

Point-of-care Ultrasound Diagnosis of Gastric Outlet Obstruction Syndrome

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Abstract

Gastric Outlet Obstruction (GOO) is a clinical syndrome characterized by postprandial vomiting, epigastric pain, and abdominal distension due to mechanical or motility disorders. The suspicion will mainly rely on abdominal radiological imaging (computed tomography, barium studies) that might not be widely available or even be contraindicated. We report a 65-year-old male who developed progressive epigastralgia, anorexia, and vomiting. Physical examination revealed mild abdominal distension and epigastric tenderness on deep palpation. With the presumptive diagnosis of gastric outlet obstruction, an abdominal point-of-care ultrasound (POCUS) was performed and showed impaired gastric emptying and a “target sign.” A gastroscopic exploration confirmed inflammatory pyloric stenosis due to coexisting antral and duodenal ulcers. POCUS could play an essential role in the easy ultrasonographic diagnosis of gastroparesis, helping to differentiate from other causes of obstruction and even raise suspicion in the diagnosis of pyloric stenosis as a consequence of a GGO. POCUS may serve as a first-line imaging test that can raise suspicion of this difficult to diagnose and probably underreported disease.

Keywords: Gastric outlet obstruction, point-of-care ultrasound, pyloric stenosis

INTRODUCTION

Gastric outlet obstruction (GOO) is a clinical syndrome characterized by abdominal epigastric pain and postprandial vomiting that can be caused by mechanical or motility disorders.^[1] The real prevalence of this disease is unknown. In the past, the main cause was peptic ulcer (>90% of the cases),^[2] but with the introduction of proton-pump inhibitor therapies and H2 blockers, the main etiology now is malignancy, especially in older patients.^[3] Pyloric stenosis is a frequent benign cause of GOO in neonates but a rare disease in adults that is probably under-reported due to a difficulty in diagnosis.^[1]

This challenge in diagnosis is evident in the case we report.

CASE REPORT

A 65-year-old male was hospitalized in the internal medicine ward due to acute cholangitis after presenting to the emergency department with a 2-day history of fever, right upper quadrant abdominal pain, and cholestasis. Intravenous antibiotics were started (piperacillin-tazobactam).

He had a history of hypertension, type 2 diabetes mellitus, dyslipidemia, and chronic obstructive pulmonary disease. He had overcome a severe coronavirus disease 2019 infection in April 2020 after a prolonged intensive care unit and ward stay due to several sequelae. The most relevant were a pharyngeal hypomotility that had led to enteral feeding by a gastrostomy tube and an invasive *Candida Albicans* infection affecting the aortic valve, both eyes, gall bladder, pancreas, and the right shoulder. He had been discharged in August with suppressive fluconazole treatment but had to be readmitted in September due to extrinsic compression of the biliary duct by a pancreatic collection that required the placement of a biliary and pancreatic prostheses.

During the present hospitalization, oral vancomycin was added after being diagnosed with a *Clostridium difficile* infection due to an increase in the stool frequency. However,

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progressive epigastralgia, anorexia, and vomiting developed, needing to withhold enteral nutrition for several days, without improvement.

Physical examination revealed mild abdominal distension, a normal gastrostomy orifice with increased gastric residual volume, normal bowel sounds and epigastric tenderness on deep palpation. No masses or organomegaly were found.

With the presumptive diagnosis of gastric outlet obstruction (GOO), an abdominal point-of-care ultrasound (POCUS), [Figure 1] was performed and showed impaired gastric emptying [Figure 2] and a “target sign” (thicker and hypoechoic pyloric muscle surrounding echogenic mucosa on a transverse image), compatible with pyloric stenosis [Figure 3, white arrow]. A gastroscopic exploration confirmed inflammatory pyloric stenosis due to coexisting antral and duodenal ulcers. A gastrojejunal tube was placed so enteral feeding could be restarted with symptom resolution. The symptoms did not recur after this therapeutic intervention.

