

Long-term outcomes of single-incision versus multiport laparoscopic colectomy for colon cancer: results of propensity score analysis

-Single-incision colectomy for colon cancer-

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Abstract

Background Non-inferiority of the long-term outcomes of single-incision laparoscopic colectomy (SILC) for colon cancer according to stage has not been clearly established. This study aimed to clarify the long-term outcomes of SILC versus multiport laparoscopic colectomy (MPLC). **Methods** Consecutive 691 patients (393 SILC and 298 MPLC patients) were identified in the retrospective review of hospital records of patients having undergone curative surgery for primary solitary colon cancer (cecum to rectosigmoid) between January 2008 and May 2014 and propensity score matching with age, sex, tumor size, body mass index, American Society of Anesthesia performance status, cT and cN were performed. After propensity score matching, 526 patients (263 each for SILC and MPLC) were selected for comparison of long-term outcomes. **Results** In the propensity-score matched population, 5-year cancer-specific survival of pathological all stages (I, II and III), I, II and III were 93.7% [95% confidence interval (CI) (89.6-96.2)], 98.5% (95% CI, 90.0-99.8), 96.0% (95% CI, 88.2-98.7), and 88.3% (95% CI, 79.6-93.6) in the SILC group as compared with 93.3% (95% CI, 89.4-95.9), 100% (95% CI, not available), 95.4% (95% CI, 88.3-98.3), and 84.1% (95% CI, 74.1-90.8) in MPLC group ($p=0.5278$, 0.2679, 0.7666 and 0.9073), and 3-year disease free survival of pathological all stages (I, II and III), I, II and III were 94.0% (95% CI, 90.2-96.4), 98.6% (95% CI, 90.4-99.8), 90.1% (95% CI, 81.4-95.0) and 79.0% (95% CI, 69.4-86.2) in SILC as compared with 93.2% (95% CI, 89.4-95.7), 100% (95% CI, not available), 94.5% (95% CI, 87.4-97.7) and 75.5% (95% CI, 64.7-83.8) in MPLC ($p=0.2829$, 0.7401, 0.4335 and 0.8518). **Conclusion** This observational study suggested that long-term oncologic outcome of SILC is comparable to MPLC.

