

Gastric bezoar and intraoral foreign body after plaster ingestion successfully treated without surgical intervention: a case report

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Some cases of plaster ingestion include the occurrence of gastrointestinal obstruction that requires surgery. To date, there are no reports on the treatment of plaster lesions in the mouth. A 50-year-old woman was referred to the emergency department after intentionally drinking a solution of approximately 100 g of plaster powder in 250 mL of water, 3 hours earlier. On arrival, the patient was alert but unable to speak because the plaster had hardened in her mouth. Hardened plaster was also found in her stomach. There was no evidence of acute gastrointestinal obstruction on abdominal computed tomography; we therefore decided to perform surgical observation. The intraoral plaster lesions were successfully removed using forceps, and the plaster bezoar was successfully eliminated without surgical treatment. The present case shows that not all patients with plaster poisoning require surgery; the patient's conditions, such as gastrointestinal obstruction, should indicate the course of treatment.

Keywords Calcium sulfate; Eating; Treatment; Case report

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Capsule Summary

What is already known

There are a few cases of gastric bezoars developing after plaster ingestion. In those reports, the plaster was surgically removed. However, no standard treatment guidelines have been established for patients with plaster ingestion. In addition, no cases of hardening of plaster in the oral cavity have been reported.

What is new in the current study

The present case shows that not all patients with plaster ingestion require surgery. To decide the appropriate treatment, the patient's condition, time from the plaster ingestion to emergency department arrival, mixing ratio of plaster powder to water, and diagnostic imaging tests should be accurately determined.



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INTRODUCTION

Plaster is a white powder consisting of 98% to 100% calcium sulfate hemihydrate ($\text{CaSO}_4 \cdot 1/2 \text{H}_2\text{O}$), a substance that hardens when mixed with water. Plaster has not yet been classified as nontoxic to humans, but its lethal dose is currently unknown.¹ Acute exposure to plaster can irritate the eyes, skin, and airways, whereas plaster ingestion can cause gastrointestinal obstruction that results in nausea, vomiting, and abdominal pain.¹

A few cases of gastric bezoars developing after plaster ingestion have been reported. In these reports, the plaster was surgically removed.^{2,3} However, no standard treatment guidelines have been established for patients who ingest plaster. In addition, to the best of our knowledge, no cases of hardened plaster in the oral cavity have been reported.

Here, we report the case of a patient who arrived at the emergency department (ED) with hardened plaster in the oral cavity and stomach after ingesting a solution containing plaster.

CASE REPORT

A 50-year-old female patient was referred to the ED after intentionally drinking a solution of approximately 100 g of plaster powder in approximately 250 mL of water, 3 hours prior. She had

no significant medical or surgical history, except for psychological problems that began 6 months earlier for which she had not received psychiatric treatment.

On arrival, the patient was alert but unable to speak because the plaster had hardened in her mouth. She communicated with the medical staff by writing on paper. Her chief complaints were discomfort in the epigastric area, nausea, and difficulty swallowing. The patient was hemodynamically stable, and had no specific abnormal laboratory test results, including drug screening results. On physical examination, white, hardened plaster deposits were evident in the area around her mouth and within her oral cavity (Fig. 1). In the pharynx, the white plaster had almost completely filled the lumen. In addition, in the epigastric area, a hard mass that moved in response to breathing was palpated.

We requested an emergency consultation from the otolaryngology department to confirm the airway patency. Fiberoptic examination revealed a white plaster mass in the oral cavity and oropharynx, but the upper airway, including the laryngeal area, was undisturbed (Fig. 1 and Supplementary Fig. 1). Subsequently, plain abdominal radiography was performed, which revealed a radio-opaque lesion in the upper abdomen (Fig. 2A).

Additional emergent consultations with a clinical toxicologist, dentist, otolaryngologist, and general surgeon were performed to discuss the case and decide the treatment strategy for the pa-



Fig. 1. White plaster material in the oral cavity and its mechanical removal using forceps. (A) Initial, (B) partial removal status in oral cavity, (C) removed plaster material, and (D) complete removal status in oral cavity. Written informed consent for publication of the clinical images was obtained from the patient.

