

## RARE COMPLICATION OF RUPTURED ABDOMINAL AORTIC ANEURYSM PRESENTED IN EMERGENCY

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RARE COMPLICATION OF RUPTURED ABDOMINAL AORTIC ANEURYSM PRESENTED IN EMERGENCY(Abstract): Aorto-enteric fistula (AEF) is defined as an abnormal communication between the aorta or aortoiliac tree with the gastrointestinal tract and presents as catastrophic gastrointestinal bleeding. The reported annual incidence of primary aorto-enteric fistula is 0.007 per million (only 250 cases reported in literature). Due to the risk of progression to hemorrhagic shock and the high likelihood of surgical intervention, these patients should be closely monitored. **Materials and methods:** This paper includes 35 consecutive patients with ruptured abdominal aortic aneurysm admitted to the Department of Vascular Surgery of the “Sf. Spiridon” County Clinical Emergency Hospital, between 2020 and 2024. **Results:** From the total of 35 patients 3 cases were complicated with primary aorto-digestive fistula (8,57%). 2 of the cases had aorto-duodenal fistula and 1 case had aorto-enteric fistula. **Conclusions:** Complicated abdominal aortic aneurysm with primary aorto-enteric fistula is a rare pathology that requires prompt diagnosis and urgent surgical treatment. **Keywords:** RUPTURED ABDOMINAL AORTIC ANEURYSM, PRIMARY AORTOENTERIC FISTULA.

Aorto-enteric fistula (AEF) is defined as an abnormal communication between the aorta or aortoiliac tree with the gastrointestinal tract and presents as catastrophic gastrointestinal bleeding. The annual incidence is reported to be 0.007 per million and until present only 250 cases were found in literature (1, 2, 3). Primary aorto-duodenal fistula (PADF) is a direct communication between the abdominal aortic aneurysm (AAA) and duodenum and it is an extremely rare cause of upper gastroin-

testinal bleeding. This condition is often overlooked due to extremely low incidence (4). The most common predisposing conditions for primary aortoenteric fistulas are atherosclerotic abdominal aortic aneurysms or penetrating atherosclerotic ulcers. Less commonly encountered causes include inflammatory or infectious aortitis, diverticulitis, peptic ulcers, appendicitis, diverticulitis, foreign bodies and gastrointestinal malignancies (3, 5, 6, 7). Unlike secondary aortoduodenal fistula (SADF) which occurs

in patients who had previous aortic prosthetic reconstruction, primary aortoduodenal fistula is uncommon (5, 8).

Aortoenteric fistulas can occur with any part of the gastrointestinal tract, the most common location is the transverse portion of the duodenum(D3), which is involved in 60% of cases (3, 9). This is due to its relatively fixed position as compared with the rest of the bowel, and the close relationship of this part of the duodenum to the aorta (3).

The diagnostic is difficult to be recognized only through clinical findings. A classical triad of symptoms was described, including a pulsating, palpable abdominal mass, abdominal pain and gastrointestinal bleeding, but often this pathology is unsuspected until surgery or postmortem (5, 8, 10). In 30% of PADF patients, a brief and self-limiting gastrointestinal bleeding known as a “herald bleed” precedes a subsequent massive hemorrhage (5).

CT scans with contrast are the most reliable modality to evaluate an AAA, with a widely variable sensitivity of 50%-94%, a specificity of 85%-100% and a detection rate of 61% (3, 5, 6). In the appropriate clinical setting, contrast-enhanced CT is reported to have an overall specificity of 100% and a sensitivity of 50% in diagnosing an aortoenteric fistula (3, 11). Though MRI may have similar specificity and sensitivity to CT, the lack of availability in the emergency setting in addition to a longer acquisition time and need for greater technical expertise often limits its use (3).

The unreliability of clinical findings accentuates the need for a high index of suspicion for a PAEF in GI bleeding, especially upper GI bleeds (5). All reports emphasize the need for prompt imagistic investigation in patients presenting with AAA. AEF has high mortality and only prompt

intervention can lead to a lifesaving outcome. (12).

