Colorectal Anastomotic Leaks

Khaled Madbouly, MD, PhD, FRCS, FACS, FASCRS, FISUCRS, MBA Professor and Chairman of Colorectal Surgery Department University of Alexandria, EGYPT President of ESCRS Vice President of Egyptian Board of Surgery Vice President of Egyptian Board of Colorectal Surgery





How many consider it personal defeat?





Postoperative Anastomotic leak

How Common is the problem?

Ileocolic anastomosis2-7%Ileorectal Anastomosis7-9 %Colocolic Anastomosis3- 6%High Colorectal Anastomosis3- 7%Low Colorectal Anastomosis2- 23%





Bruce et al, BJS 2001 (88) 1157 Blumetti et al WJGI 2015 7(12)378



Postoperative Anastomotic leak

Variable definitions > 20 (Tan et al, BJS 2009)

- Variable reported rates
- Clinical vs. radiological
- Mostly clinical diagnosis





Colorectal anastomotic leak

Definition

- Defect of the intestinal wall integrity at the anastomotic site leading to communication between intra and extra luminal compartments
- Pelvic abscess close to the anastomosis
- Grading of severity
 - Grade A: no active therapy required
 - **)** Grade B: Active intervention but no re laparotomy
 - Grade C: Relaparotomy
 - International rectal cancer study group (Surgery 2010)





Risk factors of leak

- Preoperative:
 - Obesity
 - Male gender
 - Tobacco and alcohol
 - ASA Status
 - Diverticular disease
 - Radiation and steroids
 - Nutrition





Risk factors of leak

- Intra-operative:
 - Anastomotic height
 - Duration of operation
 - Anastomotic ischemia
 - Lap Vs. open
 - Stapled Vs. hand swen
 - Omental raping
 - Leak test







Timing of Colorectal anastomotic leak

Anywhere from 3- 45 days

2 peaks:

Clinical : median 7 days

Radiological : median 16 days

12% are diagnosed > 30 days postop





Postoperative Leak

Prevention

 Proper mobilization
 Good blood supply to anastomotic line (pulsatile marginal)
 Tension free

High ligation!!!







IMA ligation















Liberal use of diverting loop ileostomy after LCR or LCA

8- 18% leeks generally reported
10% with stoma
18% without stoma
Stoma abolish consequences of leak







Anastomotic leak test

Clinical leak rate %No leak test8.1%-ve leak test3.8%

-ve leak test +ve leak test

7.7%

Proximal diversion0%Suture repair12.2%Revise anastomosis0%







Tension

Any acceptable level of tension??
No data!!!!
In canine models, tension decrease submucosal blood flow

J Surg res 1986





Postoperative Leak

Perfusion

▶ If post anastomotic Pao2 < 50% of pre anastomotic Pao2 = leak

DCR 1987

Now

Florescent vascular angiography

to check anastomotic perfusion











Trials to prevent leak

- Intra-luminal tube
 - Coloshield (permanent)
 - SBS tube (absorbable)
- Glue reinforcement
- Staple line reinforcement
 - **ROC Madbouly et al, DCR 2010**
 - Seamguard Senagore et al, DCR 2014
- Bovine pericardial collagen strips (animal trials, vascular in human)
- Florescent angiography
- Omental pedicle graft





Valtrac secured intracolonic bypass (VIB)





- VIB is a safe and effective diverting technique to protect an elective low colorectal anastomosis
- It avoids stoma-related complications and lowers the cost.

NB : No randomization and high probability of introduction of bias

Ye F et al, DCR 2008;51:109





Regenerated Oxidized Cellulose Reinforcement of Low Rectal Anastomosis: Do We Still Need Diversion?

Khaled M. Madbouly, M.D., Ph.D.¹ • Ahmed Hussein, M.D., Ph.D.¹

Conclusions:
 Decreases leak
 Insignificant difference





Prevention.....other consideration

Restrictive fluid strategy





Fluid therapy

A. K. Boesen et al. Colorect Dis 2013







How to mitigate risk?

Beneficial

Proximal diversion

Selective HS anastomosis

Restricted fluid strategy

Air leak test

No benefit

Bowel prep Drains

Omental wrapping

reinforcement





Consequences of Anastomotic leak

Peritonitis

- Fistula formation (rectovaginal or uretheral)
- Chronic pelvic sepsis (PET-CT)
- Stenosis





Consequences of leak

Higher rate of recurrence in cancer
Lower OS by 10- 20 % and DFS (HR 1.8)
Explanations:

- Lower impunity
- Tumor implantation





Original research

Anastomic leak in colorectal cancer surgery. Development of a diagnostic index (DIACOLE)



Silvia-Angélica Rojas-Machado ^a, Manuel Romero ^{a, b}, Antonio Arroyo ^{b, *}, Adaly Rojas-Machado ^a, Jerónimo López ^b, Rafael Calpena ^b

^a Coloproctology Unit, Department of Surgery, University Hospital of Alicante, Spain ^b Department of Pathology and Surgery, School of Medicine, Miguel Hernandez University, Elche, Spain

DIACOLE index.

