Ulster University

East Lancashire Hospitals NHS
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Outcomes and Prognosis of Mesenteric Ischaemia

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NorthWest Vascular Society Annual Meeting
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Disclosure

- No disclosures declared.
- No financial relationship with content.

Learning Objectives

- Revision of aetiology and pathophysiology.
- Outcomes for acute mesenteric ischaemia (AMI) treatment modalities.
- Outcomes for chronic mesenteric ischaemia (CMI) treatment modalities.
- Comparison of endovascular and surgical revascularisation.

Acute Mesenteric Ischaemia

- Pathophysiology;
  - Thrombosis of mesenteric arteries (58-64%).
  - Embolism of mesenteric arteries (28-42%).
  - Mesenteric venous thrombosis.
  - Non-occlusive mesenteric ischaemia - Arteritis, Fibromuscular Dysplasia, Trauma, Aneurysm Rupture.

- Presentation with acute abdominal pain in 75% to 90% associated with vomiting and GI dysfunction.

"Pain out of proportion to physical examination"

- Peritoneal signs and sepsis are late findings associated with increased mortality.

Acute Mesenteric Ischaemia

- Risk factors;
  - 30-43% previously asymptomatic patients may have acute deterioration of previous chronic disease.
  - 75% will have an atrial tachyarrhythmia.
  - 30% have a history of embolic events.
  - 20% have synchronous emboli in other arterial beds.

- Acute emboli accounts for 28% to 42% of AMI with SMA most commonly affected;
  - 15% ostium.
  - 50% distal to proximal jejunal and middle colic branches.
  - 35% fragment and embolise distally.

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Chronic Mesenteric Ischaemia

- Frequently caused by ostial atherosclerotic disease;
  - Female (3-4:1 ratio).
  - Median age 65 (range 40-90) years.
- Presentation with mesenteric / intestinal angina;
  - Central abdominal pain within 30 minutes of food.
  - Food fear / weight loss.
- Cardiovascular risk factors;
  - Smoking.
  - Hypertension.
  - Hypercholesterolaemia.
- Disease in other vascular territories.

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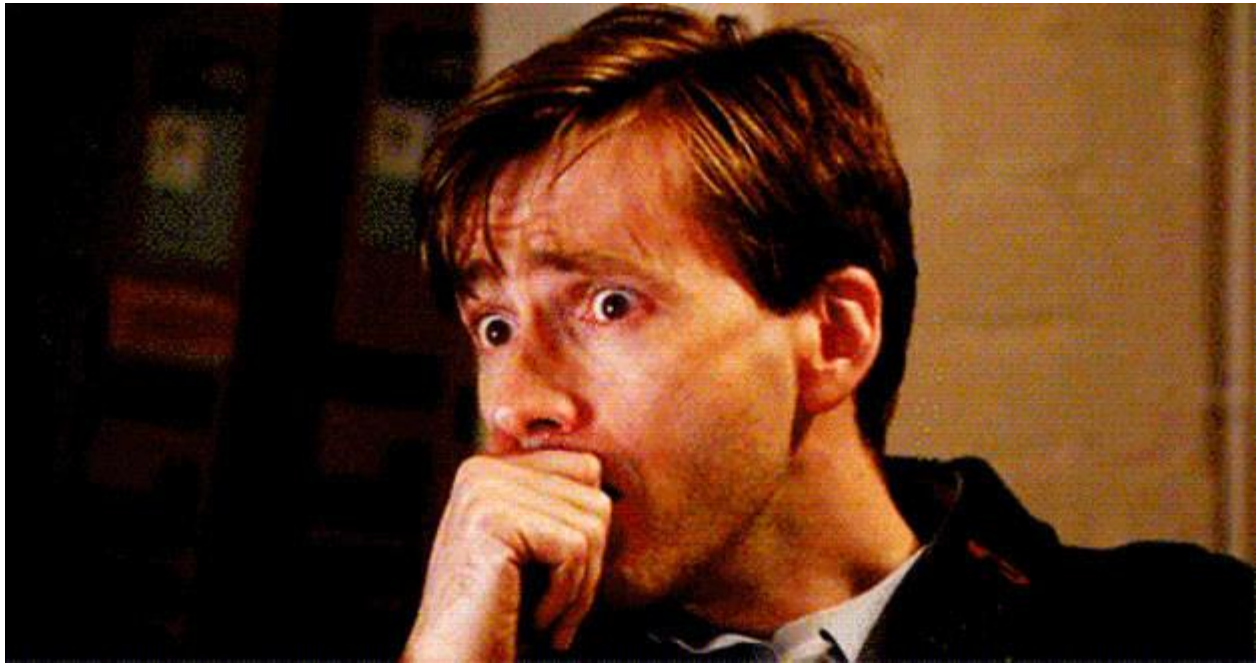
Mesenteric Ischaemia Treatment !!!!!!



Conservative Treatment

Conservative Treatment

VAGUE SYMPTOMS
NORMAL or ELEVATED BMI

INTERVENTION NOT REQUIRED

Conservative Treatment

Conservative Treatment

Medical Treatment

- Risk factor modification.

- Best Medical Therapy;
  - Antiplatelet / Anticoagulation.
  - Statin therapy.

Medical Treatment

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Mesenteric Ischaemia – Outcome Analysis

- Acute vs. Chronic.
- Endovascular vs. Surgical Interventions.
- Disease Distribution.
- Adjuvant Procedures.
- Influence of Co-Morbidities;
  - Gender.
  - Age.
  - Smoking.
  - Medical therapy.

Acute Mesenteric Ischaemia

First author	*Publication year*	*No. of patients*	*Mortality rate*
Foley	2000	21	24%
Mamode	1999	57	81%
Newman	1998	98	60%
Urayama	1998	34	35%
Klempnauer	1997	90	66%
Voltolini	1996	47	72%
Konturek	1996	28	96%
Ward	1995	34	45%
Deehan	1995	43	70%
Levy	1990	62	40%
Batellier	1990	65	51%
Bapat	1990	20	40%
Finucane	1989	32	69%
Sitges-Serra	1988	83	71%
Wilson	1987	102	92%
Lazaro	1986	23	27%
Andersson	1984	60	82%
Sachs	1982	30	77%
Krausz	1978	40	78%
Kairaluoma	1977	44	70%
Boley	1977	30	46%
Smith	1976	23	91%
Singh	1975	32	81%
Ottinger	1967	136	92%
Total		1234	69%

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Contemporary management of acute mesenteric ischemia: Factors associated with survival

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- 58 patients reviewed between 1990 and 1999;
  - Female = 36, mean age 67 (range 35-96) years.
  - Embolism (28%), Thrombosis (64%), Non-occlusive (8.6%).
  - 95% presented with abdominal pain.
  - 43% of patients had chronic mesenteric symptoms.
- Embolism patients older with higher AF prevalence.
- 15 patients presented within 6 weeks after cardiac or vascular procedure.

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- 16 of 18 CT scans confirmed SMA occlusion or bowel changes compatible with AMI
- Selective mesenteric angiography performed in 49 patients (84%);
- 8 patients had an endovascular treatment;
  - Vasodilator (n=6).
  - Angioplasty (n=10).
  - Attempted thrombolysis (n=1).

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- All 58 patients underwent surgical exploration;
  - Mesenteric revascularisation with bypass grafting (n=22), thromboembolectomy (n=19), patch angioplasty (n=11), endarterectomy (n=5) and re-implantation (n=2).
- 33 patients required bowel resection at first-look or second-look laparotomies.
- 16 patients had ostomies.

Mortality	*No. of deaths*
At ≤90 days	
Multiorgan failure/sepsis	18 (75%)
Mesenteric thrombosis	2 (8%)
Myocardial infarction	2 (8%)
Coronary obstructive pulmonary disease	1 (4%)
Unknown	1 (4%)
Total	24
At >90 days	
Cardiac	4 (25%)
Short bowel syndrome	3 (19%)
Mesenteric ischemia	2 (13%)
Cancer	2 (13%)
Unknown	2 (13%)
Pulmonary embolus	1 (6%)
Chronic obstructive pulmonary disease	1 (6%)
TPN line sepsis	1 (6%)
Total	16

AMI Outcomes

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- Major complications frequent in 46 patients;
  - Respiratory failure 36%.
  - Multi-organ failure 31%.

