

# Acute presentation of Mesenteric Ischaemia

## A practical approach

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# AMI: Background

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- Always mentioned in standard surgical texts
  - Bottom of any list of causes of abdominal pain
- Commonly held misconceptions
  - Rare
  - Difficult to diagnose
  - Near impossible to treat

# Other Forms Of Mesenteric Ischaemia

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- NOMI: Non-occlusive mesenteric ischaemia
  - Prob most common in ITU esp. after cardiac surgery
  - Pump failure and/or high dose inotropes
- Venous infarction
  - Acute venous (portal vein or SMV)
  - Associated with acquired thrombophilia
- Colonic ischaemia
  - Usually managed conservatively
  - Resection not revascularisation

# Key questions

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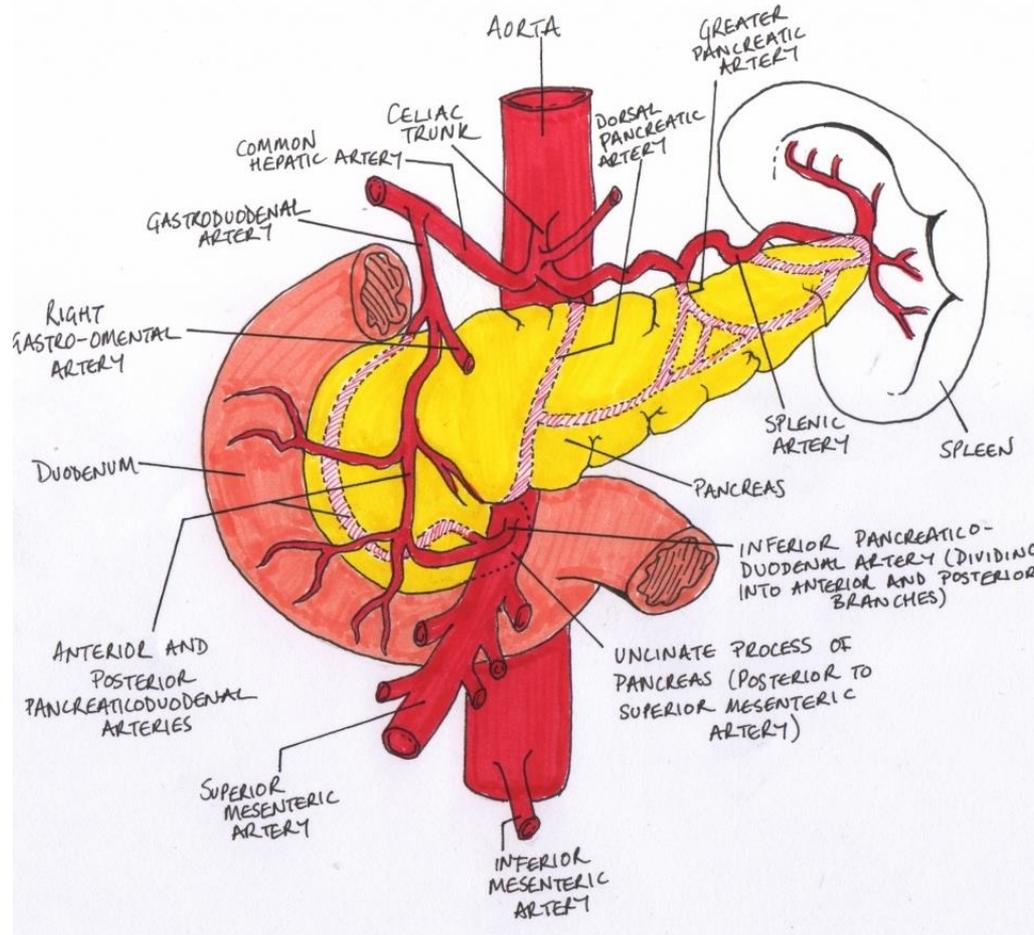
- How common is acute mesenteric ischaemia?
- What are the reported outcomes for treatment?
- How is a diagnosis made?
- Is a laparotomy needed?
- Is there a superior method of restoring perfusion?
- Is a relook laparotomy needed?
- Other issues

# Terminology

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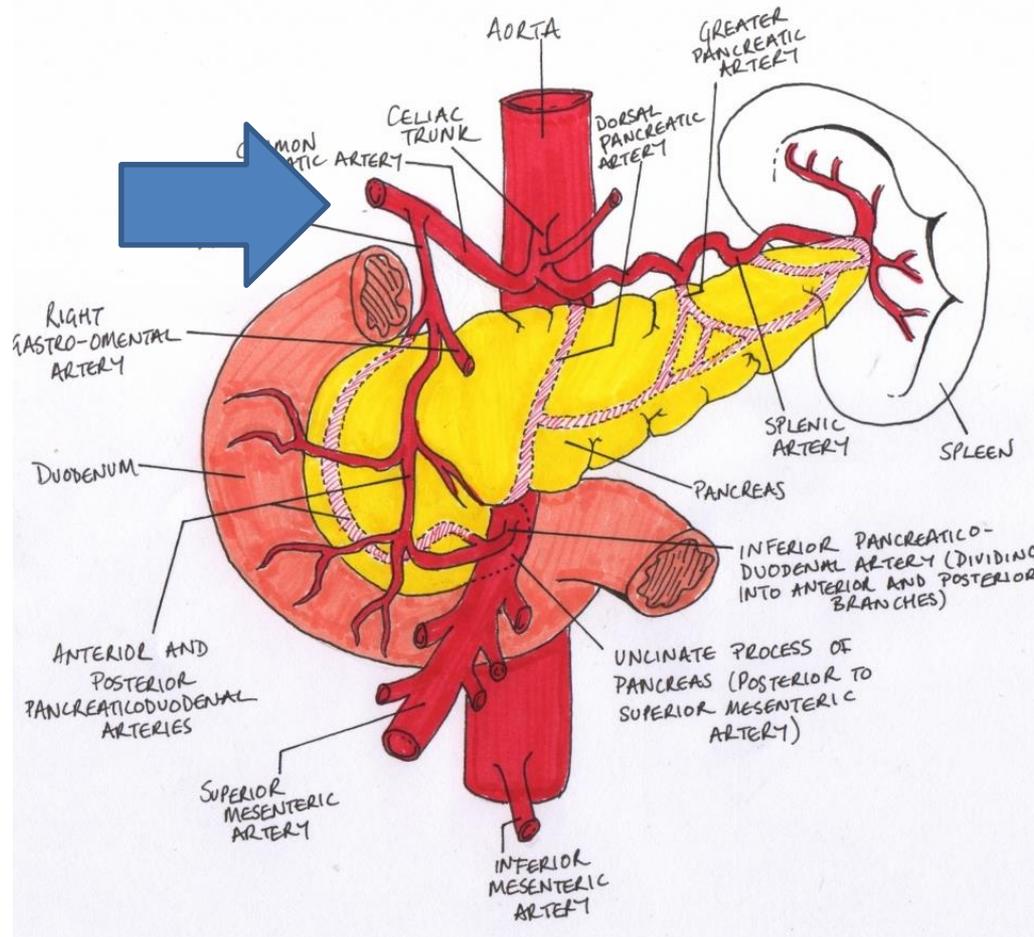
- Acute symptoms < 2 weeks
- Chronic symptoms > 2 weeks
- Acute-on-chronic Both features  
(EJVES Guidelines use 6 weeks to denote chronic symptoms)
  
- Abdominal pain: acute, chronic and change (to rest pain)
- Food-related symptoms
  - Mesenteric angina
  - Food aversion/anorexia
- Weight loss

