Basic Data Underlying Clinical Decision Making

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Uncommon Splanchnic Artery Aneurysms: Pancreaticoduodenal, Gastroduodenal, Superior Mesenteric, Inferior Mesenteric, and Colic

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Splanchnic artery aneurysms are an uncommon and potentially lethal clinical problem. Therefore an adequate frame of reference for the diagnosis and management of these unusual aneurysms is necessary for the practicing vascular surgeon. Aneurysms involving the hepatic, splenic, and celiac arteries are the most commonly reported splanchnic artery aneurysms and were reviewed previously in the May 1996 issue of ANNALS OF VASCULAR SURGERY. The purpose of this review is to document recent changes in the diagnosis and management of extremely rare aneurysms involving the pancreaticoduodenal, gastroduodenal, superior mesenteric, inferior mesenteric, and colic arteries.

We reviewed the English literature from the past 25 years (1970 to 1995) for reports of these aneurysms. Not unexpectedly, peripancreatic aneurysms involving the gastroduodenal and pancreaticoduodenal arcades were reported most frequently and were commonly associated with pancreatitis and abnormalities of the biliary tract. Interestingly, mycotic aneurysms involving the superior mesenteric artery have also been reported with increasing frequency in association with subacute bacterial endocarditis. Nonspecific abdominal pain was the most frequently reported symptom, and failure to consider the diagnosis probably contributed to the fact that in more than half of the reported cases the aneurysm had already ruptured by the time of diagnosis. Because of the high mortality rate associated with rupture, it is imperative that these lesions be considered in the differential diagnosis of unexplained abdominal pain. Current state of the art technology has demonstrated that operative therapy is clearly the treatment of choice for the majority of these lesions in all but the highest risk patients; however, percutaneous catheter-based therapies have been used successfully and will undoubtedly play an increasingly prominent role in the future. Finally, as was true of the more common splanchnic artery aneurysms, most of the cases reported in the literature were from small series or single case reports. Despite the obvious reporting biases in favor of unusual presentations and positive outcomes, these cases do provide an important frame of reference for the diagnosis and management of these unusual aneurysms.

Tables I to VII present summary data for pancreaticoduodenal artery aneurysms (56 cases) reported in the English literature from 1970 to 1995[1-51]; Tables VIII to XIV present summary data for gastroduodenal artery aneurysms (36 cases)[8,52-80]; Table XV to XXI present summary data for superior mesenteric artery aneurysms (52 cases)[81-127]; Tables XXII to XXVIII present summary data for inferior mesenteric artery aneurysms (8 cases)[128-134]; and Tables XXIX to XXXV present summary data for colic artery aneurysms (23 cases).[85,89,124,135-147]

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Table I. Pancreaticoduodenal artery aneurysms: Age

	Mean	Range
Age (yr)	48	22-78

Table II. Pancreaticoduodenal artery aneurysms: General

Characteristics	No.	Percent*
Men	38	68
Women	18	32
Ruptured	38	68
Mortality (overall)	17	30
Mortality (ruptured)†	10	26

*Percentage of total cases.
†Percentage of ruptured cases.

Table III. Pancreaticoduodenal artery aneurysms: Clinical presentation

Symptoms	No.	Percent*
Abdominal pain	40	71
Gastrointestinal hemorrhage or hemobilia	22	39
Jaundice	8	14
Shock	5	9

*Percentage of total cases (some cases may have had more than one symptom).

Table IV. Pancreaticoduodenal artery aneurysms: Diagnostic techniques

Technique	No.	Percent*
Arteriography	38	68
Laparotomy	22	39
CT scan	13	23
Ultrasound	10	18

*Percentage of total cases (some cases may have had more than one diagnostic technique).

Table V. Pancreaticoduodenal artery aneurysms: Treatment modality

Modality	No.	Percent*
Ligation	18	32
Aneurysmectomy	11	20
Embolization	8	14
Aneurysmorrhaphy	7	13
Not stated	6	11
None	5	9
Bypass/revascularization	4	7

*Percentage of total cases (some cases may have had more than one treatment modality).

Table VI. Pancreaticoduodenal artery aneurysms: Aneurysm characteristics

Characteristics	No.	Percent*
True	33	59
Not stated	9	16
False	6	11
Mycotic	4	7
Inflammatory	3	5
FMD, CMN, etc.	1	2

CMN = cystic medial necrosis; FMD = fibromuscular dysplasia.
*Percentage of total cases.

