

**Table S1. Main population characteristics**

Studies	Country	Tumor stages and characteristics	Malnutrition risk	Sex (♀)	Age (years)	BMI (kg/m <sup>2</sup> )	Neoadjuvant treatment and type of surgery	Surgical approaches	Operative time (mins)	Length of stay (days)
<b>Nutritional interventions</b>										
He 2022 n=67 [25]	CN	Stages II, III, IV - Antrum 53% - Gastric body 32% - Esophagogastric junction 15%	86% <sup>a</sup>	29%	INT: 63.2±12.0 CO: 60.5±9.4	INT: 22.0±3.0 CO: 23.1±2.4	Gastrectomy: - Distal subtotal 62% - Total 33% - Proximal subtotal 5%	-	INT: 207.0±33.1 CO: 203.3±41.1	-
Tesar 2022 n=120 [26]	CZ	Stages I, II, III - Rectum 40% - Right colon 36% - Left colon 24%	29% <sup>a</sup>	34%	INT: 67.5±10.0 CO: 63.1±12.5	INT: 27.2±4.8 CO: 26.0±5.8	-	- Laparoscopy 76% - Open 24%	-	INT: 10.9±9.0 CO: 11.2±8.0
Lee 2021 n=176 [27]	KOR	Stages I, II, III, IV - Left colon 62% - Right colon 38%	16% <sup>a</sup>	34%	INT: 65.3±9.2 CO: 65.3±11.7	INT: 24.4±3.5 CO: 24.1±4.1	- Anterior resection 60% - Right hemicolectomy 33% - Left hemicolectomy 5% - Transverse colectomy 2%	- Laparoscopy 98% - Conversion to open 2%	-	INT: 7.6±2.5 CO: 7.4±2.3
Okabayashi 2020 n=208 [28]	JP	Stages not mentioned - Hepatocellular carcinoma 91% - Intrahepatic cholangiocellular carcinoma 9%	-	31%	INT: 73.0±10.7 CO: 73.0±9.8	-	Hepatic resection: - Subsegment 52% - 1 segment 33% - ≥2 segments 15%,	-	INT: 179[43-527] CO: 167[57-519]	INT: 10[7-157] CO: 12[5-144]
Ashida 2019 n=24 [29]	JP	Stages not mentioned - Bile duct carcinoma 35% - Ampullary carcinoma 20% - Pancreatic carcinoma 15% - Others 25%	-	45%	INT: 64.0±11.0 CO: 69.0±6.0	INT: 22.3±4.6 CO: 21.4±2.5	- Whipple 100%	- Open 100%	INT: 414.0±121.0 CO: 490.0±153.0	-
<b>Physical activity interventions</b>										
Berkel 2022 n=74 [30]	NL	Stages not mentioned - Colon 95%, - Rectum 5%	- <sup>b</sup>	47%	INT: 74.0±7.0 CO: 73.0±6.0	INT: 29.8±4.1 CO: 30.5±4.9	NAT: 5% - Right hemicolectomy 47% - Sigmoid colectomy 32%	- Laparoscopy 77% - Conversion to open 19% - Open 4%	-	INT: 8.4±7.4 CO: 9.1±7.0

