

OSPEDALE SANTA MARIA NUOVA
Chirurgia Generale, Bariatrica e Metabolica
Firenze



**SOCIETÀ MEDICA
DI SANTA MARIA NUOVA**

X EDIZIONE

**Giornate Mediche di
Santa Maria Nuova 2018**



**L'ischemia intestinale:
cosa fare e cosa non fare**

Enrico Facchiano

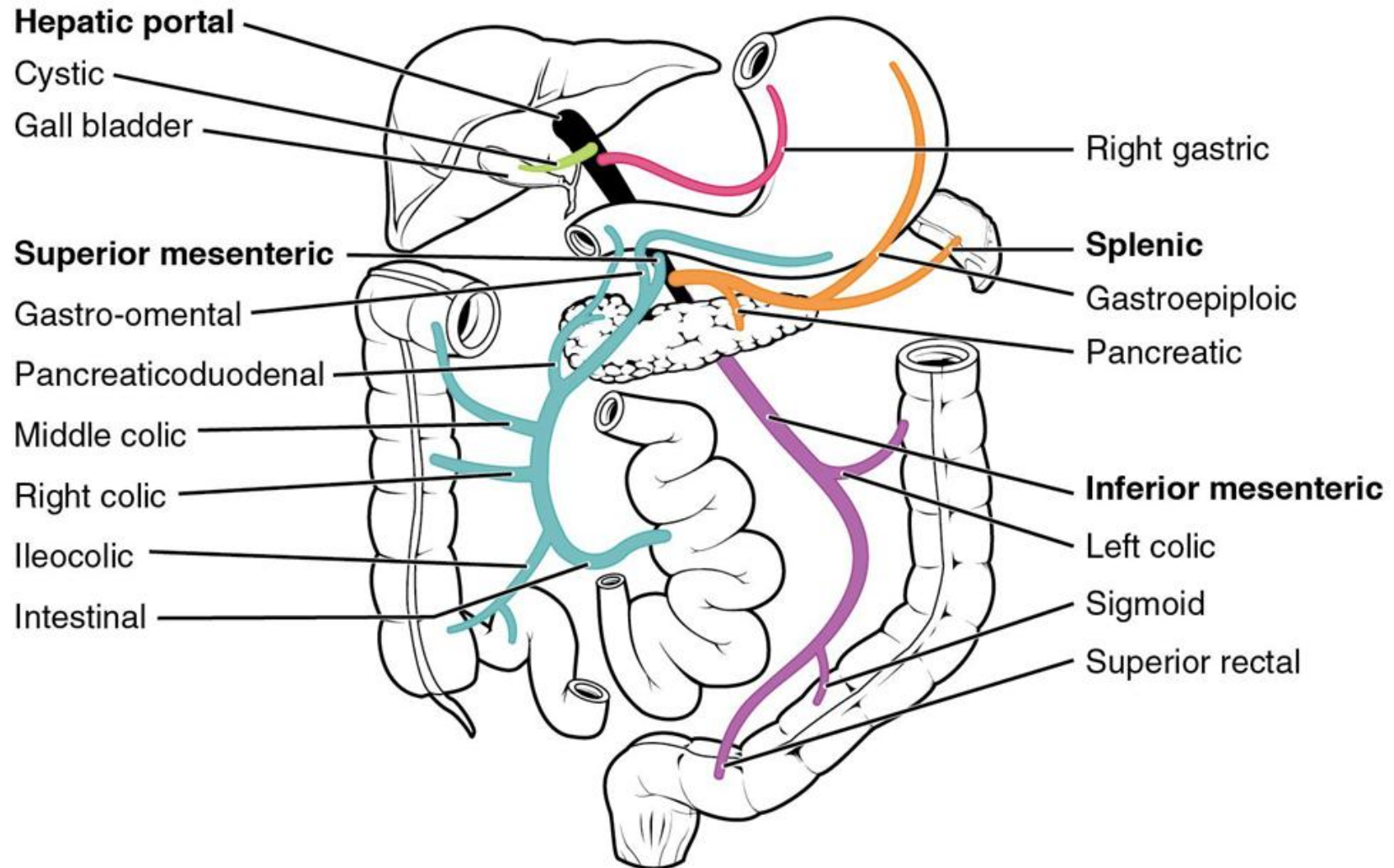
**IL DANNO TISSUTALE ISCHEMICO:
*sedi anatomiche,
strategie terapeutiche e
reti assistenziali***

18-19 Ottobre 2018

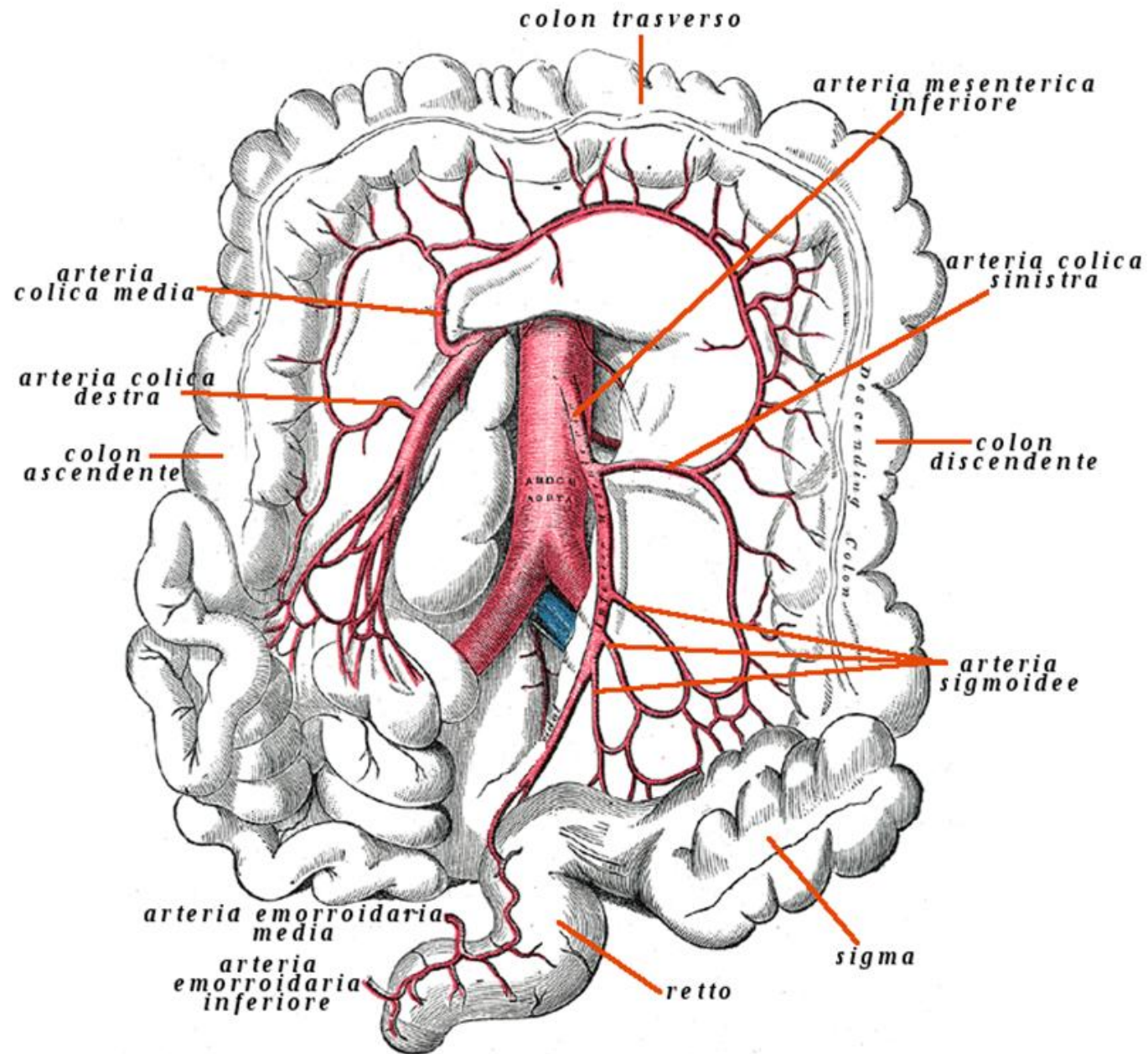
**Ischemia mesenterica acuta (IMA):
apparizione improvvisa di un ostacolo alla
circolazione in uno o più arterie viscerali**

**Björk et al, Clinical Practice Guidelines of the
European Society of Vascular Surgery.
*Eur J Vasc Endovasc Surg, 2017***

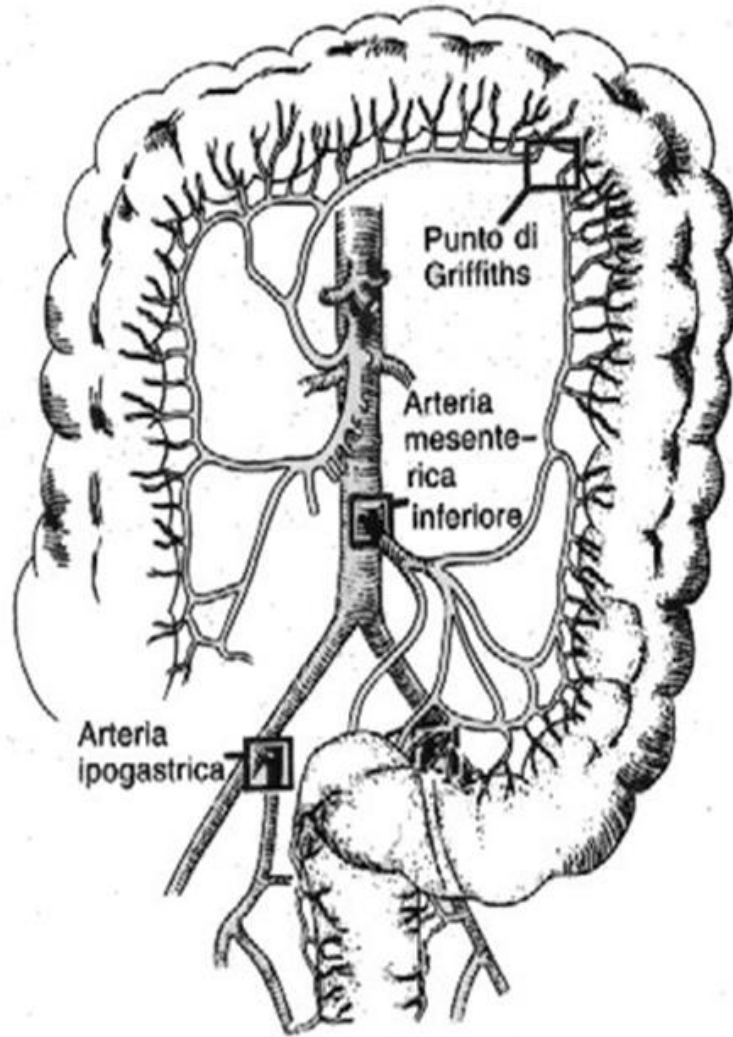
Circolazione viscerale



Circolazione mesenterica: anastomosi



Circolazione mesenterica: punti critici



Il punto di Griffiths è situato a livello dell'angolo colico sinistro, tra l'arteria colica sinistra e l'arcata del colon trasverso e interrompe il circolo di Riolano .

