A rare presentation of ruptured abdominal aortic aneurysm leading to aortoduodenal syndrome

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Duodenal obstruction is a rare complication of abdominal aortic aneurysm. Obstruction developing acutely from ruptured abdominal aortic aneurysm (RAAA) is exceedingly rare. We present a case of gastroduodenal outlet obstruction developing as the primary presentation for RAAA and a discussion of the relevant literature pertaining to the gastrointestinal complications related to the presence of intact and RAAA. Relief of obstruction is focused on direct aortic replacement with further evaluation of the upper gastrointestinal tract if indicated based on intraoperative findings. (J Vasc Surg Cases 2016;2:18-20.)

Duodenal obstruction is a rare complication of abdominal aortic aneurysm (AAA). Obstruction developing acutely from ruptured AAA (RAAA) is exceedingly rare. We present a patient with gastroduodenal outlet obstruction that developed as the primary presentation for RAAA and a discussion of the relevant literature pertaining to the gastrointestinal complications related to the presence of intact and RAAA. The patient provided consent for this case presentation.

CASE REPORT

A 75-year-old man with a known asymptomatic 6.5-cm infrarenal AAA presented to the emergency department with a 3-day history of nausea, vomiting, intermittent hematemesis, and epigastric discomfort. This patient had been previously asymptomatic from a vascular and gastrointestinal standpoint. Examination in the emergency department revealed a cachectic patient with a distended upper abdomen, moderate epigastric discomfort, and a palpable, nontender, pulsatile abdominal mass. He was hypotensive and responded to volume resuscitation.

Laboratory studies revealed hypochloremia and hypokalemic metabolic alkalosis. Given his history and presentation, the emergency department obtained a contrast computed tomography (CT) scan and requested a surgical consultation. Open repair of the aneurysm had been delayed secondary to severe chronic obstructive pulmonary disease. Workup for endovascular aneurysm repair (EVAR) revealed an AAA not amenable to standard EVAR techniques secondary to an inadequate proximal landing area neck angulation. The proximal neck length was 15 mm and the diameter was 23 mm.

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The CT examination revealed a ruptured AAA (RAAA) primarily into the right retroperitoneal region, with compression of the duodenum and gastric outlet against the anterior abdominal wall (Fig 1). There was marked gastric distention consistent with his presentation of gastric outlet obstruction (Fig 2). Vomiting originated from the gastric outlet obstruction caused by the rupture and retroperitoneal hematoma. The stomach was massively dilated in the CT scan, consistent with this diagnosis. The small bowel was decompressed distal to the ligament of Treitz.

At surgical consultation, the patient was examined and the CT reviewed. A nasogastric tube was gently placed in the emergency department, with 2000 mL of output, and the patient was taken emergently to the operating room.

At celiotomy, there was extensive retroperitoneal hematoma. The proximal and middle duodenum was compressed between the hematoma posteriorly and the abdominal wall anteriorly in the right upper quadrant. Gastric distention was noted and alleviated with repositioning of the nasogastric tube. Given the proximity of the neck to the renal vessels (Fig 3), supraceliac occlusion was used for proximal control, the aneurysm was opened, and a proximal anastomosis was performed after placement of an aortic occlusion balloon. Supraceliac aortic cross-clamp time was minimal, and there was no evidence of end-organ ischemia postoperatively. After aneurysm repair, there was no obvious evidence of duodenal obstruction. A nasoenteric feeding tube was placed for postoperative nutritional support. Despite the patient's severe chronic obstructive pulmonary disease, his postoperative recovery was uncomplicated. There was no further evidence of gastric outlet obstruction, and normal return of bowel function occurred on postoperative day 3. The patient was discharged uneventfully to home on postoperative day 10 and continues to do well.

DISCUSSION

Duodenal obstruction is a rare complication after aortic surgery. Several reports of gastric outlet obstruction resulting from duodenal compression in asymptomatic aneurysm patients before surgical reconstruction have been noted. Two previous patients with duodenal obstruction from RAAA have been reported, both of which were successfully managed by aneurysm repair in 1955.[1] To our knowledge, this represents the third case of acute duodenal obstruction resulting from an RAAA, with successful direct aortic replacement.