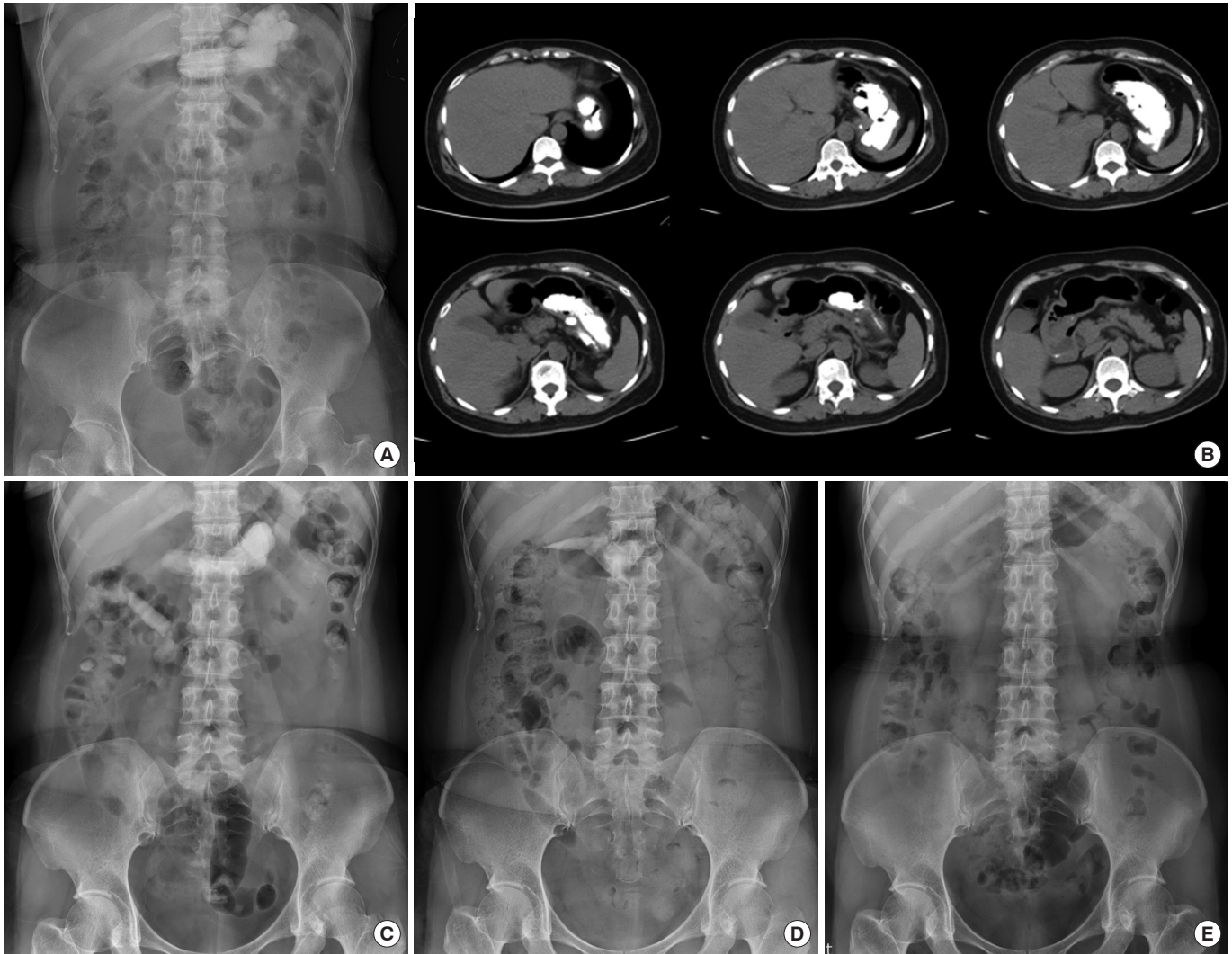


Fig. 2. Gastric cast on plain abdominal radiographs and abdominal computed tomography scan of (A, B) at the emergency department, (C) hospital day 4, (D) hospital day 7, and (E) 3 weeks after discharge.

tient. The treatment plan was as follows: first, the dentist would try to remove the intraoral plaster lesions with irrigation and forceps. If this was unsuccessful, the otolaryngologist would treat the patient surgically under general anesthesia. Next, the patient would undergo an abdominal computed tomography (CT) scan for viewing of the gastrointestinal lesions and the degree of gastrointestinal obstruction. An endoscopy would be performed if endoscope insertion could be achieved.