Il punto di Sudeck si colloca tra il sistema terminale dell'arteria mesenterica inferiore e l'arteria emorroidale superiore.

Circolazione mesenterica: punti critici

Il punto di Reiner è costituito da un segmento dell'arteria mesenterica superiore, compreso fra il punto situato a monte dell'origine della seconda arteria intestinale e della colica media ed un punto a valle dell'ileocolica.

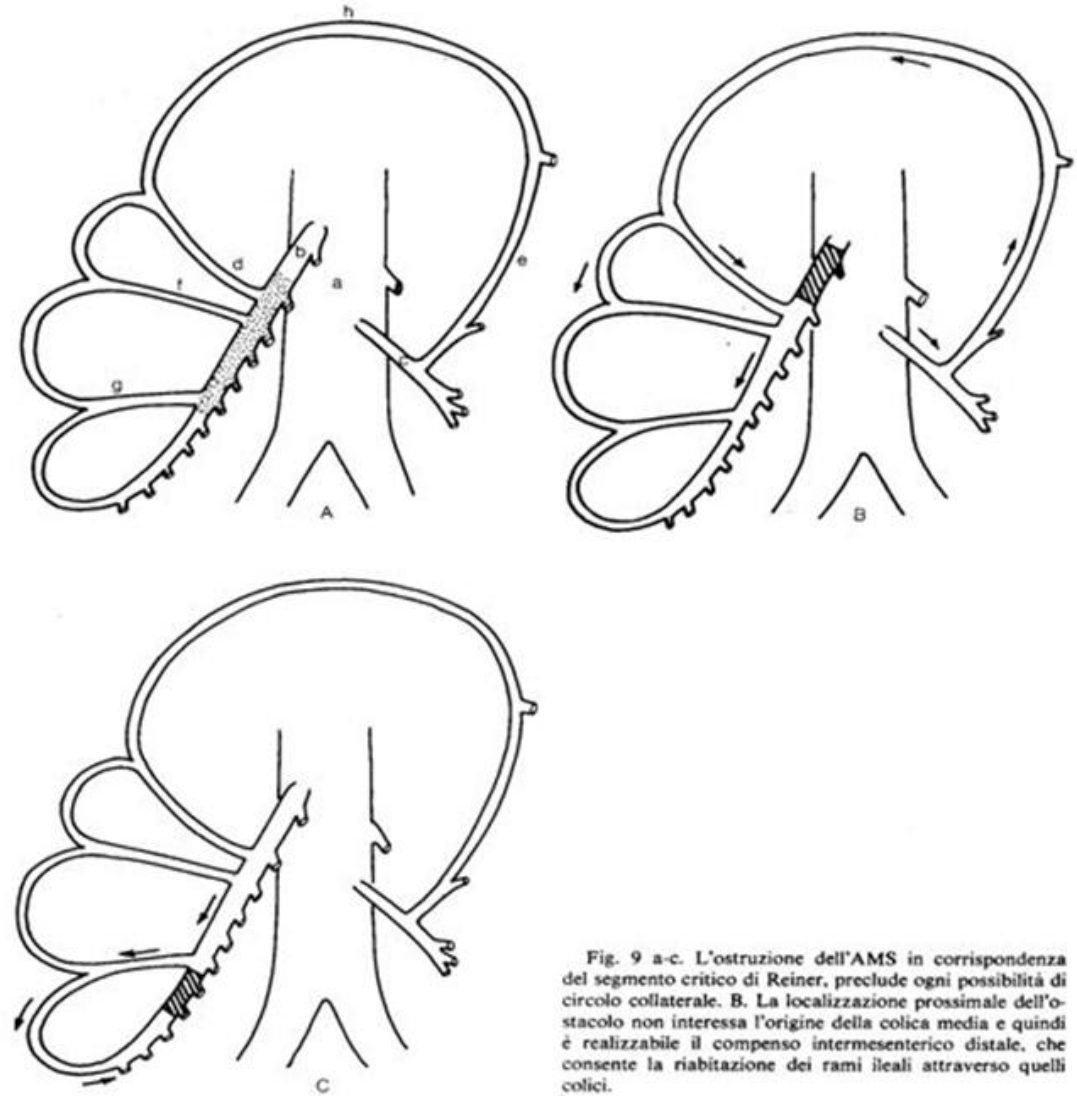


Fig. 9 a-c. L'ostruzione dell'AMS in corrispondenza del segmento critico di Reiner, preclude ogni possibilità di circolo collaterale. B. La localizzazione prossimale dell'ostracolo non interessa l'origine della colica media e quindi è realizzabile il compenso intermesenterico distale, che consente la riabilitazione dei rami ileali attraverso quelli colici.

Anno 1926

“... the diagnosis is impossible, the prognosis hopeless and the treatment useless...”

A.J. Cokkinis

AJ Cokkinis. Mesenteric vascular occlusion.
London: Baillière, Tindall & Cox; 1926. p. 1-93

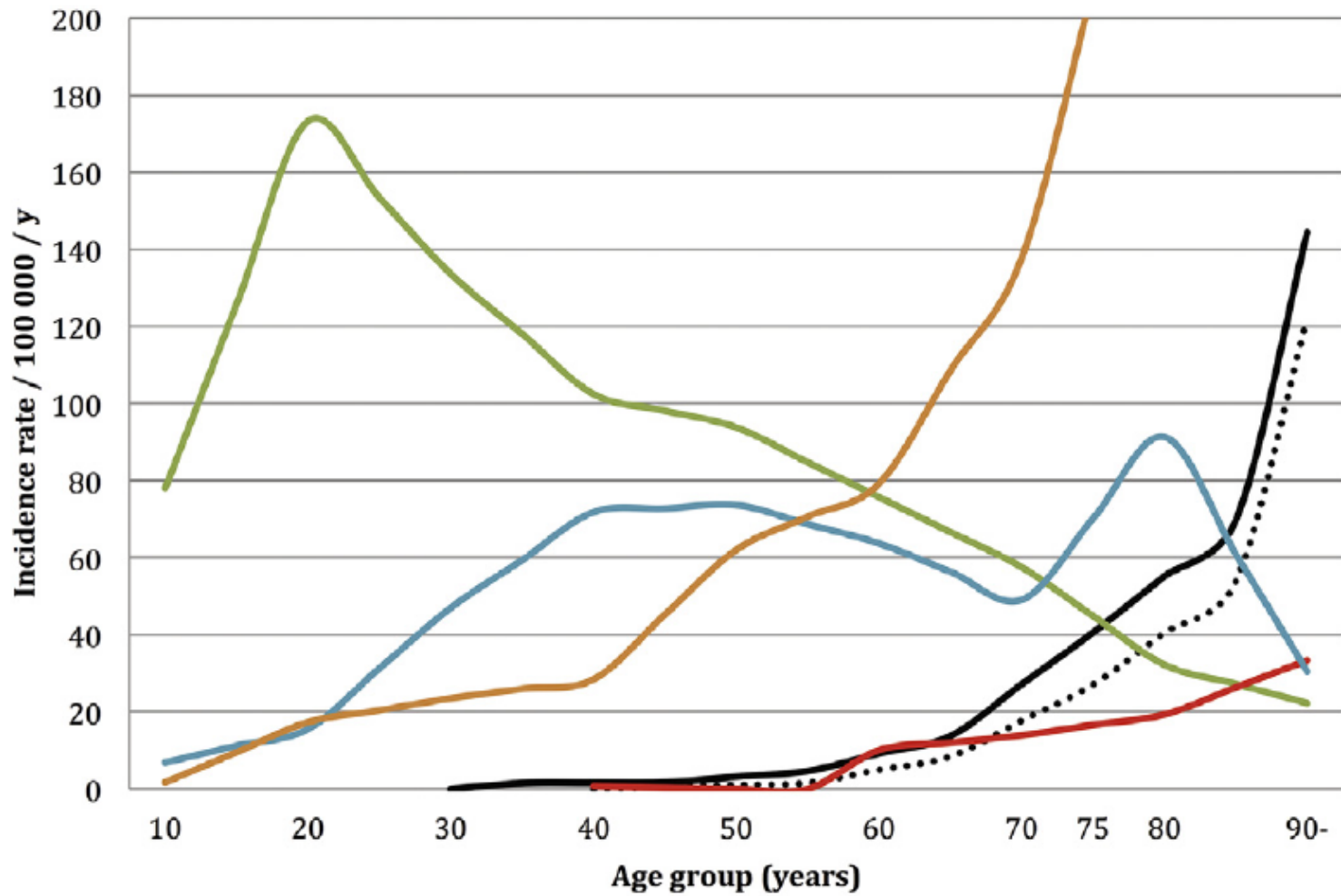
Anno 2017

- **Mortalità 95%**
- **Mortalità in caso di trattamento adeguato: 75%**
- **In totale 1% dei casi di addome acuto**
- **Nei pazienti >70 aa: 10% dei casi**

Cosa è cambiato di fatto?

