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## **Early closure of colostomy from abdominal trauma may be beneficial in otherwise healthy patients**

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# Early closure of colostomy from abdominal trauma may be beneficial in otherwise healthy patients

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**ABSTRACT** A clinical decision report using:

Khalid MS, Moeen S, Khan AW, Arshad R, Khan AF. Same admission colostomy closure: a prospective, randomised study in selected patient groups. *Surgeon*. 2005;3(1):11-14. [https://doi.org/10.1016/s1479-666x\(05\)80004-6](https://doi.org/10.1016/s1479-666x(05)80004-6)

for a patient with loop transverse colostomy due to trauma.

**Keywords:** *early ostomy closure, ostomy reversal, trauma, colon injury, surgical, adult, hospital length of stay*

## Clinical-Social Context

Mr. Jamal Harris [pseudonym] is a 19-year-old otherwise healthy gentleman who presented to a major urban hospital as a trauma code after he sustained multiple gunshot wounds to the right anteromedial knee, right lateral posterior knee, right anterior hip, and left flank. He has no other past medical or family histories and denies any past surgeries.

On Mr. Harris's initial presentation to the Emergency Room, CT abdomen and pelvis demonstrated evidence of penetrating splenic injury. Due to this, the decision was made to proceed with diagnostic laparotomy, with possible exploratory laparotomy to assess the patient's spleen and to rule out any diaphragmatic and hollow viscus injury. Mr. Harris was taken to the operating room under emergent consent at that time. A grade III injury to Mr. Harris's spleen was discovered, as well as a diaphragmatic injury with herniation of the omentum and the upper pole of the spleen. At this point, Mr. Harris underwent splenectomy and repair of a diaphragmatic laceration. He then underwent open reduction and internal fixation for his other fractures two days later. Following these procedures, Mr. Harris initially did well. However, five days after his initial splenectomy, he became tachycardic and distended. Chest x-ray showed pneumoperitoneum. He was consequently taken to the operating room for exploratory laparotomy where he was found to have a previously missed colonic injury in the splenic flexure, which was primarily repaired. He underwent a temporary diverting transverse loop colostomy.

Throughout his hospital stay Mr. Harris struggled with pain from his injuries and questioned how and when he'd be able to get back to living his normal life. He was expressing frustration being in the hospital and having to deal with his long midline incision, his left leg, and now this new colostomy. He describes always having been "pretty active" before his surgery "doing a lot of running." Mr. Harris is also in trade school for welding after having graduated high school. He wanted to finish trade school quickly to better be able to support himself and his family. He lives at home with his mother and sister who comprise his main social support system. His family will be able to help him

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with transportation to physical therapy and rehabilitation, but he mentions how “they are not always able to be around.”

Mr. Harris’s accident and its aftereffects has undoubtedly affected his mental health, as has the fact that he may have ostomy for the foreseeable future. Mr. Harris has found that dealing with his new colostomy on top of his other injuries to be very challenging. It is in close proximity to his midline laparotomy incision, but both are healing well. His leg is also improving at an appropriate pace. He states that closure by even a single month earlier would greatly contribute to him feeling more normal. This is an example of the effects of stigma (“spoiled identity”) in the clinical setting.<sup>1</sup> Although he has concerns about undergoing another surgery, he wonders about the possibility of having his colostomy reversed “earlier rather than later,” and if the risks are any less if he waits.

## Clinical Question

Does early closure of colostomy from abdominal trauma in otherwise healthy patients correlate to any increased risk of postoperative complications?

## Research Article

Khalid MS, Moeen S, Khan AW, Arshad R, Khan AF. Same admission colostomy closure: a prospective, randomised study in selected patient groups. *Surgeon.* 2005;3(1):11-14. [https://doi.org/10.1016/s1479-666x\(05\)80004-6](https://doi.org/10.1016/s1479-666x(05)80004-6)<sup>2</sup>

## Description of Related Literature

The literature review began on PubMed with an initial search of “ostomy ("closure" OR "reversal").” This yielded 444 results, which included 201 reviews, 200 clinical trials, 139 randomized controlled trials, 65 meta-analyses, and 69 systemic reviews. Restricting the search to only the randomized controlled trials, meta-analyses, and systemic reviews, resulted in 229 articles. Upon further examination, many of these publications were in reference to various aspects of ostomy closure methods, complications, and related diagnoses such as ulcerative colitis, perforated diverticulitis, and *Clostridioides difficile* infection. Specifically, many articles focused only on patients with rectal resections for cancer. These publications were excluded from final review.