- 30-day mortality rate = 32% (n=18);
  - Embolism = 31%.
  - Thrombosis = 32%.
  - Non-occlusive = 80%.

- Mortality Rates - follow-up 529 (range 0 – 2877) days;
  - 90-day = 41%.
  - 1–year = 57%.
  - 3–years = 68%.

AMI Outcomes

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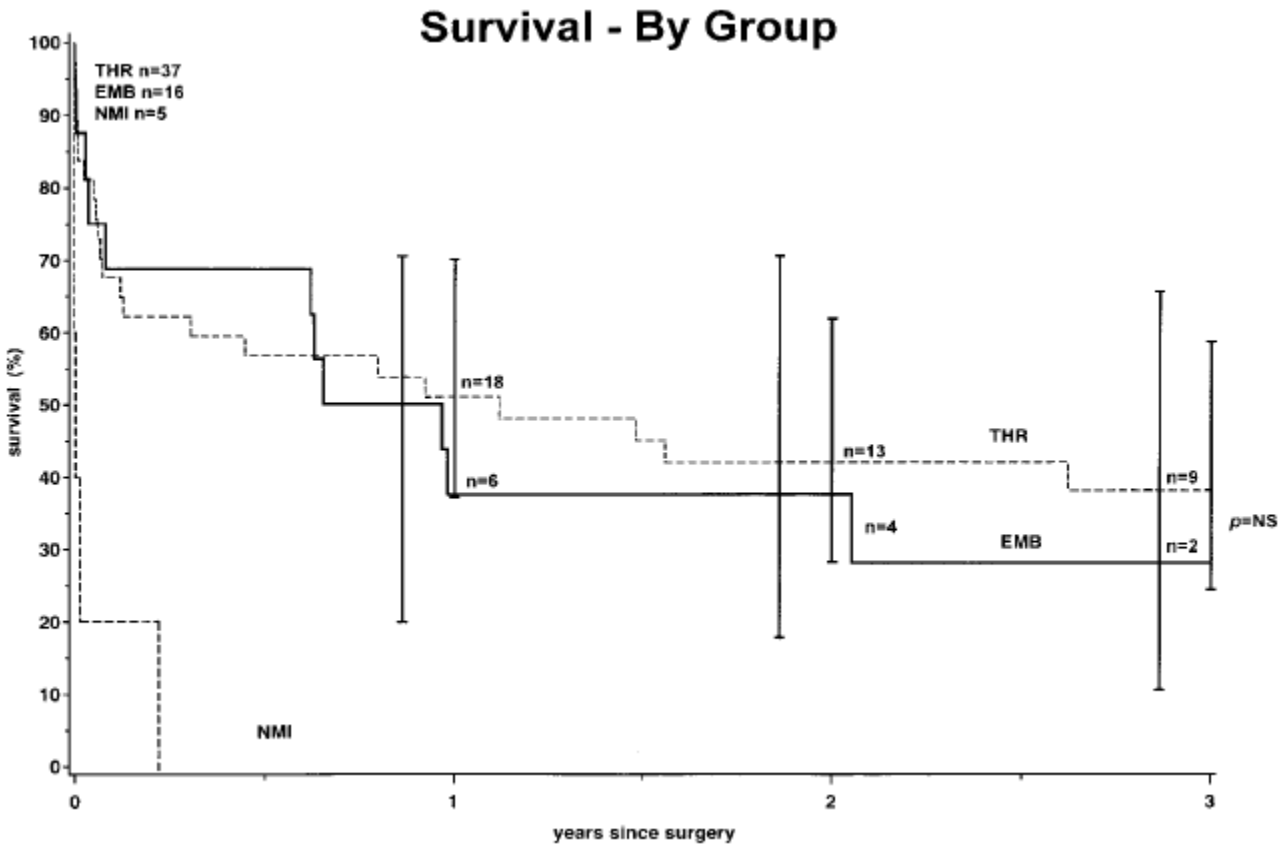

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AMI Outcomes

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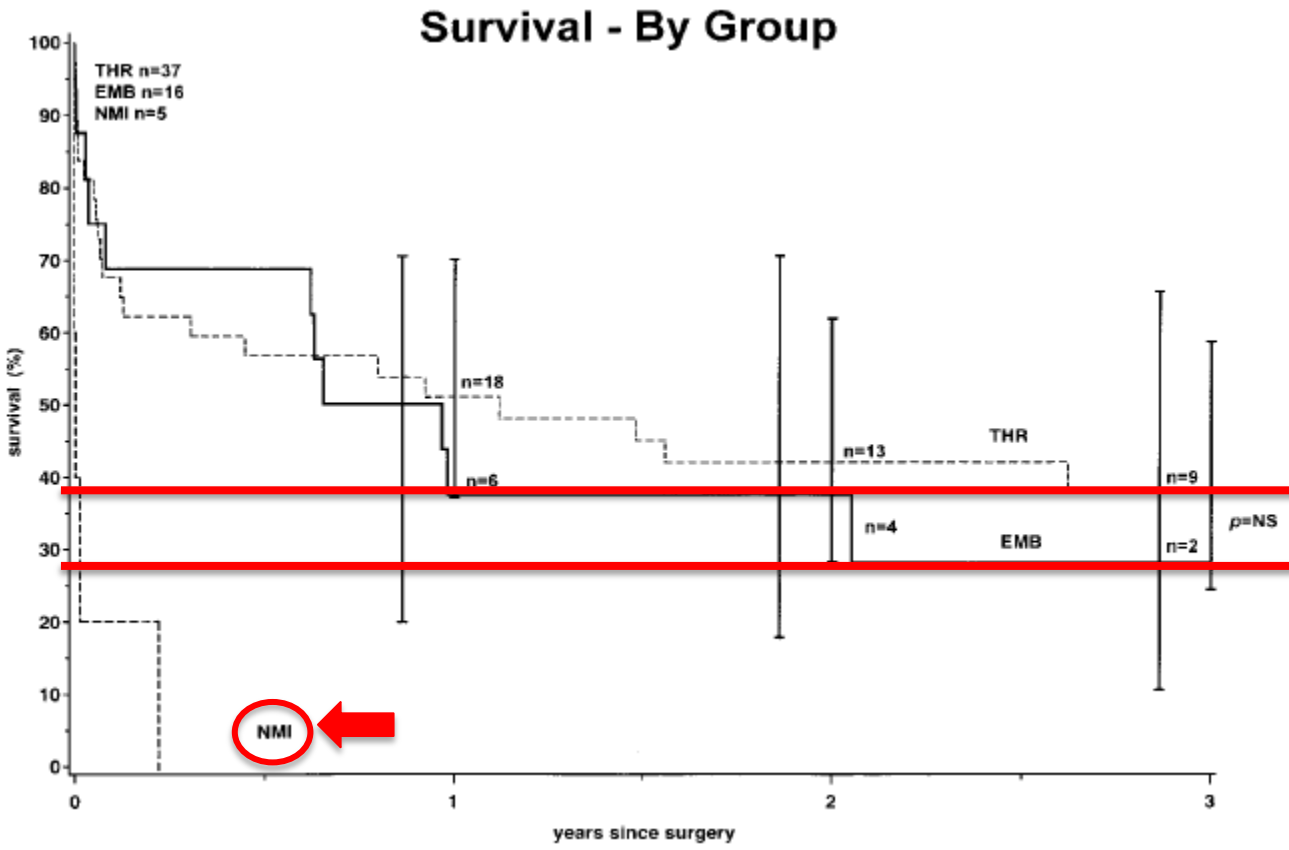

