

Management of colorectal injuries: A Western Trauma Association critical decisions algorithm

Walter L. Biffl, MD, Ernest E. Moore, MD, David V. Feliciano, MD, Roxie M. Albrecht, MD, Martin A. Croce, MD, Riyad Karmy-Jones, MD, Nicholas Namias, MD, Susan E. Rowell, MD, Martin A. Schreiber, MD, David V. Shatz, MD, and Karen J. Brasel, MD, MPH, La Jolla, California

DISCLAIMER

The Western Trauma Association (WTA) develops algorithms to provide guidance and recommendations for particular practice areas but does not establish the standard of care. The WTA algorithms are based on the evidence available in the literature and the expert opinion of the task force in the recent timeframe of the publication. The WTA considers use of the algorithm to be voluntary. The ultimate determination regarding its application is to be made by the treating physician and health care professionals with full consideration of the individual patient's clinical status as well as available institutional resources; it is not intended to take the place of health care providers' judgment in diagnosing and treating particular patients.

This is a recommended management algorithm from the WTA addressing the management of colorectal injuries in adult patients. Because there are a paucity of published prospective randomized clinical trials that have generated Class I data, the recommendations herein are based primarily on published observational studies and expert opinion of WTA members. The algorithms (Figs. 1 and 2) and accompanying comments represent a safe and sensible approach that can be followed at most trauma centers. We recognize that there will be patient, personnel, institutional, and situational factors that may warrant or require deviation from the recommended algorithm. We encourage institutions to use this algorithm to formulate their own local protocols.

The algorithm contains letters at decision points; the corresponding paragraphs in the text elaborate on the thought process and cite pertinent literature. The annotated algorithm is

intended to (a) serve as a quick bedside reference for clinicians, (b) foster more detailed patient care protocols that will allow for prospective data collection and analysis to identify best practices, and (c) generate research projects to answer specific questions concerning decision making in the management of adults with colorectal injuries.

The management of injuries to the colon and rectum has evolved over the past few decades. While the concept of mandatory colostomy was discarded many years ago, there are many considerations that stir debate among trauma surgeons. Because the location of injury is pivotal in developing clinical care guidelines for colorectal injuries, there are two algorithms: one pertaining to colon and intraperitoneal rectum (Fig. 1) and one for extraperitoneal rectal injuries (Fig. 2). The anatomic differentiation is depicted in Figure 3.¹

Algorithm 1 Colorectal Injuries

Colorectal injuries are often found at the time of surgery. If the patient is critically ill and requires a damage control laparotomy (DCL), spillage from the colonic perforation is rapidly controlled with sutures or staples. A definitive repair or resection has historically not been recommended in the damage control setting. Of note, however, a recent multi-institutional analysis found that many patients could have safe restoration of intestinal continuity at the time of DCL and that stapled discontinuity was associated with higher rates of intestinal ischemia.² Thus, the surgeon may consider restoration of continuity if conditions are favorable.

Mandatory Colostomy

The concept of mandatory colostomy was discarded over two decades ago.³ Colonic wounds that are amenable to primary repair are repaired.

Management of Wounds

The management of more destructive wounds remains a matter of debate. Resection and primary anastomosis is preferred in patients who are reasonably healthy and stable, as colostomy creation and closure are associated with significant cost, morbidity, and compromised quality of life.⁴⁻⁶ Whether the anastomosis should be hand-sewn or stapled remains a subject of debate. There have been numerous studies examining the outcomes of sutured versus stapled repair in trauma

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From the Scripps Memorial Hospital- La Jolla, La Jolla, California (W.L.B.); Denver Health Medical Center/University of Colorado, Denver, Colorado (E.E.M.); R Adams Cowley Shock Trauma Center/University of Maryland, Baltimore, Maryland (D.V.F.); University of Oklahoma Hospital, Oklahoma City, Oklahoma (R.M.A.); University of Tennessee Health Science Center—Memphis, Tennessee (M.A.C.); PeaceHealth Vancouver, Washington (R.K.-J.); Jackson Memorial Hospital/University of Miami, Florida (N.N.); Oregon Health and Science University, Portland, Oregon (S.E.R., M.A.S., K.J.B.); and University of California-Davis Medical Center, Sacramento, California (D.V.S.).

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Address for reprints: Walter L. Biffl, MD, 9888 Genesee Ave, MC LJ601, La Jolla, CA 92037; email: walt@biffl.com.