Key words Single-incision laparoscopic surgery, colon cancer, long-term outcome

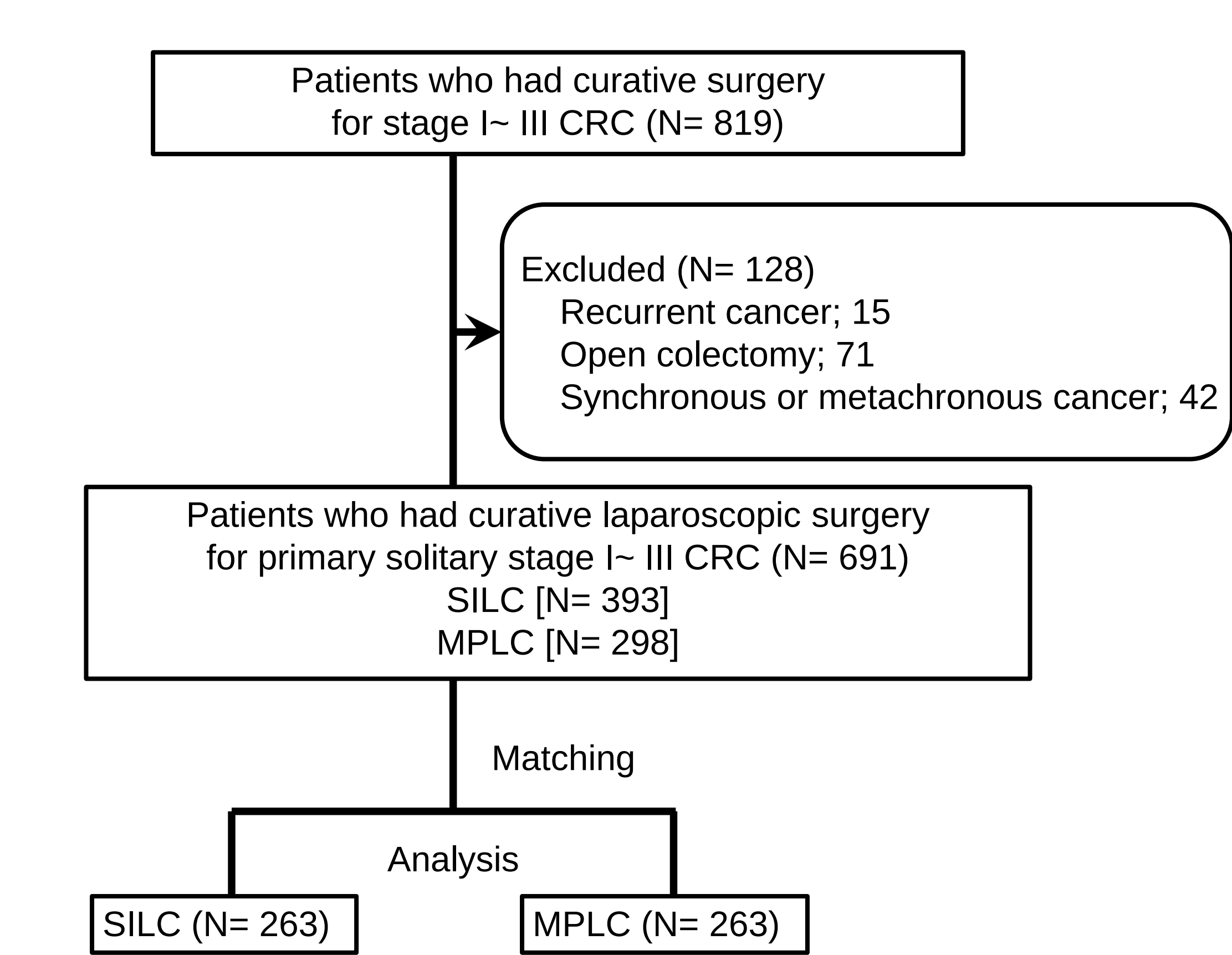


Fig. 1 Patient flow diagram. *CRC* colorectal cancer, *SILC* single-incision laparoscopic colectomy, *MPLC* multiple-port laparoscopic colectomy

