

Supplemental Table 1 Univariable analysis of different age groups for complications

Age groups	Overall (n=127)	<i>P</i>	Minor (n=102)	<i>P</i>	Severe (n=25)	<i>P</i>	Local (n=91)	<i>P</i>	Systemic (n=36)	<i>P</i>
~39 (n=62)	5	0.304	5	0.634	0	0.39	5	0.84	0	0.23
						7		4		8
40~49 (n=157)	18	0.757	14	0.684	4	0.78	13	0.82	5	0.83
						2		1		7
50~59 (n=250)	34	0.442	30	0.181	4	0.34	26	0.28	8	0.79
						1		9		5
60~69 (n=295)	34	0.671	28	0.829	6	0.62	26	0.96	8	0.40
						4		4		5
70~ (n=276)	36	0.622	25	0.625	11	0.04	21	0.43	15	0.03
						5		4		6

Supplemental Table 2 Univariable analysis of different CRC surgery types for complications

CRC surgery	Overall (n=127)	<i>P</i>	Severe (n=25)	<i>P</i>	Local (n=91)	<i>P</i>	Systemic (n=36)	<i>P</i>
right- (n=235)	34	0.230	7	0.51	21	0.90	13	0.06
				3		9		5
left- (n=88)	14	0.268	2	1.00	9	0.60	5	0.37
				0		8		6
transverse (n=11)	0	0.435	0	1.00	0	0.61	0	1.00
				0		3		0
sigmoid (n=234)	15	0.002	3	0.20	11	0.01	4	0.09
				3		3		6
LAR (n=369)	46	0.852	9	0.95	36	0.39	10	0.32
				6		4		6
abdominoperineal- (n=79)	11	0.629	2	0.93	8	0.65	3	0.86
				9		2		7

multiple- (n=24)	7	0.020	2	0.11	6	0.01	1	0.57
				1		3		5

Abbreviations: right-, right colon resection; left-, left colon resection; transverse-, transverse colectomy; sigmoid-, sigmoid colectomy; LAR, low anterior resection; abdominoperineal-, abdominoperineal resection; multiple-, multiple bowel resection

Supplemental Table 3 Univariable analysis of risk factors for overall and severe complications

Variables		No. of patients	Overall complication		Severe complication	
			<i>n</i> (%)	<i>P</i>	<i>n</i> (%)	<i>P</i>
Patient demographics						
Age (years)				0.622		0.045
	< 70	764	91 (11.9)		14 (1.8)	
	≥ 70	276	36 (13.0)		11 (4.0)	
Sex				0.219		0.076
	Male	611	81 (13.3)		19 (3.1)	
	Female	429	46 (10.7)		6 (1.4)	
BMI (kg/m²)				0.117		0.596
	< 24	891	103 (11.6)		20 (2.2)	
	≥ 24	149	24 (16.1)		5 (3.4)	
Previous abdominal surgery				0.525		0.055
	No	903	108 (12.0)		18 (2.0)	
	Yes	137	19 (13.9)		7 (5.1)	
Smoking and drinking				0.444		0.256
	No	614	71 (11.6)		12 (2.0)	
	Yes	426	56 (13.1)		13 (3.1)	
Comorbidity				< 0.001		< 0.001
	No	801	80 (10.0)		11 (1.4)	
	Yes	239	47 (19.7)		14 (5.9)	
Operative parameters						

