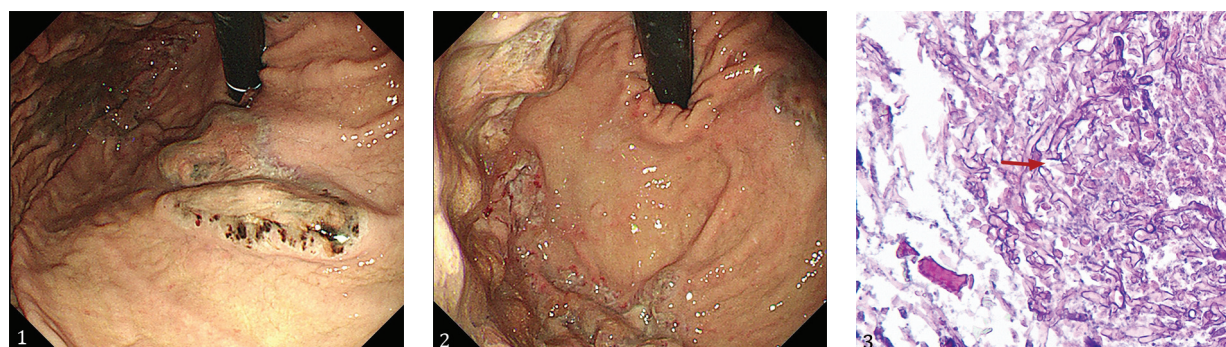


Multiple Gastric Ulcers in An Immunosuppressed Patient with COVID-19 Infection caused by Mucormycosis

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A 57-year-old male patient was admitted to the hospital for cough with sputum for 1 week. The patient had history of ANCA-associated vasculitis and end-stage kidney disease caused by vasculitis for four years. Prednisone (5mg/per day) was used to control the vasculitis and regular hemodialysis with antihypertensive drugs were applied. In this admission, the symptoms were considered pneumonia caused by COVID-19 co-infected with bacteria. During hospitalization, he developed melena with a significant drop in hemoglobin. Hence, esophagogastroduodenoscopy was performed to identified bleeding source as well as endoscopic hemostasis if necessary. Multiple ulcers were noticed in the upper part of stomach. The boundaries of ulcers were unclear and slightly irregular, covered by intense grayish-brown exudates (Figs. 1, 2). Biopsy of the ulcer showed aseptate hyphae with greater width and right-angle pattern of branch, morphology of which consistent with mucormycosis (Fig. 3). Proton pump inhibitor and antifungal treatment of liposomal amphotericin B were prescribed. The melena did not reoccur at the 6-month follow-up interview.

Mucormycosis is an opportunistic infection occurred in patients with predisposing factors leading to immunosuppressive condition. Recent meta-analyses reported that COVID-19 exposure was associated with additional risk of mucormycosis infection, mainly due to the comorbidities (e.g., diabetes, kidney disease) and the use of corticosteroid [1-3]. The application of corticosteroid improves the outcomes of COVID-19 patients but suppressed immune defense resulting in co-infection. Gastrointestinal tract is rarely involved (1.4-7%), mostly reported to affect the stomach (58-67%) [4-6]. Its classic

endoscopic features including sole or multiple giant ulcers that tend to locate the upper part of stomach, with necrotic base covered by inexplicable extensive exudates. Biopsy is imperative to differentiated them from drug-induced ulcers, malignant diseases, lymphoma and metastatic lesions.

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