After applying the search parameters previously described, three articles remained that addressed the clinical question of this decision report and remained relevant to our patient, who is an otherwise healthy young man with a colostomy that has been interfering significantly with his daily life. Three other articles were also relevant but were repetitive in the findings they demonstrated, so only one is described thoroughly here.<sup>3-6</sup> All these publications focused predominantly on early versus late closure of ileostomies and colostomies. MeSH terms were then reviewed which did not yield any additional results. Finally, Google Scholar was utilized to search for any overlooked studies under the “related articles” section. This yielded 1 additional relevant article. Overall, this body of evidence falls into the B category of the SORT criteria.<sup>7</sup>

The first article of interest is Clausen et al., which is a systemic review and meta-analysis of randomized control trials. This study was published in 2021 and focused mainly on early reversal of nonfunctioning ileostomy in patients with rectal resection.<sup>6</sup> It is representative of the numerous other publications on timing of ostomy closure in this patient demographic. They define early closure as closure within 6 weeks and identified six randomized controlled trials following 528 patients. Clausen et al. concluded that there was no statistically significant difference in postoperative complications when comparing early and standard ileostomy closure in patients with an uncomplicated postoperative course and radiologically verified distal anastomosis. While this publication answers Mr. Harris’s questions about complications after early closure, the patient demographics did not match Mr. Harris. All patients included had rectal resections, mostly due to colorectal cancer.

The second article by Ng et al. is a meta-analysis of nine difference studies from Medline and Cochrane databases that aimed to evaluate postoperative morbidity and feasibility of early stoma reversal within 14 days of the index operation.<sup>8</sup> In contrast, late stoma reversal was defined as occurring at least 8 weeks from the index operation. Among the 667 patients analyzed, they looked at key factors including anastomotic leak, wound infection, bleeding, sepsis, small bowel obstruction, and ileus. The analysis



demonstrated no differences in all these factors except wound infection rate, which was significantly higher after early closure compared to late closure (relative difference of 0.10 with 95% confidence interval of 0.00-0.19,  $p=0.047$ ). They conclude that early stoma closure was associated with a reduction in stoma-related complications, despite higher wound infection rates, but that more research still needs to be conducted.

Another article of interest to our patient, Velmahos et al., is a prospective randomized trial that studied early versus late closure of colostomies in trauma patients.<sup>9</sup> In this study, 49 patients with colostomies after abdominal trauma were assessed for distal colon healing. Early closure was defined as ostomy reversal within 15 days of ostomy creation while late closure was reversal after at least 90 days. Velmahos et al, found that early closure of loop colostomies resulted in no significant differences in morbidity compared to late closure. Additionally, the technical difficulty of early closure was lower, with corresponding shorter operating times and less intraoperative blood loss. This article is prospective, randomized, and controlled, which lends credence to its findings. The patient demographics also match Mr. Harris as they focused on colostomies created due to abdominal trauma. However, it was also published in 1995, which would exclude a significant number of new findings that may have been uncovered in that past two decades.

Finally, Khalid et al. is a prospective, randomized controlled study to compare the outcome after same admission colostomy closure (SACC) within two weeks and conventional delayed colostomy closure (CDCC) in 60 patients with predominantly traumatic injury of the large bowel.<sup>2</sup> The patient population matches Mr. Harris very well, as does the goal of earlier ostomy closure. Khaled et al. finds that rate of complications was similar between the two groups, but that the length of hospital stay and overall healthcare costs were reduced. The complications studied included wound infection, fecal fistula, chest infection, and deep vein thrombosis. These findings agree with results from other primary research papers and the many meta-analyses that my search returned. They conclude that in otherwise fit and healthy patients with normal wound healing, SACC is safe and cost-effective option. Importantly, subjective quality of life assessed on a simple scale was significantly higher in patients who had SACC compared to CDCC. Alongside the previously described articles, this one is the best fit both in terms of the patients and the question they try to answer.