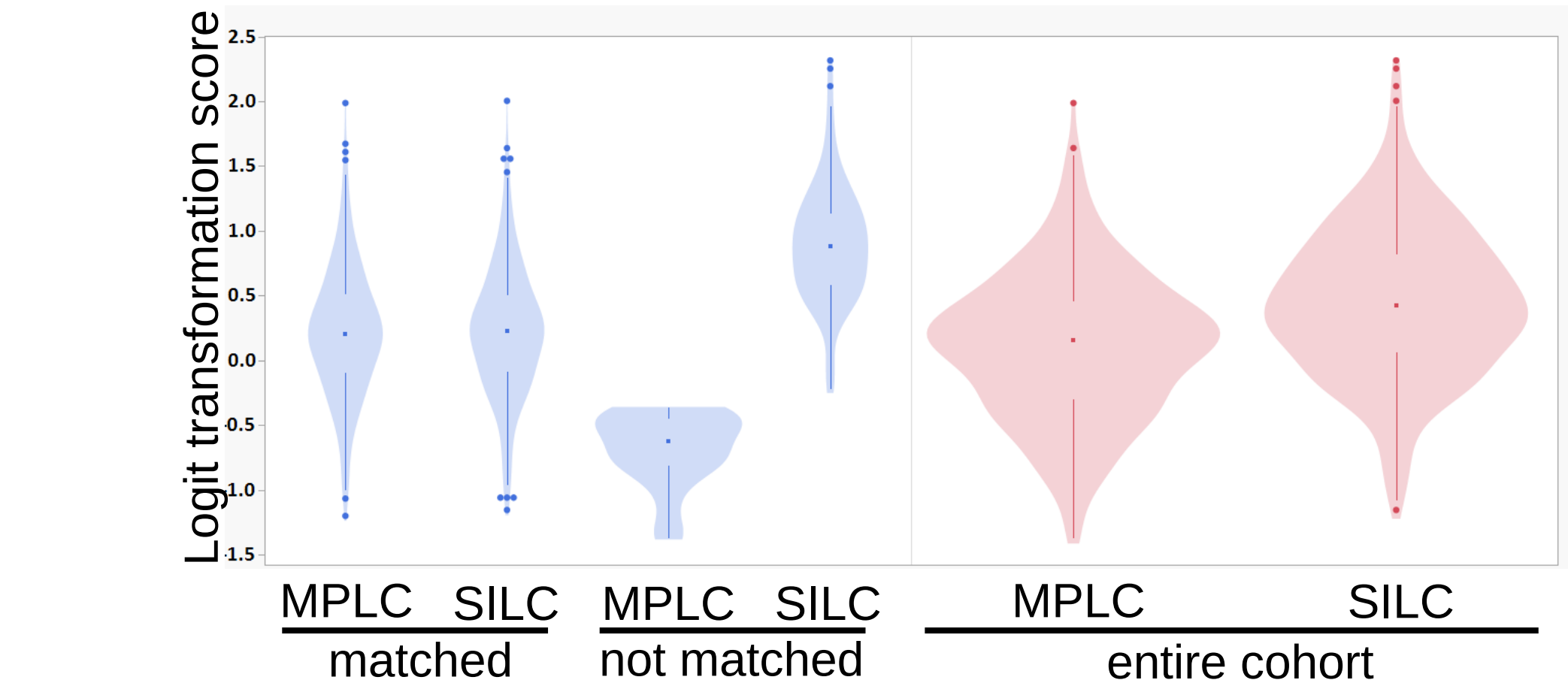


Fig. 2 Distribution of patients before and after match. *SILC* single-incision laparoscopic colectomy, *MPLC* multiple-port laparoscopic colectomy

Table. 1 Clinical characteristics of the patients

	Entire cohort (n= 619)			Propensity-score matched pairs (n= 526)		
	MPLC (n=298)	SILC (n=393)	p value	MPLC (n= 263)	SILC (n= 263)	p value
Age (years)	69 (61–76)	70 (63-78)	0.0670	69 (61-76)	69 (62-77)	0.9715
Sex			0.4837			0.4837
Female	135 (45.3)	198 (50.4)		124 (47.2)	116 (44.1)	
Male	163 (54.7)	195 (49.6)		139 (52.9)	147 (55.9)	
BMI (kg/m ²)	21.9 (19.8–24.3)	22.3 (20.0–24.1)	0.9826	21.9 (19.8-24.3)	22.2 (19.9-24.4)	0.2534
ASA-PS			0.0005			0.9415
1	52 (17.5)	118 (30.0)		52 (19.8)	52 (19.8)	
2	194 (65.1)	208 (52.9)		164 (62.4)	161 (61.2)	
3	52 (17.5)	67 (17.1)		47 (17.9)	50 (19.0)	
Location ^a			0.6597			0.6591
Right	124 (41.6)	157 (40.0)		114 (43.4)	109 (41.4)	
Left	174 (58.4)	236 (60.1)		149 (56.7)	154 (58.6)	
Clinical T			0.0001			0.9386
cT1	66 (22.2)	99 (25.2)		64 (24.4)	69 (26.2)	
cT2	30 (10.1)	70 (17.8)		30 (11.4)	27 (10.3)	
cT3	88 (29.5)	132 (33.6)		88 (33.5)	89 (33.8)	
cT4	114 (38.3)	92 (23.4)		81 (30.8)	78 (29.7)	
Clinical N			0.4940			0.9818
cN0	199 (66.8)	260 (66.2)		179 (68.1)	177 (67.3)	
cN1	67 (22.5)	80 (20.4)		54 (20.5)	55 (20.9)	
cN2	32 (10.7)	53 (13.5)		30 (11.4)	31 (11.8)	
Tumor size (cm)	40 (24–60)	35 (21–50)	0.0390	40 (20- 55)	40 (25- 60)	0.9003