# Normal Gut Arterial Supply

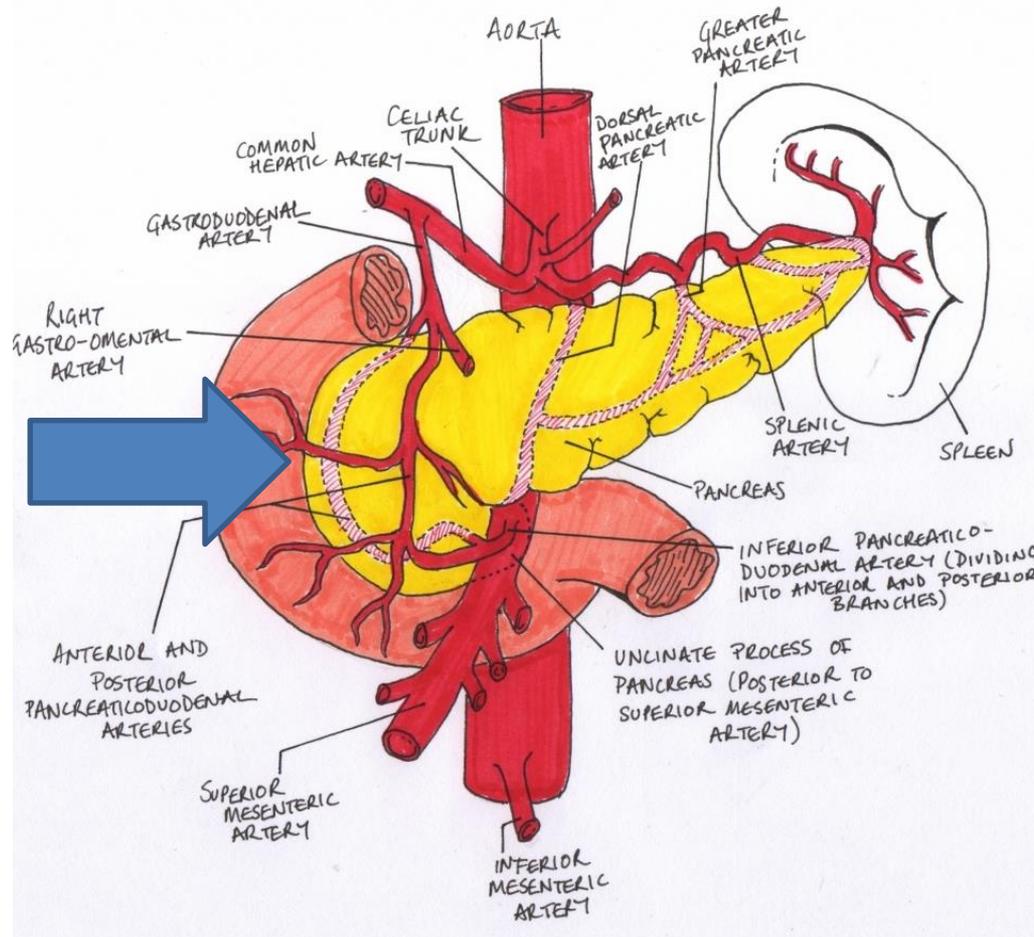




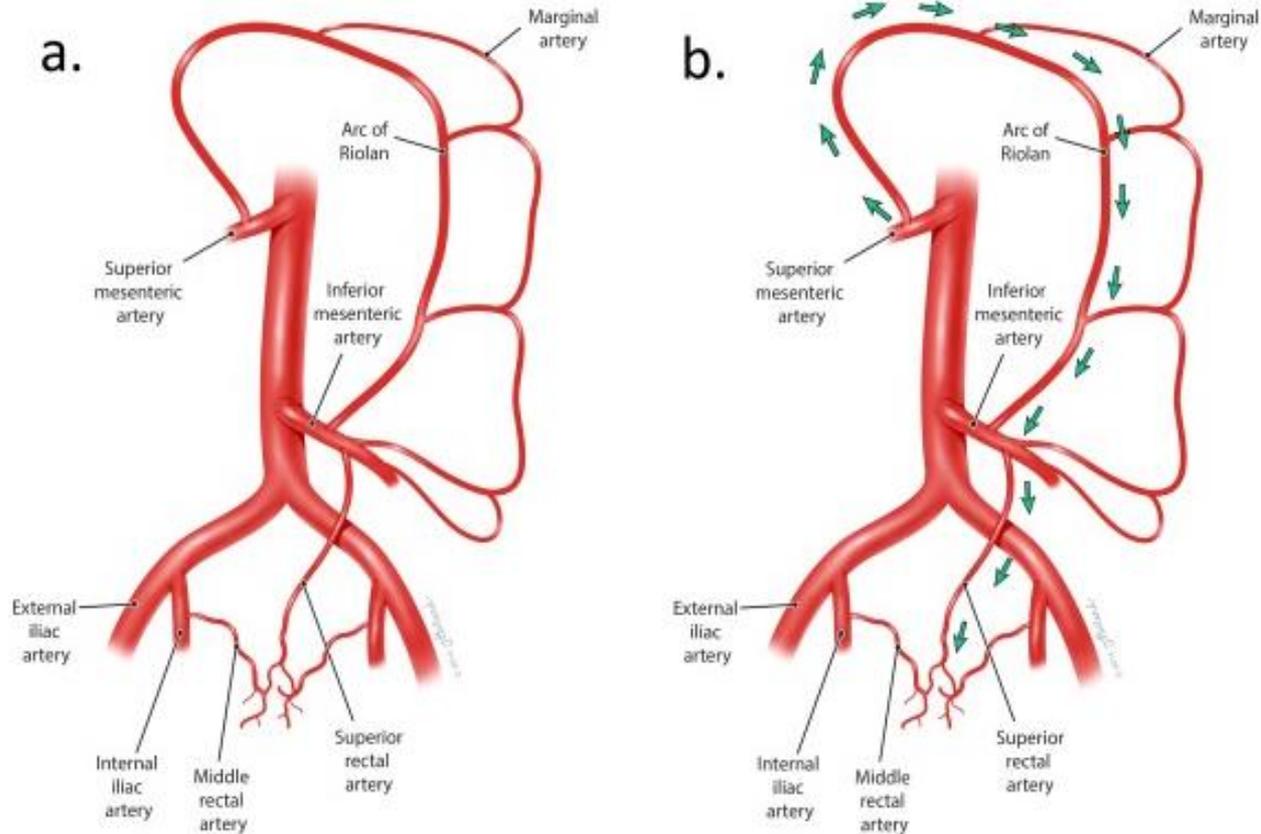
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# Epidemiology

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- Probably not that rare
- Swedish autopsy data from 80's (acute cases)
  - 87% autopsy rates
  - AMI: **8.6**/100,000 population per year (mostly SMA)
  - Only a third suspected by pre-mortem  
Acosta 2010
  - RAAA: **5.6**/100,000 (pre-screening era)
  - 8.6 /100 000 person years  $\equiv$  **103** per year GG&C

# Reported Outcomes

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## Mortality quoted:

- **48.3%** for treated\* **embolic AMI**
- **80%** for treated\* **thrombotic AMI**

Schoots (2004 review)

\*Resection/revasc/both

- **73.9%** overall† (all AMI)

- **60%** mort for 2002-2014

Adaba (2015 review)

† These data are for those with a “firm diagnosis” of mesenteric infarction: hist, lap, CT, angiography

