Surgical management of colon injuries in the field



Part I and II : Introduction and current literature

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Objectives

- Historical perspective on colon trauma management
- Injury grading
- Guideline recommendations (EAST 2019)
- Appraisal of selected studies

Case scenario I – MSF field hospital

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- initial vitals BP 85/50, HR 140, GCS 13, spO2 90% on room air
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L chest tube and laparotomy:

- Splenic injury
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Background

"The treatment of colon injuries is based on the known insecurity of suture and the dangers of leakage. Simple closure of a wound of the colon, however small, is unwarranted; men have survived such an operation, but others have died who would still be alive had they fallen into the hands of a surgeon with less optimism and more sense. Injured segments must either be exteriorized, or functionally excluded by a proximal colostomy."

- Sir W.H. Ogilvie, Forward Surgery in Modern War. London, 1944



Sir (William) Heneage Ogilvie
by Walter Stoneman, bromide print, April 1946
NPG x186920© National Portrait Gallery, London

AAST classification of colon injury

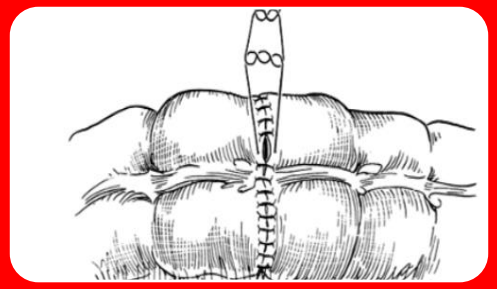
Grade*	Type	Injury Description
I	Hematoma	Contusion or hematoma without devascularization
	Laceration	Partial thickness, no perforation
II	Laceration	Laceration < 50% of circumference
III	Laceration	Laceration > 50% of circumference
IV	Laceration	Transection of colon
V	Laceration	Transection with segmental tissue loss

Nondestructive injuries

Destructive injuries

Modified from Organ Injury Scaling Committee of the American Association of the Surgery of Trauma, Moore EE, Cogbill TH, Malangoni MA, et al: Organ injury scaling II: pancreas, duodenum, small bowel, colon and rectum. *J Trauma* 30:1427, 1990

Defining possible management pathways



Primary Repair (without any ostomy)

