




# A case of diabetic ketoacidosis with hemorrhagic gastric ulcer

Momoko Isono MD<sup>1,2</sup>  | Hiroki Isono MD, MBA, PhD<sup>2</sup>  | Kousuke Ihara MD<sup>2</sup>  | Maki Oogi MD<sup>1</sup>

<sup>1</sup>Department of Diabetes, HITO Medical Center, Ehime, Japan

<sup>2</sup>Department of General Medicine, HITO Medical Center, Ehime, Japan

## Correspondence

Hiroki Isono, Department of General Medicine, HITO Medical Center, 788-1 Kamibuncho, Shikokuchuo, Ehime 799-0121, Japan.

Email: hirokisono@gmail.com

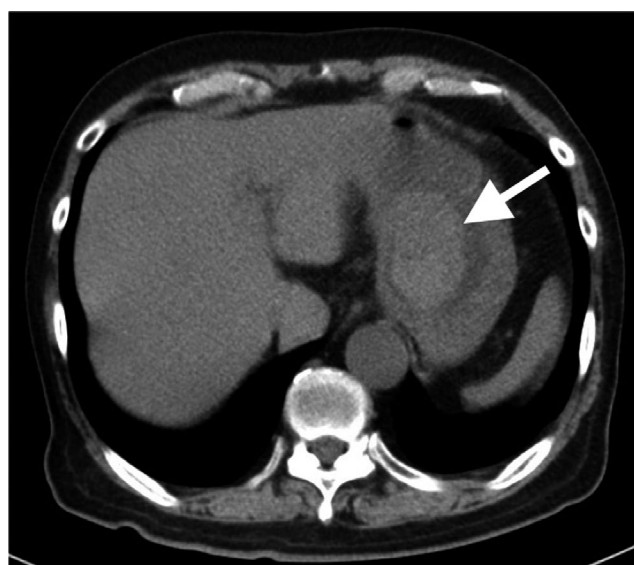
**Keywords:** gastrointestinal, blood pressure,

A 69-year-old man was unable to eat, and his diet was limited to juice for 1 week preceding admission. He had no history of major illnesses, nor did he consume medication or alcohol. On the evening of his visit, he was found while lying down at home and was responsive, and was transported to the hospital via ambulance. Vital signs at the time of admission were 36.6°C temperature, 135/86 mmHg blood pressure (BP), 100 beats/min pulse, 20 breaths/min respiratory rate, and E4V4M6 Glasgow Coma Scale. Blood test results indicated the following: blood sugar, 1,025 mg/dl; Hb, 13.8 g/dl; blood urea nitrogen (BUN), 96 mg/dl; and creatinine, 3.7 mg/dl. Blood gas analysis revealed a 7.21 pH, 3.9 mEq/L HCO<sub>3</sub> level, and anion gap (AG) of 34 mmol/L. He was hospitalized with a diagnosis of severe diabetic ketoacidosis (DKA). Although plain computed tomography (CT) showed a high-density area of 40–70 HU in the stomach, he had no abdominal symptoms. Therefore, this abnormality was overlooked on admission (Figure 1).

Infectious diseases, myocardial infarction, and acute pancreatitis were not observed. Continuous intravenous insulin infusion and fluid replacement were initiated. His BP did not drop the following morning. The input and output of fluid balance for 14 h after admission were 3,000 ml and 1,600 ml, respectively. One day posttreatment, blood tests revealed the following: blood glucose, 240 mg/dl; Hb, 9.3 g/dl; BUN, 74 mg/dl; and creatinine, 2.0 mg/dl. Blood gas analysis revealed a pH of 7.30, an HCO<sub>3</sub> level of 12.8 mEq/L, and an AG of 12 mmol/L. Findings indicated that the AG was closed. However, after 3 h, he went into shock, with a BP of 64/42 mmHg and a heart rate of 105 bpm, and exhibited excessive melena. Emergency upper gastrointestinal endoscopy was performed, revealing a hemorrhagic gastric ulcer accompanied by ejection bleeding (Figure 2). Therefore, endoscopic hemostasis was performed, after which his

condition became stable. He was discharged 26 days postadmission. *Helicobacter pylori* infection was confirmed in an outpatient setting, and eradication treatment was performed.