Table VII. Pancreaticoduodenal artery aneurysms: Associated conditions

Condition	No.	Percent*
Not stated	18	32
Pancreatitis	16	29
Biliary disease	15	27
Asymptomatic	8	14

*Percentage of total cases (some cases may have had more than one condition).

Table VIII. Gastroduodenal artery aneurysms: Age

	Mean	Range
Age (yr)	50	29-76

Table IX. Gastroduodenal artery aneurysms: General

Characteristics	No.	Percent*
Men	29	81
Women	7	19
Ruptured	20	56
Mortality (overall)	4	11
Mortality (ruptured)†	4	20
Outcome not stated	3	8

*Percentage of total cases.
†Percentage of ruptured cases.

Table X. Gastroduodenal artery aneurysms: Clinical presentation

Symptoms	No.	Percent*
Abdominal pain	23	64
Gastrointestinal hemorrhage or hemobilia	20	56
Jaundice	11	31
Mass	10	28
Nausea and/or vomiting	9	25
Shock	4	11
Asymptomatic	2	5

*Percentage of total cases (some cases may have had more than one symptom).

Table XI. Gastroduodenal artery aneurysms: Diagnostic techniques

Technique	No.	Percent*
Arteriography	29	81
Ultrasound	8	22
Laparotomy	8	22
CT scan	6	17
MRI	1	3

*Percentage of total cases (some cases may have had more than one diagnostic technique).

Table XII. Gastroduodenal artery aneurysms: Treatment modality

Modality	No.	Percent*
Ligation	26	72
Aneurysmectomy	8	22
Embolization	3	8
Not stated	3	8
Aneurysmorrhaphy	1	3
Bypass/revascularization	1	3
None	1	3

*Percentage of total cases (some cases may have had more than one treatment modality).

Table XIII. Gastroduodenal artery aneurysms: Aneurysm characteristics

Characteristics	No.	Percent*
Not stated	21	58
True	6	17
False	6	17
Mycotic	2	6
Inflammatory	1	3
FMD, CMN, etc.	0	0

CMN = cystic medial necrosis; FMD = fibromuscular dysplasia.
*Percentage of total cases.

Table XIV. Gastroduodenal artery aneurysms: Common associated conditions

Condition	No.	Percent*
Pancreatitis	17	47
Ethanol abuse	9	25
PUD	6	17
None	4	11
Not stated	2	6
Cholecystectomy	1	3

PUD = peptic ulcer disease.
*Percentage of total cases (some cases may have had more than one condition).

Table XV. Superior mesenteric artery aneurysms: Age

	Mean	Range
Age (yr)	52	13-87

Table XVI. Superior mesenteric artery aneurysms: General

Characteristics	No.	Percent*
Men	33	63
Women	19	37
Ruptured	20	38
Mortality (overall)	7	13
Mortality (ruptured)	6	30
Outcome not stated	4	8

*Percentage of total cases.

Table XVII. Superior mesenteric artery aneurysms: Clinical presentation

Symptoms	No.	Percent*
Abdominal pain	35	67
Mass	14	27
Fever	10	19
Nausea, vomiting	10	19
Gastrointestinal hemorrhage/hemobilia	8	15
Jaundice	8	15
Anemia	6	12
Shock	6	12
Asymptomatic	5	10

*Percentage of total cases (some cases may have had more than one symptom).

Table XVIII. Superior mesenteric artery aneurysms: Diagnostic techniques

Technique	No.	Percent*
Arteriography	39	75
Laparotomy	22	42
CT scan	16	31
Ultrasound	16	31
Autopsy	2	4

*Percentage of total cases (some cases may have had more than one diagnostic technique).

Table XIX. Superior mesenteric artery aneurysms: Treatment modality

Modality	No.	Percent*
Ligation	18	35
Aneurysmectomy	18	35
Aneurysmorrhaphy	11	21
Bypass/revascularization	7	13
Not stated	7	13
None	3	6
Embolization	2	4

*Percentage of total cases (some cases may have had more than one treatment modality).

Table XX. Superior mesenteric artery aneurysms: Aneurysm characteristics

Characteristics	No.	Percent*
Mycotic	16	31
True	13	25
False	8	15
Inflammatory	6	12
Not stated	6	12
FMD, CMN, etc.	3	6

CMN = cystic medial necrosis; FMD = fibromuscular dysplasia.
*Percentage of total cases for which data are available.