- Simple suture of defect
- Resection and anastomosis



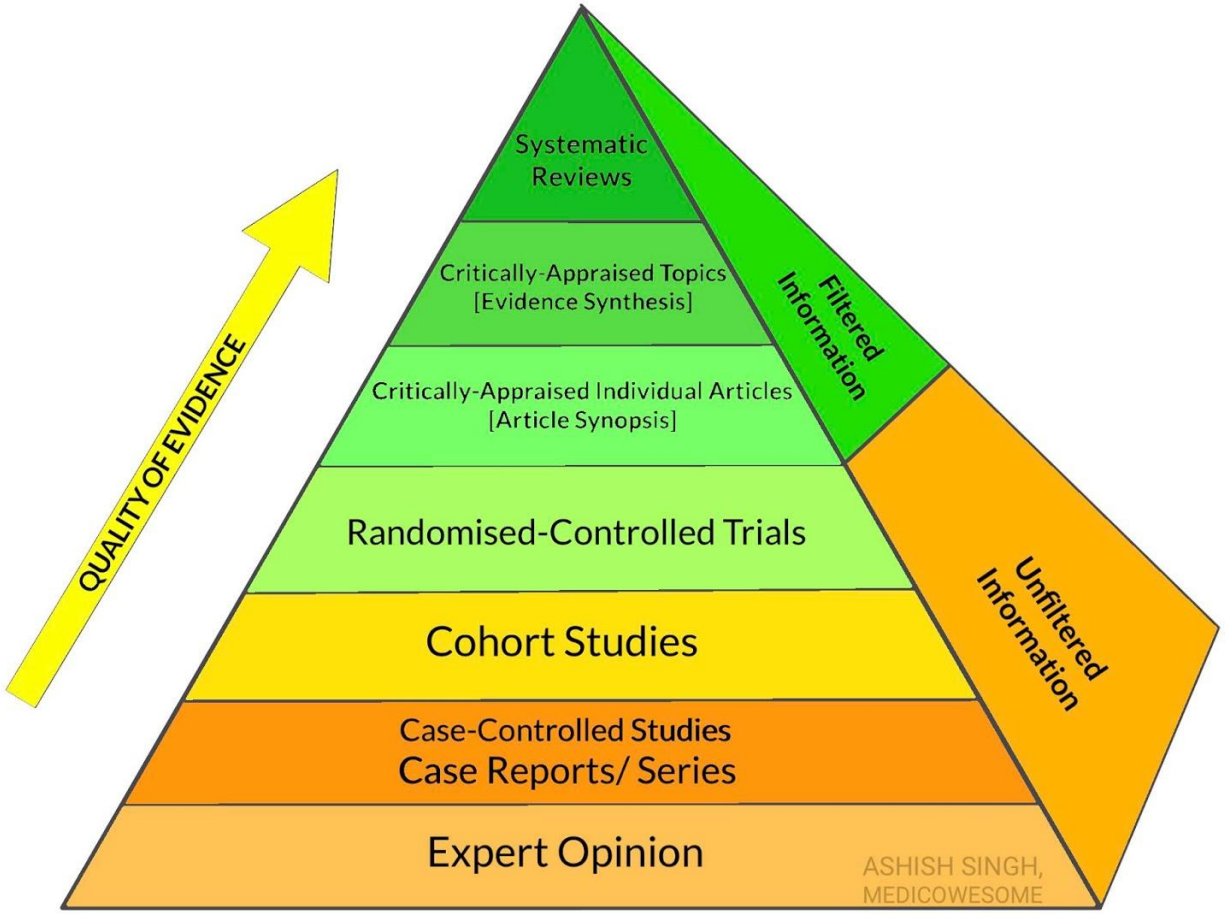
Fecal diversion

- End colostomy
- Resection and astomosis + proximal protective fecal diversion
- Exteriorizing the injured segement as a colostomy loop/double barrel colostomy



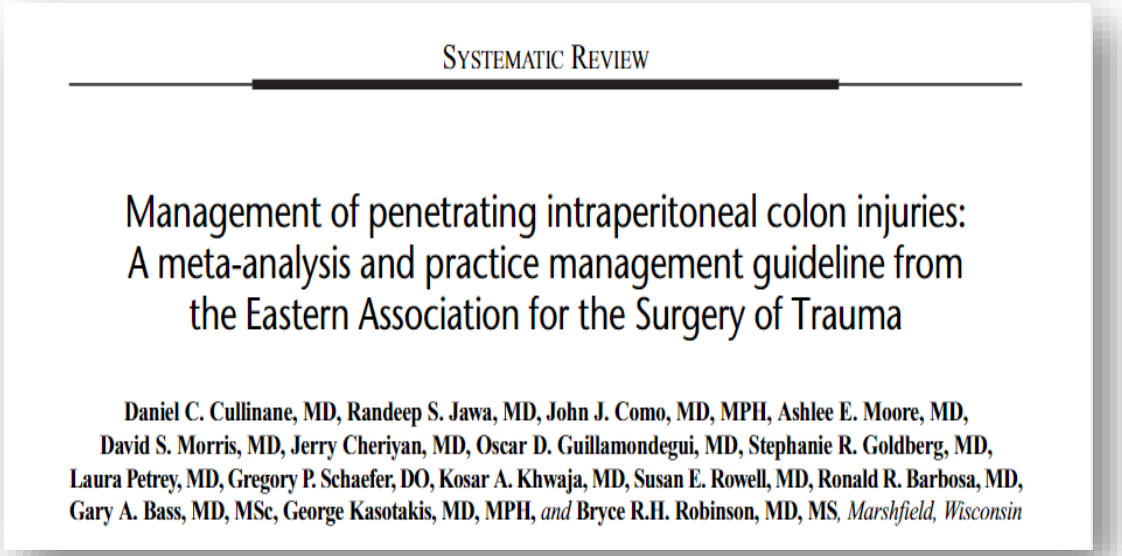
Primary Damage Control

- Primary resection left in discontinuity, end colostomy at take back
- Primary resection left in discontinuity, delayed anastomosis (± proximal diversion)
- (Primary Resection + anastomosis at first DC laparotomy)



