

AORTOENTERIC FISTULA

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diagnosis and management

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AORTOENTERIC FISTULA

- Aortoenteric Fistula (AEF) is a rare, life-threatening disease process.
- Most commonly a complication of repair of abdominal aortic aneurysms.
- Occurs in approximately 0.3-2% of patients with open AAA repairs.

AORTOENTERIC FISTULA

- Carries a very high morbidity and mortality
- 100% without surgical intervention
- 60-90% with intervention
- 9% limb amputation
- 15% renewed graft infection

DEFINITION

- **Direct communication between the aorta and the GI tract.**
- *Primary AEF*: spontaneous fistula formation in the absence of prosthetic aortic materials.
- *Secondary AEF*: fistula in the setting of prosthetic aortic materials.

PRIMARY AEF

- First described by sir Ashley Cooper in 1817.
- Primary AEF is very rare
- Fewer than 200 cases reported
- Usually occurs in the setting of *large* aortic aneurysms abutting the bowel with fistula formation over time.
- Usually, the AAA erodes into the 3rd or 4th portion of the duodenum.

PRIMARY AEF

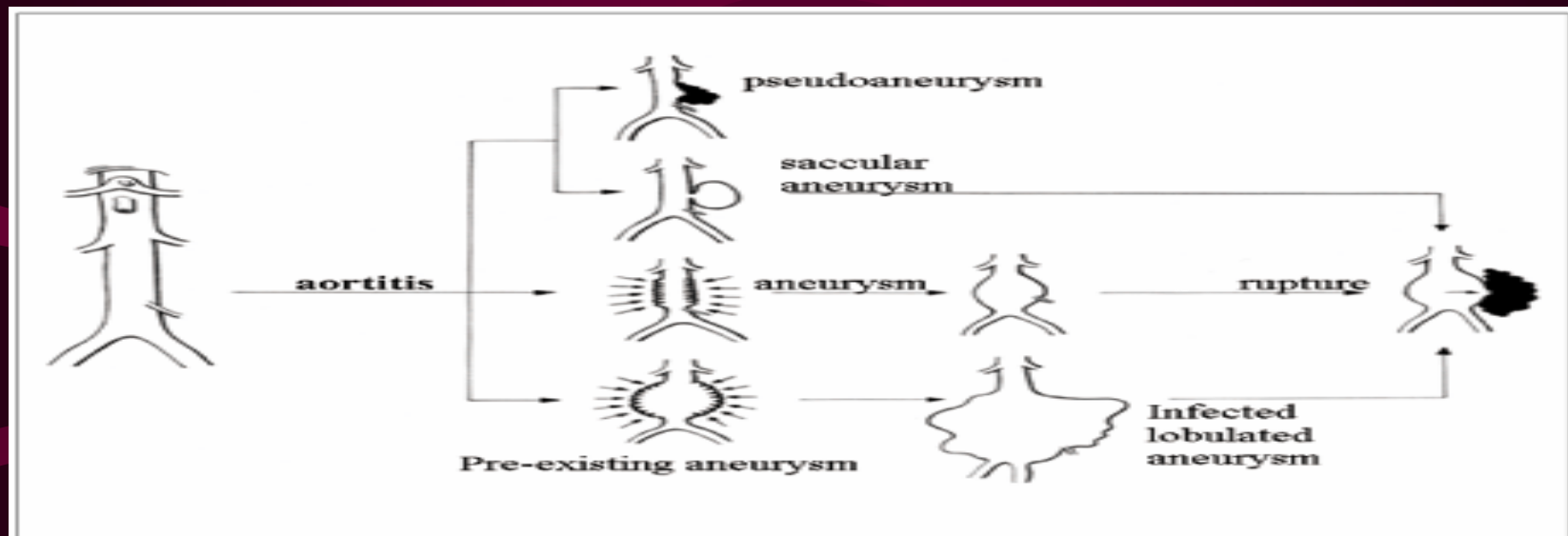


Figure 2. Infectious aortitis could affect a normal aorta or aneurysmal aorta with different forms of presentation.