ASA class			<	0.002
			0.001	
I - II	911	94 (10.3)		16 (1.8)
III	129	33 (25.6)		9 (7.0)
Operation time (min)			0.239	0.406
< 180	781	90 (11.5)		17 (2.2)
≥ 180	259	37 (14.3)		8 (3.1)
Evaluated blood loss (ml)			0.099	0.246
< 250	886	102 (11.5)		19 (2.1)
≥ 250	154	25 (16.2)		6 (3.9)
With multiple bowel resection			0.020	0.111
Yes	24	7 (29.2)		2 (8.3)
No	1016	120 (11.8)		23 (2.3)
With sigmoid colectomy			0.002	0.203
Yes	234	15 (6.4)		3 (1.3)
No	806	112 (13.9)		22 (2.7)
Types of robotic surgery			0.717	0.939
Totally robotic	507	60 (11.8)		12 (2.4)
Robotic-assisted	533	67 (12.6)		13 (2.4)
Retrieved lymph nodes			0.810	0.140
< 23	722	87 (12.0)		14 (1.9)
≥ 23	318	40 (12.6)		11 (3.5)
With multiple organ resection			<	< 0.001
			0.001	
No	1004	111 (11.1)		17 (1.7)
Yes	36	16 (44.4)		8 (22.2)
Annual operation volume			0.889	0.072
2015/5-2017/11	481	58 (12.1)		16 (3.3)
2017/11-2020/5	559	69 (12.3)		9 (1.6)

Pathology results				
Neoplasm	longest		0.950	0.985
diameter(cm)				
< 5	792	97 (12.2)	19 (2.4)	
≥ 5	248	30 (12.1)	6 (2.4)	
Histological type			0.906	0.484
Well or moderately	947	116 (12.2)	22 (2.3)	
Poorly	or			
undifferentiated	93	11 (11.8)	3 (3.2)	
pT stage			0.557	0.948
T1-T3	451	52 (11.5)	11(2.4)	
T4	589	75 (12.7)	14(2.4)	
pN stage			0.943	1.000
N0-N1	911	111 (12.2)	22 (2.4)	
N2	129	16 (12.4)	3 (2.3)	
pTNM stage			0.918	0.947
I/ II	659	81 (12.3)	16 (2.4)	
III	381	46 (12.1)	9 (2.4)	
Lymphovascular				
invasion			0.982	0.844
No	646	79 (12.2)	16 (2.5)	
Yes	394	48 (12.2)	9 (2.3)	
Perineural invasion			0.947	0.945
No	617	75 (12.2)	15 (2.4)	
Yes	423	52 (12.3)	10 (2.4)	

Abbreviations: BMI, body mass index; ASA, American Society of Anesthesiologists; right-, right colon resection; left-, left colon resection; transverse-, transverse colectomy; sigmoid-, sigmoid colectomy; LAR, low anterior resection; abdominoperineal-, abdominoperineal resection; multiple-, multiple bowel resection

Supplemental Table 4 Multivariable analysis of risk factors for overall and severe complications

Overall complication			Severe complication		
Variables	OR (95 % CI)	P	Variables	OR (95 % CI)	P
Comorbidity	1.500 (0.899-2.502)	0.12	Age (≥ 70)	1.804 (0.747-4.354)	0.190
ASA class III	2.250 (1.258-4.025)	0.006	Comorbidity	3.222 (1.129-9.195)	0.029
With multiple bowel resection*	2.452 (0.953-6.035)	0.063	ASA class III	1.787 (0.593-5.387)	0.302
With sigmoid colectomy [#]	0.448 (0.252-0.796)	0.006	With multiple organ resection	19.747 (7.351-53.049)	< 0.001
With multiple organ resection	6.792 (3.315-13.918)	< 0.001			

* multiple bowel resection type VS the other single bowel resection types

[#] sigmoid colectomy type VS the other single bowel resection types

Abbreviations: BMI, body mass index; ASA, American Society of Anesthesiologists

Supplemental Table 5 Univariable analysis of risk factors for local and systemic complications

