

# Evaluation of the postoperative course of colorectal cancer in patients with severe renal failure using a multicentre database.

Kyoko Sakamoto, Koji Okabayashi, Shimpei Matsui, Ryo Seishima, Kohei Shigeta, Yuko Kitagawa

Keio University, School of Medicine, Department of Surgery

## Introduction

- Both colorectal cancer (CRC)<sup>1</sup> and chronic kidney disease (CKD)<sup>2</sup> are increasing in prevalence worldwide.
- Overall survival (OS) and disease free survival (DFS) are poor after CRC surgery in patients with CKD.<sup>3</sup>
- The detailed postoperative course of CRC in patients with CKD is not clear.

This study aimed to clarify the natural history of postoperative CRC in patients with severe renal failure (SRF).

## Methods

### Patients

- Patients who underwent CRC surgery at seven Keio University-affiliated hospitals between January 2010 and December 2020.
- Stage I-III with radical resection performed.

### CKD category

- SRF group = Estimated Glomerular Filtration Rate (eGFR) <30

### Statistical analysis

- Primary outcome is cumulative incidence of cancer death and non-cancer death.
- We used competing risk analysis and subdistribution hazard model.

## Result 1 Patient characteristics

	SRF group (N=128)	Control (N= 3525)	P value
Age*	77.0 [70.0-81.3]	71.0 [63.0-78.0]	<0.001
Sex female(%)	52 (40.6)	1515 (43.0)	0.662
BMI (kg/m <sup>2</sup> )*	22.1 [19.8-24.8]	22.4 [20.1-24.7]	0.517
eGFR (mL/min/1.73m <sup>2</sup> )*	21.9 [9.0-26.7]	69.3 [58.1-81.8]	<0.001
Albumin (g/dL)*	3.5 [3.0-3.8]	4.0 [3.6-4.3]	<0.001
CRP (mg/dL)*	0.31 [0.10-1.33]	0.12 [0.05-0.47]	<0.001
CEA (mg/mL)*	3.90 [2.60-5.82]	3.28 [1.90-6.10]	0.02
Location (Right / Left / Rectum / Multiple, %)	49 (38.3) / 48 (37.5) / 31 (24.2) / 0 (0.0)	1304 (37.0) / 994 (28.2) / 1215 (34.5) / 11 (0.3)	0.046
Pathological stage (I / II / III, %)	44 (34.4) / 43 (33.6) / 41 (32.0)	1135 (32.2) / 1223 (34.7) / 1167 (33.1)	0.875
Dissection (D1 / D2 / D3, %)	12 (9.4) / 48 (37.5) / 68 (53.1)	92 (2.6) / 787 (22.3) / 2644 (75.0)	<0.001
Stoma (%)	26 (20.8)	544 (15.7)	0.154
Adjuvant (%)	15 (11.7)	1077 (30.6)	<0.001
Follow-up (month)*	31.8 [15.2-60.5]	38.7 [21.9-60.8]	0.017

\*median [IQR]; continuous variable, U test; categorical variable, Fisher's exact test. SRF, severe renal failure; BMI, body mass index; eGFR, estimated Glomerular Filtration Rate; CRP, C-reactive protein; CEA, carcinoembryonic antigen

The SRF group was characterised by older age, lower Alb, higher CRP and CEA, a higher proportion of colon cancer and fewer D3 dissection.

## Result 2 Short-term postoperative outcome

	SRF group (N=128)	Control (N= 3525)	P value
Complication (%)	58 (45.3)	930 (26.4)	<0.001
CD classification (%)			<0.001
1	12 (9.4)	310 (8.8)	
2	21 (16.4)	392 (11.1)	
3a	14 (10.9)	138 (3.9)	
3b	5 (3.9)	63 (1.8)	
4a	2 (1.6)	13 (0.4)	
4b	1 (0.8)	2 (0.1)	
5	3 (2.3)	12 (0.3)	
Leakage (%)	11 (8.6)	119 (3.4)	0.004
Abscess (%)	5 (3.9)	30 (0.9)	0.002
Surface SSI (%)	12 (9.4)	210 (6.0)	0.161
Ileus (%)	10 (7.8)	125 (3.5)	0.023

categorical variable, Fisher's exact test. SRF, severe renal failure; CD, clavian-dindo; SSI, surgical site infection.

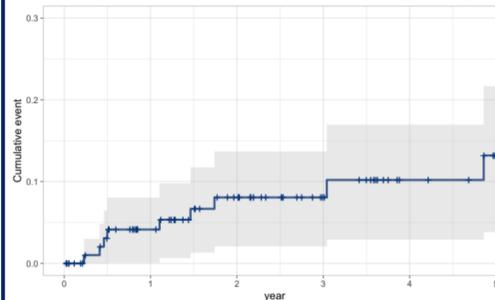
The SRF group had a higher incidence of leakage, intra-abdominal abscess and ileus.

## Conclusion

- Unlike the general population, non-cancer deaths were increased in patients with severe renal failure compared with cancer deaths during the entire post-operative period.
- It was suggested that non-cancer deaths were also increased in patients with right-sided colon cancer who had renal failure and were refrained from dissection.

