Supplementary Document

Supplementary Table 1: Search Strategy

• "Preoperative Period", • "Preoperative Care" • "Preoperative" • "preop" • "perioperative" Combined with • "immunonutrition" • "pharmacononutrition" • "immune nutrients" • "immune modulating nutrients" • "dietary supplements" • "oral supplement" • "enteral nutrition" • "nutritional support" • "arginine" • "omega-3 fatty acid" • "glutamine" • "enteric feeding" • "diet therapy" • "Nutrition(al) feed(s)" • "Nutrition Disorders", • "Nutrition Surveys", • "Home/ or nutrition", • "Total/Nutrition Therapy" combined with • "gastrointestinal surgery", • "surgeries" • "post-operative outcomes".

Detailed search strategy available on request

Supplementary Table 2: Excluded studies

Study & Year	Cancer	IMN	Control	Reason for exclusion	Notes
Wachtler *et al.* 1995[1]	Upper GI surgery for cancer	Impact, Sandoz-Nutrition, Bern, Switzerland	Isocaloric isonitrogenous supplements	Pre-2000 so not recent enough.	
McCarter *et al.* 1998[2]	Upper Gastrointestinal cancer	1. Arginine alone 2. Arginine combined with ω-3 fatty acids	Isocaloric isonitrogenous supplements	Pre-2000 so not recent enough.	
Hubner *et al.* 2012[3]	Major abdominal surgery – benign and cancer	Impact, Novartis/ Nestlé Nutrition, Vevey, Switzerland	Isocaloric isonitrogenous supplements	Mixed population of cancer and benign patients. No availability to data on cancer patients alone.	*Contact to obtain data on cancer patients alone failed.*
Barker *et al.* 2013[4]	Mixed upper and lower GI surgery (not only cancer)	Impact Advanced recovery (Nestle Medical Nutrition, MN, USA)	No supplements	Mixed population of cancer and benign patients. No availability to data on cancer patients alone.	*Contact to obtain data on cancer patients alone failed.*
Martin *et al.* 2017[5]	Pancreatic cancer (electroporation of unresectable tumours)	Impact	No supplements	Pseudo-randomization, based on affordability and availability of supplement.	
Ashida *et al.* 2018[6]	Pancreatic cancer - pancreaticoduodenectomy	Oral supplement containing eicosapentaenoic acid	Isocaloric isonitrogenous supplements	IMN product only contained a single component of immunonutrient and not a combination. So not comparable with the other studies.	

References

1. Wachtler P, Axel Hilger R, Konig W, Bauer KH, Kemen M, Koller M. Influence of a pre-operative enteral supplement on functional activities of peripheral leukocytes from patients with major surgery. *Clin Nutr.* 1995; 14: 275-282.
2. McCarter MD, Gentilini OD, Gomez ME, Daly JM. Preoperative oral supplement with immunonutrients in cancer patients. *JPEN J Parenter Enteral Nutr.* 1998; 22: 206-211.
3. Hubner M, Cerantola Y, Grass F, Bertrand PC, Schafer M, Demartines N. Preoperative immunonutrition in patients at nutritional risk: results of a double-blinded randomized clinical trial. *Eur J Clin Nutr.* 2012; 66: 850-855.
4. Barker LA, Gray C, Wilson L, Thomson BN, Shedda S, Crowe TC. Preoperative immunonutrition and its effect on postoperative outcomes in well-nourished and malnourished gastrointestinal surgery patients: a randomised controlled trial. *Eur J Clin Nutr.* 2013; 67: 802-807.
5. Martin RC, 2nd, Agle S, Schlegel M, et al. Efficacy of preoperative immunonutrition in locally advanced pancreatic cancer undergoing irreversible electroporation (IRE). *Eur J Surg Oncol.* 2017; 43: 772-779.
6. Ashida R, Okamura Y, Wakabayashi-Nakao K, Mizuno T, Aoki S, Uesaka K. The impact of preoperative enteral nutrition enriched with eicosapentaenoic acid on postoperative hypercytokinemia after pancreatoduodenectomy: the results of a double-blinded randomized controlled trial. *Dig Surg.* 2018 [Epub ahead of print].

Supplementary Table 3: The composition of IMPACT (Nestlé Health Science)

Oral Impact® is powder nutrients for oral feeding that provides 1.0 kcal/ml when reconstituted with water. And contains the following additional nutrients - ω-3 fatty acids, arginine, nucleotides and soluble fibre. For use under medical supervision. (Downloaded from https://www.nestlehealthscience.co.uk/brands/impact/impact).

Typical values	Per 100g	Per 74g (Tropical flavour*)
General		
Energy kJ/kcal	1763/418	1304/309
Fat (22% kcal) g	10	7
of which saturates g	5.1	4
of which monounsaturates g	2.1	1.5
of which polyunsaturates g	3.2	2.37
Carbohydrate (54% kcal) g	56	41.4
of which sugars g	30	22
of which lactose g	1.2	0.89
Fibre (2% kcal) g	4.1	3
Protein (23% kcal) g	24	18
Salt (= Na(g) x 2.5) g	1.1	0.8
Vitamins		
A µg	520	385
D µg	4.2	3.1
K µg	27	20
C mg	105	78
B1 (Thiamin) mg	0.49	0.36
B2 (Riboflavin) mg	0.8	0.59
B6 mg	0.7	0.52
Niacin mg/mg NE	1.7/6.5	1.3/4.8
Folic acid µg	140	104
B12 µg	2.5	1.8
Pantothenic acid mg	4	3
Biotin µg	20	15
E mg α-TE	12	8.9
Minerals		
Sodium mg/mmol	434/19	321/14
Chloride mg/mmol	608/17	450/13
Potassium mg/mmol	543/14	402/10
Calcium mg/mmol	324/8.1	240/6.0
Phosphorus mg/mmol	292/9.4	216/7.0
Magnesium mg/mmol	70/2.9	52/2.2
Iron mg	4.9	3.6
Zinc mg	5	3.7
Copper mg	0.69	0.51
Iodine µg	61	45
Selenium µg	25	18
Manganese µg	810	599
Chromium µg	41	30
Molybdenum µg	50	37
Fluoride µg	540	400
Other nutrients		
Choline mg	165	122
L-arginine g	5.1	3.8
Omega-3 g	1.3	0.96
MCT g	3	2.2
Nucleotides g	0.6	0.4
Osmolarity mOsm/l	520	
Osmolality mOsm/kg H2O	620	
Water content per 100ml: 2.4g		

* See individual packs for other flavours

Supplementary Figure 1: Funnel plot for infectious complications. The points correspond to the treatment effects (log weighted OR) from 14 individual studies, and the diagonal lines show the expected 95% confidence intervals around the pooled fixed effect log OR estimate.