Due to the evolution towards hemorrhagic shock and necessity of urgent surgical intervention, these patients should be rapidly diagnosed and admitted in the Vascular Surgery Department. Following surgical treatment patients require advanced intensive care. Prophylactic antibiotics administration is justified in special conditions, as interventions involving the intestinal tract, or the repair of traumatic injuries in contaminated wound (13). Due to the significant morbidity associated with open surgical repair, the use of endovascular repair (EVAR) for the treatment of AAA with AEF can be used as an alternative procedure (14).

## MATERIALS AND METHODS

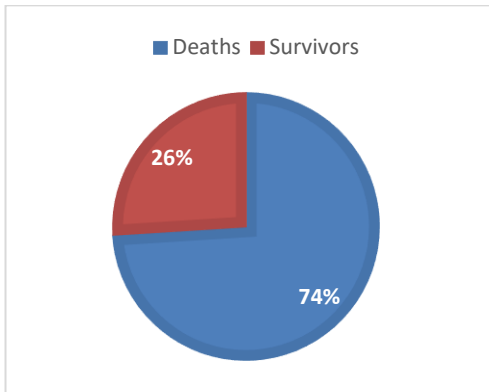
A retrospective study on patients with ruptured AAA admitted in the Vascular Surgery Department St. Spiridon Iasi Hospital between 2020-2024 was conducted. The purpose was to determine the incidence, patient characteristics and evolution in case of AAA associated with AEF.

Over the course of 5 years, a total of 35 patients with a diagnosis of ruptured AAA were admitted and underwent emergency treatment. Presentation symptoms were from discrete to severe: pale skin, diffuse abdominal pain with flank irradiation, tachycardia, tachypnoea, signs of hemorrhagic shock with hypotension, altered consciousness to confusion.

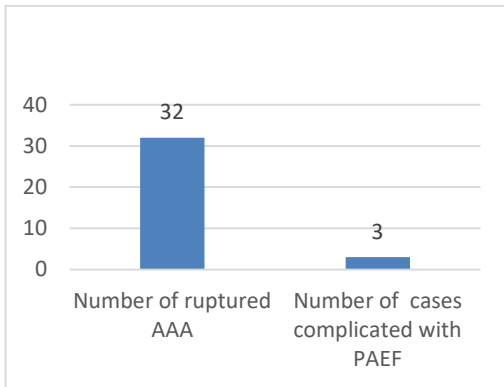
The following data were recorded: demographic characteristics (gender, age, background), perioperative clinical and biological status, presence of aortoduodenal fistula and mortality. All data was statistically analyzed using Microsoft Excel program.

**RESULTS**

In our study the majority were male patients (80%), the average age was 70 years and 71.42% were from the urban areas. The mortality rate was 74% (fig. 1). Of the total number of patients diagnosed with ruptured AAA through Angio-CT, only 3 cases were complicated with primary aorto-digestive fistula (8.57%) (fig. 2). Two of the cases had aorto-duodenal fistula and 1 case had aorto-enteric fistula. Similar to literature findings, the small number of digestive fistulas identified in our study supports the rarity of this complication.



**Fig. 1.** The mortality rate from the total number of ruptured AAA cases



**Fig. 2.** The incidence of ruptured AAA complicated with PAEF

Regarding the personal pathological history of the patients hospitalized in our clinic with ruptured AAA, there is an increased prevalence of associated cardiovascular pathologies, prevalent essential arterial hypertension (62.85%), chronic heart failure (42.85%), aortic atherosclerosis (17.14%) and embolism and thrombosis of other arteries (31.42%). There is also an increased percentage of metabolic pathologies such as type 2 diabetes complicated with peripheral angiopathy (28.57%), obesity (14.28%), dyslipidemia (11.42%) but also chronic kidney disease and neoplastic pathology, both in the same percentage (14.28%). Considering the study period one risk factor taken in consideration was SARS COV 2 infection (28.57% patients) (tab. I).

TABLE I.

