



The study on treatment outcomes and predictors for postoperative complications in laparoscopic colorectal surgery for the super-elderly patients



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Introduction

The average life expectancy of a Japanese was 81 years in men and of 87 years in women in 2024. The population expected to continue aging further. The opportunities to perform colorectal cancer (CRC) surgery on super-elderly patients of 85 years and older are increasing. We have examined the safety, efficacy, and risk factors for complications of laparoscopic surgery in elderly and super-elderly patients.

Material and Methods

We included 280 patients aged 75 years or older with CRC of Stage I-IV who underwent primary tumor resection with laparoscopic or robotic surgery in our department between January 2017 and December 2024.

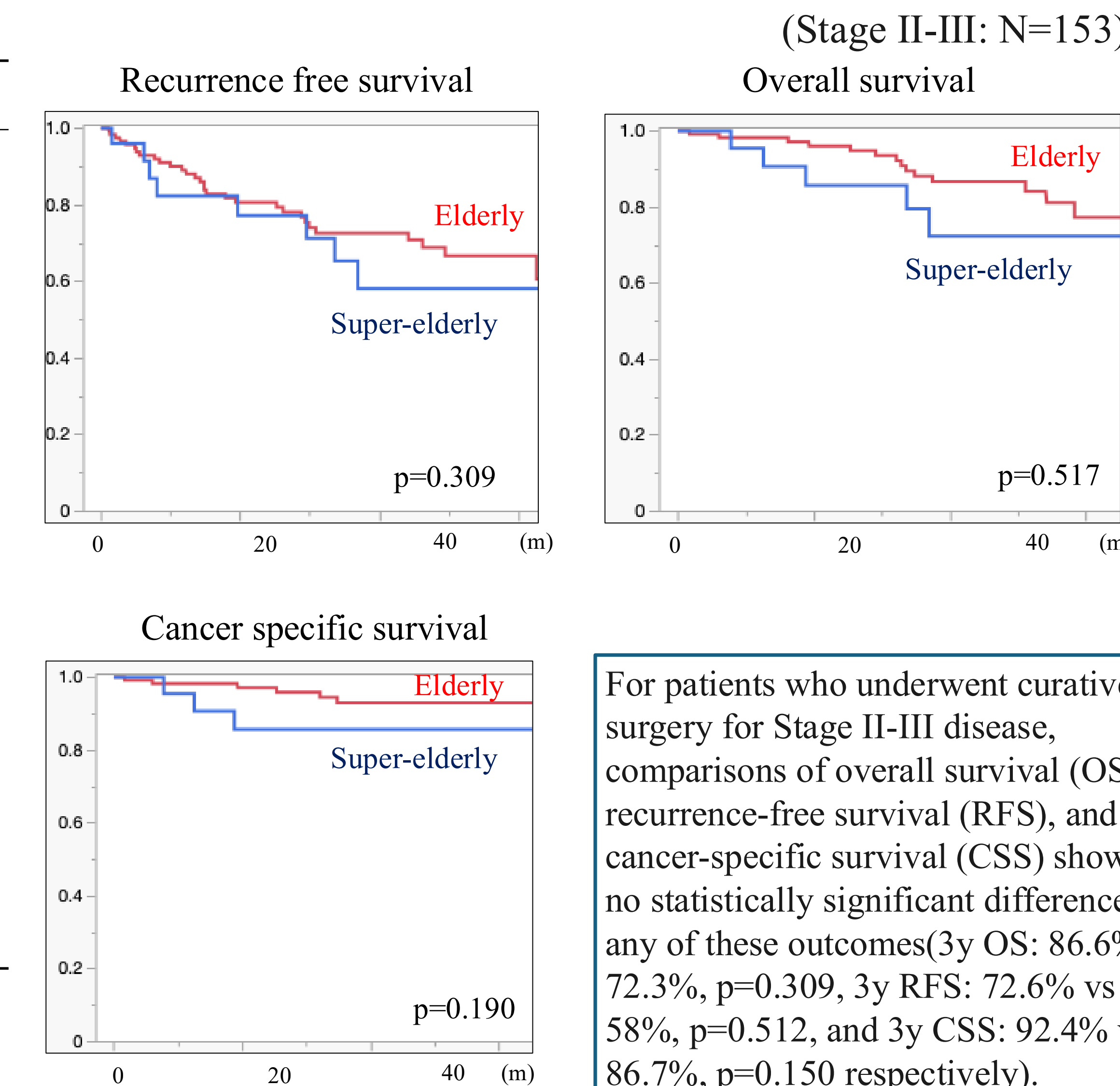
Patients were classified into two groups: elderly patients aged 75-84 years (n=223) and super-elderly patients aged 85 years or older (n=57). We examined the associations between patient background including comorbidities, tumor factors, perioperative inflammatory markers (NLR: neutrophil-lymphocyte ratio, PLR: platelet-lymphocyte ratio, LMR: lymphocyte-monocyte ratio, and CAR: C-reactive protein-albumin ratio), and nutritional indexes (GNRI: geriatric nutritional risk index, and PNI: prognostic nutrition index) with short-term surgical outcomes and prognosis.

Table.1 Patient characteristics comparing elderly to super-elderly patients.