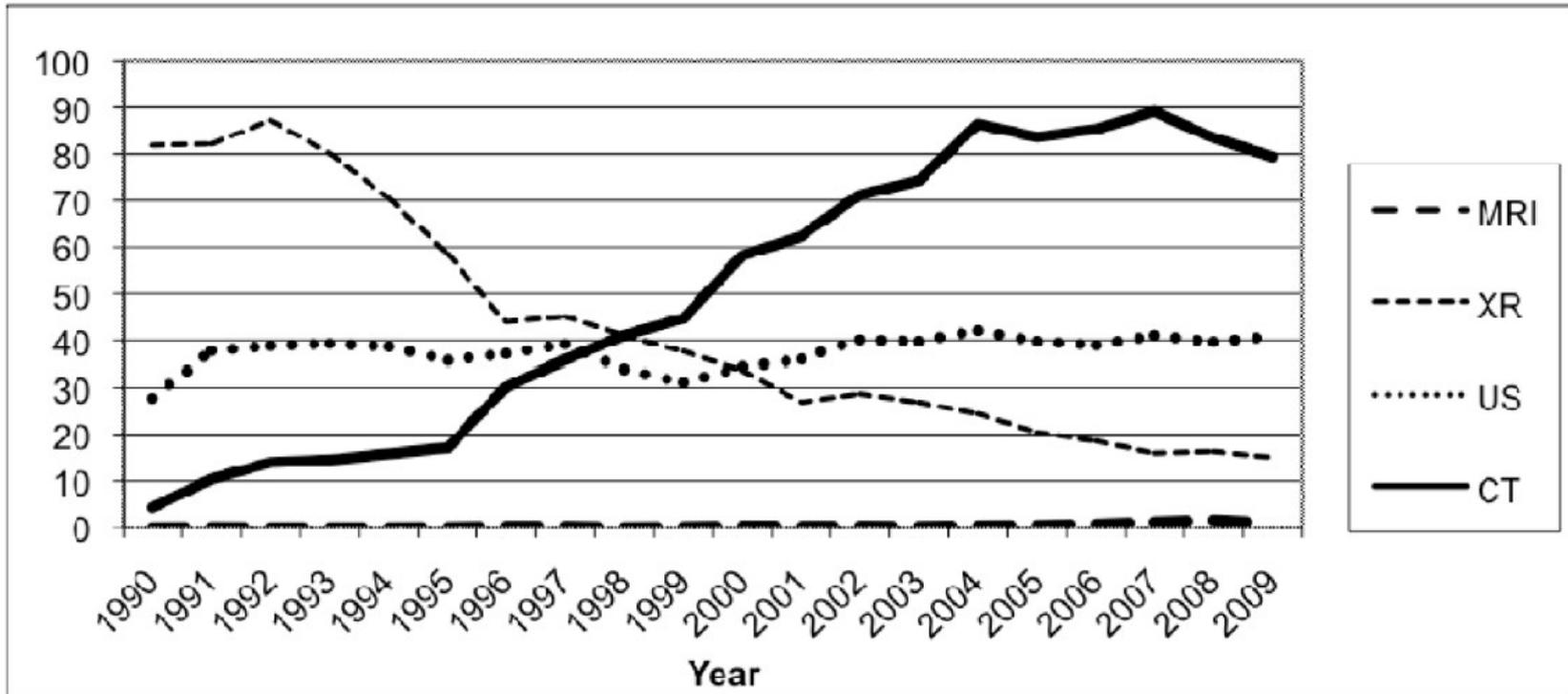
# Changes since the eighties

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- Rising recognition of acute-on-chronic disease
  - Acosta: numbers largely centred on SMA disease
- Rise of anticoagulation
  - AF, post-MI
- Rise of statins and antiplatelet agents
- Fewer smokers, more diabetes
- Imaging

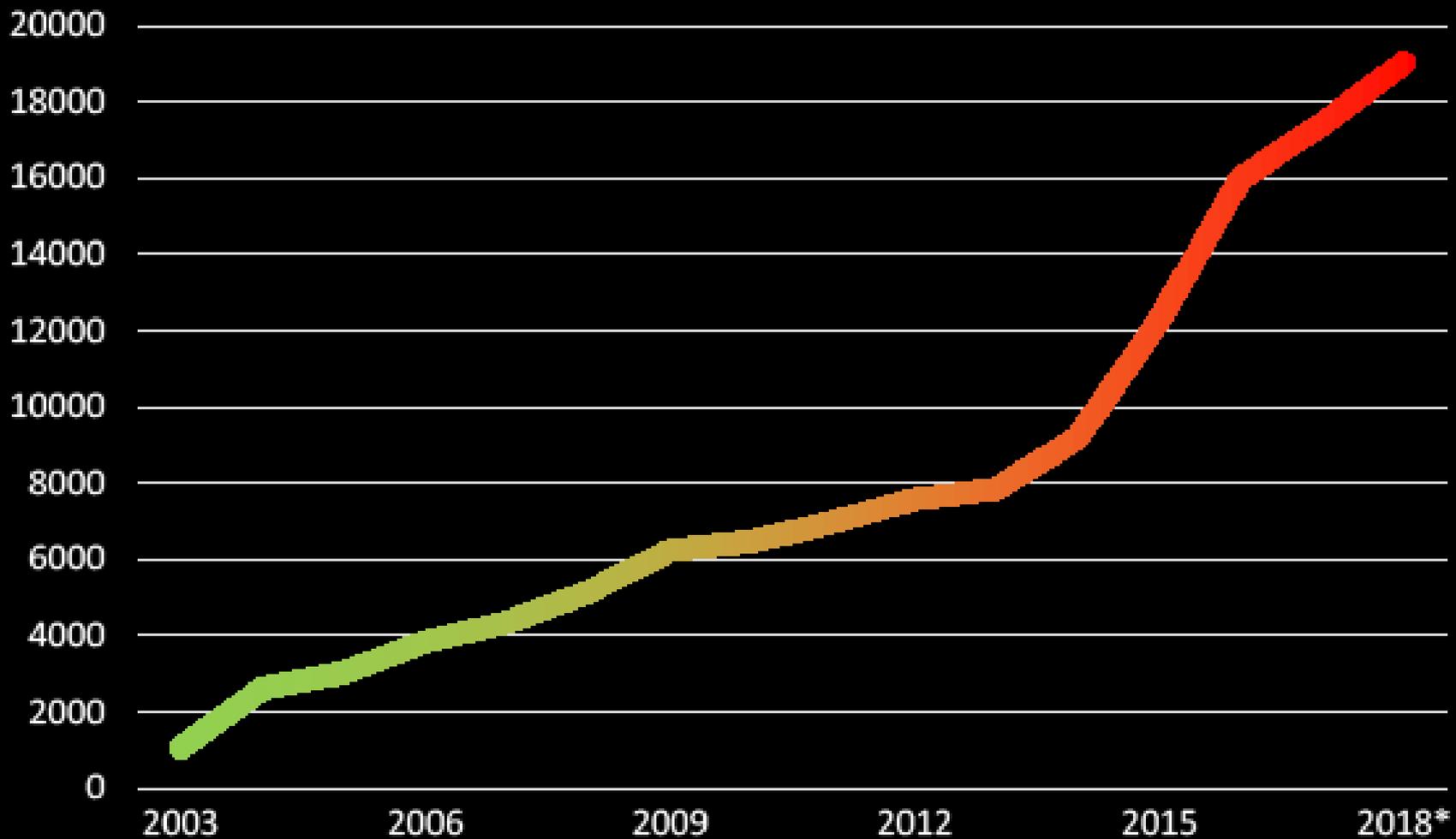
# Rise of emergency cross-sectional (CT) imaging

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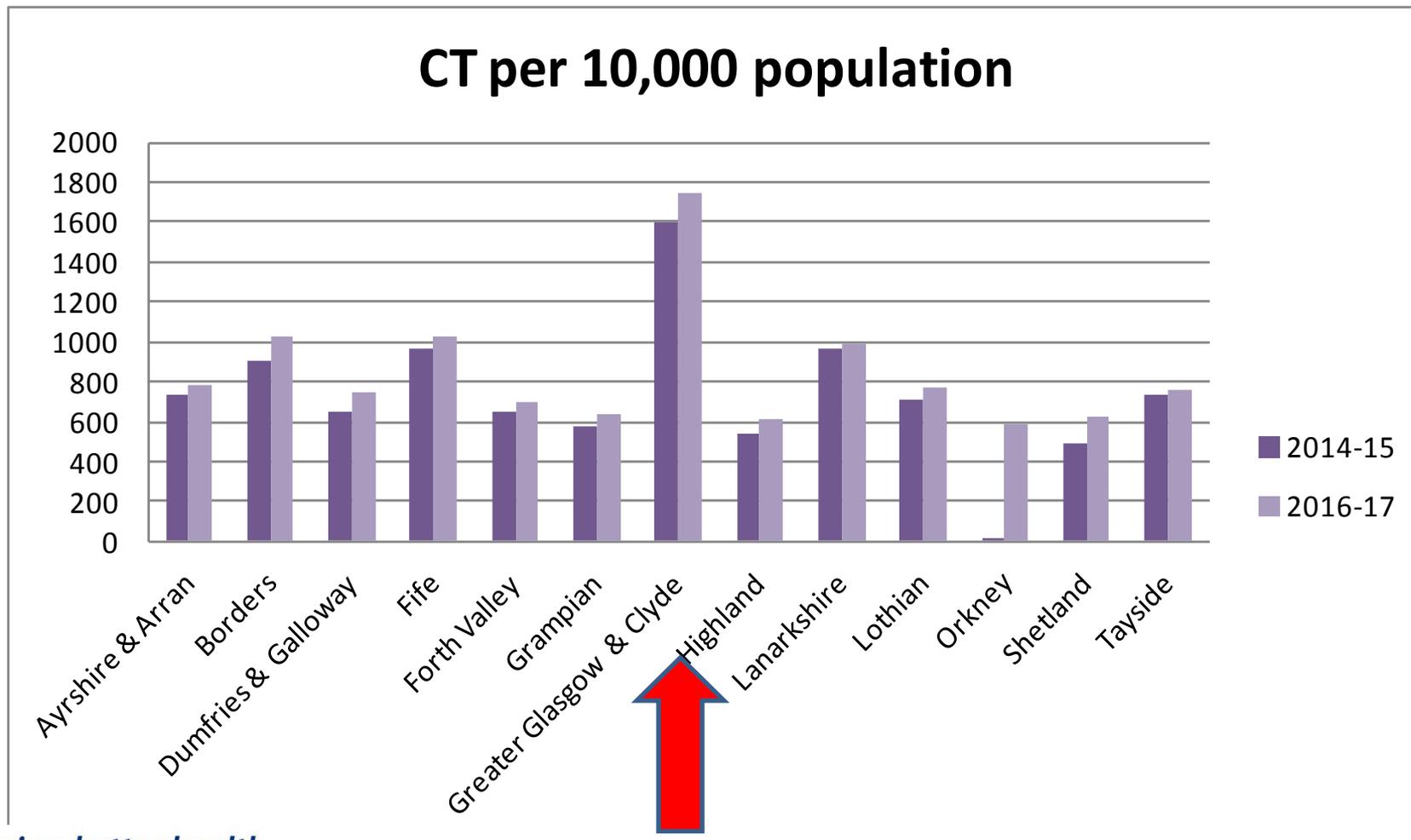
Annual number of abdominal imaging studies per modality per 1,000 ED visits. (Raja, Int J Em Med, 2011.)