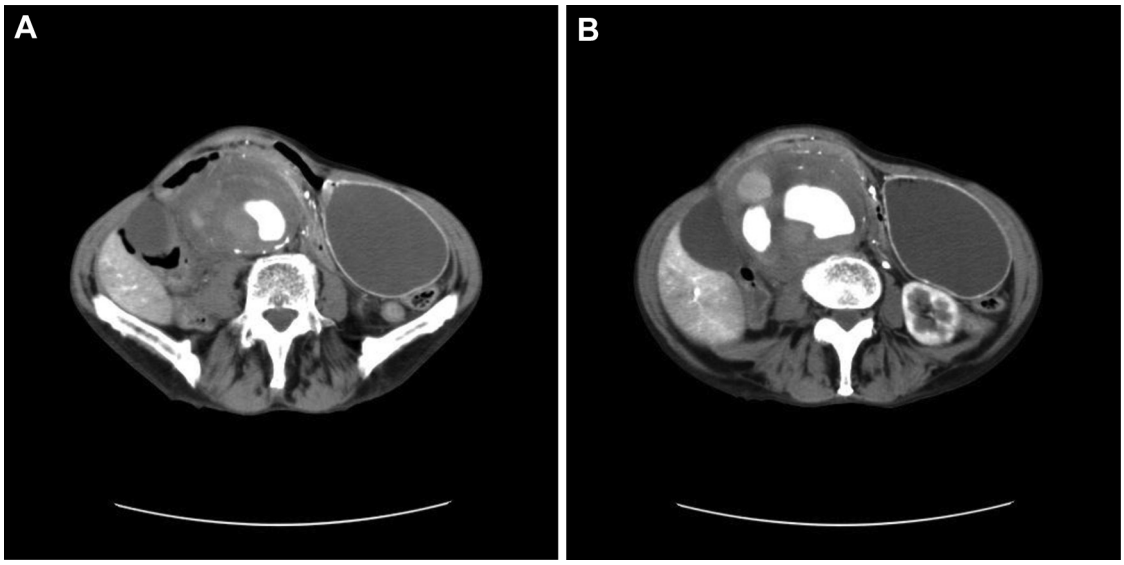

Fig 1. A and **B,** Computed tomography (CT) examination of the abdomen reveals a ruptured abdominal aortic aneurysm (RAAA) primarily into the right retroperitoneal region, with compression of the duodenum and gastric outlet against the anterior abdominal wall.

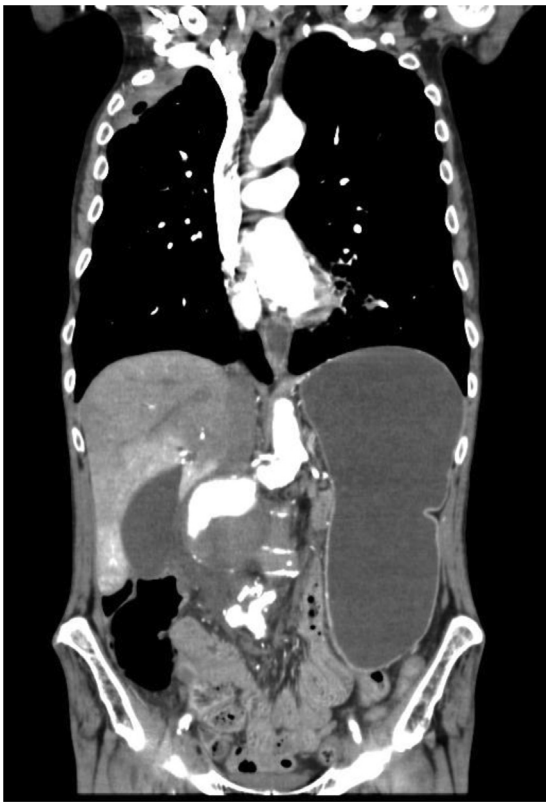

Fig 2. Coronal computed tomography (CT) imaging shows marked gastric distention consistent with gastric outlet obstruction.

Osler reported the first report of duodenal obstruction secondary to AAA in 1905, describing the etiology of duodenal obstruction in an elderly woman who subsequently died of RAAA.[2] Numerous reports since then have summarized patients presenting with duodenal obstruction from AAA. The most recent report by Deitch et al[3] summarized the presenting complaints of these patients, most notably vomiting, a pulsatile abdominal mass, weight loss, and electrolyte disturbances. Bhama et al[4] reported an isolated case of duodenal obstruction secondary to AAA in a patient with intestinal malrotation.