DISCUSSION

The main complaint of patients with gastric outlet syndrome (GOO) is vomiting, which is a common complaint seen in primary care or emergency departments. To early suspect and initiate the investigations to determine the cause of the GOO is paramount, since many of the etiologies can be treated.

However, due to the unspecific nature of the symptoms (postprandial vomiting, epigastric pain and abdominal distension), the suspicion will mainly rely on abdominal radiological imaging (computed tomography, barium studies), showing gastric distension along with retained material in the stomach or a endoscopy showing signs of gastroparesis and obstruction.^[3] However, the availability of these evaluation studies might be limited in many centers, compromising an early and correct diagnosis. Moreover, barium studies have the potential risk of aspiration or poor control of secretions and contraindicated if perforation is suspected.

Currently, malignancy can account for most of cases of GOO in adults. However, peptic ulcer, which is a more prevalent disease, can lead to GOO by causing an inflammatory edema and tissue deformation, a not rarely seen complication (2% of cases).^[3]

POCUS is a safe, rapid, cost-effective tool in the characterization of unspecific symptoms such as vomiting or abdominal pain, being more available than the previous imaging modalities or endoscopy.

Pyloric stenosis is a rare cause of GGO in adults, probably under-reported due to a difficulty in diagnosis,^[1] which can be identified with an easy ultrasound technique,^[4] by finding the gallbladder and turning the probe obliquely to find the pylorus longitudinally, and showing a target sign.^[5]

Previous reports^[6] have showed the role of POCUS in differentiating GGO (larger size and epigastric location) from

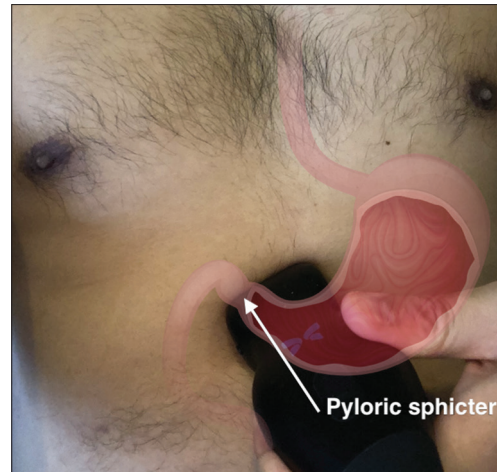


Figure 1: Anterior approach to evaluate pyloric stenosis. Usually performed with a high-frequency probe in a transverse plane, start from the subxiphoid point, visualizing the anterior gastric wall, and slide laterally using the liver as an acoustic window. The pylorus is usually slightly right of the midline and caudal to the gallbladder

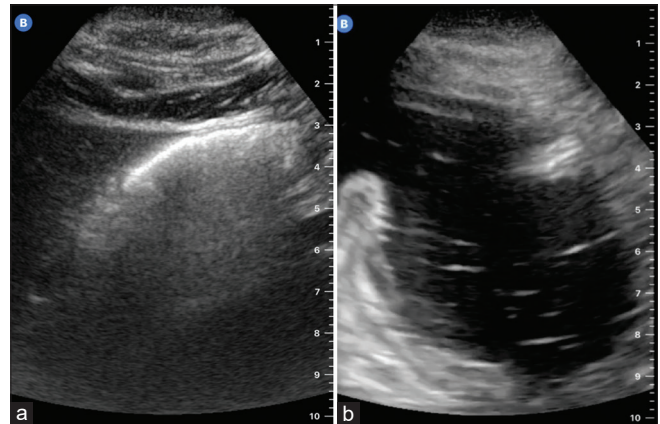


Figure 2: Ultrasound in the epigastric window, evaluating the gastric content and showing a normal stomach with air artifact (a) and preserved peristalsis compared to an impaired gastric emptying (b) and absence of peristalsis