# GG&C OOH CT Activity



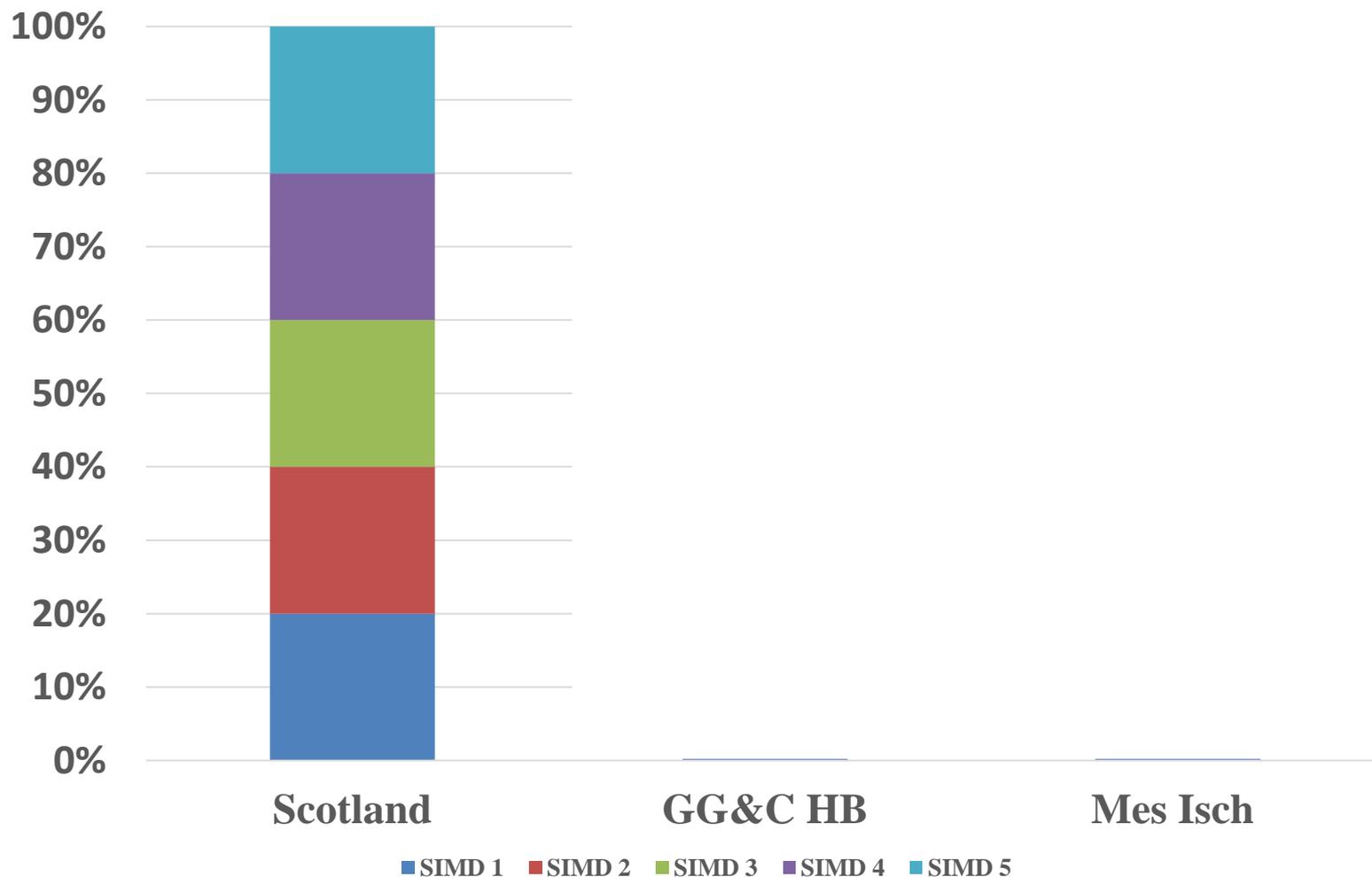
\* 2018 projection based on data to end of July

# CT Activity Scotland



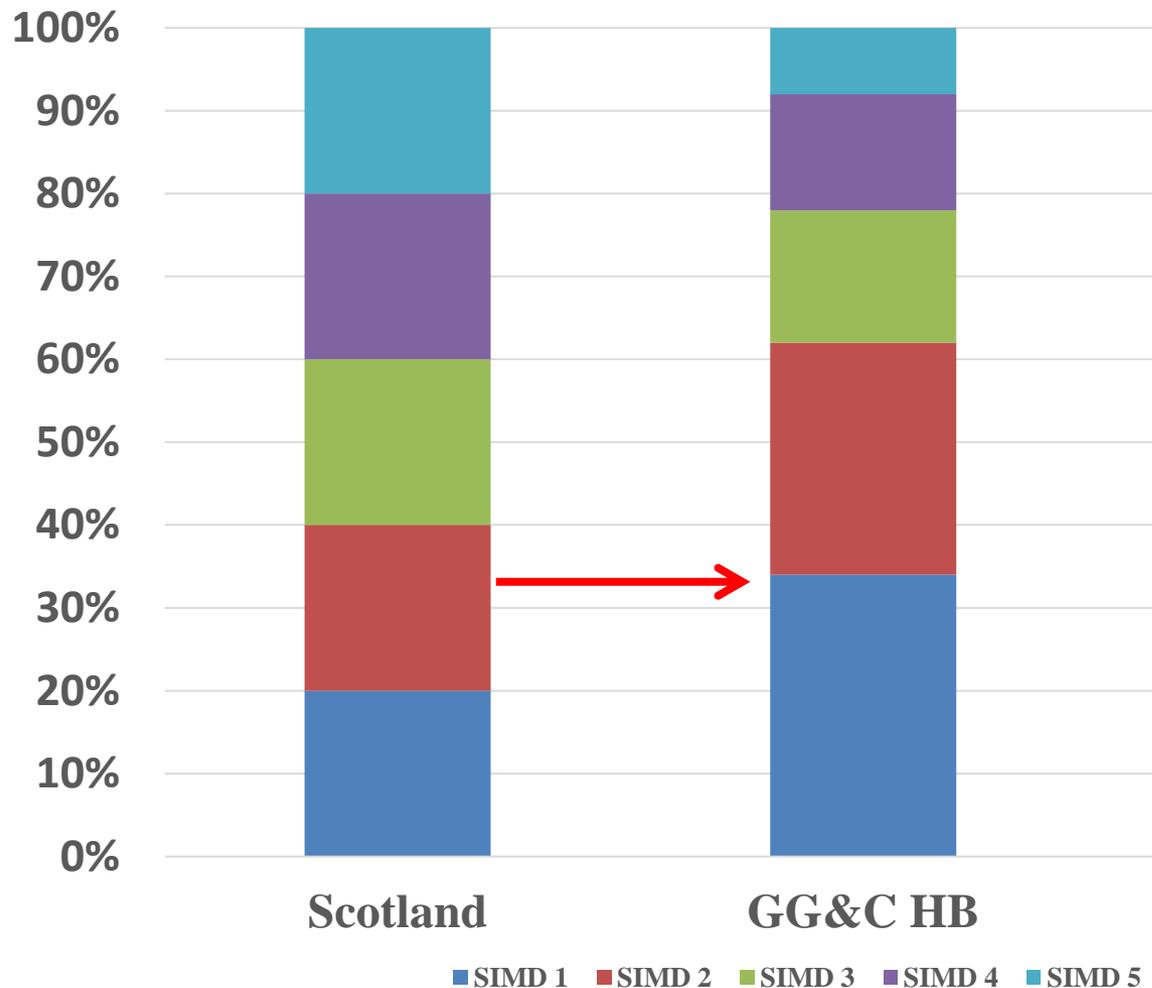
# Mesenteric Ischaemia Association With Poverty