Table XXI. Superior mesenteric artery aneurysms: Common associated conditions

Condition	No.	Percent*
Hypertension	12	23
Endocarditis	10	19
Pancreatitis	8	15
Not stated	8	15
Biliary disease	6	12
PUD	6	12
None	7	13

PUD = peptic ulcer disease.
*Percentage of total cases (some cases may have had more than one associated condition).

Table XXII. Inferior mesenteric artery aneurysms: Age

	Mean	Range
Age (yr)	53	22-79

Table XXIII. Inferior mesenteric artery aneurysms: General

Characteristics	No.	Percent*
Men	7	88
Women	1	13
Ruptured	0	0
Mortality	0	0

*Percentage of total cases.

Table XXIV. Inferior mesenteric artery aneurysms: Clinical presentation

Symptoms	No.	Percent*
Abdominal pain	4	50
Mass	4	50
Exacerbation of PAOD	4	50
None	1	13

PAOD = peripheral arterial occlusive disease.
*Percentage of total cases (some cases may have had more than one symptom).

Table XXV. Inferior mesenteric artery aneurysms: Diagnostic techniques

Technique	No.	Percent*
Arteriography	6	75
Laparotomy	3	38
CT scan	0	0
Ultrasound	0	0

*Percentage of total cases (some cases may have had more than one diagnostic technique).

Table XXVI. Inferior mesenteric artery aneurysms: Treatment modality

Modality	No.	Percent*
Aneurysmectomy	6	75
Bypass/revascularization	3	38
Ligation	2	25
None	1	13
Aneurysmorrhaphy	0	0
Embolization	0	0

*Percentage of total cases (some cases may have had more than one treatment modality).

Table XXVII. Inferior mesenteric artery aneurysms: Aneurysm characteristics

Characteristics	No.	Percent*
False	3	38
Not stated	2	25
Mycotic	1	13
True	1	13
FMD, CMN, etc.	1	13
Inflammatory	0	0

CMN = cystic medial necrosis; FMD = fibromuscular dysplasia.
*Percentage of total cases.

Table XXVIII. Inferior mesenteric artery aneurysms: Common associated conditions

Condition	No.	Percent*
PUD	7	88
Abdominal trauma	4	50
Cardiac disease/previous MI	3	38
AAA	2	25
Pancreatitis	2	25

AAA = abdominal aortic aneurysm; MI = myocardial infarction; PUD = peptic ulcer disease.
*Percentage of total cases.

Table XXIX. Colic artery aneurysms: Age

	Mean	Range
Age (yr)	55	19-70

Table XXX. Colic artery aneurysms: General

Characteristics	No.	Percent*
Men	12	52
Women	11	48
Ruptured	16	70
Mortality (overall)	2	9
Mortality (ruptured)†	1	6

*Percentage of total cases.
†Percentage of ruptured cases.

Table XXXI. Colic artery aneurysms: Clinical presentation

Symptoms	No.	Percent*
Abdominal pain	20	87
Shock	12	52
Mass	4	17
Nausea, vomiting	4	17
Gastrointestinal hemorrhage or hemobilia	3	13
Jaundice	3	13

*Percentage of total cases (some cases may have had more than one symptom).

Table XXXII. Colic artery aneurysms: Diagnostic techniques

Technique	No.	Percent*
Laparotomy	14	61
Arteriography	9	39
CT scan	4	17
Ultrasound	2	9
Autopsy	1	4

*Percentage of total cases (some cases may have had more than one diagnostic technique).

Table XXXIII. Colic artery aneurysms: Treatment modality

Modality	No.	Percent*
Aneurysmectomy	16	70
Ligation	8	35
Embolization	1	4
None	1	4
Bypass/revascularization	0	0
Aneurysmorrhaphy	0	0

*Percentage of total cases (some cases may have had more than one treatment modality).

Table XXXIV. Colic artery aneurysms: Aneurysm characteristics

Characteristics	No.	Percent*
Type		
Not stated	9	39
Inflammatory	6	26
True	4	17
Mycotic	2	9
FMD, CMN, etc.	1	4
False	1	4
Location		
Mid colon	21	91
Left colon	1	4
Right colon	1	47

CMN = cystic medial necrosis; FMD = fibromuscular dysplasia.
*Percentage of total cases for which data are available.

Table XXXV. Colic artery aneurysms: Common associated conditions

Condition	No.	Percent*
Not stated	10	43
PUD	7	30
Cholecystectomy	4	17
None	4	17
Endocarditis	3	13
Pancreatitis	2	9

*Percentage of total cases (some cases may have had more than one condition).

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