Three-Year Survival

Thrombosis < 40%

Embolic < 30%

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AMI Outcomes

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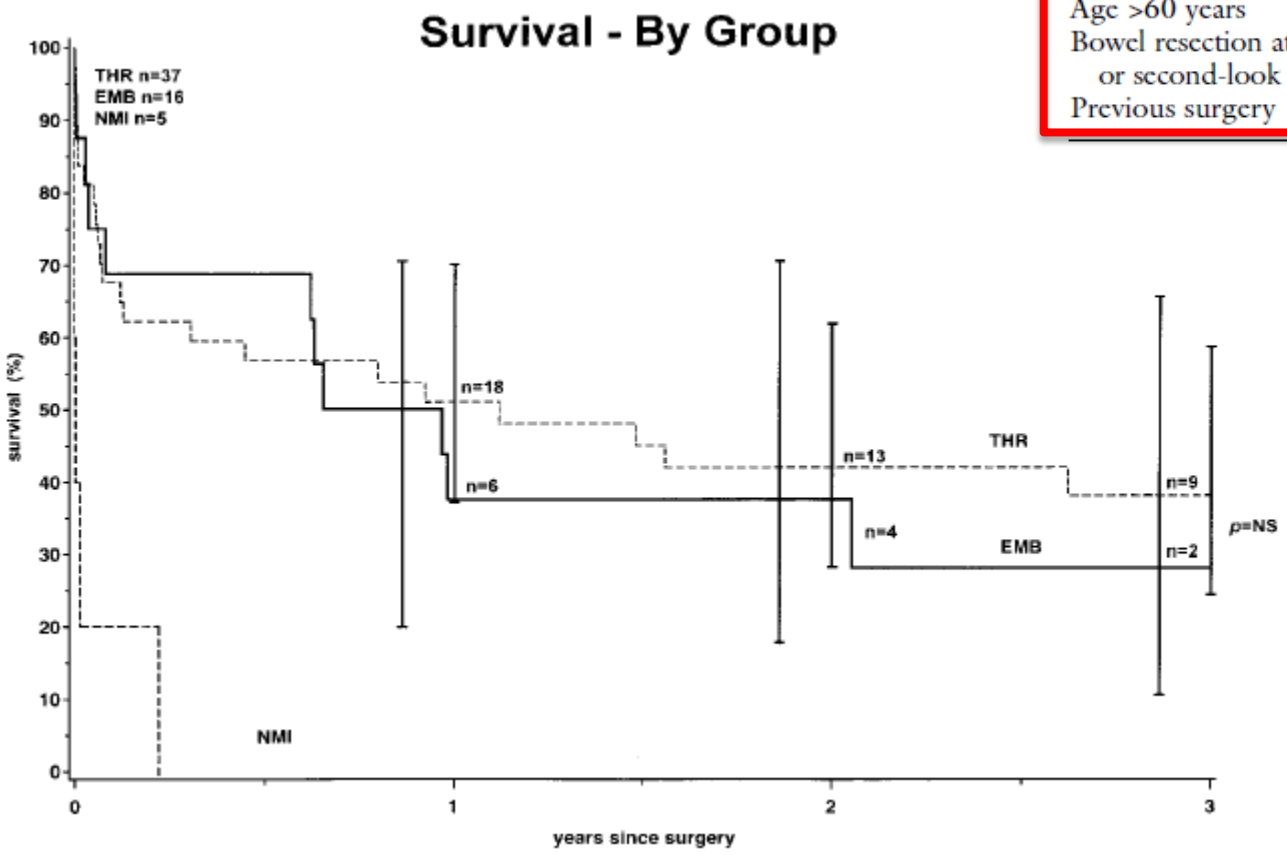
Table VI. Variables independently associated with worsened survival rate with multivariate analysis

Variable	*Relative risk ratio (95% CI)*	P *value*
Age >60 years	3.0 (1.3 - 6.9)	.0093
Bowel resection at first-look or second-look procedure	0.5 (0.2 - 0.9)	.0182
Previous surgery	2.4 (1.2 - 4.9)	.0229



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A Statewide Analysis of the Incidence and Outcomes of Acute Mesenteric Ischemia in Maryland from 2009 to 2013

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- Retrospective analysis of AMI between 2009-13;
  - 3,157,499 acute hospital admissions in Maryland.
  - 2255 (0.07%) diagnosed with AMI.
  - Annual admission rate of 10/100,000.
  - 90% classified as urgent.
  - 59% female.
  - Mean age 67 years.

- Risk factors;
  - Increasing age and illness severity.
  - Hypercoagulability.
  - Cardiac dysrhythmia.
  - Renal insufficiency.
  - Tertiary hospital admission.

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- Pathophysiology;
  - Not specifically identified.
  - 9% hypercoagulable, 2% embolic event and 1% dissection.
- AMI distribution and Bowel Resection;
  - Small intestine 38%.
  - Colonic 27%.
  - Both small and large bowel 21%.
  - Unclear in 7% who did not require bowel resection.
- Vascular Intervention ?? Infrequent – 4%;

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Characteristic	No mesenteric ischemia	Mesenteric ischemia	*P*	Survivors	Non-survivors	*P*
Number	3,155,244	2,255		1,704	551	
Demographics, *n* (%)[a]						
Age, years ± SD	57 ± 20	67 ± 16	0.0001	66 ± 17	71 ± 15	<0.0001
Age >65 years	1,204,123 (38%)	1,321 (59%)	0.0001	939 (55%)	382 (69%)	<0.0001
Female	1,870,001 (59%)	1,321 (59%)	0.51	1,010 (59%)	311 (56%)	0.24
White	1,892,553 (60%)	1,617 (72%)	0.0001	1,231 (72%)	386 (70%)	0.32
Medicare Insurance	1,358,289 (43%)	1,379 (61%)	0.0001	988 (58%)	391 (71%)	<0.0001
Admission, *n* (%)						
Emergent	2,280,960 (72%)	2,027 (90%)	0.0001	1,534 (90%)	493 (89%)	0.71
ED presentation	1,997,807 (63%)	1,824 (81%)	0.0001	1,402 (82%)	422 (77%)	0.003
Tertiary hospital	452,469 (14%)	385 (17%)	0.0001	241 (14%)	144 (26%)	<0.0001

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Non-Survivors Older

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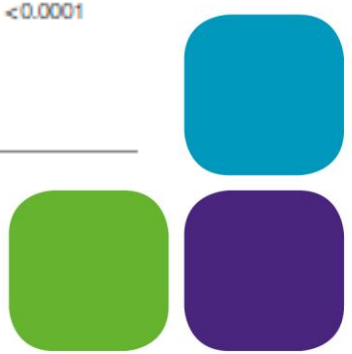
Number	3,155,244	2,255		1,825	577	
Condition, *n* (%)						
Diabetes mellitus	786,591 (25%)	350 (16%)	<0.0001	279 (16%)	71 (13%)	<0.05
Hypertension	1,053,797 (33%)	607 (27%)	<0.0001	519 (30%)	88 (16%)	<0.0001
Hypercoagulable state	47,689 (2%)	198 (9%)	<0.0001	87 (5%)	111 (20%)	<0.0001
Ischemic heart disease	634,570 (20%)	405 (18%)	0.01	275 (16%)	130 (24%)	<0.0001
Cardiac dysrhythmia	625,989 (20%)	618 (27%)	<0.0001	423 (25%)	195 (35%)	<0.0001
PAD	130,649 (4%)	91 (4%)	0.80	65 (4%)	26 (5%)	0.35
Chronic comorbidities, *n* (%)						
COPD	345,330 (11%)	264 (12%)	0.25	185 (11%)	79 (14%)	0.03
Congestive heart failure	363,843 (12%)	259 (11%)	0.95	177 (10%)	82 (15%)	0.004
Chronic kidney disease	507,982 (16%)	861 (38%)	<0.0001	519 (30%)	342 (62%)	<0.0001
Severity of illness, *n* (%)			<0.0001			<0.0001
Minor	562,464 (18%)	5 (< 1%)		5 (< 1%)	0	
Moderate	1,208,321 (38%)	181 (8%)		181 (11%)	0	
Major	1,032,943 (33%)	540 (24%)		522 (31%)	18 (3%)	
Extreme	351,516 (11%)	1529 (68%)		996 (58%)	533 (97%)	
Risk of mortality, *n* (%)			<0.0001			<0.0001
Minor	1,526,896 (48%)	81 (3%)		81 (5%)	0	
Moderate	843,060 (27%)	245 (10%)		245 (14%)	0	
Major	550,003 (17%)	589 (25%)		550 (32%)	39 (7%)	
Extreme	235,285 (7%)	1,340 (57%)		828 (49%)	512 (93%)	



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Varied co-morbidities

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Higher risk patients had higher mortality