Distribution of deprivation by SIMD Quintile



# Mesenteric Ischaemia Association With Poverty

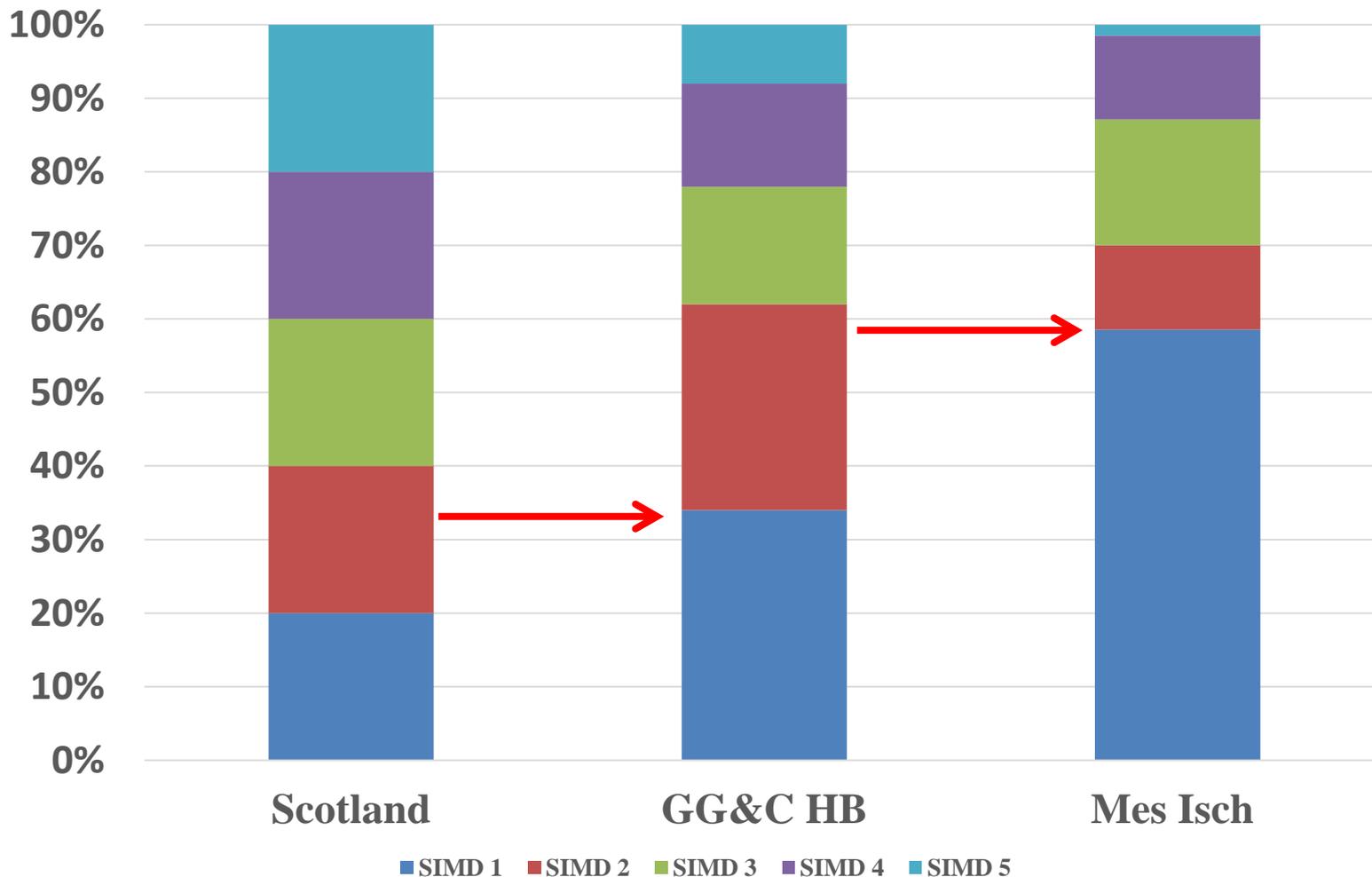
Distribution of deprivation by SIMD Quintile



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# Mesenteric Ischaemia Association With Poverty

Distribution of deprivation by SIMD Quintile



# Presenting Features

	<b>Acute (n=27)</b>	<b>Acute-on-chronic (n=54)</b>	<b>Chronic (n=48)</b>
<b>Female:Male</b>	14:13	29:25	37:11
<b>Weight loss</b>	3	39	44
<b>Abdominal pain</b>	27	54	46
<b>Eating related symptoms</b> -Post-prandial pain -Food aversion -Anorexia	2	28	39
<b>GI/abdo pain lx in preceding year</b>	9	42	48

**Eighty one cases with acute symptoms**

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<b>Female:Male</b>	14:13	29:25	37:11
<b>Weight loss</b>	3	39 (72%)	44 (92%)
<b>Abdominal pain</b>	27	54	46
<b>Eating related symptoms</b> -Post-prandial pain -Food aversion -Anorexia	2	28 (52%)	39 (81%)
<b>GI/abdo pain lx in preceding year</b>	9	42	48

**Eighty one cases with acute symptoms**

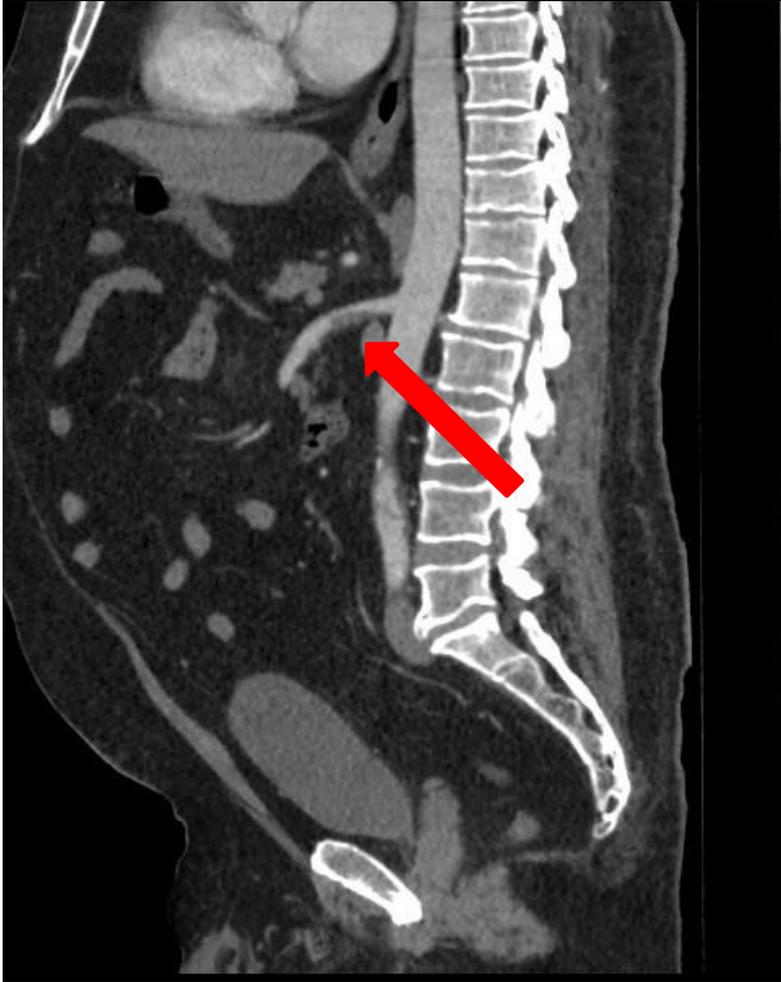
# Where do our cases come from?

