Mechanism-Stratified Complications After Operative Management of Low-Grade Colon Injuries

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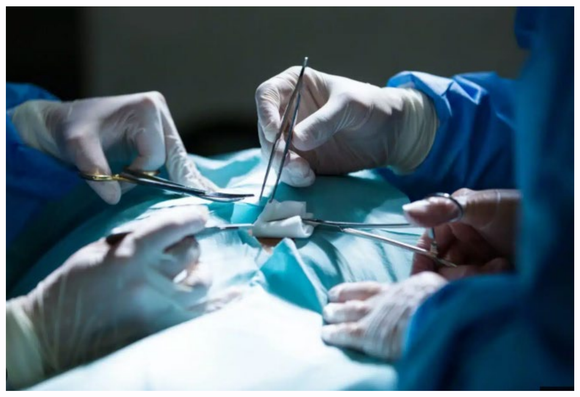
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Background

The management of traumatic colon injuries has undergone significant changes in modern history. Access to surgical care for ballistic colon injuries during both World Wars I and II led to reduced rates of sepsis and made previously lethal injuries survivable.

More new advances led to fecal diversion over local repair alone, colostomy creation, and the advent of the surgical stapler for anastomosis revolutionized modern surgery.

For low-grade colon injury, patients managed with resection with anastomosis (RWA) versus primary repair (PR) demonstrate higher rates of adverse outcomes. However, the relationship between the repair type chosen and mechanism of injury remains unknown. This study aims to compare complications between PR and RWA in patients with low grade colon injuries dichotomized by mechanism of injury.



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Methods

This was a secondary analysis of an Eastern Association for the Surgery of Trauma retrospective multicenter trial. Data were collected from 32 level I trauma centers. Patients presenting between 2011 and 2021 who underwent operative intervention were eligible for inclusion. Data, including mechanism of injury and repair type, were collected from operative notes. The type of repair used was at the discretion of the operative surgeon. The primary outcome was composite surgical site infection (SSI) rates inclusive of superficial SSI, deep SSI, and organ space infection. Secondary outcomes include rates of deep and superficial SSI, and organ space infection.



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Results

A total of 2058 patients met inclusion criteria; 79% were male and 58% had penetrating injuries. Among patients with blunt colon injuries, 636 (74%) underwent PR. American Association for the Surgery of Trauma grade, injury location, and fecal contamination differed between repair strategies for patients with a blunt mechanism. Blunt injuries repaired with RWA had increased rates of composite SSI, superficial SSI, organ space infection, and colonic leak.

On multivariable logistic regression, after controlling for vital signs at presentation, injury severity score, and fecal contamination, RWA was found to be an independent predictor of composite (adjusted odds ratio (aOR): 2.52, 95% confidence interval (CI): 1.08-5.82) and superficial SSI (aOR: 7.44, 95% CI: 2.12-28.60). In penetrating trauma, 58% of patients underwent PR. Initial systolic blood pressure, injury severity, fecal contamination, and injury location differed between repair types. Patients with penetrating injuries who underwent RWA had higher rates of superficial SSI, deep SSI, organ space infection, colonic leak, and enterocutaneous fistula formation compared to the PR group. On multivariable regression, RWA was independently associated with composite SSI (aOR: 1.56, 95% CI: 1.05-2.33), deep SSI (aOR: 2.57, 95% CI: 1.29-5.40), and suture line failure (aOR: 2.17, 95% CI: 1.03-4.92) after controlling for vital signs at presentation, injury severity score, AAST grade, and fecal contamination.

Table 3 – Outcomes in patients with AAST Grade I and II colon injuries by mechanism of injury.

Data point	All patients (n = 2058)	Blunt (n = 859)	Penetrating (n = 1199)	P value
Sepsis	132 (6%)	54 (6%)	78 (7%)	0.796
Composite SSI	291 (14%)	66 (8%)	225 (19%)	<0.001*
Superficial SSI	101 (5%)	20 (2%)	81 (7%)	<0.001*
Deep SSI	87 (4%)	24 (3%)	63 (5%)	0.009*
Organ space infection	136 (7%)	21 (2%)	115 (10%)	<0.001*
Suture line failure	68 (3%)	18 (2%)	50 (4%)	0.010*
Fascial dehiscence	87 (4%)	17 (2%)	70 (6%)	<0.001*
ECF formation	30 (1%)	6 (1%)	24 (2%)	0.056
Unplanned return to OR	218 (11%)	78 (9%)	140 (12%)	0.052
ICU LOS	3 [0-7]	4 [0-9.5]	2 [0-4.5]	<0.001*
Hospital LOS	10 [3.5-16.5]	12 [3.5-20.5]	9 [3.5-14.5]	<0.001*
30-d mortality	111 (5%)	71 (8%)	40 (3%)	<0.001*

OR = operating room; ICU = intensive care unit.
*Indicates statistically significant finding.

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Conclusions

Regardless of mechanism, PR was associated with fewer infectious complications than RWA in patients with low-grade colon injuries. PR is the preferred operative strategy in nondestructive injuries when feasible.

References