Accuracy of routine endoscopy diagnosing colonic ischaemia after AAA repair – a meta-analysis

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I have the following potential conflicts of interest to report:

- **✓** Consulting (Terumo Aortic)
- **☐** Employment in industry
- **☐** Stockholder of a healthcare company
- **☐** Owner of a healthcare company
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Introduction

- Incidence colonic ischaemia
  - Elective 0.5-3%
  - Rupture 7-36%
- Increased morbidity and mortality
Risk factors for colonic ischaemia:
- Open repair
- Emergency repair
- Peri-operative hypotension
- Abdominal compartment syndrome
- Female sex
- Occluded IMA or IIA

Recent review:
- Rupture/emergency repair (risk ratio (RR) 7.36, CI 3.08-17.58, \( p < 0.001 \))
- Open repair (RR 4.55, CI 2.56-8.33, \( p < 0.001 \)).
Which test?

- Symptoms (bloody diarrhoea)
- Intra-abdominal pressure
- Intramural pH sigmoid
- Sigmoido- or colonoscopy
  - Grade 3 transmural ischaemia

Grade 1

Grade 3
Diagnostic test accuracy

- Key question 1: What is the value of endoscopy (all grades) to diagnose CI confirmed at positive laparotomy or CI related death in AAA patients?

- Key question 2: What is the value of Grade 3 CI (transmural) at first post-operative endoscopy confirmed at positive laparotomy or confirmation of CI on post-mortem in AAA patients?

- Key question 3: What is the value of Grade 3 CI (transmural) at first post-operative endoscopy confirmed at positive laparotomy or confirmation of CI on post-mortem in ruptured AAA patients?

Methods

- Diagnostic test accuracy meta-analysis
- PubMed and Embase
- Cochrane and PRISMA guidelines
- Search:
  - Patients with an AAA, ruptured or elective, treated endovascular or with open surgery
  - Endoscopy with CI
  - Laparotomy
  - Sensitivity and specificity

** INTRODUCTION **

Colonoscopy (CI) is a rare but severe and potentially fatal complication after abdominal aortic aneurysm (AAA) repair. Recent reports have shown an incidence of clinically significant CI of 1.4–2.6% after elective repair of an AAA.

** BACKGROUND **

Colonoscopy (CI) is a devastating complication after abdominal aortic aneurysm (AAA) surgery. The aim of this review was to evaluate the diagnostic test accuracy of routine endoscopy in diagnosing CI after treatment for elective and acute AAA.

** Patients and methods:** The PubMed and Embase database searches resulted in 1388 articles. Prospective studies describing routine post-operative colonoscopy or sigmoidoscopy after elective or emergency AAA repair were included. The study quality was assessed with the QUADAS2 tool. Sensitivity and specificity forest plots were drawn. Diagnostic odds ratios were calculated by a random-effect model.

** Results:** Twelve articles were included consisting of 738 AAA patients of whom 66% were treated electively, 56% ruptured an, and 6% by endovascular repair. Of all patients, 20.8% were identified with CI (all grades), and 6.5% of patients had Grade 3 CI. The pooled diagnostic odds ratio for all grades of CI on endoscopy was 28.02 (95% CI, 8.66–79.88). The sensitivity and specificity of endoscopy for detection of Grade 3 CI after AAA repair was 55.2% (95% CI, 53–57.70) and 99.7% (95% CI, 99.6–99.8) respectively. The positive post-test probability is up to 60% in all kinds of AAA patients and 68% in ruptured AAA patients.

** Conclusion:** Routine endoscopy is highly accurate for ruling out CI after repair. Clinicians should be aware that endoscopy is less accurate in diagnosing the presence of the clinically relevant transmural CI. Endoscopy is a safe diagnostic test to use routinely as none of the studies reported adverse events.

** REFERENCES **


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** REVIEW **

Accuracy of Routine Endoscopy Diagnosing Colonic Ischaemia After Abdominal Aortic Aneurysm Repair: A Meta-analysis

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** WHAT THIS PAPER ADDS **

This paper presents a comprehensive overview of the diagnostic value of endoscopy in colonic ischemia (CI) after aneurysm surgery. The 12 prospective studies included in this review showed that endoscopy is an accurate tool in ruling out CI rather than diagnosing the presence of the clinically relevant transmural CI. Endoscopy is a safe diagnostic test as none of the studies reported adverse events. The decision whether an exploratory laboratory is necessary should also include the presence of pre- and post-operative risk factors of patients suspected of CI.
Methods

Records identified through database searching (PUBMED) (n = 1122)

Additional records identified through other sources (EMBASE) (n = 87)

Records after duplicates removed (n = 1188)

Records screened on title and abstract (n = 1188)

Records excluded (n = 1165)

Full-text articles assessed for eligibility (n = 23)

Studies included in qualitative synthesis (n = 12)

Full-text articles excluded (n = 11)
Reasons: 10 retrospective studies without standard endoscopies postoperatively 1 review

Studies included in quantitative synthesis (n = 12)
Studies

- 12 studies, 718 aneurysm patients
  - 87% male, 70 yrs
  - 44% elective, 56% rupture
  - 6% endovascular

- Median time to scopy 3 days postoperatively (range 1-13 days)

- No complications from scopy reported
Results

- Positive scopy (all grades) 20.8%
  - 6.5% grade 3 colonic ischaemia

- Laparotomy 68%
  - 74% colonic ischaemia confirmed

- Colonic ischaemia related mortality 3.7%
  - 24.2% of total mortality
Results

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Results

- Positive scopy (all grades) 20.8%
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  - 24.2% of total mortality
Bias in studies

Moderate high heterogeneity

Occurrence of publication bias
12 studies described all grades in elective / acute AAA patients (n=718)

- Sensitivity: 1.00 (95% CI, 0.88-1.00)
- Specificity: 0.83 (95% CI, 0.80-0.86)
- Diagnostic odds ratio: 26.60 (95% CI, 12.09-188.81)
Meta-analysis

5 studies described grade 3 colonic ischaemia (n=299)

- Sensitivity: 0.52 (95% CI, 0.31-0.73)
- Specificity: 0.97 (95% CI, 0.95-0.99)
- Diagnostic odds ratio: 50.40 (95% CI, 13.89-182.89)
Meta-analysis

4 studies described grade 3 colonic ischaemia in rAAA patients (n=199)

- Sensitivity: 0.50 (95% CI, 0.28-0.72)
- Specificity: 0.97 (95% CI, 0.92-0.99)
- Diagnostic odds ratio: 47.78 (95% CI, 12.09-188.81)
Pre- and post-test probability

- All grades
  - Pre-test probability: 6%
  - Positive post-test probability: 22%
  - Negative post-test probability: 1%

- Grade 3
  - Pre-test probability: 9%
  - Positive post-test probability: 60%
  - Negative post-test probability: 5%

- Grade 3 after rupture
  - Pre-test probability: 13%
  - Positive post-test probability: 68%
  - Negative post-test probability: 7%
Conclusion

- Sigmoido-/colonoscopy is a safe test
- High specificity and low sensitivity
- Can exclude colonic ischaemia
- Positive test not immediately a reason for laparotomy
- Decision whether a laparotomy is necessary should also include the presence of pre- and post-operative risk factors and comorbidities of patients suspected of CI
Thank you for your attention and welcome to ESCVS 22-25 May 2019 in Groningen, The Netherlands!

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