Variables		No. of patients	Local complication		Systemic complication	
			<i>n</i> (%)	<i>P</i>	<i>n</i> (%)	<i>P</i>
Patient demographics						
Age (years)				0.434		0.036
	< 70	764	70 (9.2)		21 (2.7)	
	≥ 70	276	21 (7.6)		15 (5.4)	
Sex				0.057		0.459
	Male	611	62 (10.1)		19 (3.1)	
	Female	429	29 (6.8)		17 (4.0)	
BMI (kg/m²)				0.215		0.372
	< 24	891	74 (8.3)		29 (3.3)	
	≥ 24	149	17 (11.4)		7 (4.7)	
Previous abdominal surgery				0.514		1.000
	No	903	77 (8.5)		31 (3.4)	
	Yes	137	14 (10.2)		5 (3.6)	
Smoking and drinking				0.543		0.665
	No	614	51 (8.3)		20 (3.3)	
	Yes	426	40 (9.4)		16 (3.8)	
Comorbidity				0.035		< 0.001
	No	801	62 (7.7)		18 (2.2)	
	Yes	239	29 (12.1)		18 (7.5)	
Operative parameters						
ASA class				0.025		< 0.001
	I - II	911	73 (8.0)		21 (2.3)	
	III	129	18 (14.0)		15 (11.6)	
Operation time (min)				0.271		0.685
	< 180	781	64 (8.2)		26 (3.3)	
	≥ 180	259	27 (10.4)		10 (3.9)	

Evaluated blood loss (ml)			0.638	0.026
< 250	886	76 (8.6)		26 (2.9)
≥ 250	154	15 (9.7)		10 (6.5)
With multiple bowel resection			0.013	0.575
Yes	24	6 (25.0)		1 (4.2)
No	1016	85 (8.4)		35 (3.4)
With sigmoid colectomy			0.013	0.096
Yes	234	11 (4.7)		4 (1.7)
No	806	80 (9.9)		32 (4.0)
Types of robotic surgery			0.765	0.852
Totally robotic	507	43 (8.5)		17 (3.4)
Robotic-assisted	533	48 (9.0)		19 (3.6)
Retrieved lymph nodes			0.967	0.715
< 23	722	63 (8.7)		24 (3.3)
≥ 23	318	28 (8.8)		12 (3.8)
With multiple organ resection			0.001	< 0.001
No	1004	82 (8.2)		29 (2.9)
Yes	36	9 (25.0)		7 (19.4)
Annual operation volume			0.368	0.254
2015/5-2017/11	481	38 (7.9)		20 (4.2)
2017/11-2020/5	559	53 (9.5)		16 (2.9)
Pathology results				
Neoplasm longest diameter(cm)			0.857	0.869
< 5	792	70 (8.8)		27 (3.4)
≥ 5	248	21 (8.5)		9 (3.6)
Histological type			0.958	0.896
Well or moderately	947	83 (8.8)		33 (3.5)

Poorly undifferentiated	or	93	8 (8.6)	3 (3.2)	
pT stage				0.586	0.834
T1-T3		451	37 (8.2)	15 (3.3)	
T4		589	54 (9.2)	21 (3.6)	
pN stage				0.924	0.796
N0-N1		911	80 (8.8)	31 (3.4)	
N2		129	11 (8.5)	5 (3.9)	
pTNM stage				0.939	0.947
I/ II		659	58 (8.8)	23 (3.5)	
III		381	33 (8.7)	13 (3.4)	
Lymphovascular invasion				0.914	0.899
No		646	57 (8.8)	22 (3.4)	
Yes		394	34 (8.6)	14 (3.6)	
Perineural invasion				0.998	0.902
No		617	54 (8.8)	21 (3.4)	
Yes		423	37 (8.7)	15 (3.5)	

Supplemental Table 6 Multivariable analysis of risk factors for local and systemic complications

Local complication			Systemic complication		
Variables	OR (95 % CI)	P	Variables	OR (95 % CI)	P
Comorbidity	1.368 (0.763-2.453)	0.292	Age (≥ 70)	1.452 (0.697-3.026)	0.319
ASA class III	1.434 (0.718-2.864)	0.307	Comorbidity	1.607 (0.640-4.033)	0.312
With multiple bowel resection*	2.991 (1.132-7.898)	0.027	ASA class III	3.778 (1.444-9.886)	0.007
With sigmoid colectomy#	0.481 (0.250-0.926)	0.028	With multiple organ resection	9.190 (3.526-23.956)	< 0.001
With multiple organ resection	3.638 (1.627-8.135)	0.002			

* multiple bowel resection type VS the other single bowel resection types

sigmoid colectomy type VS the other single bowel resection types

Abbreviations: ASA, American Society of Anesthesiologists