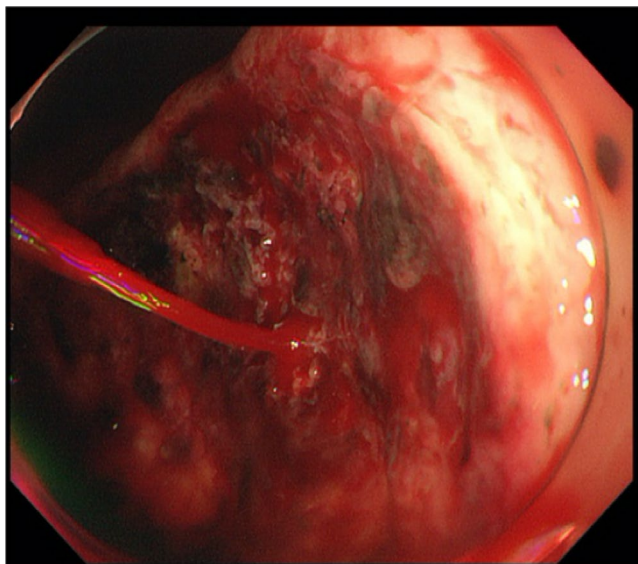
Diabetic ketoacidosis is sometimes complicated by gastrointestinal bleeding. However, cases requiring hemostasis are extremely rare. Badipatla et al. reported that upper gastrointestinal bleeding occurred in 22 (9%) of 234 DKA cases, and hemostasis was necessary only once (0.4%). In the current case, gastrointestinal bleeding was not apparent until the manifestation of shock and melena. However, the patient's plain CT scan on admission



**FIGURE 1** Axial computed tomography image showing a high-density area in the stomach (arrow)

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2021 The Authors. *Journal of General and Family Medicine* published by John Wiley & Sons Australia, Ltd on behalf of Japan Primary Care Association



**FIGURE 2** Upper gastrointestinal endoscopy findings. Large number of blood clots in the stomach. A1-stage gastric ulcer measuring 30 mm in diameter in the lesser curvature of the stomach. Pulsatile and eruptive bleeding from exposed blood vessels

showed a high-density area of 40–70 HU in the stomach. An earlier study reported a mean CT value of gastrointestinal bleeding to be 47 HU on plain CT, which was similar to that observed in this case.<sup>1</sup> Further, on the morning following hospital admission, his Hb level decreased by 3.9 g/dl, and his BUN/creatinine ratio was 37, which was greater than the BUN/creatinine ratio of 26 measured on admission. In retrospect, the patient should have been diagnosed with hemorrhagic gastric ulcer before he experienced hemorrhagic shock. Mortality rates increase when DKA is complicated with upper gastrointestinal bleeding;<sup>2</sup> thus, it is important to consider this possibility.

## ACKNOWLEDGEMENTS

Photographic consents: The consent is obtained from the patient.

## CONFLICT OF INTEREST

The other authors have stated explicitly that there are no conflicts of interest in connection with this article.

## AUTHOR CONTRIBUTION

All authors meet the ICMJE authorship criteria.

## CONSENT FOR PUBLICATION

Informed consent has been obtained from the patient for the publication of this report.

## ORCID

Momoko Isono  <https://orcid.org/0000-0002-8635-1420>

Hiroki Isono  <https://orcid.org/0000-0002-6593-8740>

Kousuke Ihara  <https://orcid.org/0000-0001-7241-7399>

## REFERENCES

1. Badipatla KR, Jadhav P, Vaddigiri S, Bajantri B, Singh A, Chandrala C, et al. Predictors of acute gastrointestinal bleeding in diabetic ketoacidosis: a retrospective observational study in minority population. *Gastroenterol Rep.* 2017;5(4):293–7.
2. Scheffel H, Pfammatter T, Wildi S, Bauerfeind P, Marincek B, Alkadhi H. Acute gastrointestinal bleeding: detection of source and etiology with multi-detector-row CT. *Eur Radiol.* 2007;17(6):1555–65.
3. Faigel DO, Metz DC. Prevalence, etiology, and prognostic significance of upper gastrointestinal hemorrhage in diabetic ketoacidosis. *Dig Dis Sci.* 1996;41(1):1–8.

**How to cite this article:** Isono M, Isono H, Ihara K, Oogi M. A case of diabetic ketoacidosis with hemorrhagic gastric ulcer. *J Gen Fam Med.* 2022;23:50–51. <https://doi.org/10.1002/jgf2.463>