The abdominal CT revealed a single radiopaque foreign body inside the gastric lumen (gastroesophageal junction, fundus, and body of the stomach) which did not cause stomach distension. Endoscopy was planned to evaluate the corrosive damage of the esophagus and stomach and for endoscopic removal of plaster. Nasogastric tube insertion was attempted, but was unsuccessful owing to the plaster deposited at the gastroesophageal junction.

Therefore, we thought it would be too difficult for the endoscope to enter the stomach. We planned to perform surgical observation rather than an emergency operation because the patient did not experience vomiting or severe abdominal pain and bezoars were not observed around the pylorus on CT imaging (Fig. 2B). If there were signs of gastrointestinal obstruction or no passage of the plaster during surgical observation, we would have recommended surgery.

In the ED, the dentist successfully removed the intraoral plaster with forceps (Fig. 1). The patient was then hospitalized in a general medicine ward. During hospital day (HD) 3, a follow-up abdominal radiograph was performed; the radiograph showed that the plaster content in the stomach had reduced in size. The patient was started on a liquid diet on HD 4, which was well tolerated (Fig. 2C). On HD 7, a follow-up abdominal radiograph re-

vealed that the plaster content in the stomach had further reduced in size (Fig. 2D). The patient was discharged in good condition on HD 10. She was referred to a psychiatric clinic for treatment of the underlying psychological disorder. Three weeks after discharge, the patient's abdominal radiograph showed that all the plaster in the stomach had been cleared (Fig. 2E). We analyzed the patient's serum calcium and sulfate levels serially to detect any increases due to the plaster powder content of calcium sulfate. The patient's serum calcium and sulfate levels remained unchanged. The patient provided informed consent for publication of the research details and clinical images.

DISCUSSION

In previous cases, gastric plaster bezoars caused by plaster ingestion have required surgical removal.^{2,3} The case presented here is rare as the patient was treated using conservative methods, such as the use of forceps for the removal of the intraoral plaster lesions without surgical intervention and the spontaneous passage of the plaster bezoar from the stomach. There are cases reported in the literature where patients without evidence of gastrointestinal obstruction were treated with gastric lavage without surgical intervention despite the size of the obstruction being large enough to cause stomach distension.^{4,5} In the present case, nasogastric tube insertion for gastric lavage was attempted but the nasogastric tube could not pass due to the plaster deposited at the gastroesophageal junction.

We propose two factors responsible for the differences observed in our patient's clinical course compared to previous cases reported in the literature. First, in our case, the patient arrived at our ED in a relatively shorter time frame following ingestion compared to the patients in other cases reported in the literature. If the patient had waited longer before visiting the ED, the intraoral plaster would have hardened further, making it impossible to remove with forceps. In addition, it would have been impossible to remove the gastric plaster contents spontaneously. The patient would have required major surgery involving a dentist, general surgeon, and thoracic surgeon. Second, the ratio of plaster powder and water consumed is essential. It is well-known that when a large amount of plaster powder in a small amount of water is ingested, the plaster is denser and hardens quickly. In such a situation, surgical treatment must be strongly considered. In our case, the patient drank approximately 100 g of plaster powder in 250 mL of water; therefore, the plaster was not as hard, and could dissolve over time and be eliminated naturally.

We tested the plaster powder, received from the patient, to visualize how it would harden if the same amount of water and

plaster powder were mixed together. We have attached the experimental video as a supplemental file (Supplementary Video 1).

The present case shows that not all patients who ingest plaster require surgery. To determine the appropriate treatment, the patient's condition, time from the plaster ingestion to ED arrival, ratio of plaster powder to liquid consumed, and the size of obstruction evaluated through diagnostic imaging tests should be comprehensively considered.

SUPPLEMENTARY MATERIAL

Supplementary Fig. 1. Upper airway view of emergent fibroscopy examination

Supplementary Video 1. Movie showing tests of plaster hardening capacity

Supplementary materials are available from: <https://doi.org/10.15441/ceem.20.033>.

CONFLICT OF INTEREST

No potential conflicts of interest relevant to this article was reported.

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