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	<b>Acute (n=27)</b>	<b>Acute-on- chronic (n=54)</b>	<b>Chronic (n=48)</b>
<b>Gastroenterology</b>	<b>1</b>	<b>4</b>	<b>15</b>
<b>Medicine Specs</b>	<b>-</b>	<b>4</b>	<b>5</b>
<b>General Surgery</b>	<b>25</b>	<b>40</b>	<b>23</b>
<b>Other vascular</b>	<b>1</b>	<b>3</b>	<b>1</b>

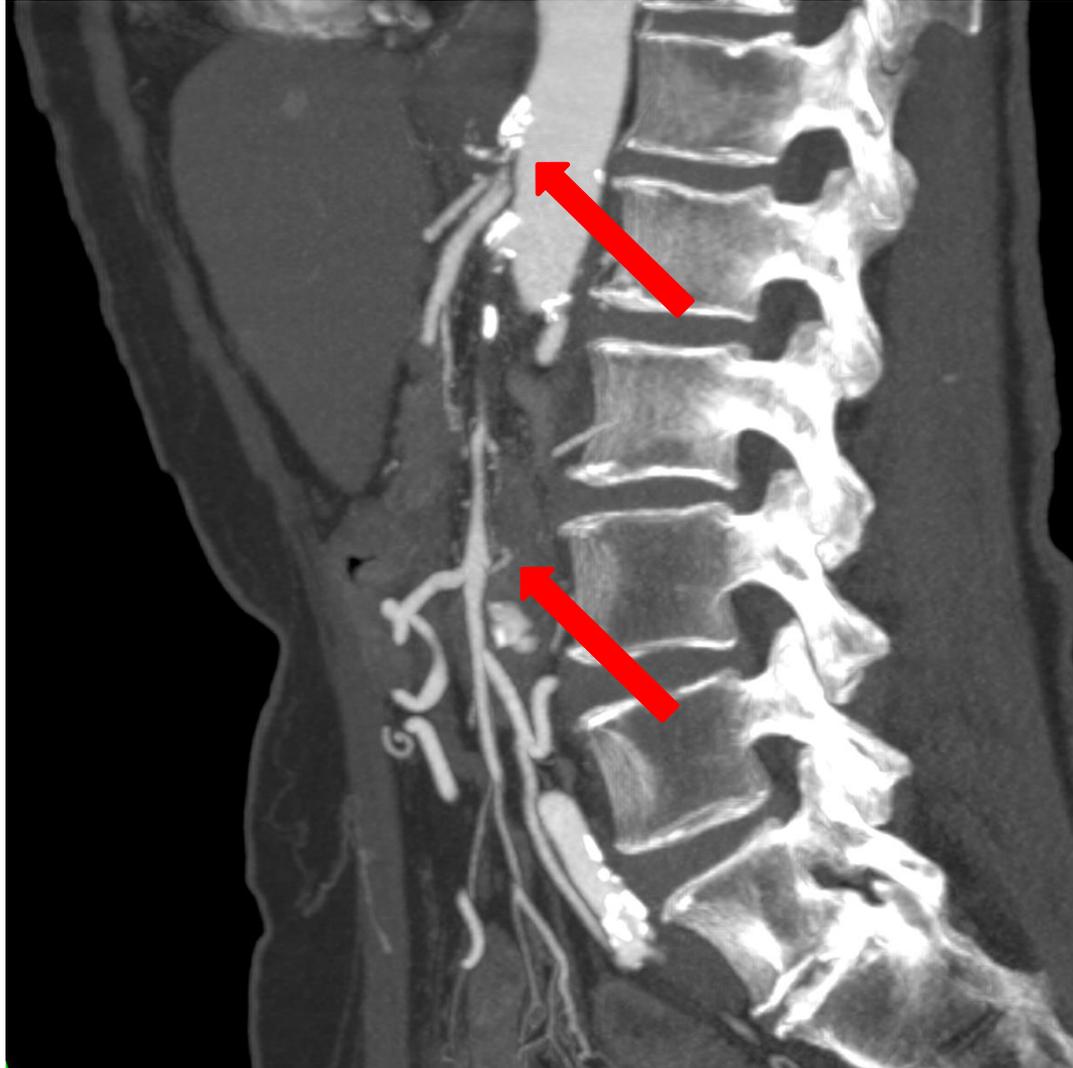
# Acute

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# Acute-on-chronic

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# Vessels Affected

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	Acute* (n=27)	Acute-on-chronic (n=54)	Chronic (n=48)
SMA only	14 (52%)	7	6
Triple vessel	5	27	22
Coeliac only	-	-	2
Coeliac and SMA	5	19	11
IMA and SMA or coeliac	2	1	7

\*One case no with no data. Laparotomy without imaging.

# Vessels Affected

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	Acute* (n=27)	Acute-on-chronic (n=54)	Chronic (n=48)
SMA only	14	7	6
Triple vessel	5	27 (50%)	22
Coeliac only	-	-	2
Coeliac and SMA	5	19 (38%)	11
IMA and SMA or coeliac	2	1	7

\*One case no with no data. Laparotomy without imaging.

# Making a diagnosis

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- Most likely after imaging
  - Radiologist suggests considering diagnosis of AMI
- Do images and symptoms match?
- What are the symptoms?
  - Lots of pain, background of pain and weight loss.
  - Food-related symptoms.
- Biomarkers: not much help
  - Perhaps a normal D-dimer makes AMI or A-on-C unlikely

# Is a laparotomy needed?

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- Abdominal signs (any tenderness or peritonism)
- WCC, perhaps a little
- Resolution of all symptoms after awake procedure
- Ceiling of care
  
- If you think it might be needed, just do it.

# Is a laparotomy needed?

	Visible necrosis	No evidence of necrosis
White cell count		
<10	2	4
10-12	1	6
12.1-15	7	5
15.1-20	7	7
>20	14	7

**Sixty** patients with acute symptoms and a primary laparotomy.

# Is a laparotomy needed?

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# Is a laparotomy needed?

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>20	14	7

**Sixty** patients with acute symptoms and a primary laparotomy.

# Primary Interventions

	<b>Acute (n=27)</b>	<b>Acute-on-chronic (n=54)</b>	<b>Chronic (n=48)</b>
<b>Primary intervention</b>			
<b>Resection only</b>	<b>4</b>	<b>0</b>	<b>0</b>
<b>Thromboembolectomy</b>	<b>13</b>	<b>4</b>	<b>0</b>
<b>Radiological Intervention</b>	<b>3</b>	<b>21</b>	<b>33</b>
<b>Bypass graft</b>	<b>7</b>	<b>28</b>	<b>14</b>
<b>Necrosis at first lap</b>	<b>19</b>	<b>16</b>	<b>0</b>
<b>Bowel resection</b>	<b>16</b>	<b>21</b>	<b>5</b>
<b>Cholecystectomy</b>	<b>-</b>	<b>2</b>	<b>-</b>
<b>Laparotomy only</b>	<b>-</b>	<b>1</b>	<b>1</b>
<b>Inpatient/30 day Death</b>	<b>10 (37%)</b>	<b>12 (22%)</b>	<b>6 (13%)</b>

# Primary Interventions

	Acute (n=27)	Acute-on-chronic (n=54)	Chronic (n=48)
Primary intervention			
Resection only	4	0	0
Thromboembolectomy	13 (48%)	4	0
Radiological Intervention	3	21	33
Bypass graft	7	28	14
Necrosis at first lap	19	16	0
Bowel resection	16	21	5
Cholecystectomy	-	5	-
Laparotomy only	-	1	1
Inpatient/30 day Death	10 (37%)	12 (22%)	6 (13%)

# Primary Interventions

	Acute (n=27)	Acute-on-chronic (n=54)	Chronic (n=48)
Primary intervention			
Resection only	4	0	0
Thromboembolectomy	13	4	0
Radiological Intervention	3	21	33
Bypass graft	7 (24%)	28	14
Necrosis at first lap	19	16	0
Bowel resection	16	21	5
Cholecystectomy	-	5	-
Laparotomy only	-	1	1
Inpatient/30 day Death	10 (37%)	12 (22%)	6 (13%)

# Primary Interventions

	Acute (n=27)	Acute-on-chronic (n=54)	Chronic (n=48)
Primary intervention			
Resection only	4	0	0
Thromboembolectomy	13	4	0
Radiological Intervention	3	21 (39%)	33
Bypass graft	7	28 (52%)	14
Necrosis at first lap	19	<del>16</del>	0
Bowel resection	16	21	5
Cholecystectomy	-	5	-
Laparotomy only	-	1	1
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Primary intervention			
Resection only	4	0	0
Thromboembolectomy	13	4	0
Radiological Intervention	3	21 (39%)	33
Bypass graft	7	28 (52%)	14
Necrosis at first lap	19	16	0
Bowel resection	16	21	5
Cholecystectomy	-	5	-
Laparotomy only	-	1	1
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Cholecystectomy	-	5	-
Laparotomy only	-	1	1
Inpatient/30 day Death	10 (37%)	12 (22%)	6 (13%)

# Best revascularisation?

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- No single answer: therefore discuss with IR
- Appearances of lesions
  - What is likely to succeed?
- Need for laparotomy: increases options
- Time considerations
- Where is the patient?
  - Distant site and in theatre with limited IR facilities
- Ceilings of care
  - Fit for laparotomy