## Result 3 Long-term postoperative outcome

### Dialysis initiation in SRF group



Dialysis before operation  
22/128 (17.2%)

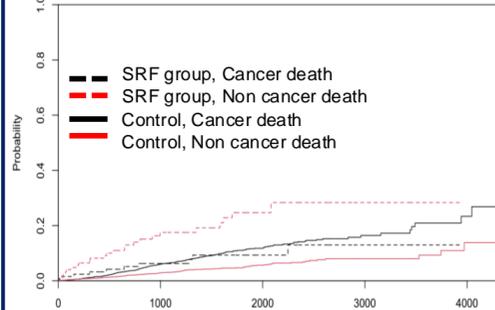
5 years cumulative event rate of dialysis initiation after operation  
**13.2%** (95%CI 3.8-21.7)

### 5 years CIR

**Cancer death**  
SRF group  
9.3% (95%CI 4.3-16.5)  
Control  
11.0% (95%CI 9.7-12.4)

**Non-Cancer death**  
**SRF group**  
**24.7%** (95%CI 15.8-34.6)  
Control  
5.7% (95%CI 3.9-5.6)

### Cumulative incidence rate (CIR)



## Result 4 Subdistribution hazard ratio

### Cancer death

	Hazard ratio	95% CI	p-value
Age	1.02	1.01, 1.04	<0.001
Sex			
Male	-	-	-
Female	0.79	0.69, 1.01	0.059
eGFR			
≥ 30	-	-	-
< 30	0.87	0.45, 1.68	0.7
BMI	0.95	0.92, 0.99	0.009
Location			
Right colon	-	-	-
Left colon	0.87	0.65, 1.17	0.4
Rectum	1.01	0.77, 1.33	>0.9
Multiple	1.46	0.18, 12.2	0.7
Complication			
No	-	-	-
Yes	1.24	0.97, 1.58	0.084
Dissection			
D1	-	-	-
D2	0.38	0.21, 0.67	<0.001
D3	0.37	0.22, 0.61	<0.001
Stage			
I	-	-	-
II	2.42	1.59, 3.68	<0.001
III	5.84	3.99, 8.56	<0.001

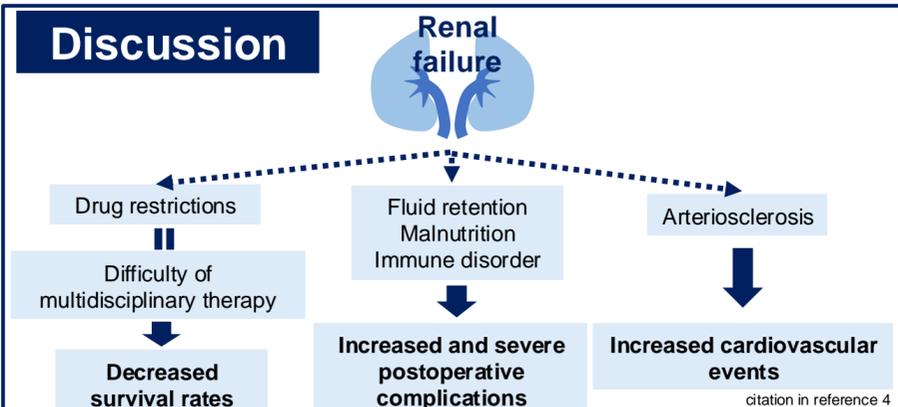
### Non-cancer death

	Hazard ratio	95% CI	p-value
Age	1.05	1.04, 1.07	<0.001
Sex			
Male	-	-	-
Female	0.42	0.29, 0.60	<0.001
eGFR			
≥ 30	-	-	-
< 30	<b>3.37</b>	<b>2.07, 5.48</b>	<b>&lt;0.001</b>
BMI	0.90	0.85, 0.95	<0.001
Location			
Right colon	-	-	-
Left colon	0.68	0.45, 1.03	0.070
Rectum	0.63	0.43, 0.95	0.025
Multiple	<0.01	0.00, 0.00	<0.001
Complication			
No	-	-	-
Yes	1.39	1.00, 1.93	0.10
Dissection			
D1	-	-	-
D2	0.64	0.36, 1.17	0.2
D3	0.29	0.16, 0.51	<0.001
Stage			
I	-	-	-
II	1.52	1.02, 2.28	0.039
III	1.30	0.84, 2.00	0.2

CI, Confidence Interval

SRF was an independent risk factor for non-cancer death.

## Discussion



It is important to understand the unique natural history and treatment problems of patients with SRF and to conduct an individualized risk assessment before surgery.

### References

- Bary F, et al. CA Cancer J Clin 2018; 68: 394-424.
- Jager KJ, et al. Nephrol Dial Transplant. 2019;34(11):1803-1805.
- Liu XY, et al. World J Gastrointest Oncol. 2022 Jun 15;14(6):1199-1209.
- Hu WH, et al. Int J Colorectal Dis 2015; 30: 1557-1562