**Pathologies associated with AAA in patients from the study group**

1. Essential arterial hypertension	62.85%
2. Chronic heart failure	42.85%
3. Embolism and thrombosis of other arteries	31.42%
4. Infection with the SARS COV 2	28.57%
5. Type 2 diabetes complicated with peripheral angiopathy	28.57%
6. Aortic atherosclerosis	17.14%
7. Obesity	14.28%
8. Chronic kidney disease	14.28%
9. Neoplastic pathology	14.28%
10. Dyslipidemia	11.42%

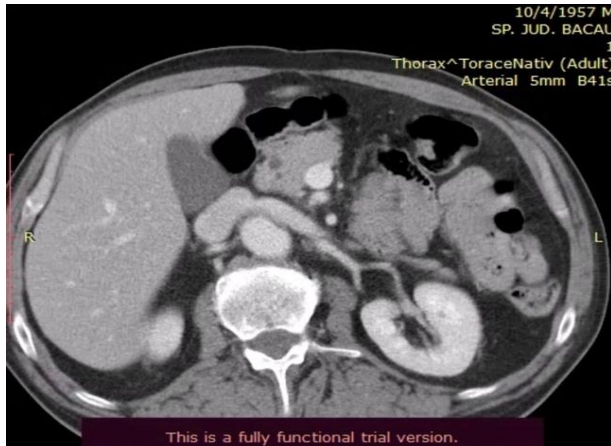
Only 1 in 3 patients presented melanic stools as initial symptom, raising the suspicion of primary AEF.

At the time of admission in the Vascular Surgery Department, 2 of 3 patients had general influenced condition, hemodynamic

instability with need for inotropic support (Noradrenaline) and hemorrhagic shock.

We emphasize on one particular case of a 62-year-old male patient associated generalized abdominal pain with lumbar irradiation, bilateral lower limb paresthesia and melanic stools. The patient was hemodynamically stable which is why he under-

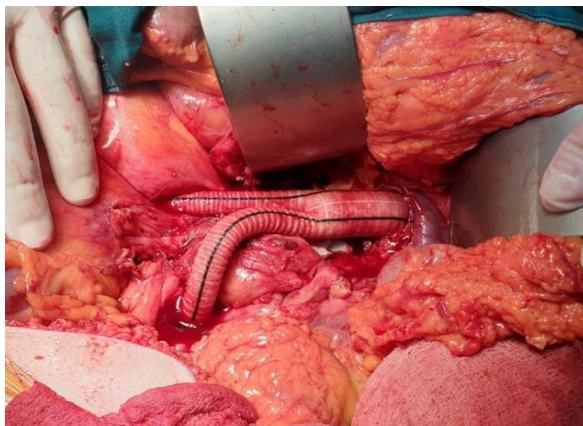
went gastric endoscopy without revealing the source of bleeding. The Angio-CT exam showed a chronic partial thrombosed sacciform infrarenal AAA, with extended parietal hematoma on the right primitive iliac artery and raises the suspicion of a duodenal lesion by the contiguity of the aneurysm (fig. 3).



**Fig. 3.** Angio-CT image of ruptured AAA complicated with ADF

The patient underwent emergency surgery. The procedure included the following stages: infrarenal AAA aneurysmectomy, aorto-duodenal fistula closure, duodenorrhaphy,

epiploonoplasty, left aorto-iliac bypass (left common iliac artery) and right aorto-femoral bypass (right common femoral artery) with synthetic Dacron graft (fig. 4).



**Fig. 4.** Intraoperative aspect: left aorto-iliac bypass (left common iliac artery) and right aorto-femoral bypass (right common femoral artery) with synthetic Dacron graft.

Postoperative the patient was admitted in the intensive care. The evolution was favorable. Patients graft patency was initial certified by the presence of pulses in the bilateral distal arteries. The patient was discharged surgically cured. A follow-up included clinical and angio-CT evaluation.

After two years, the patient returns to the emergency department for diffuse abdominal pain and melenical stools, with SAEF observation. Immediate surgical intervention was required and it consisted in exploratory laparotomy, longitudinal duodenotomy, posterior endoluminal suture of D3, duodenorrhaphy, epiploonoplasty. The unfavorable evolution despite multiple surgical reinterventions led to the death of the patient at about 1 month from admission.

