Black Esophagus Manifesting as Upper Gastrointestinal Bleeding in Diabetic Ketoacidosis: A Case Report

Fouad Jaber, M.D.[1], Rawan Rajab, M.D.[1] , Islam Hassan, M.D.[1] ,Noor Hassan M.D.[1] , Kimberly Sanders, M.D.[1,2], Taher Mahomoudi, M.D.[1,2] , Esmat Sadeddin, M.D.[1,2] , Hassan Ghoz , M.D.[1,2]

1. Department of Internal Medicine, University of Missouri-Kansas City, Kansas City, MO
2. Department of Gastrointestinal Medicine, University of Missouri-Kansas City, Kansas City, MO

Introduction

- Acute esophageal necrosis (AEN), or black esophagus, usually develops due to combination of tissue hypoperfusion, impaired mucosal defenses and gastric reflux (1).
- AEN is a rare clinical entity manifesting as upper gastrointestinal bleeding (2) and patients are diagnosed by the presence of black-colored esophageal mucosa on esophagogastroduodenoscopy (EGD) which extends to the distal esophageal junction (3).
- AEN is associated with various conditions such as sepsis, pancreatitis, shock, trauma, and renal failure (4). Black esophagus in the setting of diabetic ketoacidosis (DKA) has been rarely reported. We present a case of a 36-year-old male with black esophagus presenting as hematemesis complicating an episode of DKA.

Case Presentation

Patient : 36-year-old male
Past Medical History :

Poorly controlled type 1 DM, gastroparesis, End stage renal disease on hemodialysis , and hypertension

Chief Complaint : Abdominal pain

Presentation :

- Patient presented with abdominal pain, nausea and vomiting. The abdominal pain was generalized, constant and non-radiating.
- He reported vomiting 200-300 ml of bright red blood before admission. He denied melena or hematochezia. He denied NSAIDs use, or anti-coagulants use.
- He had hemodialysis one day prior to admission.

Vitals : T: 97.8F, HR: 64 , BP: 116/51 RR: 20 SpO: 98%

Physical Exam : Remarkable for non-distended abdomen with diffuse tenderness to palpation without peritoneal signs, with normal bowel sound.

Medications: Insulin glargine, Insulin lispro, Atorvastatin, Carvedilol, Hydralazine.
Past Surgical History : None.
Allergies : None
Social History : Denied tobacco use, alcohol use, vaping, or recreational drug use.
Family History : Multiple first-degree relatives with type II diabetes.

Timeline

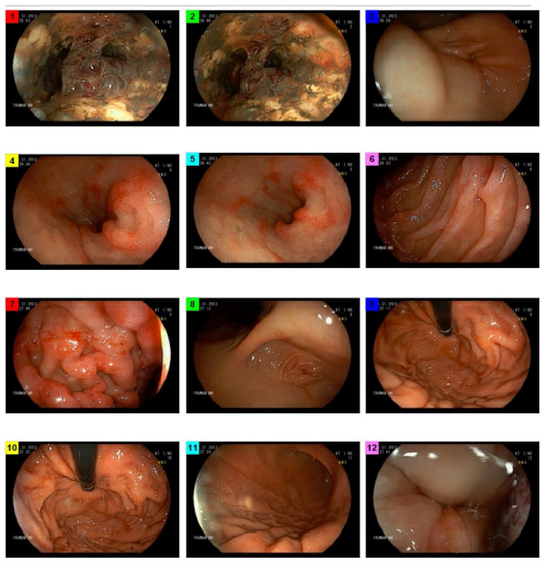
-ICU level of care
- IVF and insulin (DKA protocol)

Another episode of hematemesis :
- Tachycardia at 110, BP 95/54
- Hgb dropped to 5.6

- IVF and 2 packed RBCs
- Continuous pantoprazole infusion
- **EGD :**(Figure 1)
- **CT chest after endoscopy:** no signs of esophageal perforation.

- Continued on pantoprazole infusion.
- Strict nothing by mouth (NPO) diet for three days with gradual advancement of diet.
- Five days of empiric antimicrobial coverage with ampicillin-sulbactam and fluconazole.
- Patient reported no further episodes of hematemesis, and hemoglobin stabilized around 8.0.

Images



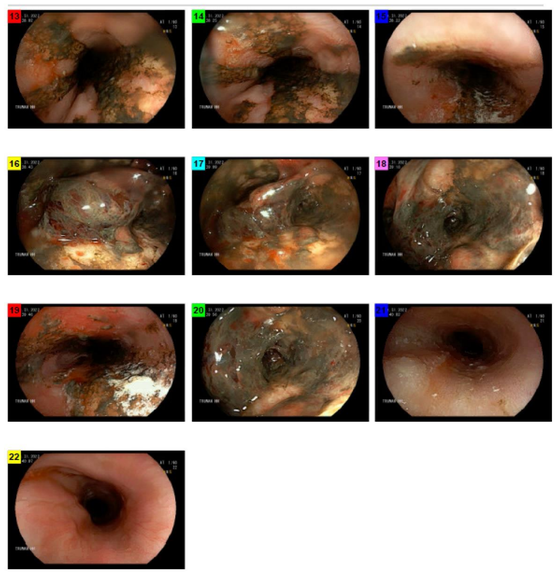
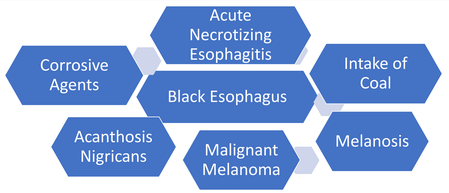