Data are shown as n (%) or median (interquartile range). *MPLC* multiple-port laparoscopic colectomy, *SILC* single-incision laparoscopic colectomy, *BMI* body mass index, *ASA-PS* American Society of Anesthesiologists physical status

^aRight indicates cecum to transverse colon, and left indicates descending to rectosigmoid colon.

Table. 2 Clinical characteristics of the patients

	Entire cohort (n= 619)			Propensity-score matched pairs (n= 526)		
	MPLC (n=298)	SILC (n=393)	p value	MPLC (n= 263)	SILC (n= 263)	p value
Operating time (minute)	195 (160–232)	172 (133–215)	<0.0001	193 (157–230)	174 (135–225)	0.0070
Blood loss (mL)	0 (0–68)	0 (0–50)	0.0939	0 (0–50)	0 (0–80)	0.9322
Conversion	10 (3.4)	14 (3.6) ^a	0.8832	0 (0)	1 (0.4) ^b	0.4647
Lymph node dissection			0.9539			0.5035
D2	84 (28.2)	115 (29.3)		80 (29.7)	73 (27.1)	
D3	214 (71.8)	278 (70.7)		189 (70.3)	196 (72.9)	
Number of lymph nodes harvested	27 (18–36)	24 (16-33)	0.0109	27 (17-36)	25(16-33)	0.2316
Pathological T			0.0408			0.4656
pT1	66 (22.2)	99 (25.2)		64 (24.3)	69 (26.2)	
pT2	27 (9.1)	49 (12.5)		27 (10.3)	18 (6.8)	
pT3	116 (38.9)	163 (41.5)		101 (38.4)	110 (41.8)	
pT4	89 (29.9)	82 (20.9)		71 (27.0)	66 (25.1)	
Pathological N			0.2970			0.2424
pN0	205 (68.8)	248 (63.1)		181 (68.8)	167 (63.5)	
pN1a/ N1b	59 (19.8)	92 (23.4)		50 (19.0)	66 (25.1)	
pN2a/ N2b	34 (11.4)	53 (13.5)		32 (12.2)	30 (11.4)	
Pathological Stage			0.0246			0.4344
pStage I	86 (28.9)	130 (33.1)		84 (31.9)	83 (29.7)	
pStage II	119 (39.9)	118 (30.0)		97 (36.9)	89 (33.8)	
pStage III	93 (31.2)	145 (36.9)		82 (31.2)	96 (36.5)	

Data are shown as n (%) or median (interquartile range). *MPLC* multiple-port laparoscopic colectomy, *SILC* single-incision laparoscopic colectomy, *BMI* body mass index, *ASA-PS* American Society of Anesthesiologists physical status.

^aConversion included 2 cases to MPLC (one was due to the inaccessibility of hepatic flexure from umbilicus, the other was due to the necessity to add suture to the anastomosis) and 13 cases to open (9 were due to severe adhesion and 4 were due to poor visibility).

^bConversion was due to poor visibility.

