

Analysis of the Risk Factors in Colorectal Injuries

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Purpose: To evaluate factors that influence morbidity and mortality in colorectal injuries. **Methods:** We reviewed the medical records of 59 patients who underwent emergency operation in JNUH from Jan. 1988 through Dec. 1997. Univariate and multivariate analyses were used to calculate the prognostic significance of the following variables: sex, age, time to operation, preoperative shock, penetrating abdominal trauma index (PATI), APACHE II score, site of injury, organ injury scale (OIS), Flint grade, associated intraabdominal injuries, the sum of transfusion during 48hours of preoperative and postoperative period and operative method. **Results:** Univariate analysis showed that colorectal organ injury scale, and operative method were related to the complication, and preoperative shock, APACHE II score, PATI, and transfusion in 48hrs of injury were related to the mortality of colorectal injury. Multivariate logistic regression analysis showed that colorectal organ injury scale (2 vs 1) was significant risk factor in the development of complication, and the odds ratios were 5.0 and 1.69 respectively. The sum of transfusion in 48hours of injury was a only significant risk factor in the mortality and the odds ratio was 1.5. **Conclusions:** We concluded that preoperative condition was very important and preservation of hemodynamic stability was critical in improvement of prognosis. We also concluded that the shortening of operative time and proper management of associated injury may reduce the development of complication and even death. (JKSCP 2000;16:423-428)

Key Words: Colorectal injury, Risk factor,

634-18 1988 1 1997 12 10
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2000 4 59

가 10 (16.9%) . 42.6
 APACHE II , (OIS, organ
 injury scaling)(Table 1),⁶ Flint (Table 2),⁷ 가 4 (6.8%), 20 가 7 (11.9%), 30 가 15
 (PATI, penetrating abdominal (25.4%), 40 가 15 (25.4%), 50 가 7 (11.9%), 60
 trauma index),⁸ , 48 가 8 (13.6%), 70 3 (5.1%) .
 가 (2) :
 5 54 3.7
 90 mmHg (10 22) ,
 가 APACHE II 5.7 (40 40) , 54
 가 가 Flint 29) .
 가 SPSS (3) APACHE II :
 22 (37.3%) 90 mmHg
 , student t-test, chi-square test, Fisher's . 37 (61%) 48
 exact test p-value 0.05 , 7.7 U (1 U= 400 ml) 1 5 U가 19
 가 (32.2%), 6 10 U가 9 (15.3%), 11 U 8
 (13.6%) . APACHE II 7.7±6.6
 1 32 .
 (4) , :
 48 , 11 .
 1) 21 (35.6%) 가 11
 (18.6%), 10 (16.9%),
 5 (8.5%), 7 (11.9%) .
 (1) : 가 49 (83.1%), (OIS, organ injury scale) 1 가 29

Table 1. Severity of colorectal injury by colon/rectal organ injury scale (n=59)

OIS*	Description	Number	Percent (%)
I	Hematoma Contusion or hematoma, without devascularization	29	49.2
	Laceration Partial thickness, no perforation		
II	Laceration Laceration <50% circumference	21	35.6
III	Laceration Laceration 50% circumference without transection	5	8.5
IV	Laceration Transection of colon (Full thickness laceration, extension to perineum) [†]	2	3.4
V	Laceration Transection of colon with segmental tissue loss	2	3.4
	Vascular Devascularized segment		

*Advance one grade for multiple injuries to the same organ. [†] Description in () is for the rectal injury cases.

Table 2. Flint grade of injury

Grade	Description	Number	Percent (%)
I	Isolated colon injury, minimal contamination, no shock. minimal delay	37	62.7
II	Through-and-through perforation, moderate contamination	17	28.8
III	Severe tissue loss, devascularization, heavy contamination	5	8.5

(49.2%) 가 , 2 가 21 (35.6%), 3 5 11 (18.6%), 11 (18.6%), 6 (8.5%), 4 5 가 2 (3.4%) . Flint (10.2%), 4 (6.8%), 27 (45.8%), 1 가 37 (62.7%), 2 가 17 (28.8%), 3 가 5 1 (1.7%), 31 (8.5%) . (52.5%) . 21.2± 52 (88.1%) , 12.1 5 70 , 25 9 (15.3%), 6 (10.2%), 가 45 (76.3%), 26 14 (23.7%) .

Table 3. Univariate analysis of risk factors influencing to the morbidity and mortality after management of colorectal injuries

	Variables	Cx (%)	p value	Death (%)	p valueage
Age	70 (n=56)	23 (41.1)	ns*	9 (16.1)	ns
	> 70 (n=3)	1 (33.3)		0 (0)	
Sex	m (n=49)	18 (36.7)	ns	8 (16.3)	ns
	f (n=10)	6 (60)		1 (10)	
Time to surgery	8 hr (n=32)	15 (46.9)	ns	7 (21.9)	ns
	> 8 hr (n=22)	8 (36.4)		1 (4.5)	
Shock	no (n=34)	12 (35.3)	ns	1 (2.9)	< 0.01
	yes (n=25)	12 (48.0)		8 (32.0)	
APACHE II score	0 10 (n=42)	17 (40.5)	ns	3 (7.1)	< 0.01
	11 20 (n=14)	5 (35.7)		3 (21.4)	
	21 (n=3)	2 (66.7)		3 (100)	
OIS [†]	1 (n=29)	6 (20.7)	< 0.01	3 (10.3)	ns
	2 (n=21)	14 (66.7)		3 (14.3)	
	3 (n=5)	3 (60)		2 (40)	
	4 (n=2)	0 (0)		0 (0)	
	5 (n=2)	1 (50)		1 (50)	
Site of injury	Ascending (n=10)	5 (50)	ns	1 (10)	ns
	Transverse (n=21)	6 (28.6)		2 (9.5)	
	Descending (n=5)	2 (40.0)		0 (0)	
	Sigmoid (n=11)	7 (63.6)		2 (18.2)	
	Rectum (n=5)	2 (40.0)		1 (20.2)	
	Multiple (n=7)	2 (28.6)		3 (42.9)	
Flint grade	1 (n=37)	12 (32.4)	ns	3 (8.1)	ns
	2 (n=17)	9 (52.9)		5 (29.4)	
	3 (n=5)	3 (60.0)		1 (20.0)	
PATI [‡]	25 (n=45)	17 (37.8)	ns	4 (8.9)	< 0.05
	> 26 (n=14)	7 (50)		5 (35.7)	
Operation	PC s resection [§] (n=31)	8 (25.8)	< 0.05	5 (16.1)	ns
	PC c resection (n=11)	7 (63.6)		0 (0)	
	DC [¶] (n=17)	9 (52.9)		4 (23.5)	
Transfusion in 48 hours of injury**	0 (n=23)	9 (39.1)	ns	0 (0)	0.001
	1 5 (n=19)	7 (36.8)		1 (5.3)	
	6 10 (n=9)	3 (33.3)		1 (11.1)	
	11 (n=8)	5 (62.5)		7 (87.5)	
	Injury of associated organs	No (n=7)		3 (42.9)	
Yes (n=52)	21 (40.4)	9 (17.3)			

*ns = not significant; [†]OIS = organ injury scale; [‡]PATI = penetrated abdominal trauma index; [§]PC s resection = primary closure without resection; PC c resection = primary closure with resection; [¶]DC = diverting colostomy.

**One unit equals 400 ml.