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Number	2,255	1,704	551	
Gastrointestinal surgery, *n* (%)				
No bowel resected	172 (7%)	70 (4%)	102 (19%)	<0.0001
Small bowel resection	920 (38%)	781 (46%)	139 (25%)	0.005
Large bowel resection	651 (27%)	518 (30%)	133 (24%)	<0.0001
Small and large bowel resections	512 (21%)	335 (20%)	177 (32%)	<0.0001
Vascular intervention, *n* (%)	99 (4%)	62 (4%)	37 (7%)	0.002
Open	11 (< 1%)	7 (< 1%)	4 (1%)	0.48
Endovascular	88 (4%)	55 (3%)	33 (6%)	0.004
Critical care, *n* (%)				
Mechanical ventilation	897 (37%)	494 (29%)	403 (73%)	<0.0001
Parenteral nutrition	774 (32%)	594 (35%)	180 (33%)	0.35
Dialysis	181 (8%)	90 (5%)	91 (17%)	<0.0001
Transfusion	1,031 (43%)	711 (42%)	320 (58%)	<0.0001

A Statewide Analysis of the Incidence and Outcomes of Acute Mesenteric Ischemia in Maryland from 2009 to 2013

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Robert S. Crawford[1†], Donald G. Harris[1†], Elena N. Klyushnenkova[2], Ronald B. Tesoriero[3], Joseph Rabin[3], Hegang Chen[2] and Jose J. Diaz*

frontiers in Surgery April 2016 | Volume 3 | Article 22

Characteristic	Mesenteric Ischemia	Survivors	Non-survivors	*P*
Number	2,255	1,704	551	
Gastrointestinal surgery, *n* (%)				
No bowel resected	172 (7%)	70 (4%)	102 (19%)	<0.0001
Small bowel resection	920 (38%)	781 (46%)	139 (25%)	0.005
Large bowel resection	651 (27%)	518 (30%)	133 (24%)	<0.0001
Small and large bowel resections	512 (21%)	335 (20%)	177 (32%)	<0.0001
Vascular intervention, *n* (%)	99 (4%)	62 (4%)	37 (7%)	0.002
Open	11 (< 1%)	7 (< 1%)	4 (1%)	0.48
Endovascular	88 (4%)	55 (3%)	33 (6%)	0.004
Critical care, *n* (%)				
Mechanical ventilation	897 (37%)	494 (29%)	403 (73%)	<0.0001
Parenteral nutrition	774 (32%)	594 (35%)	180 (33%)	0.35
Dialysis	181 (8%)	90 (5%)	91 (17%)	<0.0001
Transfusion	1,031 (43%)	711 (42%)	320 (58%)	<0.0001

Low vascular intervention rate

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- Patient Outcomes:
  - Overall mortality 24%.
  - Mortality associated with a combination of small and large bowel resection or no resection at all.
  - Amongst survivors;
    - 58% discharged home.
    - 24% to a nursing facility.
    - 9% to a rehabilitation centre.
    - 6% to another acute hospital.

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Variable	Odds ratio (95% CI)	P
Age > 65 years	1.8 (1.4–2.3)	<0.0001
Extreme severity of illness	2.8 (1.5–5.3)	<0.0001
Tertiary hospital admission	1.9 (1.4–2.5)	<0.0001
Hypercoagulability	2.6 (1.8–3.7)	<0.0001
Chronic kidney disease	1.8 (1.4–2.3)	<0.0001
Cardiac dysrhythmia	1.5 (1.1–1.9)	0.003
Mechanical ventilation	2.9 (2.3–3.8)	<0.0001
Bowel resection		
None (reference)	1.0	
Small intestine	0.13 (0.09–0.21)	<0.0001
Large intestine	0.15 (0.10–0.23)	<0.0001
Small + large intestine	0.19 (0.12–0.30)	<0.0001

AMI severity, increased age, hypercoagulability, need for multiple intestinal resection and mechanical ventilation all significantly increased mortality risk.

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Comparison of open and endovascular treatment of acute mesenteric ischemia

Robert J. Beaulieu, MD,[a] K. Dean Arnaoutakis, MD,[a] Christopher J. Abularrage, MD, FACS,[b] David T. Efron, MD, FACS,[c] Eric Schneider, PhD,[d] and James H. Black III, MD, FACS,[b] *Baltimore, Md*

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- Review of 4665 out of 23,744 AMI patients who underwent interventional treatment from 2005 through 2009.
  - 57.1% female.
  - Mean age 70.5 years.
- 679 patients underwent vascular intervention;
  - 514 (75.7%) open surgery.
  - 165 (24.3%) endovascular treatment.
- Endovascular treatment increased from 11.9% in 2005 to 30.0% in 2009.

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- Severity of comorbidities did not differ significantly between the treatment groups.
- Mortality was significantly more commonly associated with open revascularization compared with endovascular intervention (39.3% vs 24.9%; P = .01).
- Length of stay was also significantly longer in the patient group undergoing open revascularization (12.9 vs 17.1 days; P = .006).

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- During the study time period, 14.4% of patients undergoing endovascular procedures required bowel resection compared with 33.4% for open revascularization ($P < .001$).
- Endovascular repair was also less commonly associated with requirement for TPN support (13.7% vs 24.4%; $P = .025$).

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Chronic Mesenteric Ischaemia

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Chronic Mesenteric Ischemia: 20 Year Experience of Open Surgical Treatment

Eur J Vasc Endovasc Surg (2015) 49, 587—592

A. Lejay [a,*], Y. Georg [a], E. Tartaglia [a], O. Creton [a], B. Lucereau [a], F. Thaveau [a], B. Geny [b], N. Chakfe [b]

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- A retrospective single centre analysis of all consecutive digestive artery revascularizations performed for CMI between January 2003 and December 2012 was performed.
- Primary outcomes were 30 day mortality and morbidity.
- Secondary outcomes were survival, primary patency (PP), secondary patency (SP), and freedom from digestive symptoms, depending on the completeness of the revascularization performed.

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- Eighty-six revascularizations were performed with median follow up of 6.9 years (range 0.3–20.0).

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- Eighty-six revascularizations were performed with median follow up of 6.9 years (range 0.3–20.0).

Total number = 86	Digestive revascularization alone $n = 77$	Associated aortic reconstruction $n = 9$
Aorto-hepatic and – SMA bypass	32 (37%)	None
Aorto-hepatic bypass	4 (5%)	None
Aorto-SMA bypass	27 (31%)	5 (6%)
SMA direct reimplantation	7 (8%)	None
SMA indirect reimplantation	6 (7%)	None
SMA and IMA reimplantation	None	4 (5%)
Transaortic endarterectomy	1 (1%)	None

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- Eighty-six revascularizations were performed with median follow up of 6.9 years (range 0.3–20.0).
- The 30 day mortality and morbidity rates were respectively 3.5% and 13.9%.
- Ten year survival was 88% for complete revascularization (CR) and 76% for incomplete revascularization (IR) ($p = .54$).

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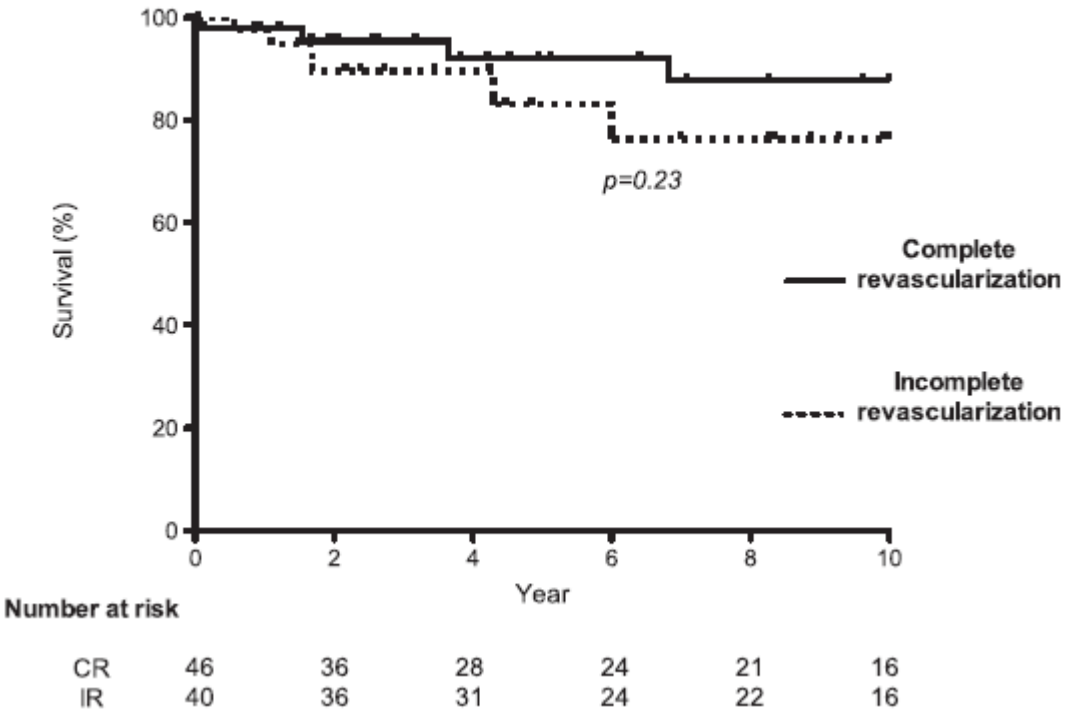

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- Primary patency was 84% at 10 years for CR and 87% respectively for IR (p = .51).
- Secondary patency was 92% at 10 years for CR and 93% for IR (p = .63).
- Freedom from digestive symptoms was influenced by the completeness of revascularization: 79% for CR versus 65% for IR at 10 years (p = .04).