		(Stage I-IV: N=280)		
		Elderly 75-84(N=223)	Super-elderly 85-(N=57)	p value
Gender	Male/ Female	134/89	20/37	<0.001
ASA-PS	I/ 2-3	150/73	25/32	0.006
Symptom	negative/ positive	57/152	13/40	0.687
Cardiovascular disease	negative/ positive	179/44	36/21	0.001
Pulmonary disease	negative/ positive	198/25	54/3	0.182
Renal disease	negative/ positive	204/19	55/2	0.2
Mental disease	negative/ positive	219/4	55/2	0.425
Tumor location	Colon/ Rectum	147/72	33/23	0.25
Tumor depth	pT1-2/ pT3-4	85/135	18/38	0.37
Lymph node metastasis	pN0/ N1-3	135/88	39/18	0.274
Distant metastasis	cM0/ M1	195/28	49/8	0.766
CD3	negative/ positive	213/10	10/0	0.104
preoperative NLR	median(range)	2.3(0.7-12.8)	2.7(1.2-10.4)	0.269
preoperative PLR	median(range)	142(34-468)	154(55-444)	0.182
preoperative LMR	median(range)	4.7(1.4-11.6)	3.6(1.4-9.4)	0.024
preoperative PNI	median(range)	48(28-59.5)	41(29-54)	0.218
preoperative CAR	median(range)	0.04(0-3)	0.05(0.01-1.8)	0.79
preoperative GNRI	median(range)	101(69-4779)	93(63-119)	0.382
NLR POD1	median(range)	3.1(0.8-328)	2.8(1-16.2)	0.501
PLR POD1	median(range)	209(66-2449)	196(85-481)	0.21
LMR POD1	median(range)	3.9(0.2-13.4)	3.6(1.8-9.3)	0.842
PNI POD1	median(range)	37(20-55)	35(26-53)	0.125
CAR POD1	median(range)	0.4(0.01-6.9)	0.6(0.02-9.6)	0.213
GNRI POD1	median(range)	88(62-4773)	81(66-103)	0.533

The postoperative complications of Clavien-Dindo classification: grade 3 occurred in 10 cases (3.6%) overall, all in the elderly group.

Figure.1 Kaplan-Meier curves for RFS, OS, and CSS comparing elderly to super-elderly patients



For patients who underwent curative surgery for Stage II-III disease, comparisons of overall survival (OS), recurrence-free survival (RFS), and cancer-specific survival (CSS) showed no statistically significant differences in any of these outcomes (3y OS: 86.6% vs 72.3%, p=0.309, 3y RFS: 72.6% vs 58%, p=0.512, and 3y CSS: 92.4% vs 86.7%, p=0.150 respectively).

Results

Table.2 Logistic regression model for postoperative comparison of CD grade 3 in elderly and super-elderly patients (Stage II-III: N=153)

		Univariate analysis		Multivariate analysis	
		Odds ratio, 95% CI	p value	Odds ratio 95% CI	p value
Gender	Male/Female	3.397(0.833-22.783)	0.092		
ASA-PS	PS2-3	1.7(0.463-6.25)	0.413		
Symptom	positive	1.287(0.302-8.775)	0.752		
Cardiovascular disease	positive	0.821(0.122-3.381)	0.803		
Pulmonary disease	positive	min	0.143		
Renal disease	positive	1.389(0.074-7.961)	0.77		
Mental disease	positive	min	0.507		
Tumor location	Rectum	2.444(0.632-10.085)	0.191		
Tumor depth	pT3-4	5.597(1.029-103.963)	0.046	1.928(0.3762-9.884)	0.433
Lymph node metastasis	pN1-3	0.399(0.06-1.63)	0.215		
Lymph node dissection	D3	0.621(0.169-2.28)	0.461		
Operation time		1.000(0.999-1.001)	0.656		
Oblood loss		1.003(1.005-0.997)	0.009	1.00196(0.9992-1.0045)	0.154
preoperative NLR		0.631(1.094-1.584)	0.121		
preoperative PLR		0.999(1.007-1.001)	0.846		
preoperative LMR		0.807(1.146-1.238)	0.247		
preoperative PNI		0.95(1.005-1.053)	0.25		
preoperative CAR		0.6137(2.788-1.629)	0.646		
preoperative GNRI		0.976(1.0009-1.025)	0.326		
NLR POD1		1.053(1.008-1.1243)	0.003	1.0167(1.0004-1.0563)	0.045
PLR POD1		1.002(0.999-1.003)	0.107		
LMR POD1		0.530(0.296-0.837)	0.004	0.851(0.4295-1.3827)	0.567
PNI POD1		0.824(0.733-0.916)	<0.001	1.0089(0.8376-1.2636)	0.923
CAR POD1		1.638(1.203-2.266)	0.003	1.3799(0.7913-2.2638)	0.236
GNRI POD1		0.929(0.866-0.99)	0.023	0.9997(0.902-1.0017)	0.948

In univariate analysis, postoperative complications of Clavien-Dindo classification: grade 3 correlated with tumor depth, intraoperative blood loss, and NLR, LMR, PNI, CAR, and GNRI on postoperative day 1 (p=0.046, p=0.009, p=0.003, p=0.004, p=0.0002, p=0.003, and p=0.023, respectively). Multivariate analysis showed a correlation only with NLR on postoperative day (POD) 1 (Unit odds ratio: 1.017, 95% CI 1.0004-1.0563, p=0.045).

Discussion

- Several studies reported that laparoscopic surgery for CRC can be safely performed and cancer control can be achieved even in super-elderly patients similar to younger patients ^{1,2}.
- Previous reports showed that the main reason for poor prognosis was early mortality in the first postoperative year in elderly patients, so appropriate patient selection is important ^{3,4}.
- Preoperative controlling nutritional status (CONUT) score is reported as a useful marker to predict postoperative complications in super-elderly patients ⁵.
- Not only preoperative inflammatory markers and nutrition indexes but also postoperative ones are strongly associated with the incidence of postoperative complications in elderly patients.

Conclusion

Although there is selection bias in the cases, it is possible that laparoscopic radical surgery can provide benefits in the super-elderly population equivalent to those in the elderly safely. Inflammatory markers and nutritional indexes on POD 1 are highly useful for predicting postoperative complications in elderly patients.

References

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