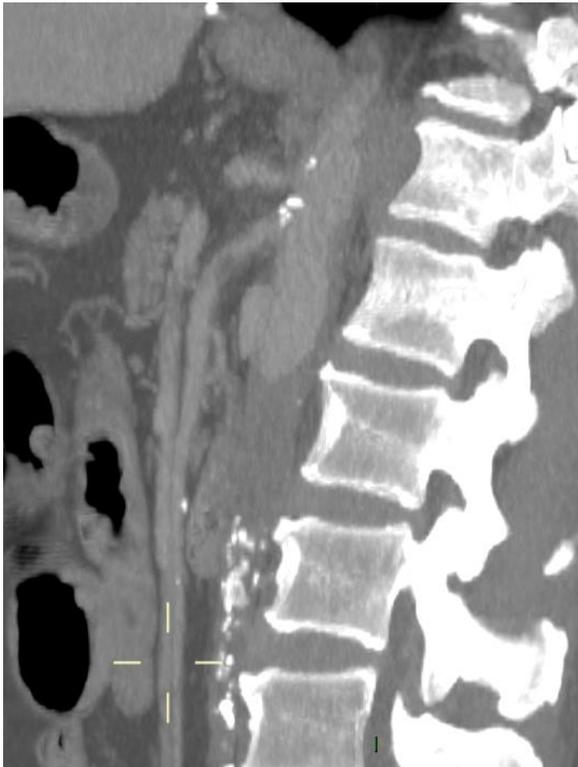
# Thrombus aspiration

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# Retrograde SMA stent

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Patient with **intermittent rest** pain on a **background of food related symptoms** awaiting scheduled endovasc intervention. Continuous pain overnight, WCC rose to 21

**Findings: GB fundus infarction**  
(no perforation)

Good quality common hepatic artery

Long occlusion of SMA  
(Aorta not occluded)



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Day 2 post-op second-look:  
well perfused bowel

**Day 4 post-op:**

**WCC rose again** with new  
abdo pain

Laparotomy: all bowel clearly  
well perfused. SMA limb  
occluded, but no action taken

(CT performed 6 weeks later  
on readmission. Abdo pain,  
settled in 24 hours, cons Mx.)



# CHA-SMA vein graft

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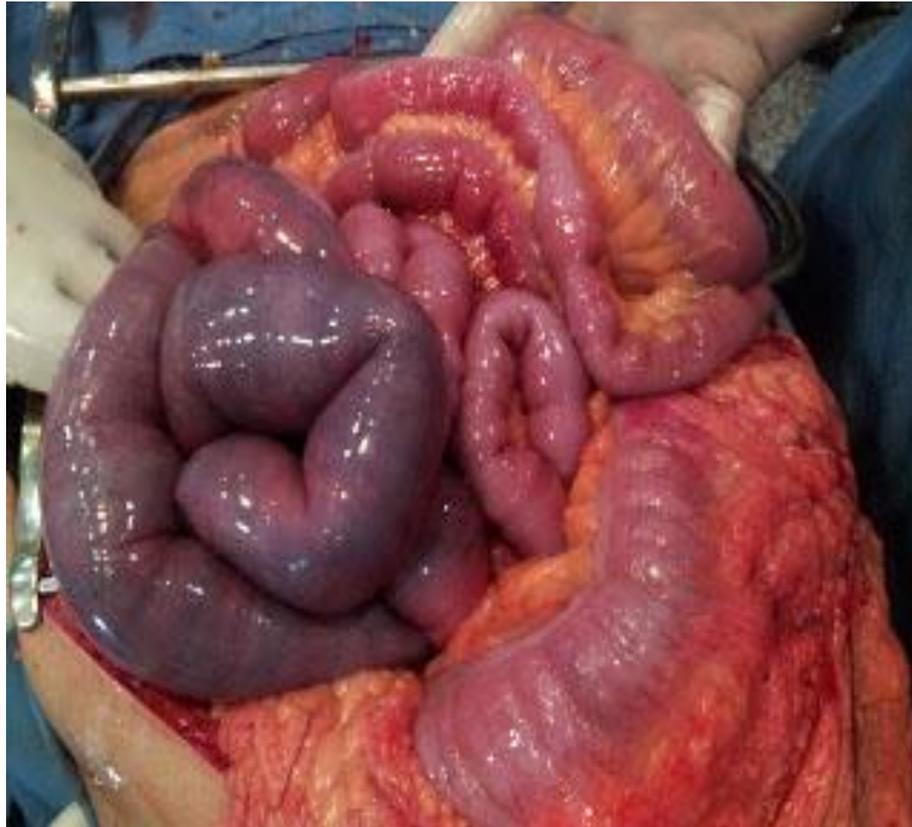


# Laparotomies and re-intervention

	Acute (n=27)	Acute-on- chronic(n=54)	Chronic (n=48)
<b>No of laparotomies</b>	<b>43</b>	<b>70</b>	<b>33</b>
<b>0</b>	<b>1</b>	<b>13</b>	<b>26</b>
<b>1</b>	<b>15</b>	<b>19</b>	<b>14</b>
<b>2</b>	<b>7</b>	<b>17</b>	<b>6</b>
<b>3</b>	<b>3</b>	<b>4</b>	<b>1</b>
<b>4</b>	<b>1</b>	<b>0</b>	<b>1</b>
<b>5</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>Vascular Re-intervention:</b>			
<b>-Early</b>	<b>1</b>	<b>8</b>	<b>6</b>
<b>-Late</b>	<b>2</b>	<b>10</b>	<b>8</b>