Mesenteric Revascularization: Management and Outcomes in the United States 1988–2006

Marc L. Schermerhorn, **Kristina A. Giles**, **Allen D. Hamdan**, **Mark C. Wyers**, and **Frank B. Pomposelli**

J Vasc Surg. 2009 August ; 50(2): 341–348.

Mesenteric Revascularization: Management and Outcomes in the United States 1988–2006

Marc L. Schermerhorn, Kristina A. Giles, Allen D. Hamdan, Mark C. Wyers, and Frank B. Pomposelli

J Vasc Surg. 2009 August ; 50(2): 341–348.

- Patients treated for AMI and CMI who underwent surgical (bypass, endarterectomy, or embolectomy) or angioplasty / stenting were reviewed between 1988 to 2006.

- Trends in management with comparison of in-hospital death and complications between surgical bypass and endovascular interventions for the years 2000 to 2006.

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- Results:
  - 6342 angioplasty / stenting procedures and 16,071 open surgical repairs.
  - Endovascular interventions surpassed surgery for CMI in 2002 with further increases in endovascular intervention for AMI.

- Mortality rate was lower for endovascular intervention compared to open surgery;
  - AMI (16% vs 28%, $P < .01$).
  - CMI (3.7% vs 13%, $P < .01$).
  - Bowel resection was more common after bypass than endovascular intervention (7% vs 3%, $P < .01$).

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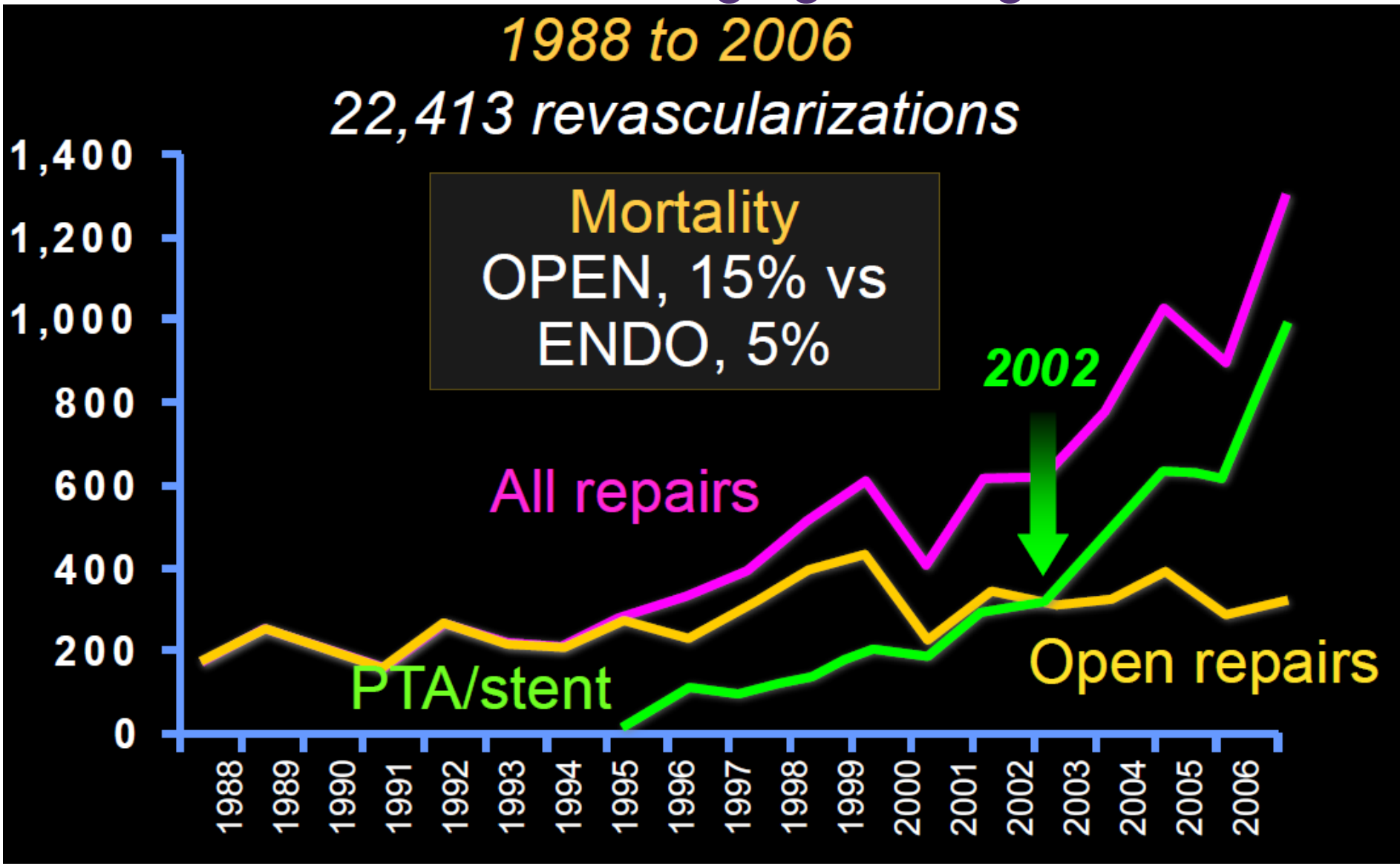
Mesenteric Ischaemia – Changing Paradigm