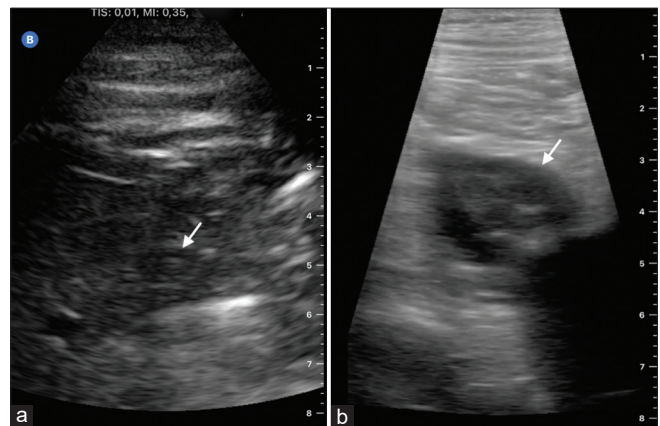


Figure 3: Normal pylorus (a, arrow) and “Target sign” (b, arrow) in an inflammatory pyloric stenosis on a transverse plane with hypoechoic muscle edema and a hyperechoic central mucosa. Even in nonpathological conditions pylorus can be identified in the long axis with its slightly thickened appearance

small (presence of villi) or large bowel (presence of haustra and extension to the left or right flank, as ascending or descending colon) obstruction. It can also raise the suspicion of gastric ulcer with the sonographic presence of a volcano-shaped projection of the gastric lumen.^[7]

POCUS can help getting to a bedside diagnosis and thus, to an earlier treatment^[8] as well as monitor the resolution of obstruction.

CONCLUSION

In GOO syndrome, early detection of the cause is key to prevent malnutrition in hospitalized patients, as well as to alleviate acute symptoms. Therefore, in patients with suspected GOO, such as in the case reported, POCUS may serve as a first-line imaging test that can raise suspicion of this difficult to diagnose and probably underreported disease.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kumar A, Annamaraju P. Gastric outlet obstruction. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2021. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557826/?report=classic>. [Last updated on 2020 Dec 14].
2. Gan SI. Gastric outlet obstruction in adults. In: Post TW, editor. UpToDate. Waltham, MA: UpToDate; 2020. [https://www.uptodate.com.m-hulp.a17.csinet.es/contents/gastric-outlet-obstruction-in-adults?search=gastric outlet syndrome&source=search_result&selectdTitle=1-122&usage_type=default&display_rank=1](https://www.uptodate.com.m-hulp.a17.csinet.es/contents/gastric-outlet-obstruction-in-adults?search=gastric+outlet+syndrome&source=search_result&selectdTitle=1-122&usage_type=default&display_rank=1) [Last accessed on 2021 Mar 30].
3. Jaka H, Mchembe MD, Rambau PF, Chalya PL. Gastric outlet obstruction at Bugando Medical Centre in Northwestern Tanzania: A prospective review of 184 cases. *BMC Surg* 2013;13:41.
4. Donnelly LF. *Pediatric Imaging*. Philadelphia, Pennsylvania, USA: Saunders; 2009.
5. Lumhagen JD, Maclin L, Krauter D, Rosenbaum DM, Weinberger E. Sonographic diagnosis of hypertrophic pyloric stenosis. *AJR Am J Roentgenol* 1988;150:1367-70.
6. Gottlieb M, Nakitende D. Identification of gastric outlet obstruction using point-of-care ultrasound. *Am J Emerg Med* 2017;35:1207.e1-2.
7. Pattee PL, Tao HH, Bhargava R, Al-Alwadh A. Ultrasound demonstration of a benign gastric ulcer with gastric outlet obstruction. *Can J Gastroenterol* 1994;8:41-4.
8. Dorinzi N, Pagenhardt J, Sharon M, Robinson K, Setzer E, Denne N, *et al.* Immediate emergency department diagnosis of pyloric stenosis with point-of-care ultrasound. *Clin Pract Cases Emerg Med* 2017;1:395-8.