Part II: current literature and guidelines

Metanalysis and guidelines: EAST 2019



SYSTEMATIC REVIEW

Management of penetrating intraperitoneal colon injuries: A meta-analysis and practice management guideline from the Eastern Association for the Surgery of Trauma

Daniel C. Cullinane, MD, Randeep S. Jawa, MD, John J. Como, MD, MPH, Ashlee E. Moore, MD, David S. Morris, MD, Jerry Cheriyan, MD, Oscar D. Guillamondegui, MD, Stephanie R. Goldberg, MD, Laura Petrey, MD, Gregory P. Schaefer, DO, Kosar A. Khwaja, MD, Susan E. Rowell, MD, Ronald R. Barbosa, MD, Gary A. Bass, MD, MSc, George Kasotakis, MD, MPH, *and* Bryce R.H. Robinson, MD, MS, *Marshfield, Wisconsin*

- EAST guideline updated 2019
- Military trauma excluded, only adult civilian population
- Final metaanalysis of 37 articles

- Three distinct research questions, colon repair/R&A vs colostomy in:

1. Low risk patients
2. High risk patients
3. High risk patients requiring DCL

EAST 2019: low risk population

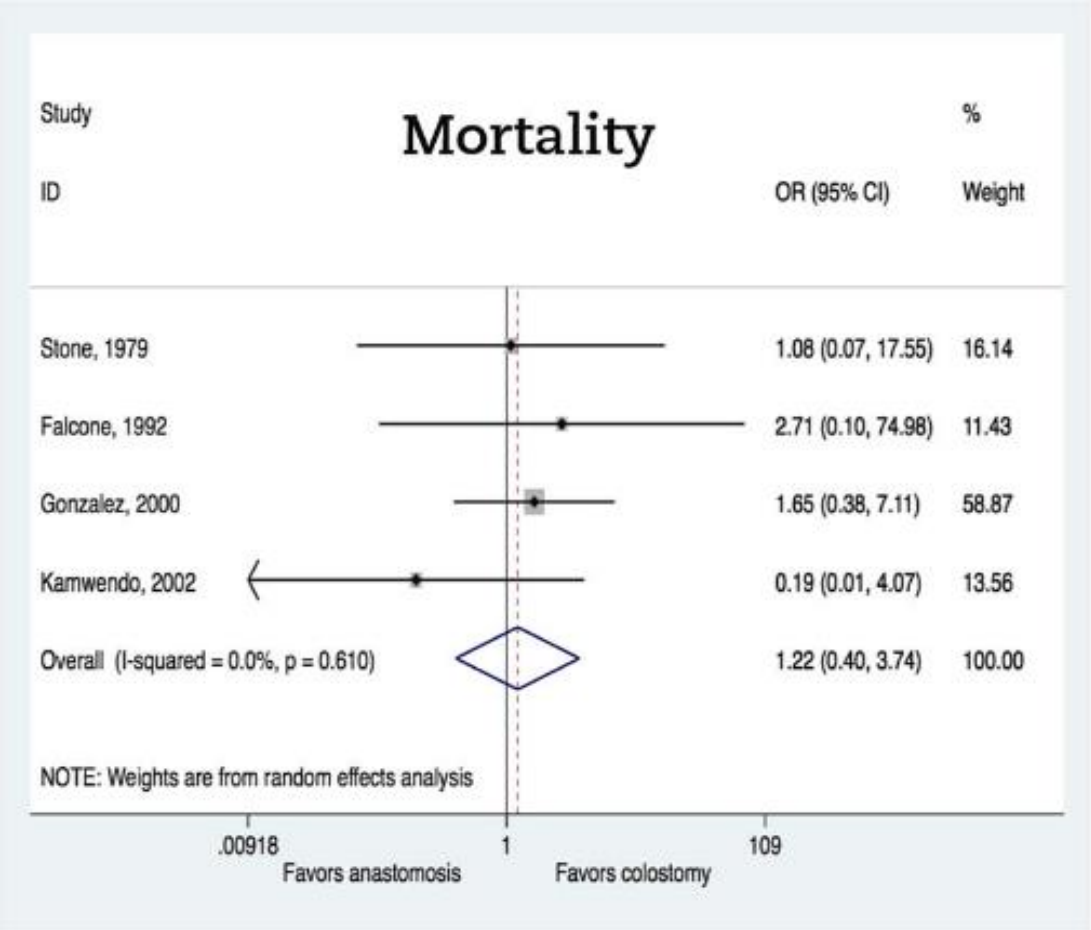
Low risk definition used:

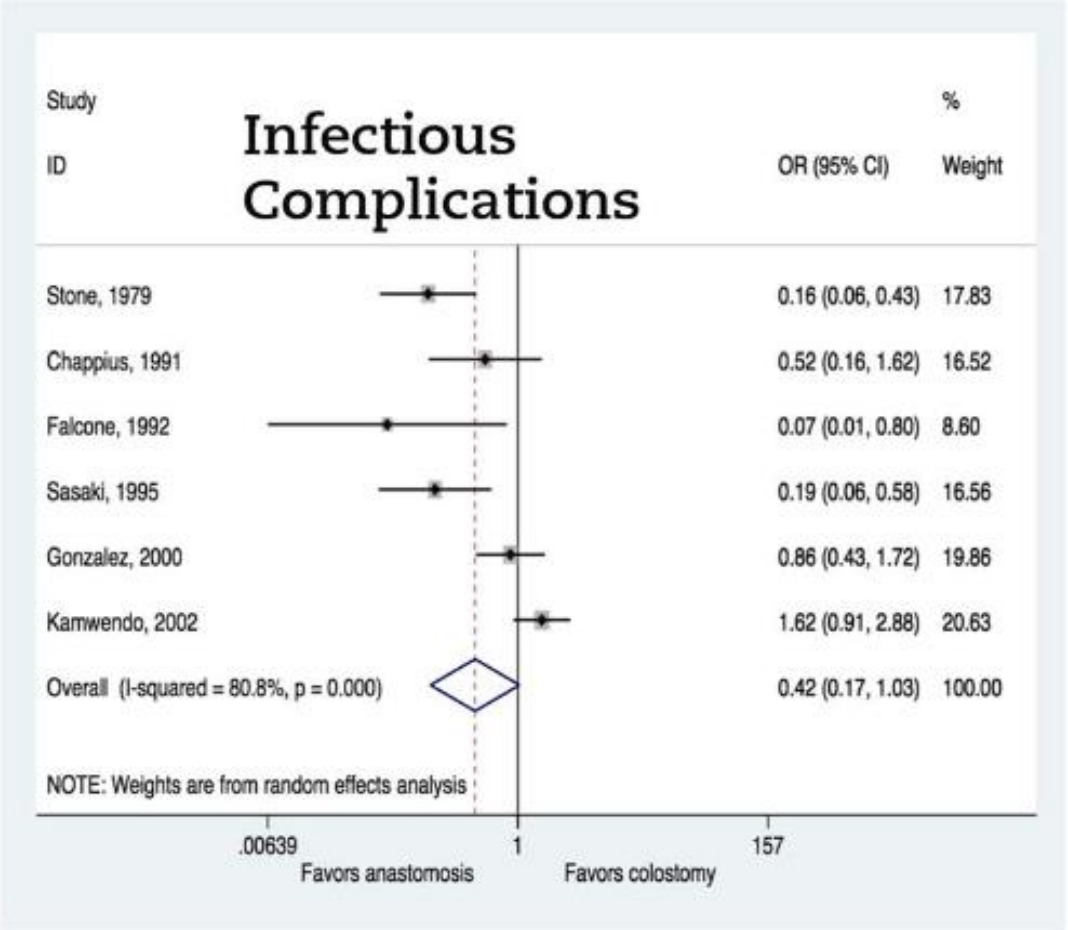
- All injury grades
- No signs of shock,
- No transfusion > 6 Units blood
- No delay to surgery >12hrs
- No severe contamination