Schemerhorn M et al J Vasc Surg 2009; 50: 341-48

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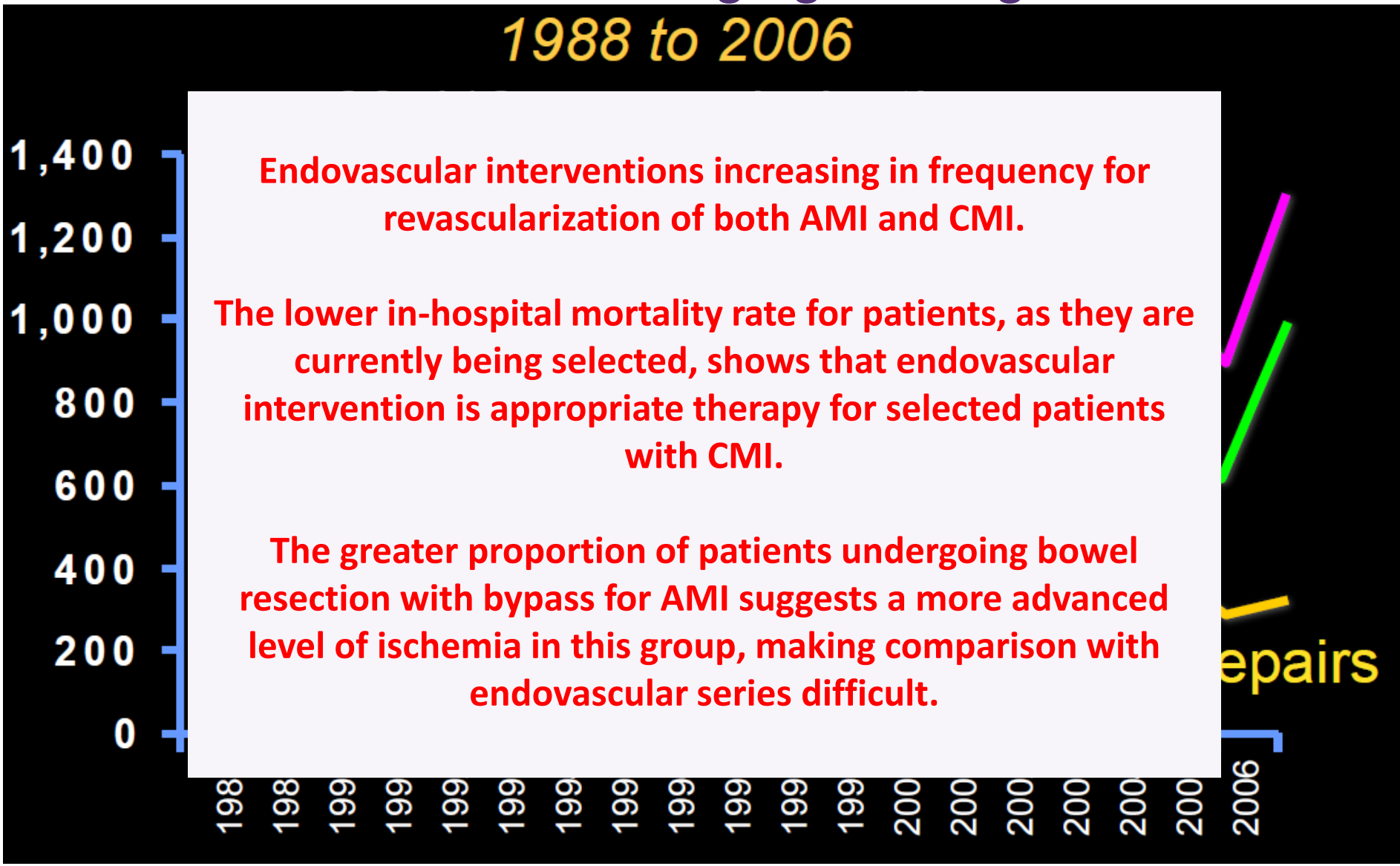
Mesenteric Ischaemia – Changing Paradigm



Endovascular interventions increasing in frequency for revascularization of both AMI and CMI.

The lower in-hospital mortality rate for patients, as they are currently being selected, shows that endovascular intervention is appropriate therapy for selected patients with CMI.

The greater proportion of patients undergoing bowel resection with bypass for AMI suggests a more advanced level of ischemia in this group, making comparison with endovascular series difficult.

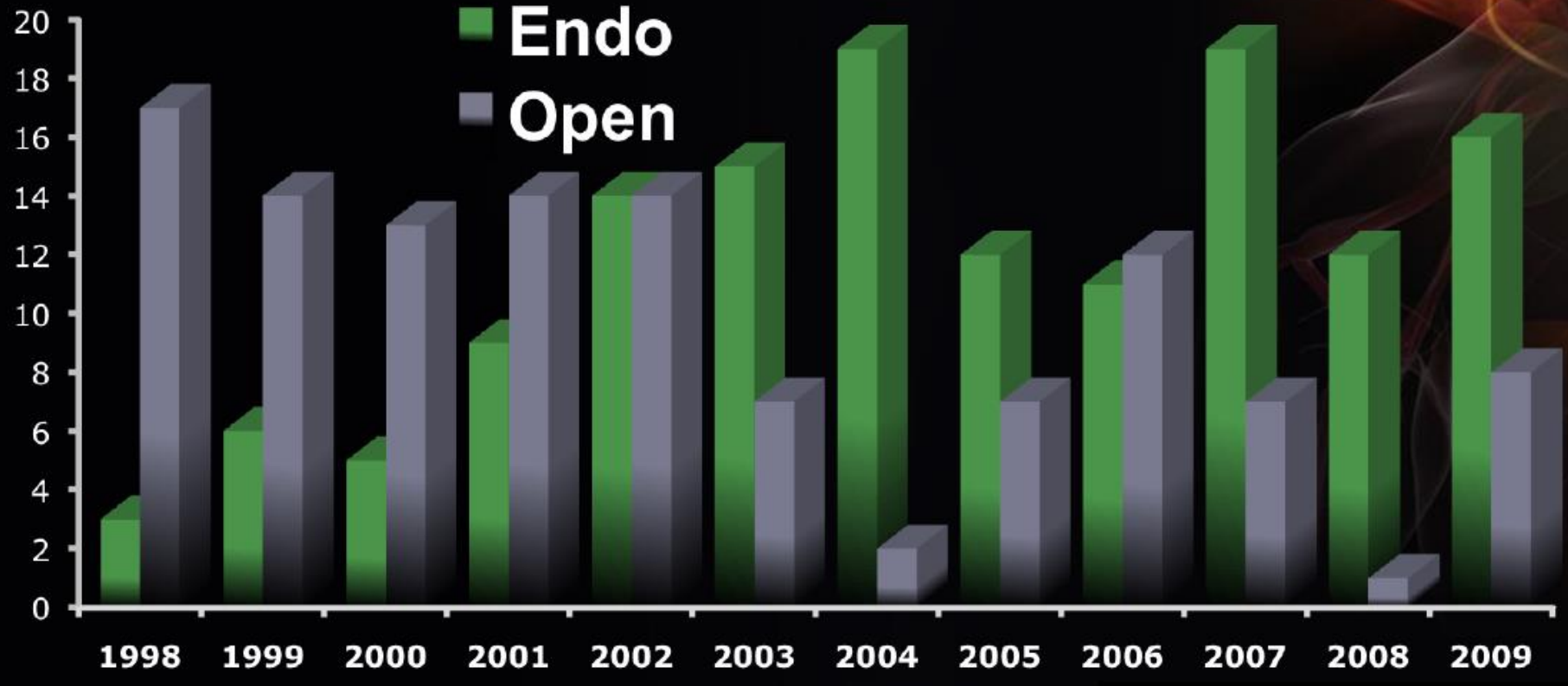
Schemerhorn M et al J Vasc Surg 2009; 50: 341-48

Mesenteric revascularization

Change in paradigm

257 patients
(1998-2009)

2000-2013
>90% Endovascular



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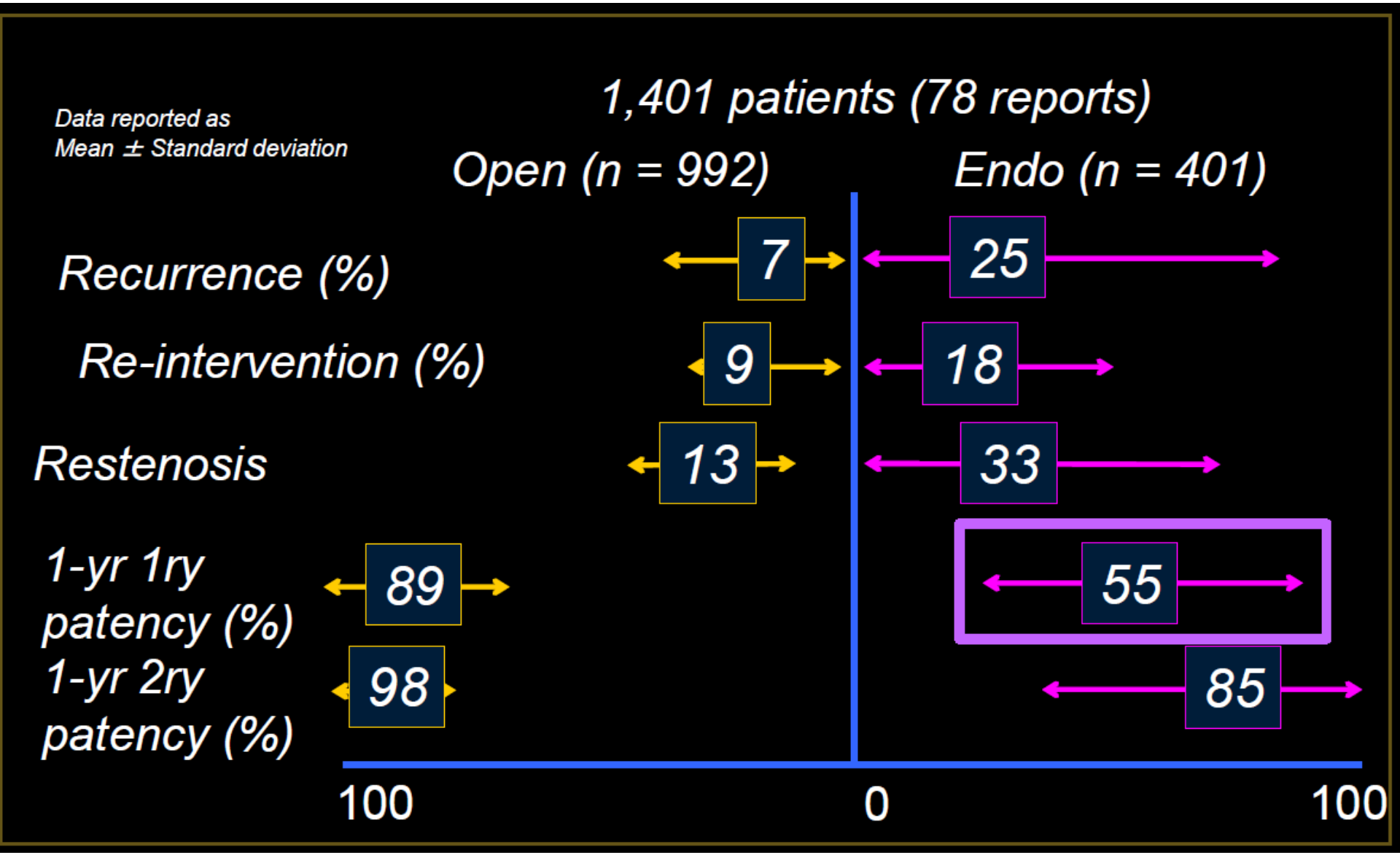
Outcomes - Open vs. Endovascular