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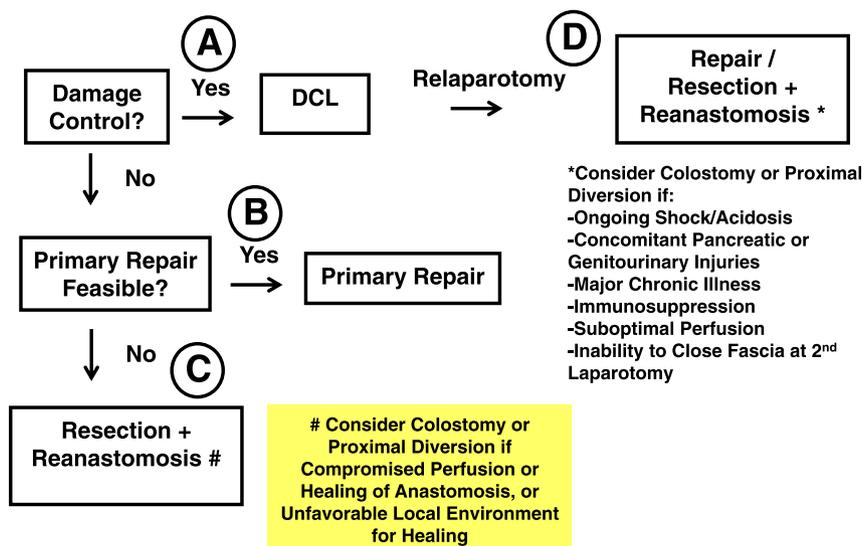


Figure 1. Algorithm for management of wounds to colon and intraperitoneal rectum.

and in emergency surgery, with mixed results.⁷⁻¹⁰ A multicenter study of the WTA⁷ found higher rates of anastomotic leaks and abscesses after stapled repairs, while a multicenter study of the American Association for the Surgery of Trauma⁸ found no significant difference. Most studies are not well-controlled and there is a high risk of bias.¹⁰ Overall, outcomes favor hand-sewn anastomoses, but it is acknowledged that the optimal technique in healthy bowel is the one with which the surgeon is most comfortable.^{7,10}

Diversion is not recommended routinely, but there are situations in which it might be considered. In 1994, the Memphis group¹¹ proposed resection with primary repair for destructive colon wounds unless the patient received six or more units of packed red blood cells or had comorbid medical diseases. The group continues to promote this approach for penetrating¹² as well as blunt¹³ colonic injuries, with morbidity and

mortality rates comparing favorably with contemporary published literature.¹⁴⁻¹⁷ On the other hand, a prospective multicenter study of the American Association for the Surgery of Trauma¹⁴ concluded that the surgical method of colon management was not the determinant of abdominal complications, and suggested that primary anastomosis be considered in all patients. The current algorithm encourages the surgeon to perform primary repair or anastomosis but to use his or her judgment if there are real risks of anastomotic failure. We offer factors for consideration to include those that might compromise perfusion or healing of the anastomosis (e.g., persistent shock, heart failure, chronic steroid use) or create an unfavorable local environment for healing (e.g., potential exposure to leaking urine or pancreatic enzymes).

To improve quality of life and avoid stoma-related complications, the surgeon may consider early ostomy closure, that is,

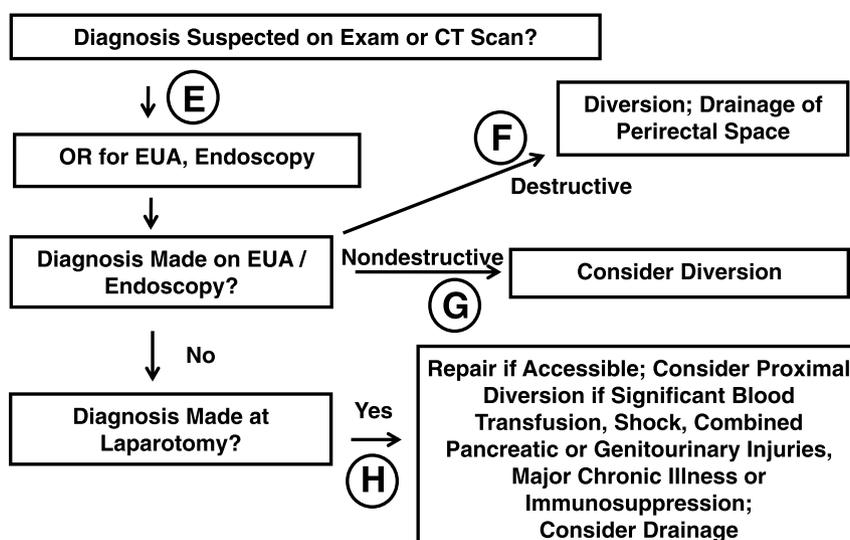


Figure 2. Algorithm for management of wounds to extraperitoneal rectum.

