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CASE REPORT

Beneath the Surface: Diagnosing Gastric Linitis Plastica

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Abstract

Gastric Linitis plastica is characterized by extensive infiltration of gastric wall by poorly differentiated tumor cells, creating a "leather-bottle stomach" appearance. We describe a case involving a 71-year-old male presenting with globus sensation, early satiety and weight loss. Recent EGD had revealed chronic gastritis with polypoid mucosa at the GE junction, and subsequent FDG-PET indicated asymmetric FDG localization. On admission, repeat EGD with deep biopsies confirmed invasive poorly differentiated gastric adenocarcinoma with signet ring features. Despite palliative radiation, the patient died within a month, highlighting the disease's aggressiveness and importance of advanced diagnostic techniques in suspected cases of Linitis plastica.

Keywords: Gastric Linitis plastica, Leather-bottle stomach, Gastric cancer, Diagnosis

1. Introduction

Gastric Linitis plastica is a distinct phenotype of poorly differentiated gastric tumor in which diffuse infiltration of the gastric wall leads to fibrosis and organ contraction. It is classically recognized as the "leather-bottle stomach." Histologically, bands of filaments resembling linen, hence the term "linitis," and grossly, a "leather bottle" characterized by limited distensibility are appreciated. Linitis plastica is an uncommon variant of gastric cancer, accounting for approximately 10%−20% of all gastric malignancies; early diagnosis is critical given the aggressive nature and potential for metastasis. Most patients do not survive more than 5 years after diagnosis,[1] with some studies reporting a 5-year survival rate of 11% even after curative resection.[2] Early diagnosis remains challenging, however, given the anomalous pattern of spread within gastric tissue, oftentimes sparing the gastric mucosal layer early in the disease, rendering conventional endoscopy and biopsy falsely negative.

2. Objective

To highlight that prompt recognition and early deep tissue biopsy are crucial in diagnosing Linitis plastica, in order to optimize therapeutic outcomes and prevent metastasis.

3. Case report

A 71-year-old male presented to hospital with globus sensation, early satiety and weight loss of 60 pounds in 6 months. He denied fatigue, abdominal discomfort, or night sweats, and attributed weight loss to restricted oral intake given financial and social constraints. On initial hospitalization he underwent an esophagogastroduodenoscopy (EGD) that revealed a polypoid mucosa at the gastroesophageal junction; histology demonstrated inactive chronic gastritis and he was subsequently discharged with recommendations to obtain an outpatient fludeoxyglucose positron emission tomography (FDG-PET) due to ongoing suspicion for malignancy. Outpatient imaging demonstrated

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asymmetric FDG localization to the gastric fundus just below the gastroesophageal junction, new ascites and areas of nodularity within the omentum. One week later, he represented in the setting of persistent early satiety and an inability to tolerate any oral intake. Computed tomography (CT) of abdomen (Fig. 1) showed diffuse gastric wall thickening with mucosal enhancement as well as left upper quadrant omental stranding. A repeat EGD revealed a large, fungating, ulcerated, circumferential mass at the gastroesophageal (GE) junction with associated oozing extending into the cardia (Fig. 2). Multiple tunneled biopsies were performed with extension into the submucosa, and pathology revealed an invasive poorly differentiated adenocarcinoma with signet ring features suggestive of Linitis plastica (Fig. 3). The patient declined surgery and while offered chemotherapy, he deferred. He was admitted to another center two days later with severe dysphagia and was initiated on palliative radiation. A permanent nasogastric tube was considered given the relative contraindication to a PEG tube; however, he was transitioned to hospice. He passed away 20 days after initial diagnosis and within 6 months of symptom onset.