Oderich GS et al Ann Vasc Surg 2009; 23: 700-12

CMI Outcomes - Open vs. Endovascular

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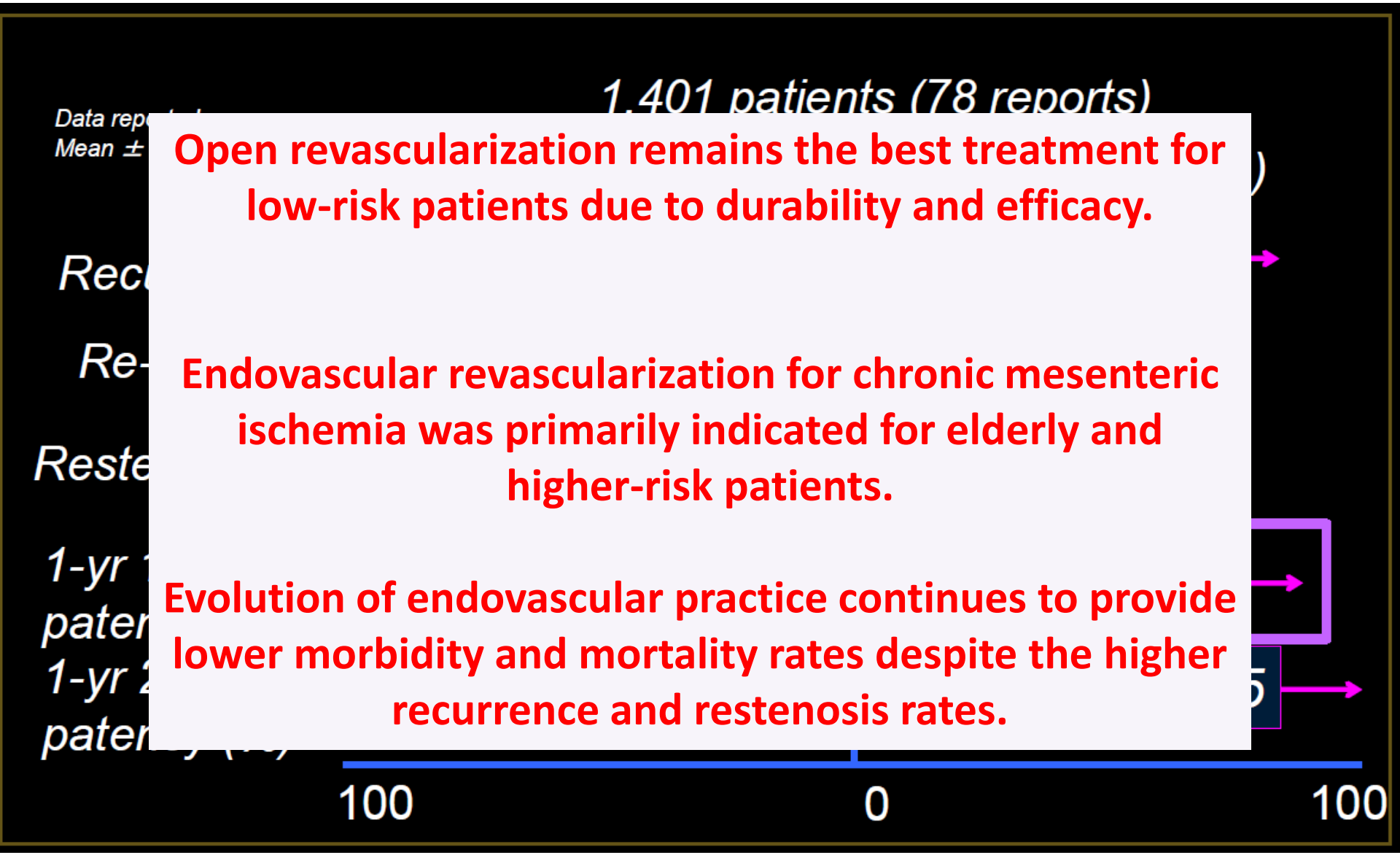

Open revascularization remains the best treatment for low-risk patients due to durability and efficacy.

Endovascular revascularization for chronic mesenteric ischemia was primarily indicated for elderly and higher-risk patients.

Evolution of endovascular practice continues to provide lower morbidity and mortality rates despite the higher recurrence and restenosis rates.

Oderich GS et al Ann Vasc Surg 2009; 23: 700-12

Chronic mesenteric ischemia outcome analysis and predictors of endovascular failure.

Zacharias N[1], Eghbalieh SD[1], Chang BB[1], Kreienberg PB[1], Roddy SP[1], Taggert JB[1], Sternbach Y[1], Darling RC 3rd[2].

J Vasc Surg 2016 Jun;63(6):1582-7.

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J Vasc Surg 2016 Jun;63(6):1582-7.

- Retrospective review of 161 (215 vessels) CMI patients between 2008 and 2012;
  - 116 patients first treated with endovascular (ER=72%) and 45 patients with open revascularisation (OR=28%).
  - Perioperative mortality (30-day) was not statistically significant between the groups (5.2% vs 11%; P = .165).
  - Overall mortality was 6.8% (11/161).
  - Long-term survival rates were higher in the ER group (95% vs 78%; P = .003).

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J Vasc Surg 2016 Jun;63(6):1582-7.

- Endovascular revascularisation patients;
  - Were older (73 vs 66 years; P = .014).
  - Had similar comorbidities.
  - Had higher rate of short lesions (≤2 cm) on preoperative angiograms (23% vs 47%; P = .004).
  - But 27 developed restenosis and required OR (23%).

- Primary patency at 3 years was higher in the OR group compared with the ER group (91% vs 74%; P = .018).

- Hospital length of stay and intensive care unit length of stay were shorter in the ER group (<.001).

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- Subgroup analysis reported that patients with failure of endovascular revascularisation had;
  - Significantly higher rates of aortic occlusive disease (86% vs 49%; P = .005).
  - Longer lesions ≥2 cm on angiography (57% vs 12%; P < .001) that were close to the mesenteric takeoff.

- Perioperative mortality was higher in the ER failure group (15% vs 2%; P = .009).

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Comparison of covered stents versus bare metal stents for treatment of chronic atherosclerotic mesenteric arterial disease

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Gustavo S. Oderich, MD,[a] Luke S. Erdoes, MD,[b] Christopher LeSar, MD,[c] Bernardo C. Mendes, MD,[a] Peter Gloviczki, MD,[a] Stephen Cha, MS,[a] Audra A. Duncan, MD,[a] and Thomas C. Bower, MD,[a] *Rochester, Minn; Bethesda, Md; and Chattanooga, Tenn*

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- Review of 225 patients treated for CMI at 2 centres;
  - 160 female.
  - Mean age 72 years.
- Bare metal stent = 164 patients (197 vessels).
- Covered stent = 61 patients (67 vessels).