								- Left hemicolectomy 9%			
								- Transverse hemicolectomy 3%			
								- Abdominal perineal resection 2%			
								- Low anterior resection 2%			
								- Subtotal colectomy 2%			
								- Other 3%			
Steffens 2021 n=22 [31]	AUS	Stages not mentioned - Primary rectal 14% - Recurrent rectal 32% - Appendix adenocarcinoma 27% - Pseudomyxoma peritonei 14% - Colorectal 9% - Other 4%	-	46%	INT: 62[48-72] CO: 66[46-70]	-	NAT: 17% - Pelvic exenteration 50% - Cytoreductive surgery & hyperthermic intraperitoneal chemotherapy 50%	- Open 100%	-	INT: 36[15-52] CO: 29[15-53]	
Karlsson 2019 n=23 [32]	SE	Stages I, II, III, IV - Colon 86% - Rectum 14%	-	62%	INT: 83[76-85] CO: 74[73-76]	-	NAT: 14% No information on type of surgery	- Laparoscopy 71% - Open 29%	INT: colon 150[140-164] rectum 401[-] CO: colon 159[145-176] rectum 529[441-616]	INT: 5[4-6] CO: 6[4-7]	
<b>Probiotics and symbiotics interventions</b>											
Roussel 2022 n=54 [33]	FR	Stages not mentioned - Hepatocellular carcinoma 100%	-	15%	INT: 66.0±8.9 CO: 66.9±6.7	-	NAT: 11% - Minor liver resection 93% - Major liver resection 7%	-	INT: 130[40-400] CO: 100[40-290]	-	
Polakowski 2019 n=120 [34]	BR	Stages I, II, III	-	47%	INT: 60.9±6.7 CO: 58.9±6.3	INT: 24.8±3.2 CO: 24.9±2.9	NAT: 0% - Abdominal rectosigmoidectomy 49% - Rectosigmoidectomy with colostomy /ileostomy 44% - Right colectomy 7%	-	-	INT: 3.0±1.0 CO: 4.0±18.0	
<b>Nutritional and physical activity interventions</b>											
Ausania 2019 n=40	ES	Stages not mentioned - Ductal carcinoma 45%	INT: 100% <sup>c</sup> CO: -	45%	INT: 66[38-80] CO: 66[38-81]	INT: 24.8[-] CO: 26.5[-]	- Whipple 100%	- Open 100%	-	INT: 11[7-46] CO: 13[7-60]	

[35]		- Ampullary carcinoma 40% - Cholangiocarcinoma 7.5% - Intraductal papillary mucinous neoplasm carcinoma 7.5%								
Minnella 2018 n=68 [36]	CA	Stages I, II, III - Esophagus 80%, - Gastric 20%	16% <sup>a</sup>	25%	INT: 67.3±7.4 CO: 68.0±11.6	INT: 26.1±4.8 CO: 25.7±4.7	NAT: 69% - Esophagectomy 80% - Partial gastrectomy 12% - Total gastrectomy 8%	- Open 57% - Laparoscopy 43%	INT: 195[170-226] CO: 226[179-315]	INT: 8[6-12] CO: 7[6-13]
<b>Multimodal interventions</b>										
Allen 2022 n=54 [37]	UK	Stages I, II, III, IV	-	15%	INT: 65.0±6.0 CO: 62.0±9.0	INT: 28.1±4.8 CO: 27.7±5.1	NAT: 100% - Open esophagectomy 84% - Total gastrectomy 11% - Resection abandoned 5%	-	INT: 515[429-528] CO: 475[431-536]	INT: 11[9-21] CO: 16[9-33]
Carli 2020 n=120 [38]	CA	Stages I, II, III, IV - Colon 72% - Rectum 28%	64% <sup>d</sup>	53%	INT1: 78[72-82] INT2: 82[74-84]	INT1: 25[23-30] INT2: 26[24-31]	NAT: 12% - Right hemicolectomy 42% - Low anterior resection 15% - Anterior/sigmoid resection 14% - Left hemicolectomy 12% - Abdominoperineal resection 7% - Ileocecal resection 3% - Subtotal colectomy 3% - Transverse colectomy 2% - Other 2%	- Laparoscopy 79% - Open 21%	INT1: 180[110-280] INT2: 180[130-300]	INT1: 4[3-8] INT2: 5[3-9]
Minnella 2020 n=42 [39]	CA	Stages I, II, III - Colon 74%, - Rectum 26%	41% <sup>c</sup>	38%	INT1: 67[60-72] INT2: 67[50-76]	INT1: 29[23-32] INT2: 26[23-34]	NAT: 19% No information type of surgery	- Laparoscopy 100%	INT1: 183.5±51.4 INT2: 216.7±52.4	INT1: 4[3-6] INT2: 4[3-5]

Results are presented as mean±SD, median[IQR]; <sup>a</sup> Nutritional Risk Screening (NRS), <sup>b</sup> Short Nutritional Appetite Questionnaire (SNAQ), <sup>c</sup> Patient-Generated Subjective Global Assessment (PG-SGA), <sup>d</sup> Subjective Global Assessment (SGA)

**Abbreviations:** -: no data, BMI: Body mass index, CN: China, CZ: Czech Republic, KOR: South Korea, JP: Japan, NL: Netherlands, AUS: Australia, SE: Sweden, FR: France, BR: Brazil, ES: Spain, CA: Canada, UK: United Kingdom, INT: Intervention group, CO: Control group, INT1: Intervention N°1, INT2: Intervention N°2, NAT: Neoadjuvant treatment