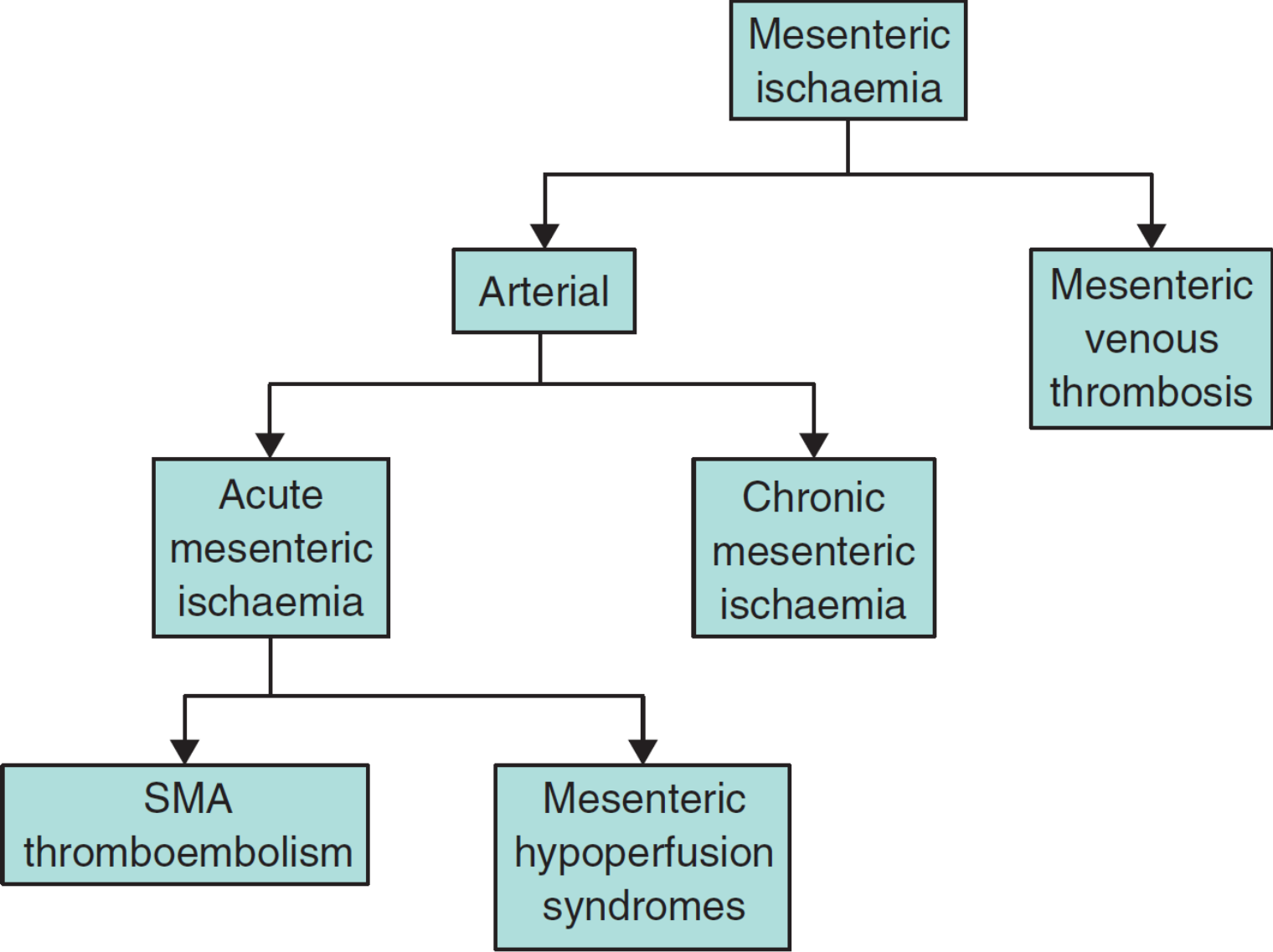
- **Diagnosi più rapida: TC multi-slice con m.d.c.**
- **Tecniche endovascolari**
 - **Negli USA mortalità dopo procedure endovascolari per IMA:**
 - 1995: 51%
 - 2010: 26%

Incidenza



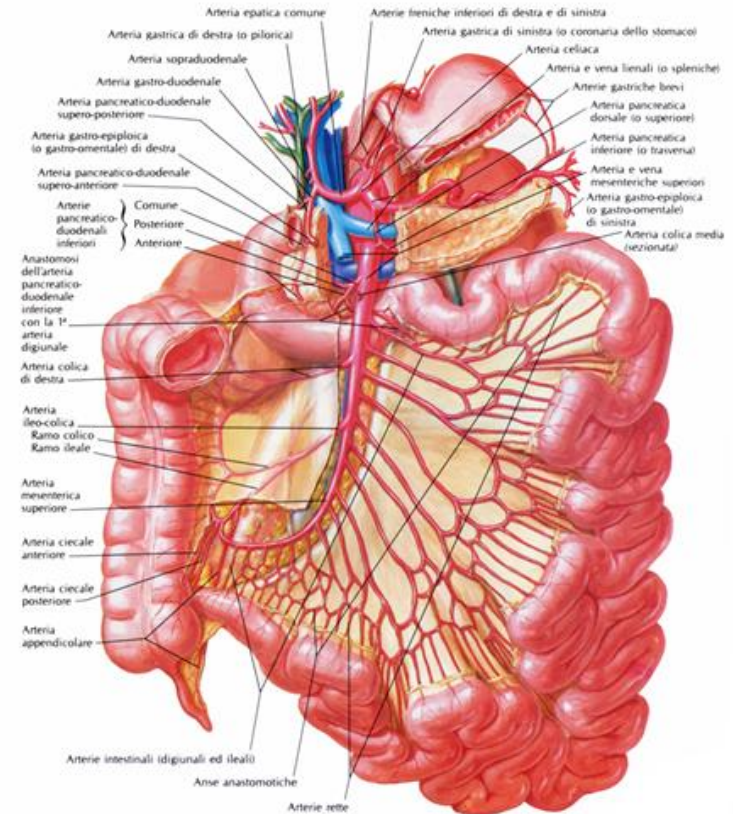
— AMI (all etiologies) Occlusive AMI — Acute appendicitis
— RAAA — Acute pancreatitis — Acute cholecystitis

Classificazione



Differenti fenotipi di IMA

- **Embolia arteriosa mesenterica acuta: 50%**
 - Origine: atrio sinistro o placche aterosclerotiche aortiche
 - AMI vulnerabile a causa dell'angolo con l'aorta ed il diametro ampio all'origine
 - Solitamente stop a 3-10 cm dall'origine
- **Trombosi arteriosa acuta: 25%**
 - Di solito all'origine dell'AMS
 - Associata a malattia aterosclerotica
- **Ischemia mesenterica non occlusiva (NOMI): 20%**
 - Vasocostrizione con basso flusso splancnico
- **Trombosi venosa mesenterica: 10%**
 - Triade di Virchow: diminuito flusso, ipercoagulabilità, infiammazione vascolare



Fattori di rischio per i differenti fenotipi di IMA

Table 2 Risk factors for specific phenotypes of AMI

	Pathogenesis of AMI			
	Acute mesenteric arterial embolism	Acute mesenteric arterial thrombosis	NOMI	Mesenteric venous thrombosis
Risk factors	Atrial fibrillation Recent MI cardiac thrombi Mitral valve disease Left ventricular aneurysm Endocarditis Previous embolic disease	Diffuse atherosclerotic disease Postprandial pain Weight loss	Cardiac failure Low flow states Multi-organ dysfunction Vasopressors	Portal hypertension History of VTE Oral contraceptives Estrogen use Thrombophilia pancreatitis

AMI acute mesenteric ischemia, *NOMI* non-occlusive mesenteric ischemia, *MI* myocardial infarction, *VTE* venous thromboembolism

Fattori predisponenti e sintomi

	SMA embolus	SMA thrombus	Venous thrombus
History			
Age ≥ 80 years	++	+	-
Age < 50 years	-	-	+
Women > men	+	+	+/-
Atrial fibrillation	++	-	-
Previous myocardial infarction	++	+	-
Stroke	+	++	-
Previous arterial embolism/source of embolus	++	-	-
Previous symptoms of chronic mesenteric ischaemia	-	++	-
Previous deep venous thrombosis or pulmonary embolism	-	-	++
Activated protein C resistance	-	-	++
Pancreatitis or pancreatic cancer	-	-	++
Liver cirrhosis/portal hypertension	-	-	++
Symptoms			
Sudden onset	++	+/-	-
Insidious onset	-	+	+
Abdominal pain	++	+	+
Vomiting	++	++	+
Diarrhoea	+	+	+
Bloody stools	+	+	+/-
Synchronous embolism	++	-	-

++, Factor likely to be present; +, factor perhaps present; -, factor unlikely to be present.

Fattori prognostici

Time lapse till revascularization ←

Pathogenesis of the occlusion (embolism, thrombosis, NOMI)

Affected intestinal artery (celiac artery, SMA, IMA, multiple vessels)

Location of the occlusion (central, peripheral)

Degree of ischemia (complete, reversible)

Extent of ischemia (extensive, localized)

Affected intestinal segment (small or large intestine, combined)

NOMI = Non-occlusive mesenteric ischemia; SMA= superior mesenteric artery; IMA = inferior mesenteric artery.

