perform the maneuver. Additionally, he judged that the tangerine obstructing the airway was not evacuated sufficiently after a few attempts, and he repeated the procedure by applying excessive pressure. We assumed that these factors contributed to the gastric injury in our patient.

## Conclusion

The Heimlich method is an effective treatment method when a foreign body induces airway obstruction; however, it can also cause fatal complications. Disastrous consequences can be reduced by a close examination of patients who have undergone the procedure to ensure that they do not exhibit signs of the abovementioned complications.

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## Declaration of conflicting interests

The authors have no conflict of interest to declare.

## Ethical approval

This study was approved by the Institutional Review Board of Chungbuk National University Hospital (approval number: 2022-01-030).

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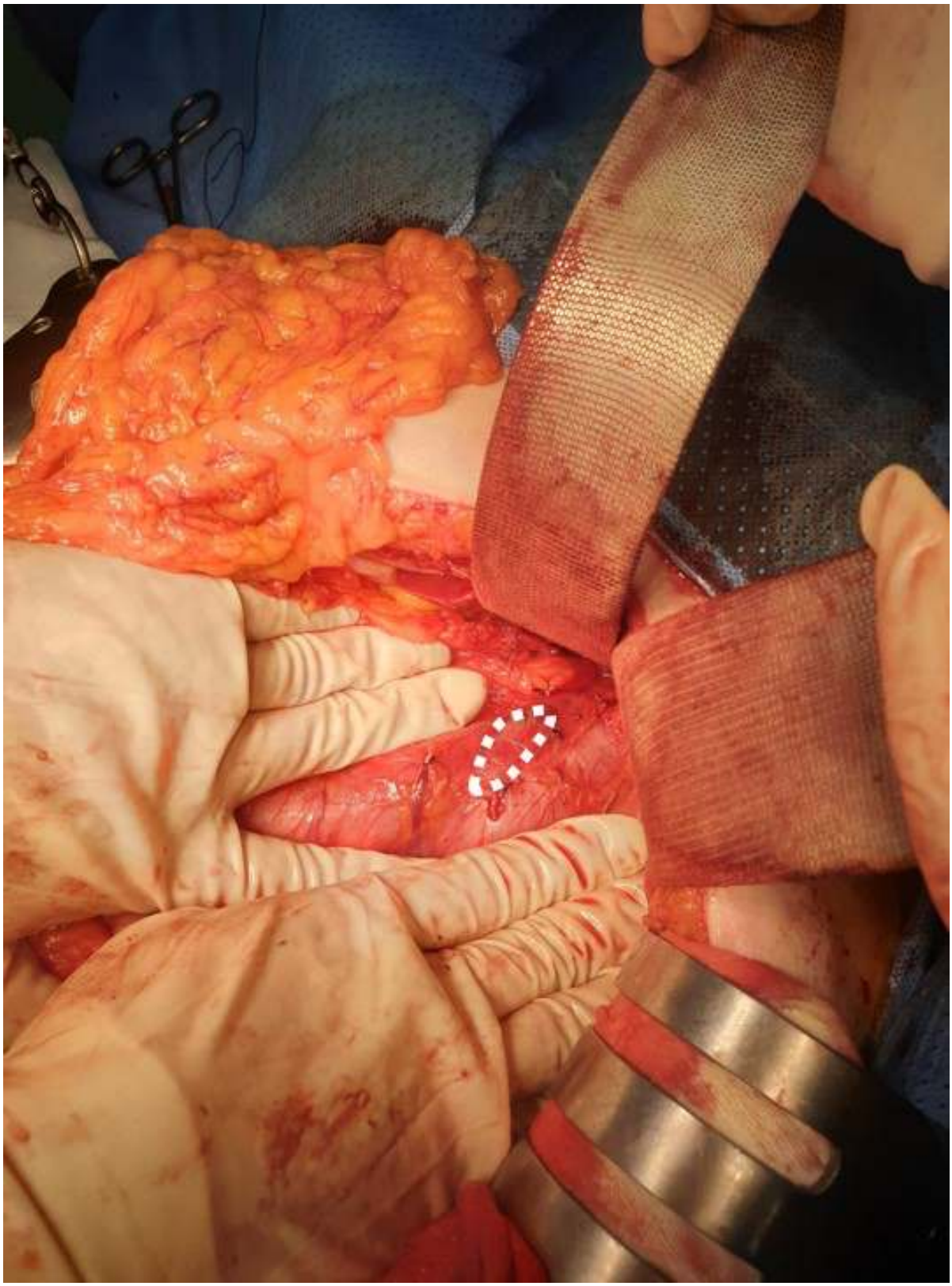
**Figure 1**. Computed tomography image

Legend: The black dotted line indicates the disruption of the wall at the lesser curvature of the stomach. The white dotted line indicates the free air pocket in the retroperitoneal cavity.

**Figure 2**. Emergency laparotomy finding



Legend: The white dotted line indicates the wall disruption of the lesser curvature of the stomach.

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