Most reported cases of duodenal obstruction from AAA disease are associated with a large aneurysm diameter averaging 7.8 cm.[4] The mechanism of obstruction is postulated to pertain to two primary anatomic factors: the fixed retroperitoneal position of the middle-to-distal duodenum and the location of the superior mesenteric artery. Despite these anatomic constraints, duodenal obstruction remains a rare presentation. Numerous reports also exist detailing the incidence and management of duodenal obstruction after aortic surgery. Management options range from conservative therapy to surgical decompression, typically of the associated hematoma, seroma, or adhesions.

Current recommendations for treatment include accurate assessment of the AAA and preoperative evaluation of the upper gastrointestinal tract to ensure other common causes of gastroduodenal obstruction are excluded. This includes CT scan of the abdomen and pelvis as well upper gastrointestinal contrast studies or endoscopy. Despite older literature suggesting gastrointestinal bypass as an accepted treatment, direct aortic replacement is the only accepted treatment to alleviate this obstruction in patients with acceptable operative risk.

In cases of duodenal obstruction with associated RAAA, nasogastric decompression is necessary to minimize the risk of pulmonary aspiration. However, evaluation of other causes of gastroduodenal outlet obstruction must

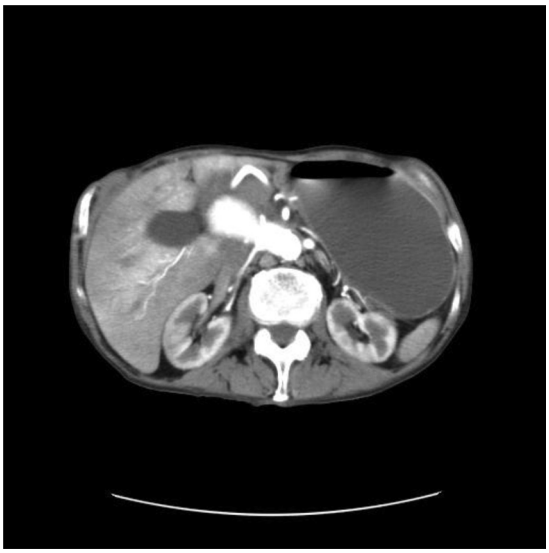

Fig 3. Computed tomography (CT) examination reveals the proximity of the neck to the renal vessels.

be delayed until the aneurysm repair is completed. Intraoperative endoscopy may facilitate this evaluation of the upper gastrointestinal tract. Intraoperative assessment of the gastroduodenal region can be further assessed by passage of a nasoenteric feeding tube and can be used for postoperative enteral support.

Expeditious correction of electrolyte abnormalities is critical because prolonged periods of time before repair may impair postoperative recovery. Aspiration, acute renal failure, and metabolic derangements have accounted for up to 43% of the deaths in the setting of duodenal obstruction. Rupture during the resuscitation period before elective or urgent repair has not been reported; however, one could easily postulate that any significant delay might lead to rupture. In recent years, mortality has approached that of elective aneurysm repairs and is likely explained by improved preoperative diagnosis and resuscitation as well as intraoperative management and postoperative care.[3]

Repair techniques are dictated by the anatomy of the aneurysm and associated paravisceral branch vessels. Our patient had an aneurysmal aorta up to the takeoff of the renal vessels, providing limited proximal landing area and excluding him from conventional endovascular techniques. EVAR would not have changed our patient's gastric outlet obstruction because it was caused by rupture and hematoma, which required laparotomy and decompression. Owing to the rupture and to the very distorted retroperitoneal anatomy, supraceliac control was used before dissection of the retroperitoneal structures and facilitated the proximal anastomosis. This technique has been described extensively.

CONCLUSIONS

Duodenal obstruction is a rare complication of AAA; however, duodenal obstruction developing acutely from RAAA is exceedingly rare. Relief of obstruction is focused on direct aortic replacement, with further evaluation of the upper gastrointestinal tract if indicated based on intra-operative findings.

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