- Six prospective randomized trials
- n=705 patients

- Overall high quality of evidence

EAST 2019: low risk population





Strong recommendation: favor colon repair or R&A in low-risk patients without signs of shock, significant hemorrhage, severe contamination, or delay to surgical intervention

EAST 2019: high risk population

Definition of high risk factors:

- **Delay > 12 hrs**
- **Presence of shock**
- **Transfusion >6U of blood**
- **Other associated injuries**
- **Presence of contamination**
- **Left side colon injuries**

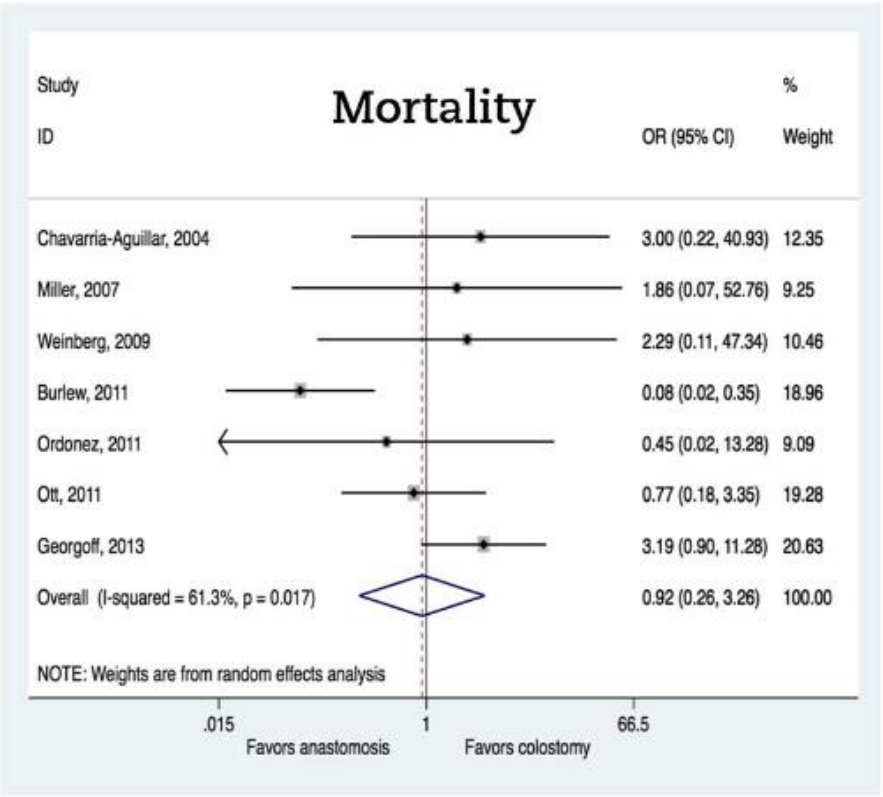
Data:

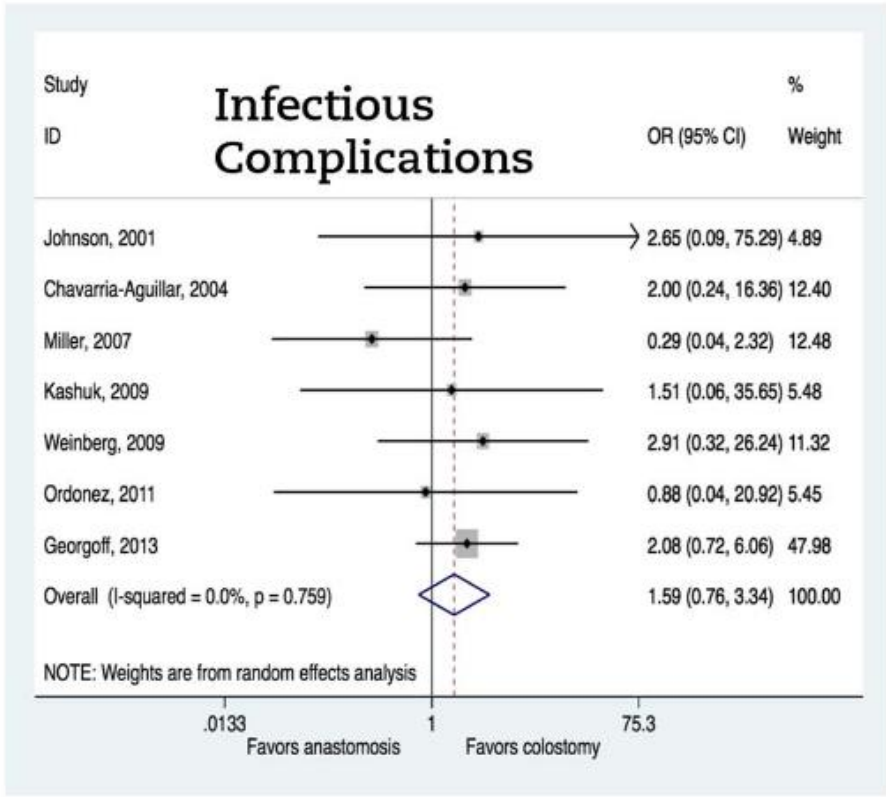
- **Three prospective randomized trials**
- **Three prospective observational studies**
- **12 retrospective cohort studies**

- **<u>Overall quality of evidence is low</u>**

Conditional recommendation for adult, civilian, high risk population: Favor colon repair/R&A rather than colostomy. Colostomy may have limited role in selected patients

EAST 2019: high risk + DCS





Data

10 retrospective studies

n=395

<u>Very low quality of evidence</u>

Conditional recommendation: definitive repair, delayed R&A, or anastomosis (if resection already took place in DCL) may be performed rather than colostomy.