Comparison of covered stents versus bare metal stents for treatment of chronic atherosclerotic mesenteric arterial disease

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- Review of 225 patients treated for CMI at 2 centres;
  - 160 female.
  - Mean age 72 years.
- Bare metal stent = 164 patients (197 vessels).
- Covered stent = 61 patients (67 vessels).
- Both treatment groups had similar demographics, cardiovascular risk factors and extent of disease.

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- Primary interventions;
  - Mean follow-up 29 ± 12 months.

- At 3-years, compared to bare metal stents, patients treated by covered stents had;
  - Higher freedom from restenosis (92% vs 53%; P = .003).
  - Symptom recurrence (92% vs 50%; P = .003).
  - Reintervention (91% vs 56%; P = .005).
  - Better primary patency (92% vs 52%; P < .003).

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- Re-intervention group
  - Mean follow-up 24 ± 9 months.

- At 1-year, compared to bare metal stents, patients treated by covered stents had;
  - Higher freedom from restenosis (89% vs 49%; P < .04).
  - Symptom recurrence (100% vs 64%; P = .001).
  - Reintervention (100% vs 72%; P = .03).
  - A trend toward improved primary patency (100% vs 63%; P = .054).

- Secondary patency rates were similar in both groups.

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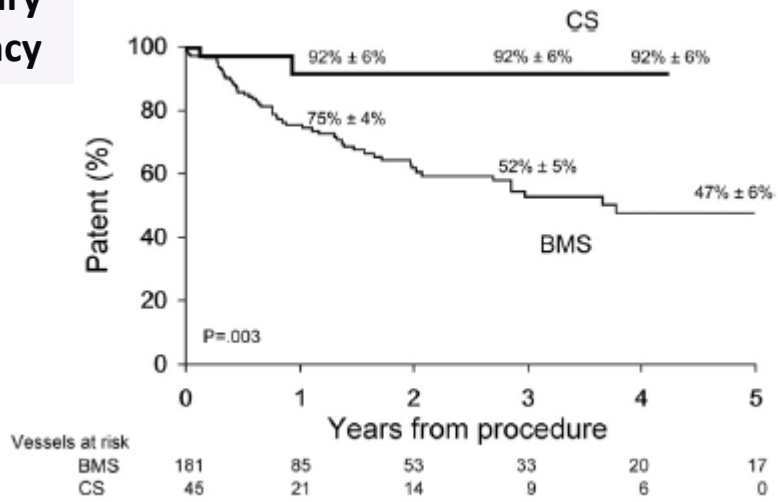
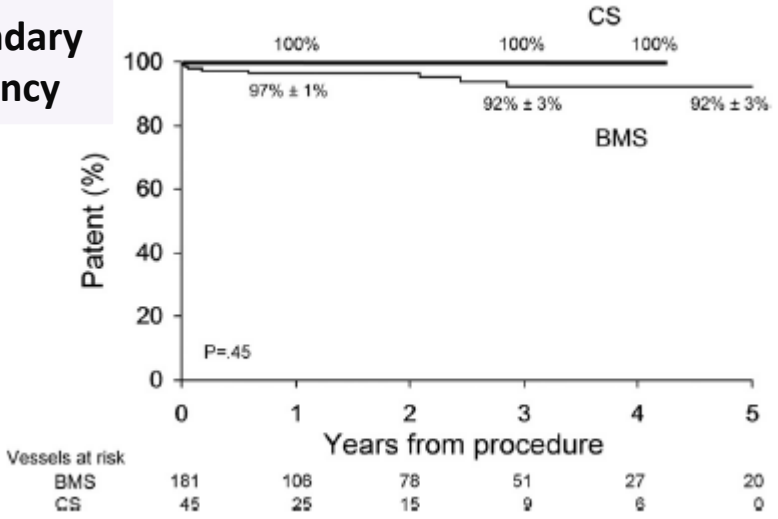
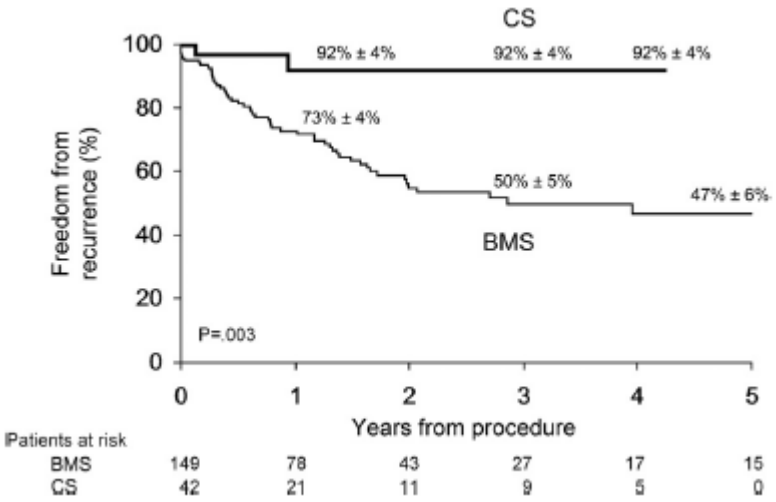
Primary Patency



Secondary Patency



Freedom from Symptom Recurrence



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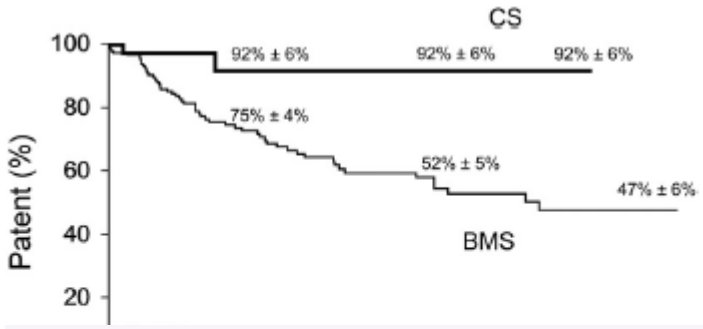
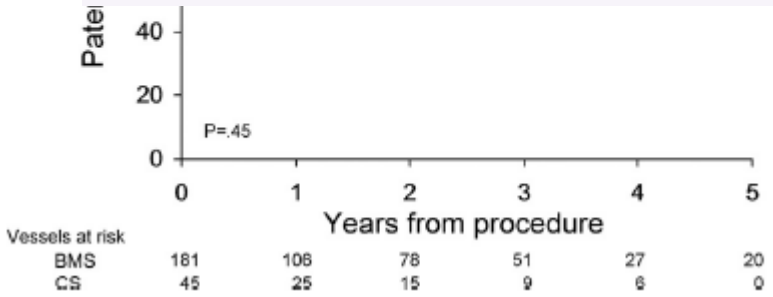
Primary Patency



Freedom from Symptom Recurrence

Covered Stents associated with less restenosis, recurrences, and reinterventions than Bare Metal Stents in patients undergoing primary interventions or reinterventions for CMI.

Secondary Patency



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Conclusions

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- Mesenteric ischaemia still poses a significant diagnostic and therapeutic challenge.
- AMI severity, increased age, hypercoagulability, need for multiple intestinal resection and mechanical ventilation all significantly increase mortality risk.
- Use of endovascular technology is increasing and may reduce intestinal resection, TPN requirement and length of hospital stay but carries a higher re-stenotic and re-intervention rate which may be improved with use of covered stents.

Conclusions

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- Mesenteric ischaemia still poses a significant diagnostic and therapeutic challenge.
- AMI severity, increased age, hypercoagulability, need for multiple intestinal resection and mechanical ventilation all significantly increase mortality risk.
- Use of endovascular technology is increasing and may reduce intestinal resection, TPN requirement and length of hospital stay but carries a higher re-stenotic and re-intervention rate which may be improved with use of covered stents.

NO RCT ??
DATA SKEW OF ENDO FIRST STRATEGY IN FITTER PATIENTS

To be Determined ???

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- Extent of revascularisation not entirely clear – Ostial vs. distal arterial vessel intervention.
- Effect of best medical therapy.
- Use of chemical or mechanical lysis.
- Hybrid endovascular outcomes.

Questions ?