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Is Ostomy Still Mandatory in Rectal Injuries?

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The aim of this study was to compare the outcomes of the treatment methods of ostomy and primary repair in rectal injuries. A total of 63 patients with rectal injury who had been treated at Dicle University Hospital between 2000 and 2011 were retrospectively reviewed. To determine the outcomes of the treatment methods, the patients were divided into 2 groups (ostomy group: patients who underwent ostomy plus primary repair; repair group: patients who only underwent primary repair) and compared. The patients included 51 men and 12 women. A total of 44 patients underwent ostomy, whereas 19 patients underwent primary repair. No morbidity was detected in either group with grade II intraperitoneal rectal injury. The outcomes of the patients with grade II intraperitoneal and extraperitoneal rectal injury were similar. In the treatment of patients with low-grade rectal injuries, primary repair can be preferred to ostomy.

Key words: Rectal injury – Colostomy – Primary repair

The principles of management of rectal injury have been developed by using wartime experiences. With various treatment methods, the high mortality rates of rectal injuries shown in studies from the early 20th century are now only around 0% to 10% today. Initially, colostomy, and in some cases presacral drainage, was applied for all rectal injuries during World War II, so the mortality rates of rectal injury decreased to 35%. Primary repair and distal rectal washout were added to the treatment and were associated with improved results.[1] During the next few decades, because of the rapid transport of injured patients and improvement in patient management, as well as the development of new antibiotics, the mortality and the morbidity rates were noticeably reduced.[2] During wartime, most of the patients had high-energy injuries, so colostomy was suitable for them. But in peacetime, low-energy rectal injuries were more commonly seen. So, the necessity of ostomy in all rectal injuries came into question. Several factors have been considered important for the decision between primary repair with diversion and primary repair only in the surgical management of rectal injuries. The grade of the injury, trauma treatment interval, presence of fecal contamination, and presence of anal sphincter injury should be kept in mind, as should the cause of the trauma.[3–5] But still, there is not yet a standard

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Table 1 Demographic findings and trauma scores of the groups

	Ostomy group	Repair group	*P* value
Male	38	13	NS
Female	6	6	NS
Mean age	28.7 ± 9.97	33.53 ± 13.84	NS
Mean grade of injury	2.82 ± 0.49	2.0 ± 0	<0.01
Mean ISS	12.20 ± 10.84	13.36 ± 9.74	NS
Mean RTS	7.72 ± 0.31	7.79 ± 0.16	NS
Mean TTI	1.34 ± 0.47	1.16 ± 0.37	NS
Mean TRISS	98.0 ± 2.43	98.1 ± 1.77	NS

ISS, injury severity score; NS, not significant; RTS, revised trauma score; TTI, trauma treatment interval; TRISS, trauma injury severity score.

method for treatment of rectal injuries. In this study, we tried to find out for which rectal injury primary repair should be adequate.

Patients and Methods

We retrospectively identified 63 patients with rectal injury who had been operated on at Dicle University Hospital between 2000 and 2011. The data of those patients were reviewed. The patients were divided into 2 groups. Patients who underwent ostomy plus primary repair were included in ostomy group (OG; n = 44). The patients who underwent primary repair only were included in repair group (RG; n = 19). Patients' age, sex, cause of the injury, location of the injury, length of hospital stay, morbidity, and mortality were noted and compared between the 2 groups. In addition, the grade of the injury, trauma treatment interval, concomitant organ injury, injury severity score, revised trauma score, and trauma injury severity score also were calculated and compared between 2 groups. The severity of colon injury was graded according to the American Association for the Surgery of Trauma (AAST) Rectal Organ Injury Scale,[1] which was defined as follows:

AAST Rectal Organ Injury Scale

I
- a. Contusion or hematoma without revascularization
- b. Partial-thickness laceration

II Laceration ≤50% of circumference
III Laceration >50% of circumference
IV Full-thickness laceration with extension into the perineum
V Devascularized segment

Table 2 Site of the injury

	Ostomy group, No.	Repair group, No.
Extraperitoneal	30	16
Intraperitoneal	8	3
Extraperitoneal and intraperitoneal	6	0

In the evaluation of the study results, Statistical Package for Social Sciences Windows 11.5 program was used for statistical analysis. The quantitative data were indicated as mean ± SD. Kolmogorov-Smirnov test was used for the compatibility of normally distributed data. In comparison of the groups, Mann-Whitney *U* test was used in the analysis of nonparametric data, whereas χ^2 test was used in the analysis of categoric data. *P* values <0.05 were accepted to be significant for all variables.

Results

Among the 63 patients, none had grade I or grade V injury. A total of 29 patients had grade II rectal injury; 10 of these patients were in the OG and 19 were in the RG. A total of 33 patients had grade III rectal injury and 2 patients had grade IV injury. All of the patients with grade III or IV injury were in the OG. There was no statistical difference in demographic findings and trauma scores between OG and RG (Table 1). Although the number of patients who had extraperitoneal injury was higher in the OG than in the RG, the difference was not statistically significant (Table 2). All of the patients in the OG underwent ostomy plus primary repair regardless of the site of the injury. Because of the absence of patients with grade III or IV rectal injury in the RG, comparison of outcomes of the treatment methods could only be established in patients with grade II rectal injury. No morbidity was seen in patients with grade II rectal injury in the OG, whereas 2 patients developed morbidity in the RG. A total of 16 patients with grade III rectal injury and 2 patients with grade IV rectal injury in the OG developed morbidity, but there were no patients with grade III or IV rectal injury in the RG (Fig. 1). No mortality was seen in OG patients with grade II rectal injury, but 3 patients with grade III and 1 patient with grade IV injury died. None of the patients in the RG died. There were different causes of rectal injury in both groups (Table 3). But there was no significant difference in the distribution of the causes between 2 groups. There