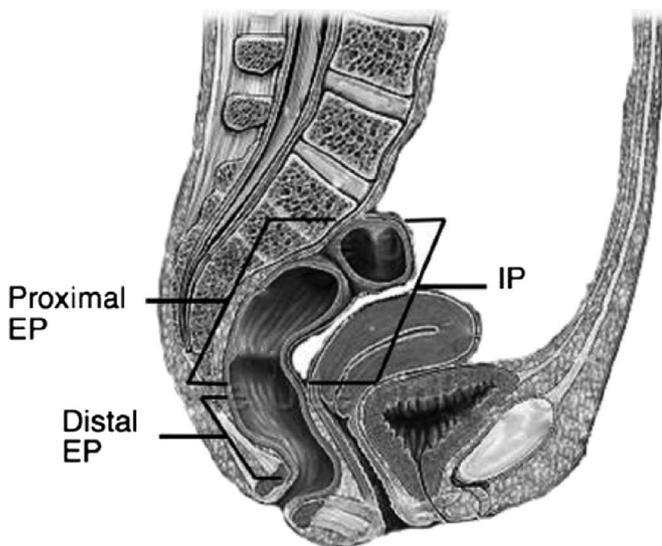


Figure 3. The intraperitoneal (IP) and extraperitoneal (EP) divisions of the rectum. Reproduced with permission from Weinberg JA, Fabian TC, Magnotti LJ, Minard G, Bee TK, Edwards N, Claridge JA, Croce MA. Penetrating rectal trauma: management by anatomic distinction improves outcome. *J Trauma* 2006; 60(3):508–514.

within 15 days of injury. Studies from Johannesburg¹⁸ and Atlanta¹⁹ have found that 60% to 80% of patients have no major complications and have contrast enema evidence of rectal healing by day 10 and are thus candidates for ostomy closure. Velmahos et al.¹⁸ found that early colostomy closure was “technically far easier,” associated with shorter operative times and less blood loss compared with late closure.

Management of Colonic Injury

Following DCL, the patient is returned to the operating room (OR) once physiologically optimized. At this time, definitive management of the colonic injury is undertaken. A number of groups have reported suture line failure rates between 12% and 27% in this setting.^{15–17,20} While primary anastomosis is considered relatively safe and preferable to colostomy, there are a few important considerations. First, leak rates are significantly higher if the anastomosis is not performed at the first reoperation (19% vs 2%).²¹ Second, a WTA multicenter study²² found that leak rates were fourfold higher if the anastomosis was performed at five or more days after the index operation. In addition, the WTA trial²² reported leak rates of 3% when a right colon anastomosis was performed after initial DCL, 20% after a transverse colon anastomosis, and 45% after a left colon anastomosis. Thus, in the current algorithm, we suggest that the surgeon consider diversion after DCL if one of the following is present: ongoing shock or acidosis, concomitant pancreatic or genitourinary injuries, major chronic illness, immunosuppression, or inability to close the fascia at the second laparotomy. In addition, the surgeon should ensure excellent perfusion of the bowel at any proposed site of anastomosis.

In the discussion of diversion for destructive colonic injuries, diversion generally implies end colostomy. Exteriorizing a

colonic repair, or “protecting” a colonic anastomosis with proximal diversion (ileostomy or proximal colostomy) is occasionally performed, but comparative data are lacking. It is likely that, just as primary anastomosis and proximal diversion are being performed more for inflammatory problems like diverticulitis,²³ this will be an area of future study in trauma. Whether diversion in trauma is best achieved by colostomy or ileostomy is debated. Loop ileostomies are often recommended over colostomies given the lower reported rate of ileostomy stomal prolapse and lower wound infection rate associated with ileostomy closure. This must be weighed against the increased risk of peristomal skin problems in patients with ileostomies.²⁴ It is important to recognize that the data from randomized controlled trials are mixed and that most of the randomized trials have compared ileostomy with loop transverse colostomy, in the setting of distal colon resection. Very few studies pertain strictly to trauma or compare loop ileostomy with loop sigmoid colostomy. Ultimately, it becomes a matter of personal preference with consideration given to body habitus, the impact of fluid loss, etc.