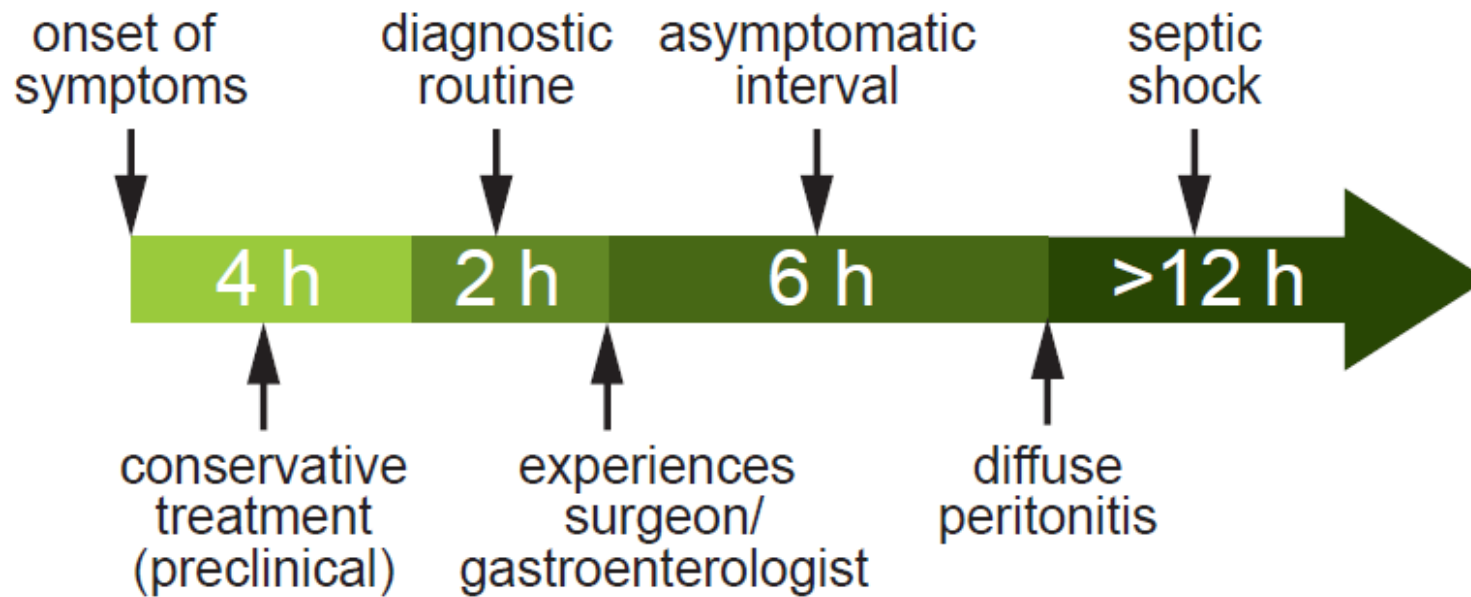
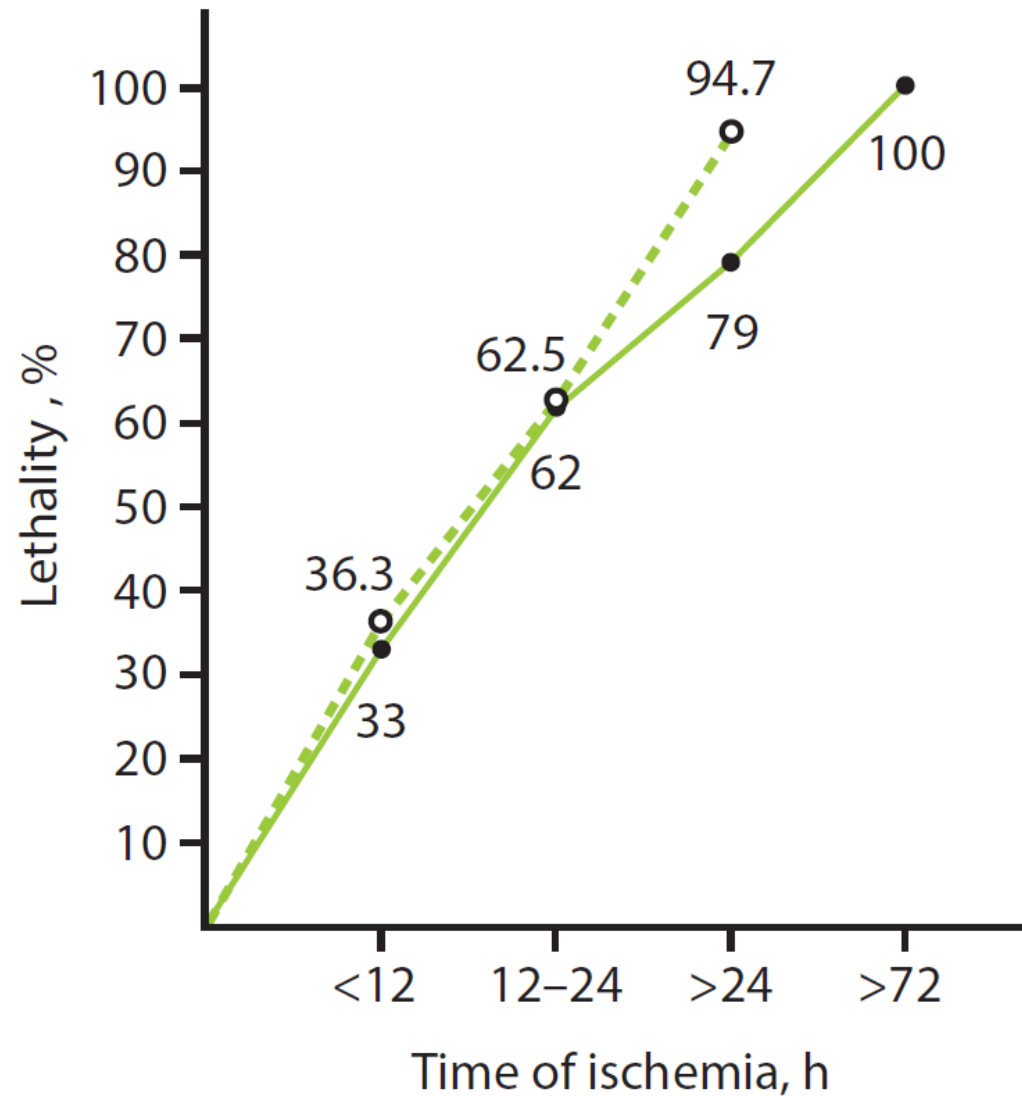


Fig. 1. Clinical course and treatment of acute mesenteric ischemia (according to [30]).

Fig. 2. Correlation between lethality and duration of intestinal ischemia according to Paes et al. [6] (1990) (—) and Walter et al. [7] (1992) (-----)



L'ischemia intestinale: cosa non fare

Perdere tempo



Acute mesenteric ischemia: guidelines of the World Society of Emergency Surgery

Miklosh Bala^{1*}, Jeffrey Kashuk², Ernest E. Moore³, Yoram Kluger⁴, Walter Biffi⁵, Carlos Augusto Gomes⁶, Offir Ben-Ishay⁴, Chen Rubinstein⁷, Zsolt J. Balogh⁸, Ian Civil⁹, Federico Coccolini¹⁰, Ari Leppaniemi¹¹, Andrew Peitzman¹², Luca Ansaloni¹⁰, Michael Sugrue¹³, Massimo Sartelli¹⁴, Salomone Di Saverio¹⁵, Gustavo P. Fraga¹⁶ and Fausto Catena¹⁷

Table 1 Grading of recommendations

Grade of recommendation	Clarity of risk/benefit	Quality of supporting evidence	Implications
1A Strong recommendation, high-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	RCTs without important limitations or overwhelming evidence from observational studies	Strong recommendation, applies to most patients in most circumstances without reservation
1B Strong recommendation, moderate-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	RCTs with important limitations (inconsistent results, methodological flaws, indirect analyses, or imprecise conclusions) or exceptionally strong evidence from observational studies	Strong recommendation, applies to most patients in most circumstances without reservation
1C Strong recommendation, low-quality or very low-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	Observational studies or case series	Strong recommendation but subject to change when higher quality evidence becomes available
2A Weak recommendation, high-quality evidence	Benefits closely balanced with risks and burden	RCTs without important limitations or overwhelming evidence from observational studies	Weak recommendation, best action may differ depending on the patient, treatment circumstances, or social values
2B Weak recommendation, moderate-quality evidence	Benefits closely balanced with risks and burden	RCTs with important limitations (inconsistent results, methodological flaws, indirect or imprecise) or exceptionally strong evidence from observational studies	Weak recommendation, best action may differ depending on the patient, treatment circumstances, or social values
2C Weak recommendation, low-quality or very low-quality evidence	Uncertainty in the estimates of benefits, risks, and burden; benefits, risk, and burden may be closely balanced	Observational studies or case series	Very weak recommendation; alternative treatments may be equally reasonable and merit consideration

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Severe abdominal pain out of proportion to physical examination findings should be assumed to be AMI until disproven. (Recommendation 1B)



Conventional plain X-ray films have limited diagnostic value in evaluating AMI, although signs of intestinal perforation may be seen. (Recommendation 1B)