Clinical judgment in these situations is paramount

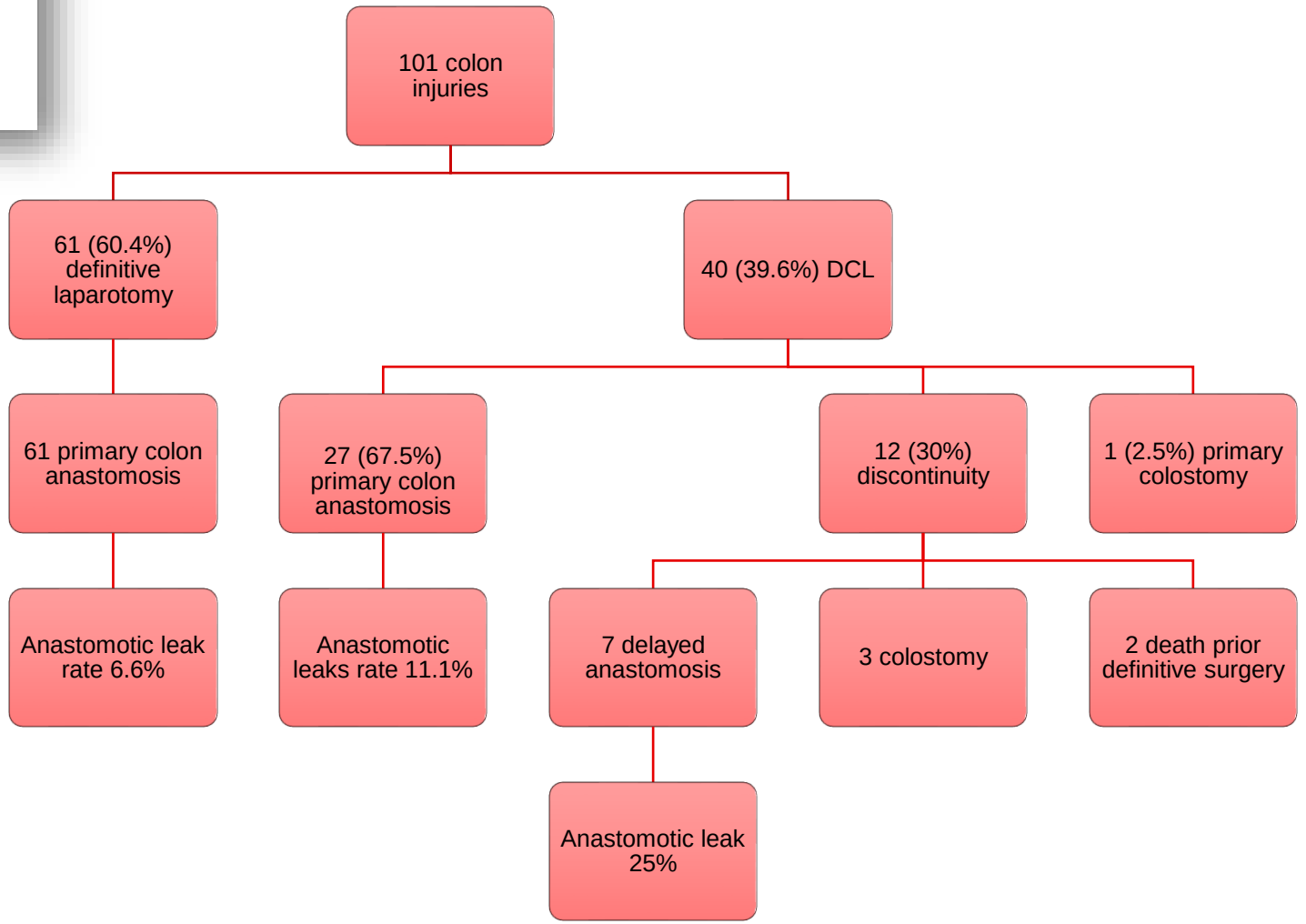
Outcomes of liberal anastomosis policy

J Trauma Acute Care Surg. 2022 Jan 25. doi: 10.1097/TA.0000000000003513. Online ahead of print.

DESTRUCTIVE COLON INJURIES REQUIRING RESECTION: IS COLOSTOMY EVER INDICATED?

Delbrynth P Mitchao [1], Meghan R Lewis, Matt Strickland, Elizabeth R Benjamin, Monica D Wong, Demetrios Demetriades

- Retrospective single center study
- N= 101
- Anastomosis: 25 ileocolic, 63 colo-colonic
- Total colostomy rate: 2%
- 8.9% total anastomotic leak rate, all leak colo-colonic, none ileocolic
- Total mortality 7.9% (none colon related)



Military context – A different story?

Comparative Study › J Trauma. 2009 May;66(5):1286-91; discussion 1291-3.
doi: 10.1097/TA.0b013e31819ea3fc.