## **DISCUSSION**

Similar to literature findings, our study revealed a low prevalence of primary AEF as a complication of ruptured AAA. Given this aspect, nonspecific symptoms and rare gastrointestinal bleeding, it is hard to suspect this pathology.

The low prevalence of primary AEF can be attributed to several facts. Ruptured AAA incidence decreased due to screening and surgical or endovascular treatment prior to rupture. Also, AAA have higher success rate when treated electively (15). As we find in the literature, there is a high difference in mortality between patients who are surgically treated electively and those who benefit from emergency surgical treatment. Prevalence of abdominal aortic aneurysm in men older than age 65 has been decreasing over time, falling from about 4-8% to 2% in recent studies (15). The incidence of rupture was demonstrated to decrease as a result of active screening,

increased surveillance and intervention in noncomplicated AAA.

The average age of presentation cited in the literature for patients with AAA is 63-64 years. The fact that the patients from our group are older can be attributed to the lack of screening programs leading to a later diagnostic. Similar to data in the literature AAA is being more frequent identified in men (same percentage - 80%) (6, 16, 17).

As mentioned, the clinical presentation of primary AEF is non-specific, consisting in digestive bleeding and abdominal or lumbar pain. The complete classic triad associating a palpable abdominal mass is found in only 11% of patients with AEF (3, 5, 6, 16, 18).

All patients underwent contrast CT scans for diagnosis and management planning. This imagistic investigation remains the study of choice with the highest detection rate. Imaging features suggestive of PAEF include air within the aortic wall, focal bowel wall thickening, disruption of pre-aortic fat, or the pathognomonic sign of contrast in proximity or in the small bowel (5, 6).

A review of the literature (366 cases) showed that 72.9% of PAEFs were in the duodenum, with 66% in the third portion of the duodenum and 33% in the fourth portion (D4) (19). Georgeades *et al.* shows in their study that 16 of the cases were in D3, 6 were in D4, 1 was in D2, and 13 cases had PADFs in an unspecified duodenal location (6).

When considering management of PADF, there are three main objectives - hemorrhage control, contamination / infection control, and maintenance of distal perfusion. Surgery remains the primary treatment modality of ADFs, with a periop-

erative mortality rate of 50% or higher with survival rates between 18% and 93% (6). Direct closure of the duodenal fistula appears to be the most common, but other procedures include resection with anastomosis, pyloric or duodenal exclusion, pancreaticoduodenectomy, Bilroth type I or II reconstruction, Roux-en-Y reconstruction, and others (6, 17, 18, 20-25).

Surgical technique has also been improving over time. In 2016 Ho S *et al.* reported mortality associated with PAEF repair of 34% compared with 44% prior to 1994 (5).

One important aspect of surgical repair is the use of an omental interposition flap between the aorta and duodenum. One study evaluated outcomes of ADF repair in 791 cases and noted that an omental interposition was the strongest predictor of survival. The most common cause of death is fistula recurrence, which occurs in 41.8% of patients, and has a higher frequency in those that did not have an omental interposition (6, 17).

Another important aspect in the subsequent evolution of the patients is the general condition at the time of presentation,

being directly correlated with evolution. All 3 cases of ruptured AAA with primary FAE benefited from emergency surgery, regardless of clinical-biological status. Good general status and hemodynamically stable are correlated with postoperative favorably evolution.

## CONCLUSIONS

Complicated AAA with primary FAE is a rare pathology that requires an increased degree of susceptibility to facilitate prompt diagnosis and initiation of specialized surgical treatment. This pathology is also associated with an increased mortality rate despite multidisciplinary treatment. Beside prompt surgical treatment and postoperative advanced intensive care, patient evolution is highly influenced by the general condition and preoperative clinical and biological parameters.

## CONFLICT OF INTEREST AND FUNDING

The authors declare that there is no conflict of interest, and they received no specific funding regarding this scientific research.

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