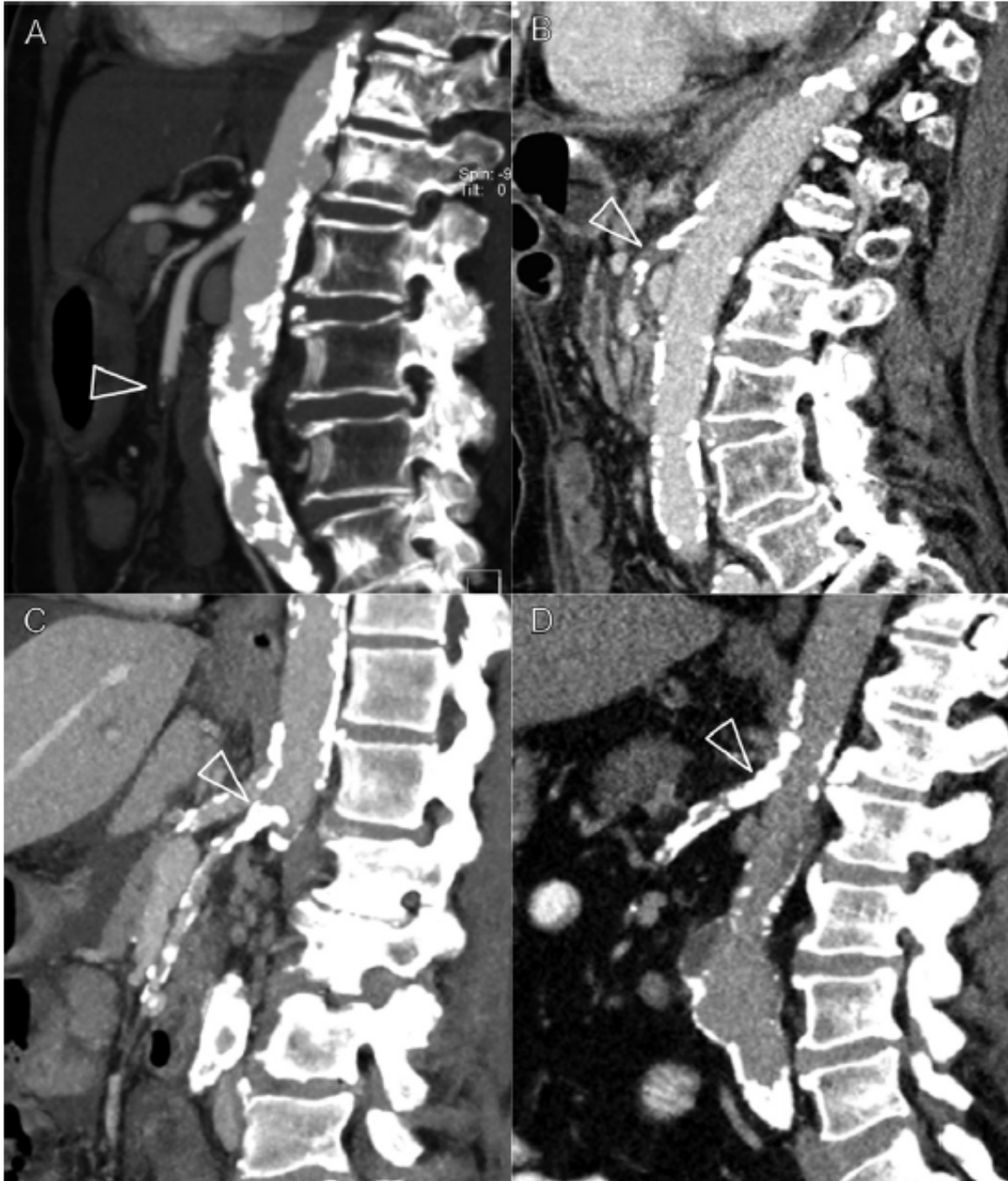
Computed tomography angiography (CTA) should be performed as soon as possible for any patient with suspicion for AMI. (Recommendation 1A)

Acute mesenteric ischemia: guidelines of the World Society of Emergency Surgery

Comprehensive biphasic CTA includes the following important steps:

- a) Pre-contrast scans to detect vascular calcification, hyper-attenuating intravascular thrombus and intramural hemorrhage.
- b) Arterial and venous phases to demonstrate thrombus in the mesenteric arteries and veins, abnormal enhancement of the bowel wall, and the presence of embolism or infarction of other organs.
- c) Multi-planar reconstructions (MPR) to assess the origin of the mesenteric arteries [35].

CTA should be performed despite the presence of renal failure, as the consequences of delayed diagnosis, missed diagnosis, or mismanagement are far more detrimental to the kidneys and the patient than exposure to the iodinated contrast agent. A recent study found that in 27 of 28 patients (96.4%) MDCT correctly diagnosed AMI (specificity of 97.9%) [16, 36].



A: embolo occlusivo dell'AMS

B: Occlusione trombotica

C: Stenosi aterosclerotica dell'AMS del 99% con trombosi

D: Occlusione calcifica cronica



Fig. 1 Selected image from a CTA scan of a patient with acute mesenteric ischemia secondary to occluded SMA from an embolic source (arrow). 3D reconstruction is demonstrates mid occlusion of SMA (arrow)

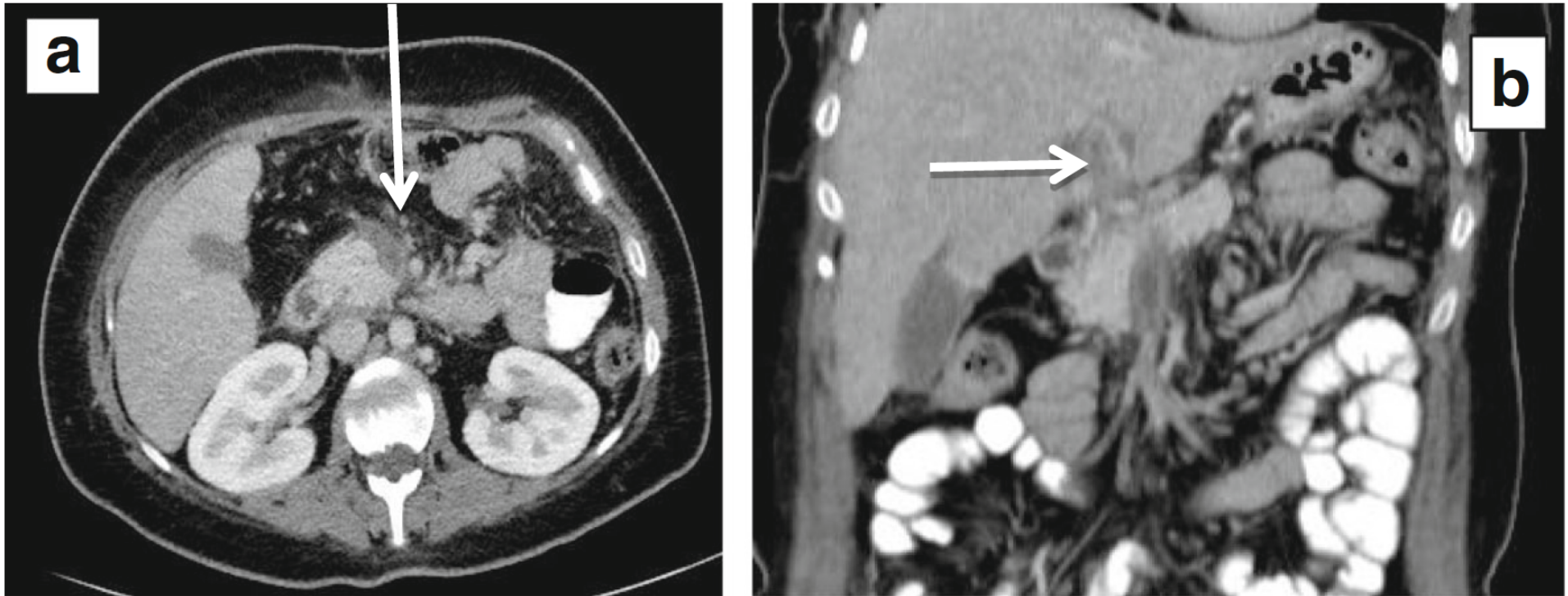


Fig. 2 30-year-old patient with acute superior mesenteric vein **a** and portal vein thrombosis **b** due to hypercoagulable state. No signs of bowel ischemia were noted, and the patient was treated successfully with long-term anticoagulation

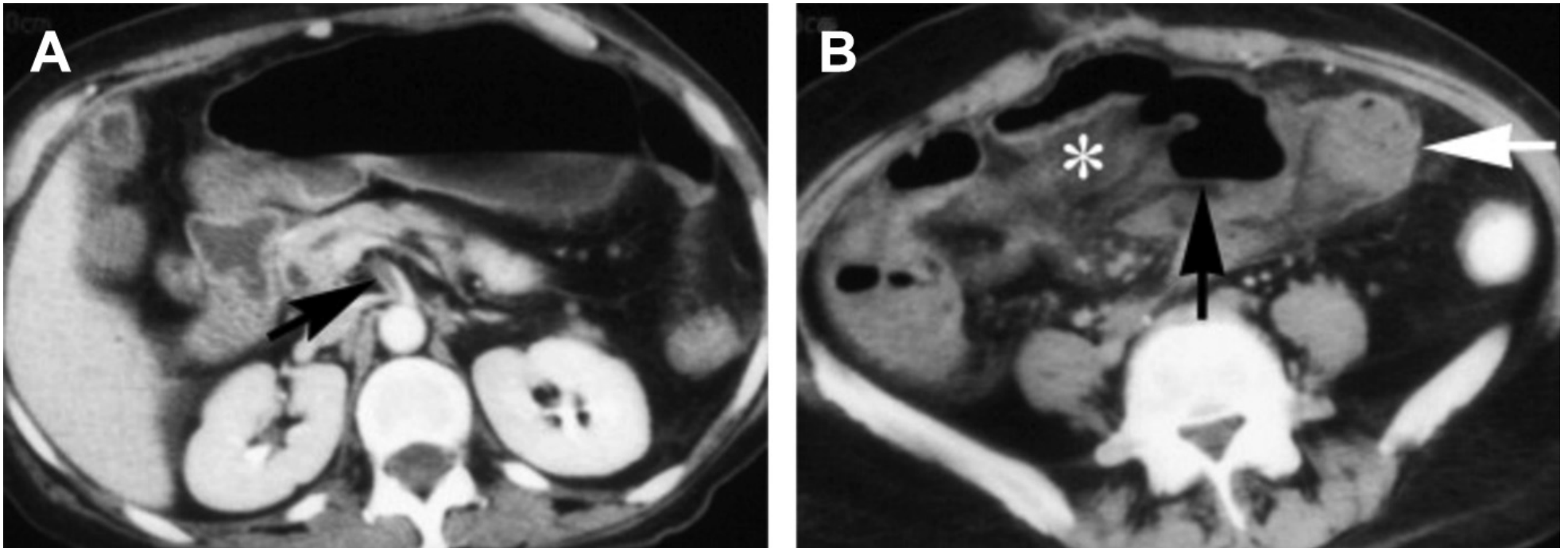
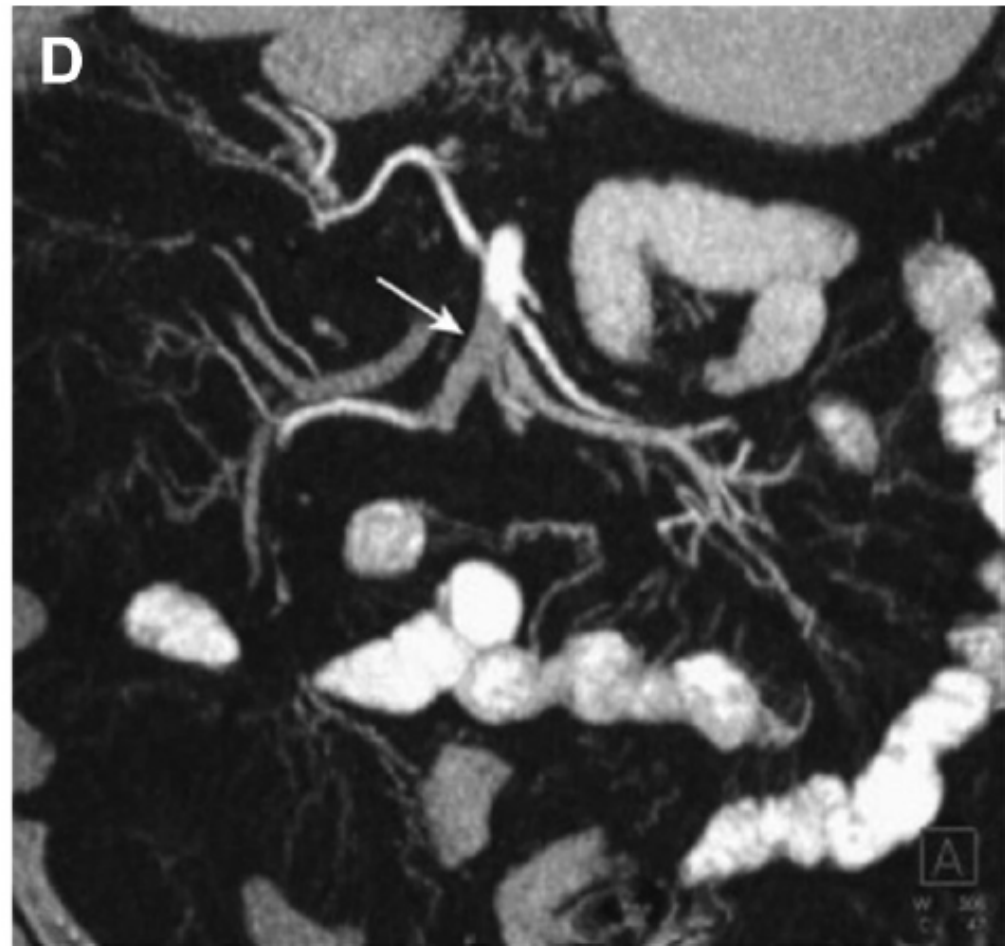