- 85% of AAA with AEF were atherosclerotic
- 8% mycotic
- 1% media necrosis

A.H. Tareen and T.V. Schroeder, Primary aorto-enteric fistula Eur J Vasc Endovasc Surg 12 (1996)

PRIMARY AEF

Table 2. Characteristics of patients with primary aortoenteric fistula due to aortitis without previous aortic aneurysm

Authors/year	Gender	Age	Clinical findings	Diagnostic approach/fistula site	Etiological agent	Treatment	Outcome
McIntyre et al., ⁶ 1981	M	73	Diabetes, low back pain, fever, pulsatile mass	Laparotomy: 3 rd portion of duodenum	Arizona hinshawii	Aortic division + axillo-bifemoral bypass	Satisfactory after 9 months
Goldbaum et al., ⁷ 1986	M	75	Abdominal pain, fever, hematemesis	Laparotomy: 3 rd portion of duodenum	Mycobacterium tuberculosis	Dacron graft in situ	Satisfactory after 20 years
Morrow et al., ⁸ 1987	F	32	Abdominal pain, back pain, hematemesis	Laparotomy: 4 th portion of duodenum	Salmonella enteritidis	Dacron graft in situ	Satisfactory after 3 years
Wheeler et al., ⁵ 1992	M	63	Melena, abdominal pain, pulsatile mass	Laparotomy: 4 th portion of duodenum	Mycobacterium tuberculosis	Dacron graft in situ	Satisfactory after 7 years
Calligaro et al., ⁶ 1992	F	60	Abdominal pain, fever	Laparotomy: 3 rd portion of duodenum	Streptococcus viridans	Aortic division	Death in the operating room

SECONDARY AEF

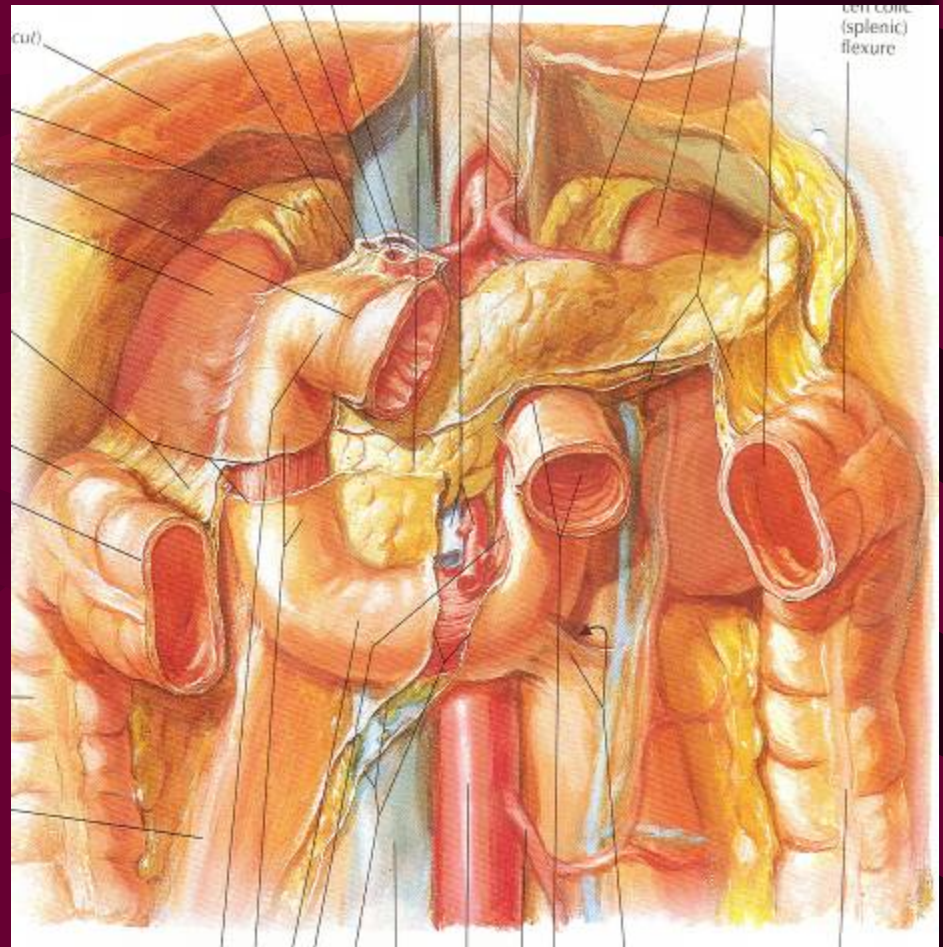
- First published case was in 1953 by R.C Brock
- First successful repair was in 1957 by G. Heberer in Germany
- More common
- Due to development of a pseudo aneurysm at the proximal suture line of AAA repair or by direct mechanical effects of scarring between bowel and the suture line.
- This usually occurs *years* following open aortic surgery