## Critical Appraisal

The Khalid et al. study, as mentioned previously is the most fitting primary research article to answer our patient's question on earlier closure of colostomy. It was a prospective, randomized controlled study. Almost all the randomized patients had colorectal trauma as the primary pathology. Patients were excluded if they needed a permanent colostomy, had inflammatory bowel disease, had intra-abdominal sepsis or wound infection as a complication during the primary surgery, or had poor general condition.<sup>2</sup> Confounding from pre-operative demographics was minimal, as patients in both the control and experimental arms of the trial had comparable ages, gender distribution, and causes of colorectal pathologies.

Colostomy closure was done under a single surgeon to minimize confounding. SACC occurred between the first and second weeks following stoma formation, while CDCC occurred six to twelve weeks after the index operation. Closure during this early proliferative time period, if possible, was conducive to better wound and anastomotic healing. The appropriate bowel preparations and fluids were completed for all patients. Follow-up was done every two weeks for complications and quality of life. These methods lend to the validity of this study. Blinding was not mentioned as a patient would know if they had an early closure. The study had a relatively small sample size, and lack of blinding. However, it had good follow-up and comparable patient outcomes with other studies on the same subject. The level of evidence for this article is II.<sup>2</sup>

### Clinical Application

Mr. Harris is interested in having his colostomy reversed as soon as medically possible. He is worried about not being mobile and having the colostomy bag rupture or leak. He does struggle with completing some activities of daily living from his leg injury. Outside of this, Mr. Harris does not endorse difficulties with housing, nutrition, or family support when he leaves the hospital. Our chosen article demonstrates that there is no greater increase in risks if an ostomy is closed within the same admission. Other studies also report similar findings, with the exception from one study that wound infection risk may increase. Benefits would include not needing an additional hospitalization down the road and not having to live with an ostomy at home while he also deals with rehabilitation and trade school. After risks and benefits were communicated to him, Mr. Harris is strongly



considering aiming for this accelerated timeline, especially since the study demographics tightly correspond to Mr. Harris and how overall postoperative risks are unchanged. Because he also had an initial missed injury, Mr. Harris prefers to have his reversal done within the same hospital admission to avoid returning for additional complications. From a medical standpoint, he is stable with well healing incisions and would likely be a good candidate for early closure.

After this decision report was initially submitted for review, Mr. Harris continued to be hospitalized. Over the course of the following 3 weeks during his hospital stay, Mr. Harris familiarized himself with the management of his colostomy and received the necessary supplies. In the end, he decided not to pursue early colostomy closure, as he had a prolonged hospital course and wanted to be discharged. Given his acceptance and proper understanding of colostomy maintenance, the care team agreed. Mr. Harris ultimately returned 6 months after his initial surgery to have the colostomy reversed. At subsequent clinic follow-ups he has been doing well and was satisfied that his own decisions and choice played a large role in his clinical decision making.

## New Knowledge Related to Clinical Decision Science

An interval time of at least three months has been the standard for ostomy reversal. However, literature review suggests that early reversal may benefit certain patients more than this standard length of time. Longer interval time from ileostomy creation to closure was also a factor associated with postoperative ileus after loop ileostomy closure.<sup>10</sup> Particularly motivated patients like Mr. Harris may find greater satisfaction from shorter length of time with an ostomy. While this is not the appropriate approach for most patients, Mr. Harris is young, otherwise healthy individual and was initially interested in being rid of his ostomy. For patients who do take initiative on their preferences, this type of shared decision making will lead to the best possible outcomes.

Of course, this clinical decision report highlights the need for the treating physicians to be willing to consider this management. A research question related to Clinical Decision Science is provider acceptance of early reversal after literature review. In this way, the standard of care depends on the willingness of physicians to explore, consider, and offer a different management.

## Conflict Of Interest Statement

The author declares no conflicts of interest.

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