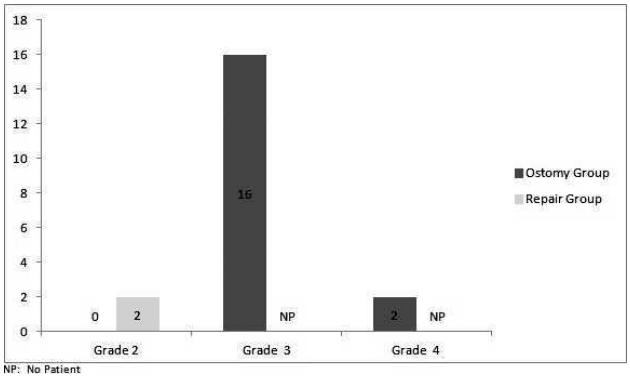

Fig. 1 Morbidity in the groups.

was no statistical difference between the groups in terms of hospital stay time. Mean hospital stay time of the OG and RG patients with grade II rectal injury were not statistically different either ($P > 0.05$).

Discussion

The studies performed in peacetime demonstrated that primary repair showed noticeably good results in the management of colorectal injuries.[6] Thus, the primary repair of colorectal injuries has been performed with increased confidence during recent years.[7] Multiple factors have been considered to be important for making the decision between primary repair with or without colostomy in the surgical management of colorectal injuries: site of the injury, cause of the injury, physiologic condition of the patient, and antibiotic use. Among all of these considerations in surgical management, the grade of colorectal injury has been most widely discussed.[3–5] In our study, mean grade of injury was statistically higher in the OG because most of the patients with high-grade rectal injury had undergone colostomy. Many studies indicate that injuries to the intraperitoneal rectum can be managed similarly to left colon injuries with primary repair without the need for colostomy.[8–10] Recently, there have been reports of primary repair without fecal diversion in selected extraperitoneal rectal injuries.[8,9,11–13] Levine *et al*[8] repaired 5 extraperitoneal rectal injuries transanally without fecal diversion in a series of 30 patients with no subsequent morbidity. McGrath *et al*[9] showed that injuries right at the peritoneal reflection, or injuries encountered with minimal dissection, may also be primarily repaired without the need for colostomy. In our study, there were 16 patients with extraperitoneal grade II rectal injury who had undergone primary repair. We did not find any statistically significant difference between the outcomes of the patients with extraperitoneal grade II rectal injury in the OG and the RG. It has been reported that in most series, gunshot wounds account for 80% to 85% of injuries, and stab wounds for 3% to 5%. Blunt force trauma accounts for 5% to 10% of cases. Other causes include iatrogenic injuries, sexual misadventure, and anorectal foreign bodies.[1] In our study, gunshot wounds accounted for 33.3% of injuries, stab wounds for 23.8%, and blunt force traumas for 25.4%. There was no statistical difference between the groups for cause of the injury. Colostomy was mandatory in colorectal injuries during World War II because the causes of the injuries were high-energy firearms. Recently, Velmahos *et al*[14] reported that diverting colostomy without rectal repair or drainage appears to be safe for the management of most civilian retroperitoneal gunshot wounds. But evolution in the management of rectal injuries resulted in decreased ratios of ostomy, even in military injuries. Steele *et al*[15] found that stomas were placed more frequently with rectal or sphincter injuries among injured patients treated at the 32nd Combat Support Hospital during the Operation Iraqi Freedom operation (65%; $P < 0.01$), and rectal injuries were associated with increased mortality. This study revealed that most of the patients with high-energy rectal injury underwent ostomy, but primary repair can be performed in selected patients. In our study, eligible patients had been repaired without ostomy regardless of the cause of the injury and the site of the injury. It is known that the patients who undergo ostomy have to be hospitalized again for ostomy closure. So, morbidity rates and cost of treatment would be increased. Papadopoulos *et al*[7] found no significant difference in hospital stay between primary repair and colostomy patients. In our study, we did not find any significant difference between the OG and the RG with grade II rectal injury for hospital stay.

Table 3 Causes of the rectal injury

Cause of the injury	Ostomy group, No.	Repair group, No.
Gunshot	16	5
Stabbing	12	3
Traffic accident	4	2
Falling from height	8	2
Iatrogenic	1	2
Coitus	1	2
Transanal rectal injury	2	2
Animal horn	0	1

There are many studies that demonstrate that primary repair only has significantly fewer complications in penetrating colon injuries compared with diversion.[16,17] And many other studies exposed significant morbidity rates of colostomy construction and colostomy closure. Park *et al*[18] reported that 22% of the patients had early complications and 3% of the patients had late complications directly related to the stoma in a series of 528 stomas created for trauma. In our study, there were no significant differences between 2 groups for mortality, but morbidity rates were higher in the OG ($P < 0.05$). However, there were no statistically differences between the 2 groups with grade II rectal injury.

Conclusion

Colostomy is no longer mandatory for all rectal injuries. Although colostomy should be appropriate for patients with fecal contamination, long trauma treatment interval, or sphincter injury, primary repair of the rectal injuries without ostomy should be kept in mind for selected rectal injuries. We came to the conclusion that primary repair can be performed in selected patients with grade II rectal injuries.

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