Algorithm 2

Extraperitoneal Rectum

The extraperitoneal rectum is at particular risk in the setting of penetrating pelvic trauma or major pelvic fractures. An injury may be suspected based on physical examination (e.g., blood on digital rectal examination or suspicion of missile traversing the rectum) or computed tomographic scan findings (e.g., air or fluid adjacent to the rectum). If there is suspicion, it is recommended that the patient be taken to the operating room (OR). The OR is recommended, as it allows diagnostic as well as therapeutic maneuvers in one place, under anesthesia. In the OR, the patient should be placed in low lithotomy position. This will allow for examination under anesthesia (EUA) and rigid (preferred over flexible) proctosigmoidoscopy, as well as laparotomy or laparoscopy if necessary.

Destructive Rectal Injury

If there is a destructive injury of the rectum (i.e., >25% of the circumference of the wall), it is recommended that a diverting ostomy be created. In addition, the surgeon should consider draining the perirectal space to avoid pelvic sepsis. Laparoscopy may be used to exclude intraperitoneal injury and to create a loop ileostomy or colostomy.^{25,26}

Nondestructive Rectal Injury

If a nondestructive injury is found on EUA or endoscopy, the surgeon may consider repair if the wound is readily accessible and should consider diversion with either colostomy or ileostomy. Again, this can be done laparoscopically.^{25,26} Fecal diversion has been a longstanding fundamental component of management of rectal injuries to minimize the risk of pelvic sepsis. The group from Ben Taub²⁷ reaffirmed that in 1989, suggesting that while colonic washout and attempts at repair of the rectal injury were not necessary or beneficial to the patient, colostomy and presacral drainage were essential. Both of these practices have been called into question.

A recent practice management guideline promulgated by the Eastern Association for the Surgery of Trauma²⁸

conditionally recommends proximal diversion versus no diversion for extraperitoneal rectal injuries, irrespective of the degree of tissue destruction. This is based on a higher rate of infection without diversion (18% vs 9%), but also recognition that the quality of evidence is poor, with only one prospective trial of 14 patients.²⁹

The Eastern Association for the Surgery of Trauma guideline²⁸ recommends against routine presacral drainage. The data pertaining to this intervention are similarly sparse, as only one prospective randomized trial could be found.³⁰ From that trial, Gonzalez et al.³⁰ reported no difference in outcomes related to presacral drainage. However, their methodology must be examined. They describe that “No attempt was made to expose or repair the extraperitoneal rectal injuries unless dissection to expose other extraperitoneal structures (i.e., bladder, bleeding vessels) exposed the rectal injury. When rectal injury exposure occurred, it was primarily repaired. . . .” Among 23 patients in the “no presacral drainage” group, 13 had bladder injuries, 1 had a ureteral injury, and 3 had major vascular injury. Without further detail offered by the authors, it seems that many potentially had the extraperitoneal space opened, in effect converting it to an intraperitoneal injury. In the absence of solid data refuting the practice, it makes intuitive sense that drainage should be considered in the setting of destructive extraperitoneal wounds (see “Destructive Rectal Injury” subsection) or a collection of blood, fluid, and air trapped in the extraperitoneal perirectal space. On the other hand, as the series from Cape Town²⁵ and a recent series from Los Angeles³¹ indicate, many extraperitoneal rectal wounds can be managed safely without perirectal drainage. Of note, most patients in the Cape Town²⁵ and Los Angeles³¹ series had diverting colostomy.

Diagnosis at Laparotomy

If the diagnosis is made at laparotomy, that is, if the extraperitoneal space is entered and the injury visualized, it should be managed like an intraperitoneal rectal injury with consideration of diversion and drainage for the same indications previously noted.

AUTHORSHIP

W.L.B., E.E.M., D.V.F., R.M.A., M.A.C., R.K.J., N.N., S.E.R., M.A.S., D.V.S., and K.J.B. designed the algorithm. All authors contributed to the literature search and participated in algorithm creation and initial manuscript preparation. All authors contributed to critical revision of the manuscript.

DISCLOSURE

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