Fig. 1. (A, B) – Acute mesenteric ischemia with small intestinal infarction in a 65-year-old woman who complained of severe, acute abdominal pain. (A, B) Intravenous contrast-enhanced computed tomography scan shows hypoattenuating thrombus occluding the origin of the superior mesenteric artery (*arrow, A*), mesenteric edema (*asterisk, B*), mural thickening (*white arrow, B*) and dilatation (*black arrow, B*) of the small intestine. (C, D)



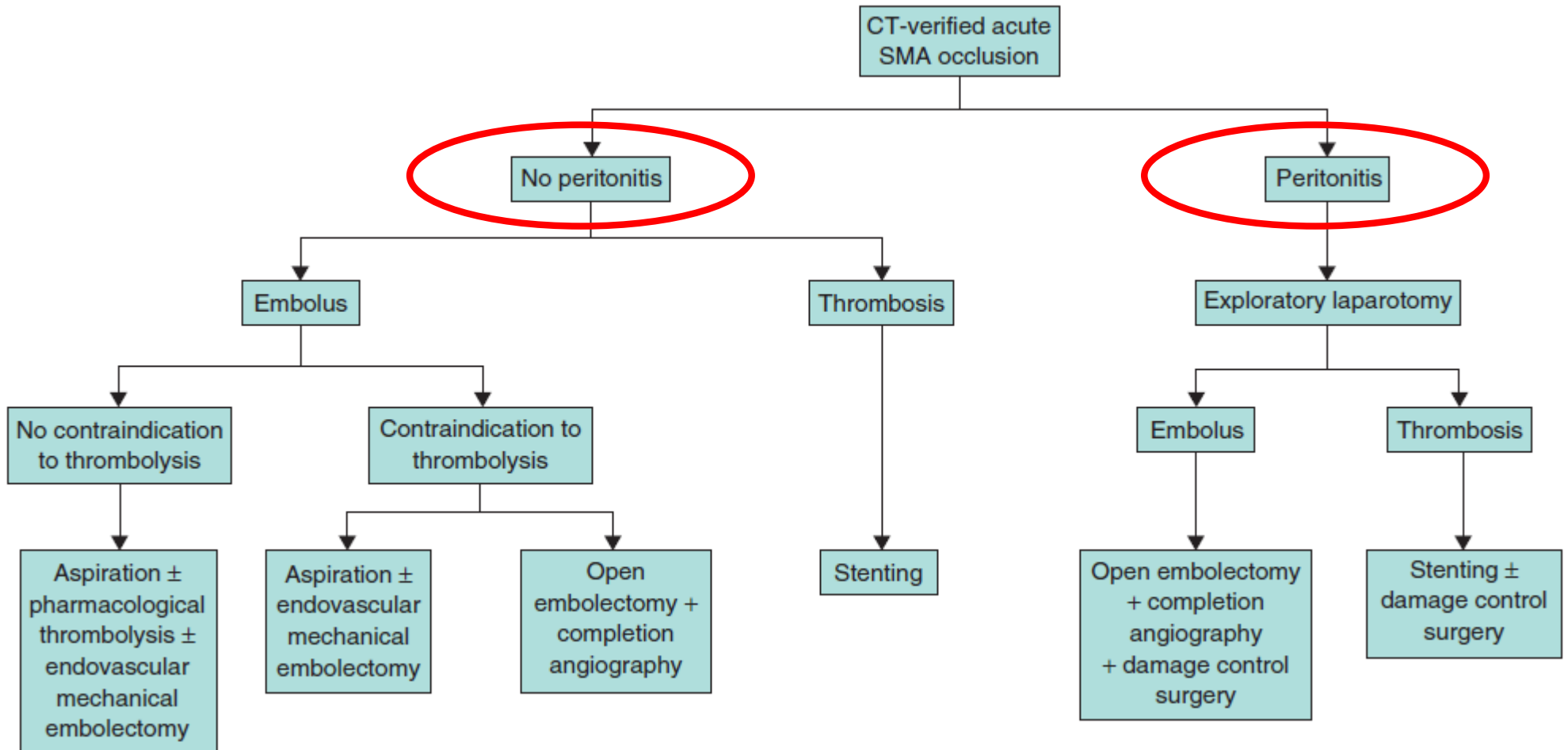
An 80-year-old man with acute abdominal pain. A sagittal multiplanar reconstruction (C) and coronal maximum intensity projection (D) show a large thrombus in the middle of the superior mesenteric artery (*arrow*); this was embolic, presumably from a cardiogenic source. Surgical embolectomy was performed. (From [A, B] Levy AD. Mesenteric ischemia. *Radiol Clin North Am* 2007;45(3):593–9, x; and [C, D] Horton KM, Fishman EK. CT angiography of the mesenteric circulation. *Radiol Clin North Am* 2010;48:331–45, viii.)

Trattamento di base

Table 3. Basic care of acute mesenteric ischemia

Fluid resuscitation	e.g. Ringer's lactate 1–2 ml/kg/h
Anticoagulation	20,000 IE/heparin/24 h, PTT-controlled
Antibiotics	cephalosporin 3 × 1.5 g, metronidazole 3 × 500 mg
Analgesics	peridural catheter or opioids, e.g. up to 15 mg/h piritramide

Algoritmo terapeutico



Acute mesenteric ischemia: guidelines of the World Society of Emergency Surgery

Trattamento chirurgico

Prompt laparotomy should be done for patients with overt peritonitis. (Recommendation 1A)

The goal of surgical intervention for AMI includes:

- 1) Re-establishment blood supply to the ischemic bowel.
- 2) Resection of all non-viable regions.
- 3) Preservation of all viable bowel.

Intestinal viability is the most important factor influencing outcome in patients with AMI. Non-viable intestine, if unrecognized, results in multi-system organ dysfunction and ultimately death. Prompt laparotomy allows for direct assessment of bowel viability.