DIACOLE index	
Postoperative clinical signs and symptoms included in DIACOLE score registered during anytime in postoperative period	Weight
Postoperative fever (≥38 °C)	1.517
Postoperative blood transfusion	1.635
Surgical wound infection	1.500
Prolonged ileus (>3 postoperative days)	1.497
Diarrhea	1.366
Abdominal pain	1.632
Cardiac complications	1.879
Respiratory tract complications	1 740
Neurological complications	2.318
Urinary complications	1.205
Leukocytosis (>12,000 unit/mm3)	1.788
Blood urea levels $> 48 \text{ mg/dl}$	2,206
C-reactive protein levels > 20 mg/dl from third postoperative day	3.602





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If the DIACOLE score is > 3.065, obtaining a complete blood count and reevaluating the score daily are recommended
 In cases of a DIACOLE higher than 5.436, a radiological test (CT scan or soluble contrastenema) is advised











Prediction of anastomotic leak in colorectal cancer surgery based on a new prognostic index PROCOLE (prognostic colorectal leakage) developed from the meta-analysis of observational studies of risk factors

S. A. Rojas-Machado^{1,2} • M. Romero-Simó^{1,2} • A. Arroyo^{2,3} • A. Rojas-Machado^{1,2} • J. López² • R. Calpena^{2,3}

 Table 1
 Weight of the factors for the calculation of the prognostic index of anastomotic leak in colorectal cancer surgery PROCOLE (prognostic colorectal leakage)

Factor	Weight (β)
Drugs consumption (alcohol and/or tobacco)	0.40
Diabetes mellitus	0.47
Cardiovascular diseases	0.26
Respiratory diseases	0.64
Renal pathology	0.45
Hepatic pathology	0.58
Concurrency presented pathologies	0.93
Male sex	0.41
Obesity (IMC>30 kg/m ²)	0.52
Classification ASA ≥ 3	0.57
Steroids consumption	0.70
Neoadjuvant treatment	0.47
Preoperative serum haemoglobin levels <11.0 g/dl Preoperative leukocyte count >12,000/mm ³	0.90
Preoperative albumin levels <3.5 g/dl	0.99
Emergency surgery	0.67
Additional surgery simultaneous to colorectal surgery	0.55
Mechanical anastomosis	0.19
Intraoperative blood transfusion	0.81
Intraoperative adverse event that the primary surgeon considered as such and reflects on the part of theatre	1.08

Table 2 Weight of the factor concerning the type of surgical intervention in colorectal cancer for the calculation of the prognostic index of anastomotic leak PROCOLE (prognostic colorectal leakage)	
Factor	Weight (β)
Intraperitoneal resection: high anterior resection (anastomosis placed more than 10 cm far from the anal verge), right hemicolectomy, high left segmental colectomy, left hemicolectomy, transverse hemicolectomies, sigmoidectomy and subtotal colectomy	0.00
Low anterior resection (anastomosis placed less than 5 cm from the anal verge)	0.82
Ultra-low anterior resection (anastomosis placed between 5 and 10 cm from the anal verge)	1.64







Postoperative Leak



PROCOLE prognostic index establishes a discrimination value threshold of 4.83 for recommending the implementation of a protective stoma





Attempts to preserve anastomosis

- Drain sepsis early
 - Trans-rectal
 - Trans-abdominal
 - Radiologic
 - Trans-vaginal





Endoscopic adjuncts

Limited case reports and series
 Covered stents
 ± diversion
 Possible migration







Endoscopic Clip

Standard clips (used to control bleeding) can be used (low closure force and are limited in size)

- Not ideal in closing anastomotic leaks
- > Tissue is scarred and fibrotic, and often irradiated.
- Over the scope clip loaded at the tip of the endoscope (OTSC, Ovesco)
 - Larger clip area and increased compression
 - Allows for full thickness closure
 - The wall is anchored with a dedicated grasper and bowel wall is suctioned as the clip is released

















Endo Sponge

- Open pore polyester sponge attached to suction catheter
- Endoscopic sponge exchange every 3 days for several weeks
- Continuous drainage
- Debridement, rapid cleaning of the wound cavity
- Promotes granulation
- Controls infection







Endo Sponge

- Indication
 - Leak following colo-rectal surgery with anastomosis in the extraperitoneal position
 - Hartmann's stump leak in the area of the lower pelvic area (extraperitoneal position)
 - No benefit in intraperitoneal anastomosis
- Treatment criteria
 - Endoscopically accessible leakage
 - Rapid clinical improvement in patient's condition





Postoperative Leak

Pre-sacral Abscess

 CT guided aspiration
 If reoperation, unroofed and debridement







Endorectal Flap

Transanal Endorectal flap advancement closure of the defect

Flaps were created after excising and closing the sinus opening,





Marsupialization of the presacral sinus

- Marsupialization of the presacral sinus can be performed utilizing an endoscopic stapler, electrocautery, or laparoscopic electrocautery scissors
- This allows complete drainage of the cavity with incorporation of the sinus tract into the lumen of the bowel





Postoperative Leak









If you can, keep anastomosis after lavage, drainage and diversion





Redo CAA or CRA

- 66 failed anastomosis
- ▶ 44 CRA and 22 CAA
- 32% morbidity (bladder, ureter and nerve injuries common)
- 8% recurrent leaks
- Only 72% were stoma free

Petil et al, Ann Surg 2012





Redo CAA or CRA

- 33 failed anastomosis
- > 24 CRA and 9 CAA
- 26% morbidity
- 12 % recurrent leaks
- Only 79 % were stoma free
- **56%** failure in prior CAA vs. 8% in prior CRA

Lefevre et al, Surgery 2011, 149: 55





Postoperative Leak







Anastomotic leak <u>Conclusions</u>

- Avoid problems
 - Well vascularized
 - Tension free , Diversion
- Failed CAA most difficult to revise
 - Choose patient carefully
 - Long operation, need good setup and light
 - Beware of bladder, ureter and nerve injuries





Anastomotic leak <u>Conclusions</u>

- Long instruments
- TATA approach, and hand sewn CAA
- Unroof presacral abscess

Mobilize remaining colon to reach anus with no tension





Thank you