SECONDARY AEF

- Classified according to their anatomical and pathophysiological characteristics
- Three types:
 - Ia (direct fistula) fistula directly to the suture line
 - Ib (indirect fistula) fistula to a false aneurysm
 - II (para prosthetic) erosion of the intestinal wall by the prosthesis itself

ANATOMIC DISTRIBUTION

- 3rd and 4th part of Duodenum (80%)
 - located retroperitoneal
 - direct contact with the abdominal aorta
- Jejunum and ileum (10%)
- Large bowel (6%)
- Stomach (4%)



Abernathy, W., Sekijima, J.H. Aortoenteric fistula. New England Journal of Medicine 1997; 336: 27-28.

RISK FACTORS

- Primary AEF:
 - Atherosclerotic (Most common in USA)
 - Inflammatory aortitides: Syphilis, Tuberculosis, Mycotic infection, Collagen Vascular Disease (Most common worldwide)
- Secondary AEF:
 - Abdominal aortic aneurysm
 - Aortic aneurysm repair with prosthetic graft
 - Aortic endovascular stent
 - Infection of prosthetic aortic graft
 - Aortic radiation
 - Gastrointestinal disease: peptic ulcer disease, gallstones, pancreatitis, diverticular disease
 - Tumor invasion
 - Trauma
 - Foreign body perforation

CLINICAL MANIFESTATIONS

- Most frequent sign is gastrointestinal bleeding: both upper and lower
- *Herald bleed*: initial bleed presenting as melena or hematochezia with relatively few hemodynamic consequences. This is almost always followed by a catastrophic bleeding and exsanguination. Herald bleeds occur as clot fills the fistula with subsequent small bowel contraction. This bleed can occur hours to several days before diagnosis is made.

CLINICAL MANIFESTATIONS

- Once the clot dislodges or is lysed, and aortic pressure increases leading to a larger volume bleed
- May present with hematemesis, melena, or hematochezia
- Crampy, upper abdominal pain
- Back pain
- Physical exam may demonstrated palpable abdominal aortic aneurysm with abdominal bruit

EVALUATION

- High index of suspicion is the key.
- Any patient with known aortic aneurysm repair presenting with GI bleed should be evaluated for AEF.
- There is not one superior diagnostic modality
- EGD is most commonly employed, follow by CT scan

ENDOSCOPY

- Procedure of choice
- Fastest way to determine presence of AEF
- 90% of AEFs are within the range of endoscopy
- Can exclude other causes of acute UGI bleed (ulcer)

ENDOSCOPY



Ulcer over the posterior wall of duodenum (D3) with the underlying prosthetic aortic graft clearly visible

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CT SCAN

- Used if EGD fails to demonstrate lesion
- May confirm the diagnosis



Figure 1. CT scan reveals a large pseudoaneurysm with air close to aortic wall (arrows).

CT SCAN



Black arrow: Pseudoaneurysm and calcification of aneurysm wall

White arrow: Contrast media seeping into colon (white arrows)

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OTHER DIAGNOSTIC TOOL

- Not frequently used
- Time consuming
- 11 patients diagnosed prior to surgery
- 17 cases suspected and confirmed during surgery
- Not one single superior diagnostic modality

Table III. Methods of diagnostic evaluation

	<i>Abnormal</i>			<i>Diagnostic</i>	
	<i>No.</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Esophagogastroduodenoscopy	17	9	52.9	2	11.8
Abdominal/pelvic CT	24	22	91.7	8	33.3
Angiography	30	12	40.0	0	
Sinography	3	3	100.0	0	
Colonoscopy	10	6	60.0	0	
Upper GI series	8	5	62.5	1	12.5
Lower GI series	5	2	40.0	0	
Magnetic resonance scan	6	6	100.0	0	
Gallium scan	2	1	50.0	0	
Indium WBC scan	7	4	57.1	0	
Technetium WBC scan	1	0	0.0	0	

GI, Gastrointestinal; *WBC*, white blood cell.