Outcomes of primary repair and primary anastomosis in war-related colon injuries

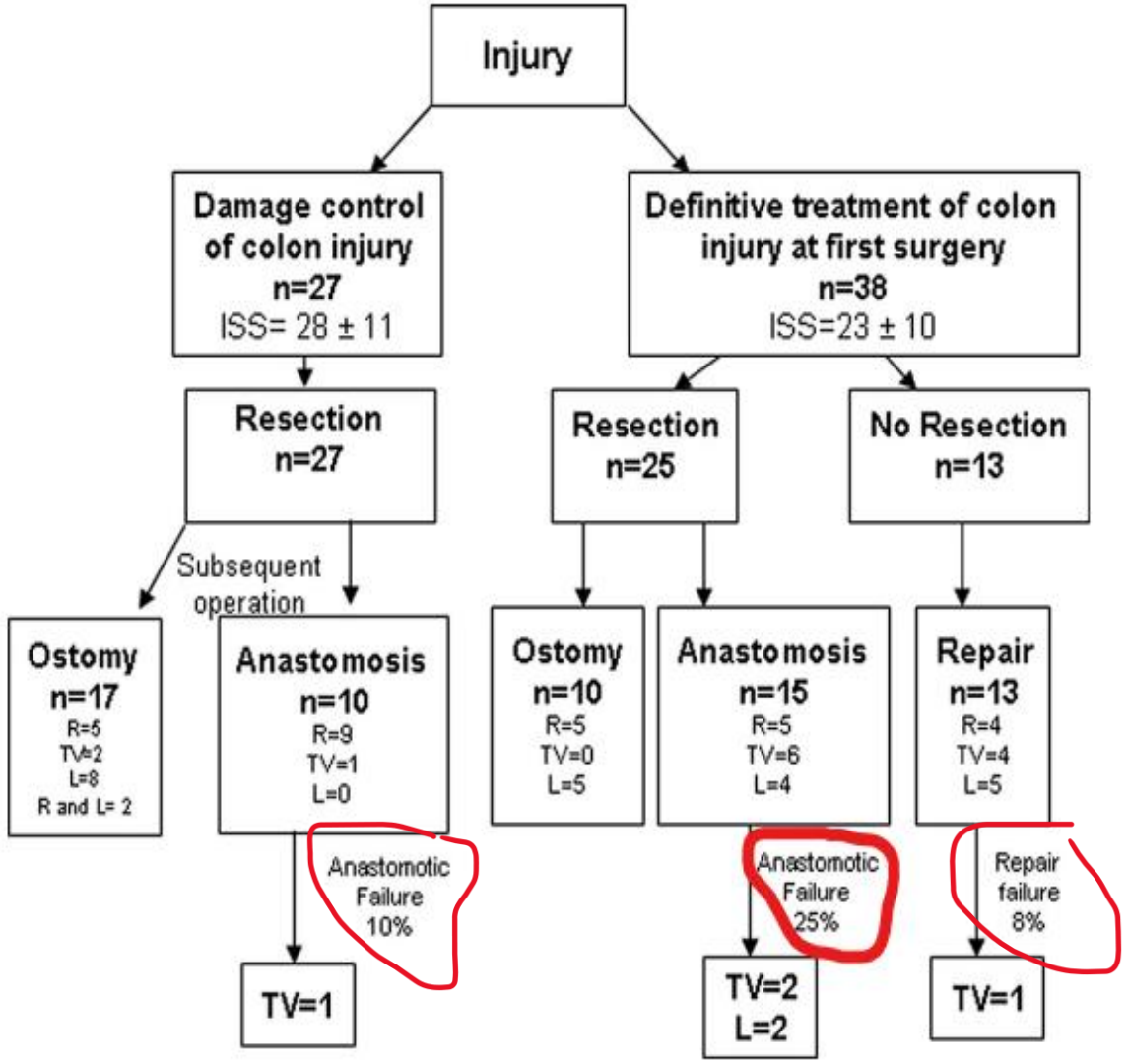
Amy Vertrees [1], Matthew Wakefield, Chris Pickett, Lauren Greer, Abralena Wilson, Sue Gillern, Jeffery Nelson, Jayson Aydelotte, Alexander Stojadinovic, Craig Shriver

Design:

- Retrospective data from US Military
- N=65 (Grades II - V)

Primary management outcome:

- Overall morbidity between diversion vs. PA/PR (37% vs. 29%, p=0.59), not statistically significant!
- **Total anastomotic leak rate in PR/PA group: 16%**
- No failures in right colon PR/PA



Conclusions

- Context matters!!
- Mechanism matters !
- Injury location matters in certain patient groups

- Primary repair and anastomosis is save in low risk settings

- PR/PA can be considered in high risk patients under the right circumstances (but we don't know which these are in the field context !)



Conclusions

"All the circumstances of war surgery thus do violence to civilian concepts of trauma surgery."

- M. DeBakey, Military surgery in World War II; a backward glance and a forward look. 1947

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Case scenario II – MSF rural surgical project

GSW to R abdomen 11 hrs ago

- on arrival BP 120/60 HR 100, SpO2 96% on room air, GCS15,
- abdominal guarding, no exit wound

Laparotomy:

- Isolated injury to caecum >50 % circumference, moderate fecal soiling
- No active bleeding, stable vitals

Context:

- Rural hospital, no referral option
- On site: rudimentary ICU (no vent no pressors), X ray and ultrasound