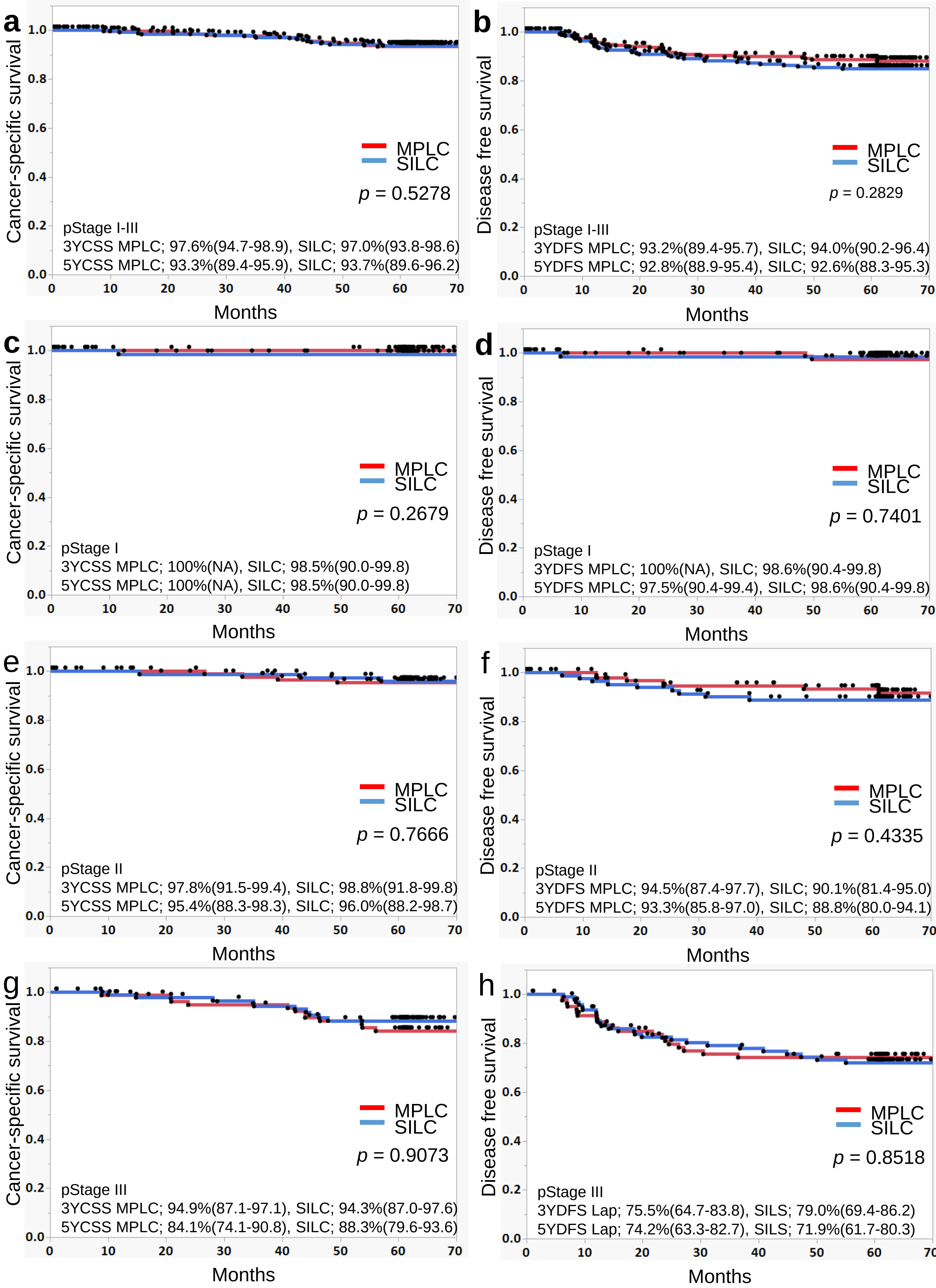


Fig. 3 Kaplan-Meier cancer-specific survival (a, c, e and g) and disease-free survival (b, d, f and h) of matched *SILC* and *MPLC* CRC patients. a and b, all stage. c and d, pStage I. e and f, pStage II. g and h, pStageIII. p pathological, *SILC* single-incision laparoscopic colectomy, *MPLC* multiple-port laparoscopic colectomy