L. Kuestner. Secondary aortoenteric fistula *Journal of Vasc. Surgery* Feb. 1995 vol.2

TREATMENT

- Surgical intervention is mandatory for survival and successful outcome.
- Surgery involves:
 - stop bleeding
 - removal of prosthetic aortic graft
 - ensure peripheral circulation via extra-aortic bypass
 - repair (<3cm) or resect intestinal lesion
- Omental or peritoneal flap interposition recommended to prevent formation of another fistula
- Intravenous antibiotics are an essential adjunct therapy

PROGNOSIS

- Prognosis is poor
- Mortality rate of 100% if no surgical intervention done.
- Mortality rate between 60-90% with surgical intervention
- 9% limb amputation
- 15% renewed graft infection

PATHOLOGY

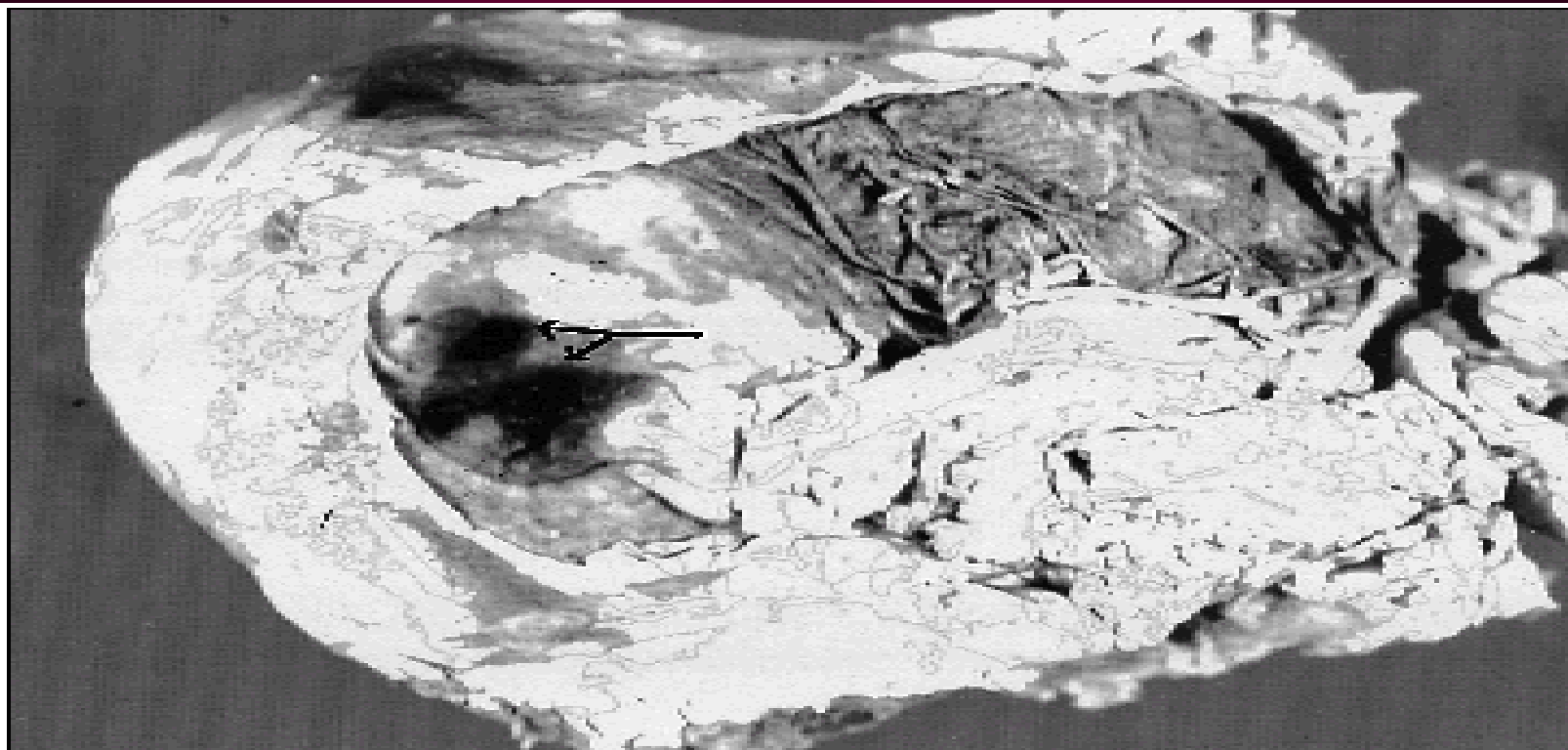


Fig. 2. Stretched-out jejunal segment with three ragged hemorrhagic openings (arrows) of the aortoenteric fistula.

CONCLUSION

- A high index of suspicion along with good history and physical exam is critical for making a successful diagnosis
- Surgical exploration is warranted with continued bleeding and high index of suspicion even if EGD and CT scan is not diagnostic

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THE END