4. Discussion

Gastric Linitis plastica often presents with an insidious onset of non-specific gastrointestinal symptoms. Symptoms arise mostly in advanced stages and are attributed to limitations in stomach distensibility. One case series described symptoms such as dyspepsia (55%), vomiting (33%), regurgitation of food from the esophagus and dysphagia (33%) due to the infiltration of the submucosa and muscle layer resulting in gastric wall stromal thickening.[2] The overall prognosis is poor with median survival time of 5.7–13.8 months due to the advanced nature of the disease at presentation, higher rates of peritoneal metastasis and higher rates of recurrence.[3]

Diagnosis requires a high index of suspicion and often a multimodal approach involving imaging and direct endoscopic evaluation. CT findings that raise suspicion for Linitis plastica include gastric

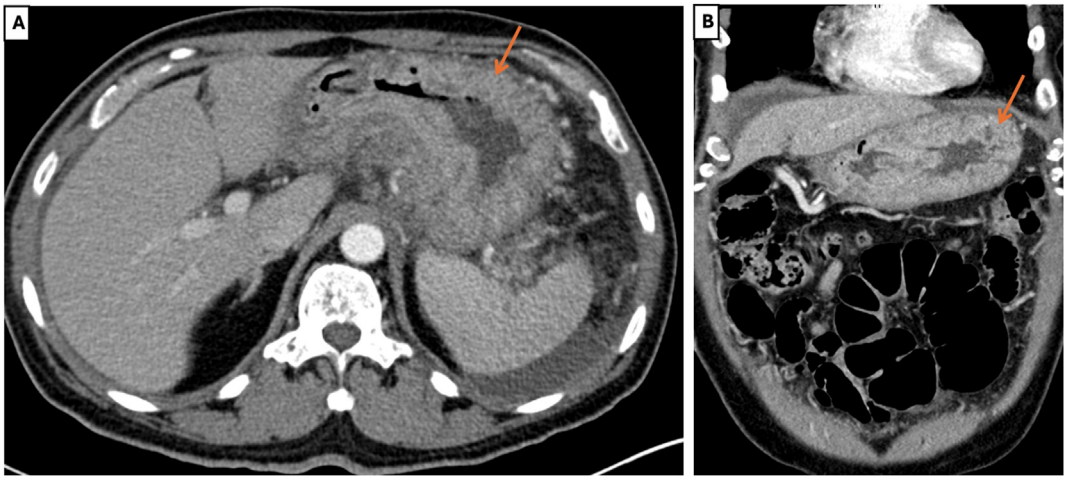

Fig. 1. Abdomen and pelvis computed tomography images showing gastric thickening (arrows) from axial (A) and sagittal (B) views.

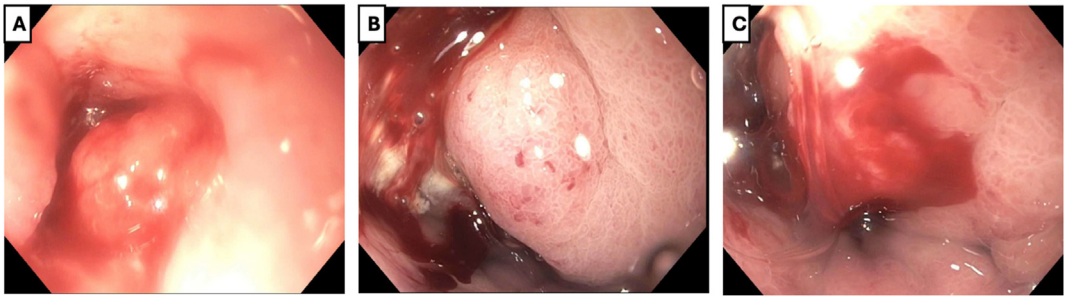

Fig. 2. Upper endoscopic evaluation showing a partially obstructing mass extending from (A) the lower third of the esophagus into (B) the gastric cardia, where a biopsy was taken, with (C) bleeding post-biopsy.