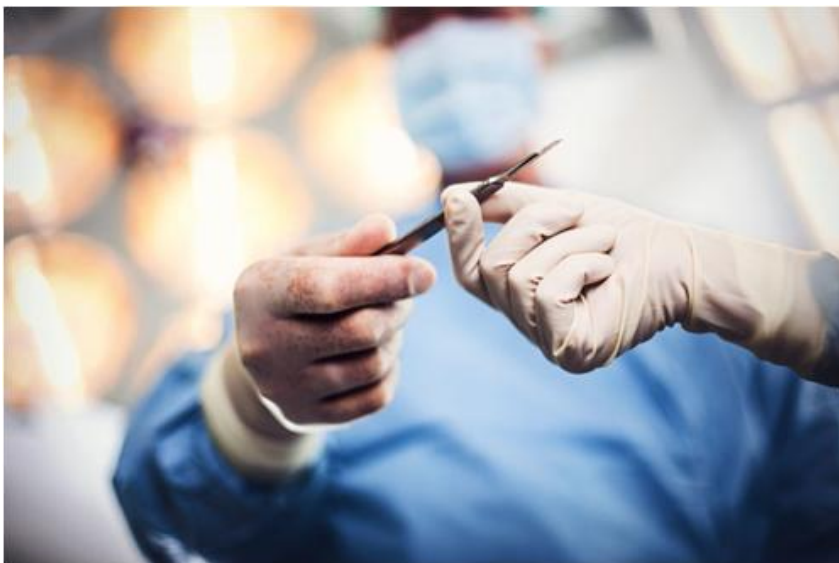
Trattamento chirurgico: resezione intestinale

Table 4. Critical lengths of remaining bowel to avoid short bowel syndrome

100 cm for a permanent jejunostomy (loss of colon)

65 cm for a jejunocolic anastomosis (preservation of colon)

35 cm for a jejunoileal anastomosis with preservation of the ileocecal region

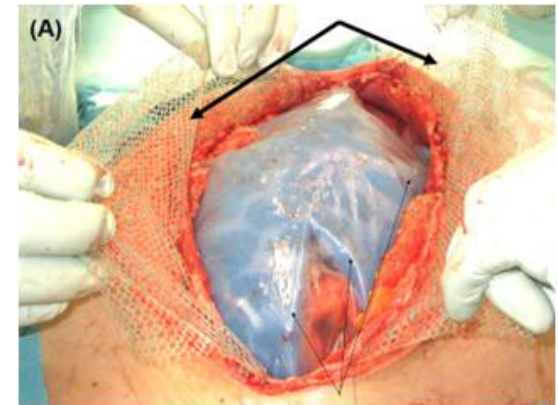


Trattamento chirurgico: resezione intestinale

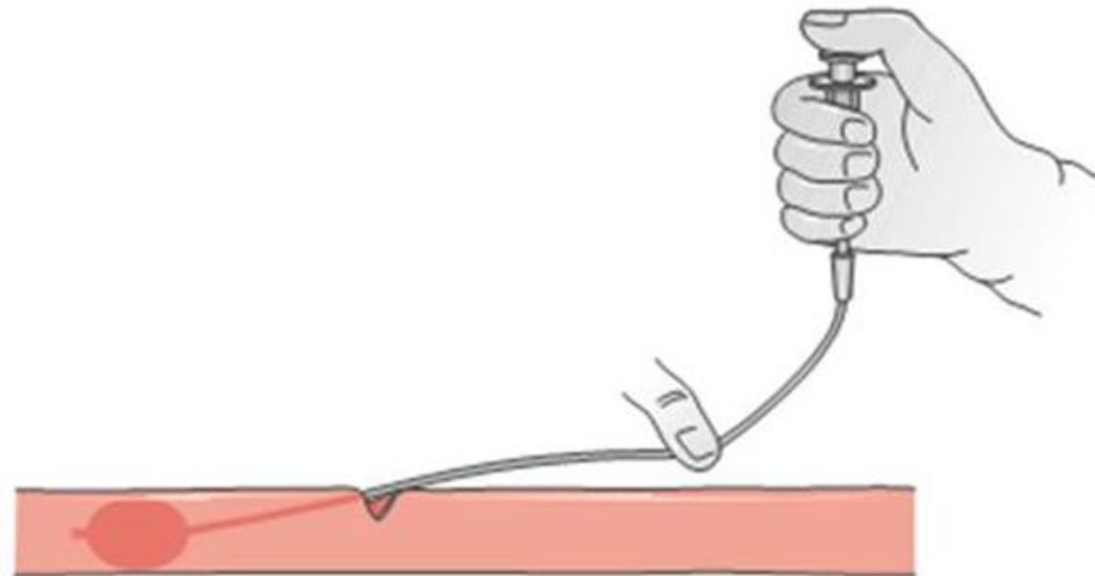
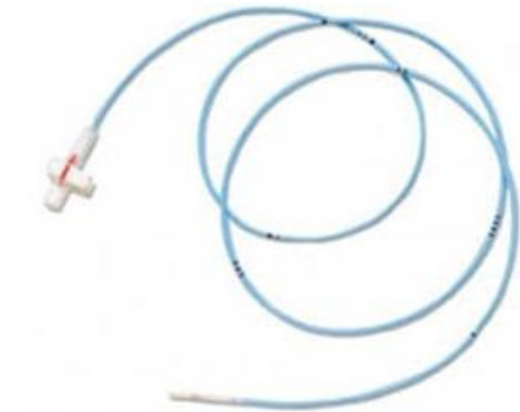


Trattamento chirurgico: damage control surgery

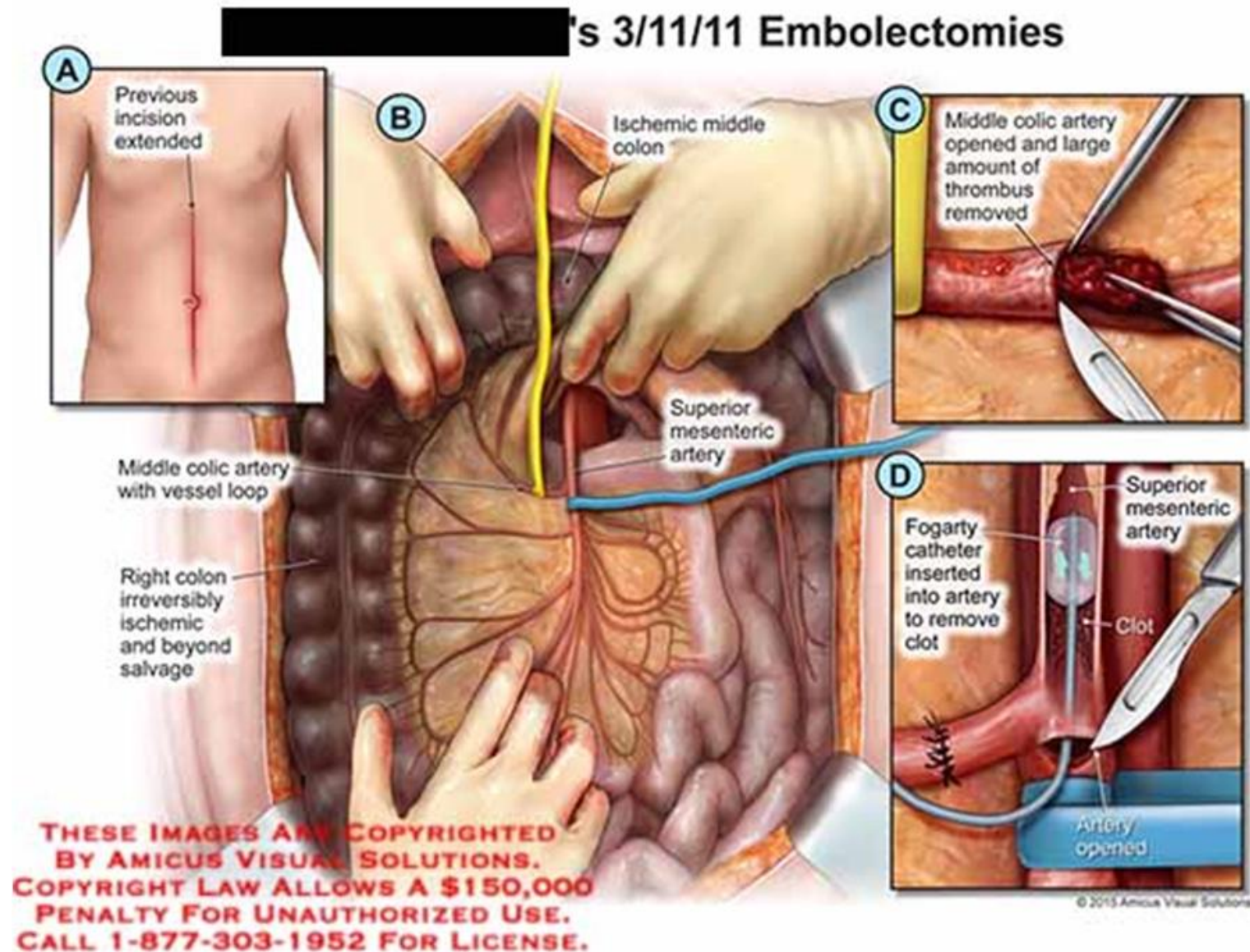
Damage control surgery (DCS) is an important adjunct for patients who require intestinal resection due to the necessity to reassess bowel viability and in patients with refractory sepsis. Planned re-laparotomy is an essential part of AMI management. (Recommendation 1B)