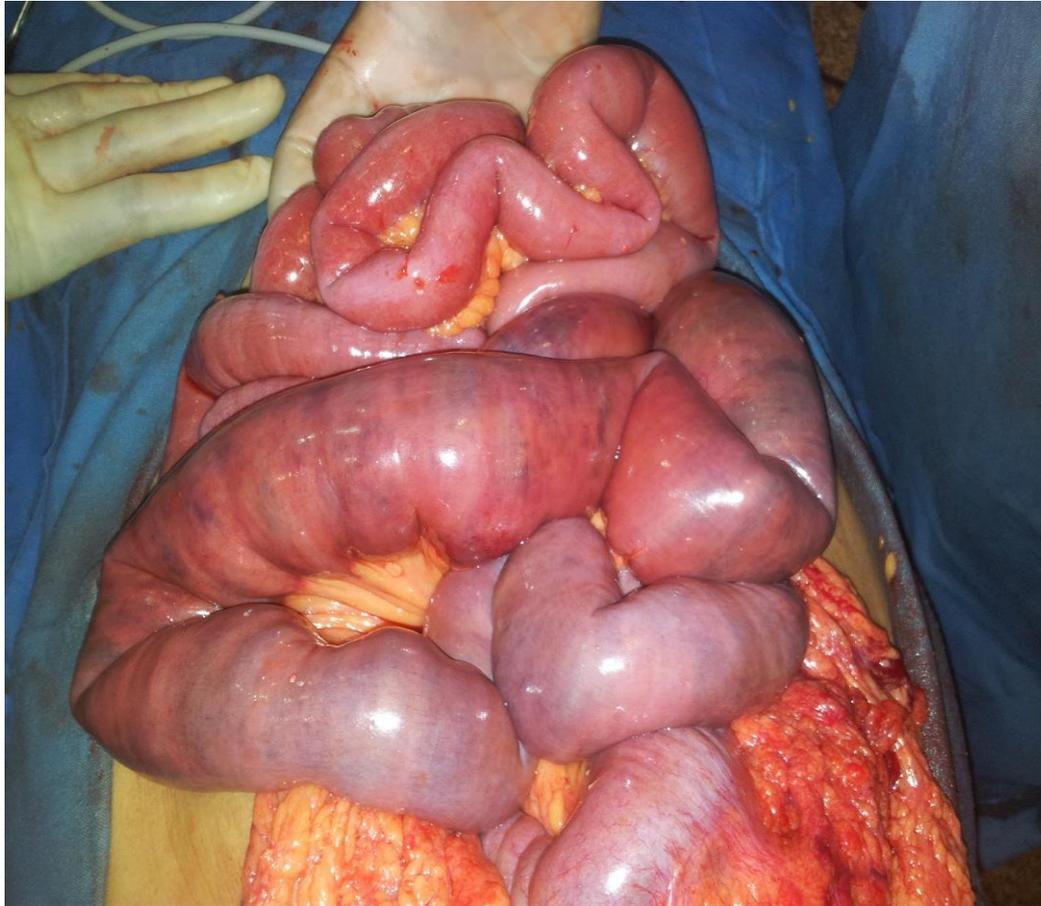
# Ischaemic but not necrotic

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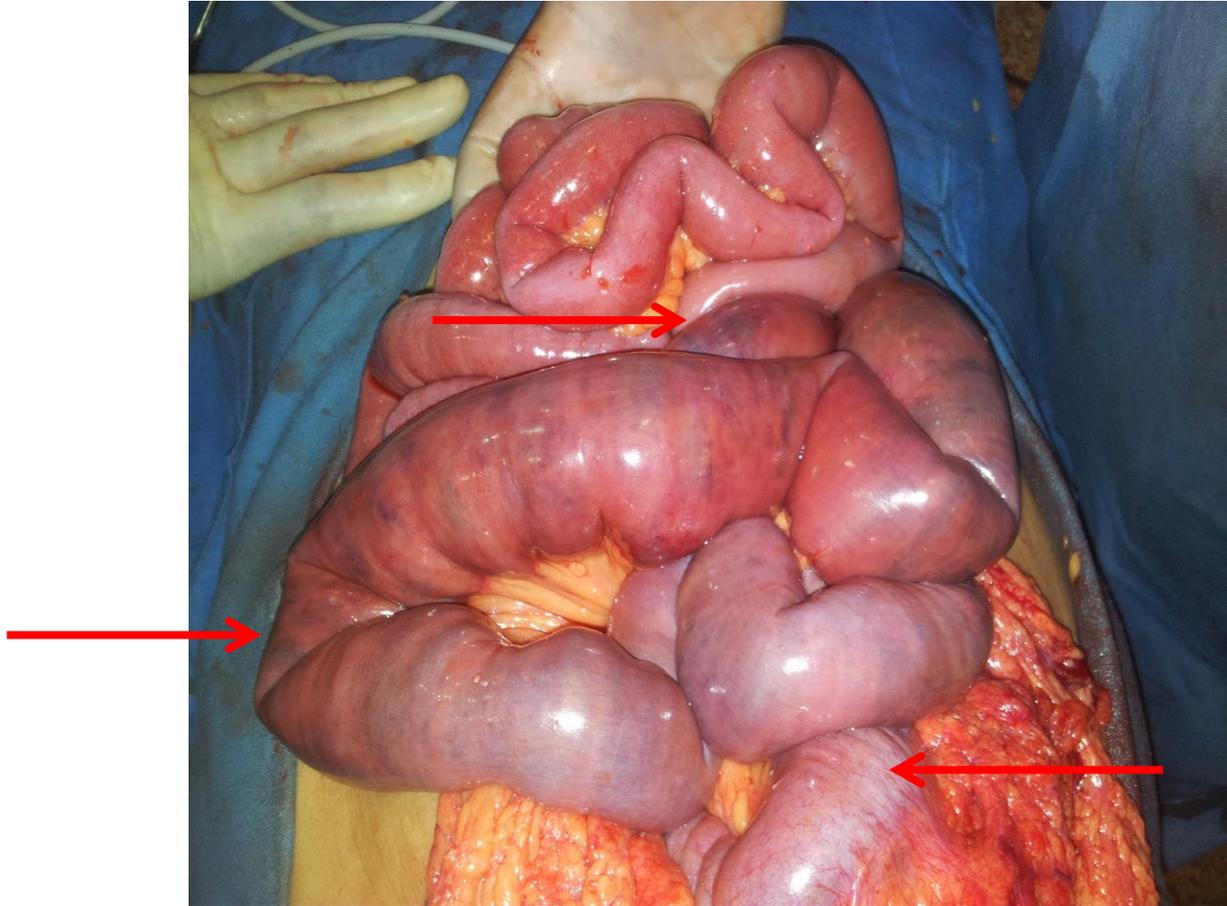
# Much improved

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# Dubious viability

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# Outcomes

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	Acute (n=27)	Acute-on-chronic (n=54)	Chronic (n=48)
<b>Fistula</b>	<b>1</b>	<b>4</b>	<b>0</b>
<b>Stoma</b>	<b>8</b>	<b>7</b>	<b>4</b>
<b>Home TPN</b>	<b>3</b>	<b>5</b>	<b>2</b>
<b>Inpatient/30 day Death</b>	<b>10 (37%)</b>	<b>12 (22%)</b>	<b>6 (13%)</b>

# Outcomes

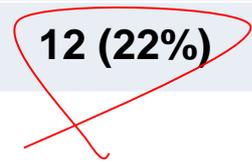
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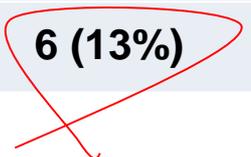
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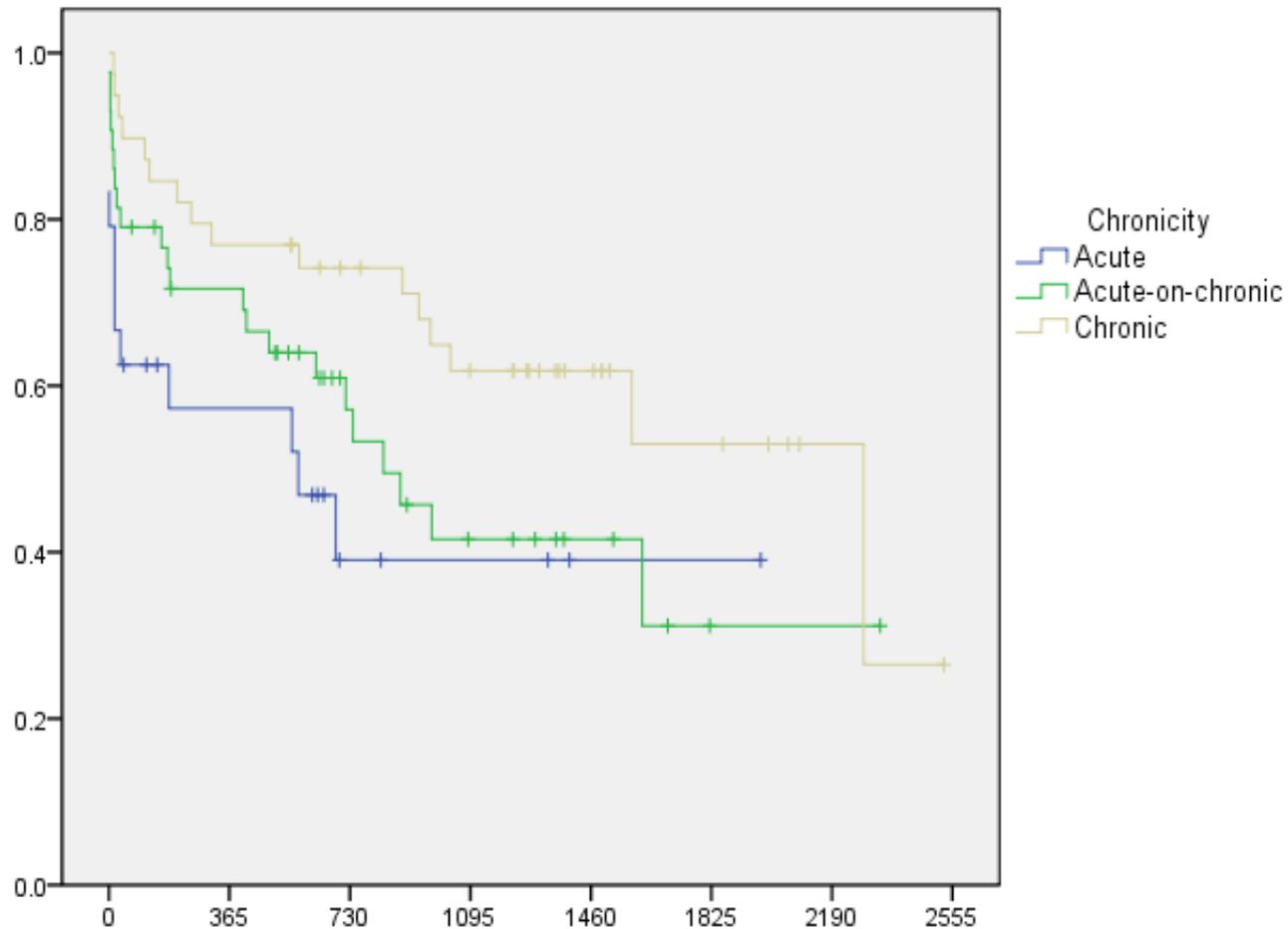
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# Survival After Intervention

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# Summary

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## Glasgow strategy

- Discuss with IR if at all possible
- Tailor treatment to patient's needs and what might work quickly and first time
- Low threshold for laparotomy
- Low threshold for second laparotomy: standard in acute
- Repeat lap & salvage procedures as needed
- Acceptable results are possible