Figure 1 : In the middle and lower third esophagus, from 20 cm from the incisors, severe, ulcerative, necrotic, circumferential esophagitis was noted consistent with acute necrotizing esophagitis (Black esophagus). Just above the GE junction, a medium-sized blood clot was seen without evidence of active bleeding. Area adjacent to the clot beyond the depth of insertion was suspicious for deep mucosal tear and possible false lumen, hence the clot was not manipulated and minimal air Insufflation was used from that point.

Labs (Table 1)

Lab	Result	Lab	Result
Na	121	WBC	10.2
K	7.2	Hemoglobin	7.5 (8.5 three days prior)
Co2	9	Hematocrit	29
Anion Gap	41	Platelets	148
Glucose	1491	Total Bilirubin	0.4
Creatinine	6.32	Lipase	41
BUN	101	PT	12.4
Ca	8.4	INR	1.1
Phosphorus	9.4	Lactic Acid	1.4
Magnesium	4	Osmolality	388
Albumin	3.6	Urine Analysis	Positive for glucose and ketones
AST	45	ABG	7.3/279/ 3.3
ALT	80	Blood Cultures	One positive for *Staph. Epidermisdis*

Differential Diagnosis (5)



Take-Home Message

- The association between diabetes and black esophagus is uncertain but has been reported in a few studies (6,7). The association could be hypothesized as diabetic patients have greater damage in arteries, especially small caliber arteries (8). Greater endothelial damage and atherosclerotic disease in diabetes contribute to more vascular events (8).
- Complications of AEN include perforations (86%), esophageal strictures (10.8%), mediastinitis and abscesses (5.7%) (4,5).
- The current standard management for AEN includes supportive care with hydration, proton pump inhibitors, and antibiotics (9). Surgical intervention is usually reserved for extensive esophageal ulceration or perforation (9).
- Deveoplment of AEN is an independent risk of mortality and should be considered in diabetic ketoacidosis patients presenting with upper gastrointestinal bleeding.

References

1. Schizas D, Theochari NA, Mylonas KS, et al.: Acute esophageal necrosis: a systematic review and pooled analysis. *World J Gastrointest Surg*. 2020, 12:104-15. 10.4240/wjgs.v12.i3.104.
2. Gurvits GE: Black esophagus: acute esophageal necrosis syndrome. *World J Gastroenterol*. 2010, 16:3219-25. 10.3748/wjg.v16.i26.3219.
3. Day A, Sayegh M: Acute oesophageal necrosis: a case report and review of the literature. *Int J Surg*. 2010, 8:6-14. 10.1016/j.ijsu.2009.09.014.
4. Akaishi R, Taniyama Y, Sakurai T, Okamoto H, Sato C, Unno M, Kamei T: Acute esophageal necrosis with esophagus perforation treated by thoracoscopic subtotal esophagectomy and reconstructive surgery on a secondary esophageal stricture: a case report. *Surg Case Rep*. 2019, 5:73. 10.1186/s40792-019-0636-3.
5. Jacobsen NO, Christiansen J, Kruse A: Incidence of oesophageal necrosis in an autopsy material . *APMIS*. 2003, 111:591-4. 10.1034/j.1600-0463.2003.1110509.x.
6. Field Z, Kropf J, Lytle M, Castaneira G, Madruga M, Carlan SJ: Black esophagus: a rare case of acute esophageal necrosis induced by diabetic ketoacidosis in a young adult female. *Case Rep Gastrointest Med*. 2018, 2018:7363406. 10.1155/2018/7363406.
7, Moss K, Mahmood T, Spaziani R. Acute esophageal necrosis as a complication of diabetic ketoacidosis: A case report. *World J Clin Cases*. 2021;9(31):9571-9576. doi:10.12998/wjcc.v9.i31.9571
8. Rehman O, Jaferi U, Padda I, Khehra N, Atwal H, Parmar M. Epidemiology, Pathogenesis, and Clinical Manifestations of Acute Esophageal Necrosis in Adults. *Cureus*. 2021;13(7):e16618. doi:10.7759/cureus.16618
9. Siddiqi A, Chaudhary FS, Naqvi HA, Saleh N, Farooqi R, Yousaf MN: Black esophagus: a syndrome of acute esophageal necrosis associated with active alcohol drinking. *BMJ Open Gastroenterol*. 2020, 7:10.1136/bmjgast-2020-000466.