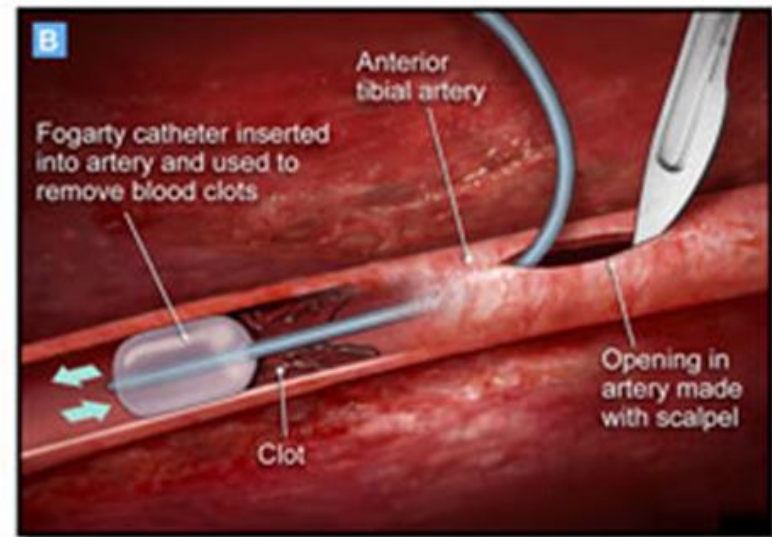
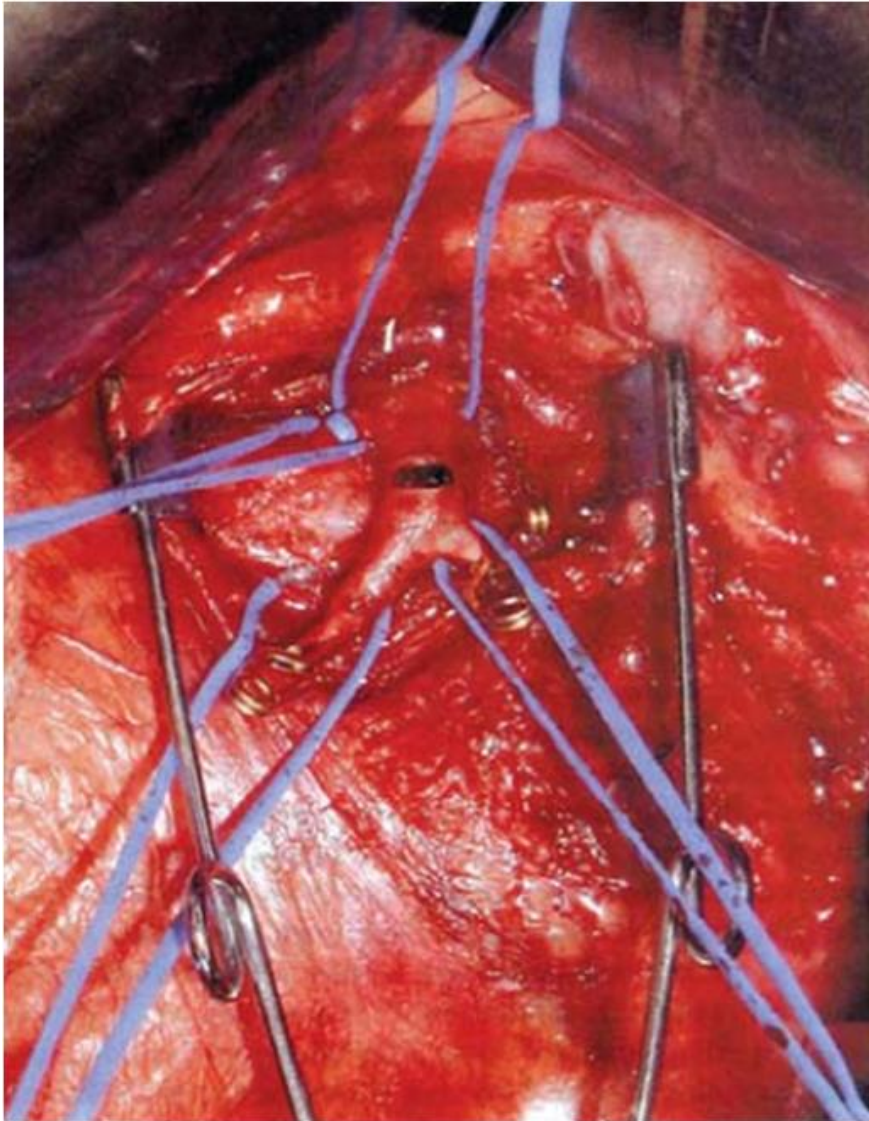
Trattamento chirurgico: embolectomia



Trattamento chirurgico: embolectomia



Trattamento chirurgico: embolectomia



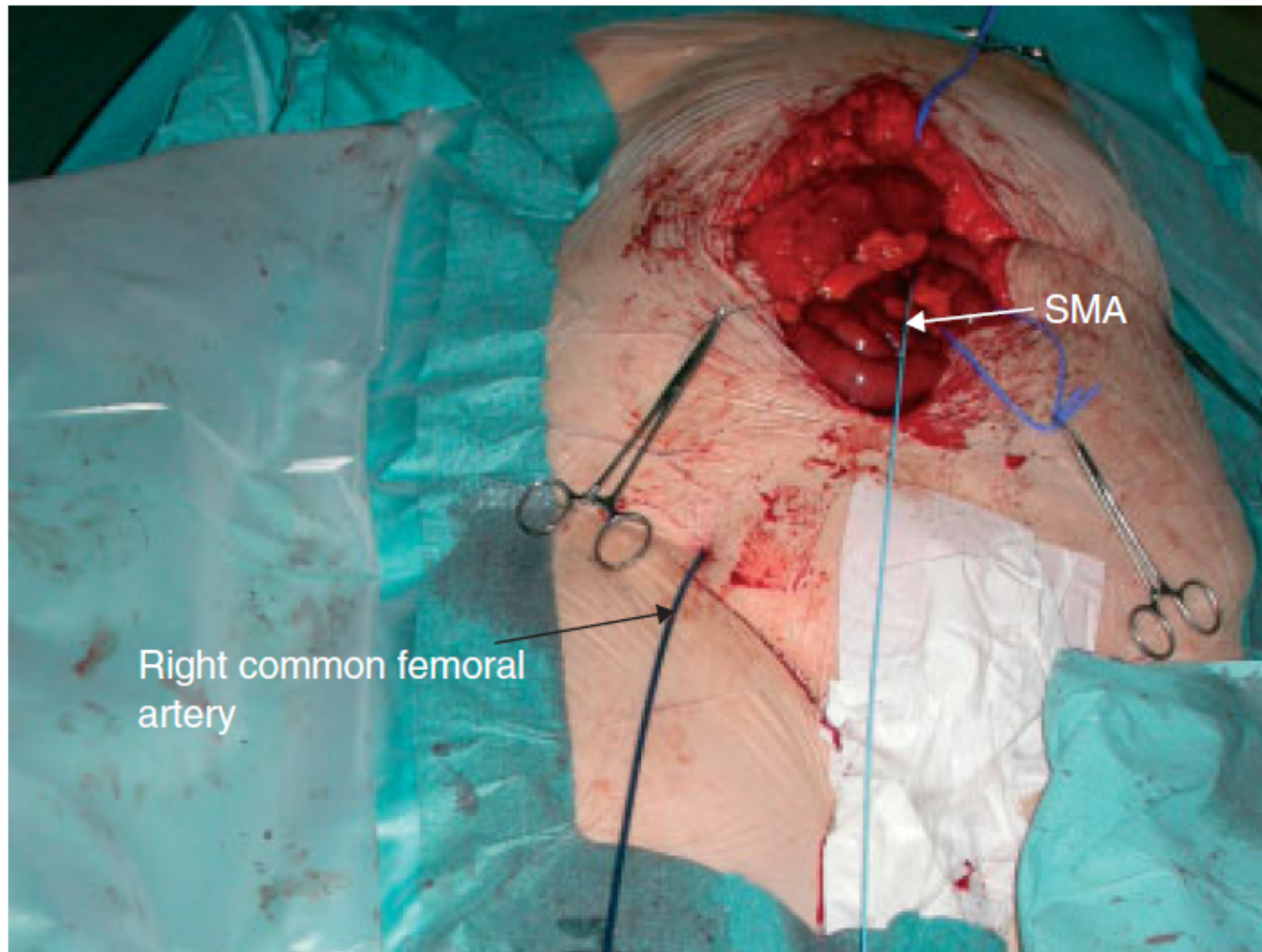
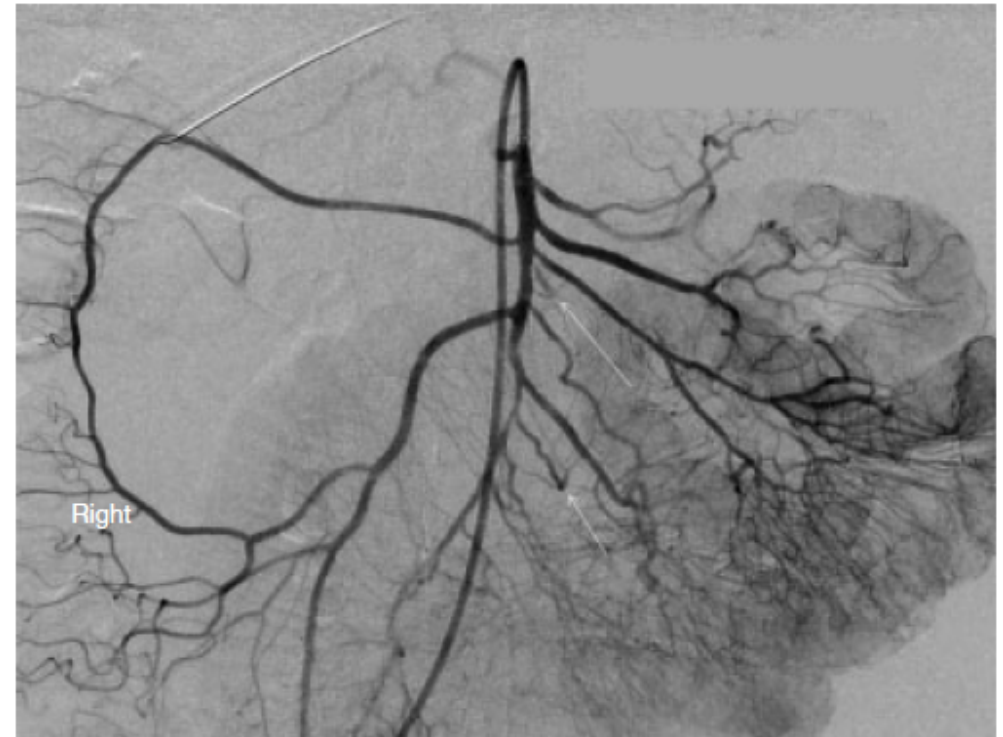


Fig. 6 Through-and-through access. A guidewire runs inside a catheter (white arrow) from the distal superior mesenteric artery (SMA) through the inside of the introducer (black arrow) via the right common femoral artery

Trattamento endovascolare



a Embolus in SMA



b After local aspiration and nitroglycerine injection

Trattamento endovascolare



Fig. 4. a, b Implantation of 5 mm stents in the superior mesenteric artery und celiac artery. **c, d** Reocclusion of both stents 4 weeks later with acute mesenteric ischemia. **e** Open reconstruction with an aorto-celiac bypass and aortic reinsertion of the superior mesenteric artery. Outcome: recovery.

Conclusioni

- **Patologia a prognosi severa, mortalità elevatissima**
- **Sintomi aspecifici**
- **Esame diagnostico principale TC con mdc**
- **Trattamento multimodale (chirurgico, medico, endovascolare)**
- **Fondamentale una diagnosi precoce**