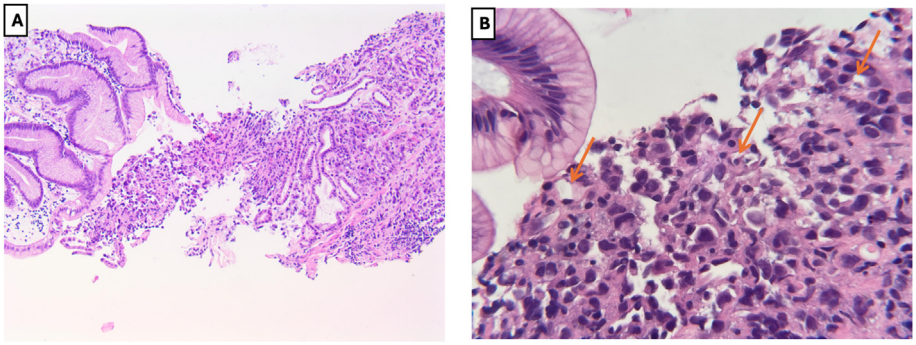

Fig. 3. Histological examination of the gastric cardia mass biopsy shows (A) an infiltrative growth pattern with hyperchromasia (hematoxylin-eosin stain, magnification ×10) and (B) nuclear membrane irregularities with occasional signet ring cells (arrows) (hematoxylin-eosin stain, magnification ×40).

thickening, yet this remains non-specific. Furthermore, the combination of hypertrophic mucosal folds and/or symptoms due to limited distensibility of the stomach may be noted in other conditions such as gastric lymphoma, Menetrier disease, granulomatous disease, and metastasis,[1] underscoring need for direct histological evaluation. Conversely, an 18-FDG PET scan, has been reported to have meager diagnostic significance as poorly differentiated, diffuse, mucinous, and signet ring carcinomas have been reported to have low 18-FDG uptake. Surprisingly, in our case, the tumor showed significant FDG uptake, possibly suggesting a more aggressive variant.

Endoscopy with biopsy remains the gold standard for diagnosis. Unfortunately, due to the poorly cohesive characteristic of these malignant cells, they are scattered within the tumor stroma. Furthermore, these cells are primarily located within the submucosa and muscularis propria, sparing the mucosa, and thereby predisposing to false negative biopsy results. As such, standard endoscopic biopsy oftentimes remains negative or non-diagnostic. Levine et al.[5] and Shabot et al.[4] documented that 30–36% of biopsies are non-diagnostic in those with gastric Linitis plastica. A recent case series further described a patient that underwent endoscopic evaluation over three times with persistent non-diagnostic results, who was subsequently found to have gastric Linitis plastica on endoscopic ultrasound (EUS).[6] Several strategies can be used to improve diagnostic yield, such as EUS combined with fine-needle aspiration (FNA). Submucosal and muscular thickening may be noted with EUS and when coupled with FNA, allows sampling of the deeper submucosal layers. Some clinicians have proposed the use of submucosal endoscopic biopsy, whereby biopsies are taken from tissue deep to a dissected submucosal tunnel.[7] Newer generation endoscopic techniques (endocytoscopy and endomicroscopy) have also been proposed.[8] Blood-based biomarkers such as high levels of trypsinogen have yet to be validated.[9] Future diagnostics including "liquid biopsy" of circulating tumor cells, cDNA, or miRNA are additional diagnostic avenues, especially as genomic and epigenetic characteristics of gastric malignancies are further understood.[10] Suspicion of Linitis plastica should prompt consideration for laparoscopy to assist in staging, and given the tropism of the disease to peritoneum, peritoneal washings should be mandatory.[11]

Therapeutic management of Linitus plastica remains equally challenging due to the absence of guideline-directed management protocols. Surgical resection with adequate margins (>5 cm) is recommended for gastric cancers,[12] however outcomes remain unfavorable. Some authors have suggested benefit of aggressive multimodal treatments like preoperative hyperthermic intraperitoneal chemotherapy, while others advocate primary chemotherapy due to low survival rates post curative surgery.[13] Radiotherapy as adjunctive modality was found to be significantly less effective in managing tumors with diffuse spread.[14] Currently, use of immunotherapies alongside standard chemotherapy to target residual cells post-gastrectomy is investigated.[15]

5. Conclusion

Gastric Linitis plastica poses a diagnostic challenge due to the limitations of conventional endoscopy and biopsy methods, leading to delayed diagnosis and detection of advanced-stage malignancies. Current literature recommends use of advanced endoscopic techniques, given the complexity of managing advanced disease and the absence of standardized treatment protocols.

Disclaimers

None.

Ethics information

Informed consent was obtained for publication of case materials. No experimentation was done on humans or animals.

Source of support

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Patient consent

Informed consent was obtained for publication of case materials.

Conflict of interest

All authors declare no conflict of interest.

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