

NUTRITIONAL AUTONOMY IN SHORT BOWEL SYNDROME AND INTESTINAL FISTULAS

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INTRODUCTION

Short bowel syndrome (SBS) and entero-cutaneous/atmospheric fistulas are common causes of type 3 intestinal failure (IF). Patients suffering from type 3 IF require parenteral nutrition (PN) as it is impossible for them to absorb sufficient amounts of oral and enteral nutrition. In patients with SBS and fistulas the need for permanent nutritional support is determined by the length of remnant small bowel, the type of the digestive circuit of anastomosis and the health of the remaining mucosa.

AIM

The aim of the study was to evaluate the likelihood of achieving nutritional autonomy in a large home parenteral nutrition (HPN) cohort from a national reference centre.

METHOD

Clinical records of adult patients receiving HPN over an 18-year period between January 2001 and December 2018 were reviewed. The censoring date for achieving nutritional autonomy was 01/06/2021. Patients were classified as successful at achieving nutritional autonomy if they remained off HPN for a period of 12 months.

Patients were "predicted" to achieve nutritional autonomy based on their final anatomy: SBS group 1/fistula with small bowel in continuity ≥ 115 cm, SBS group 2 with small bowel in continuity ≥ 60 cm and $>50\%$ or $<50\%$ colon, SBS group 3 with small bowel in continuity ≥ 35 cm and intact colon as per ESPEN guidelines.

Kaplan-Meier curves were generated for the nutritional autonomy analysis. Achieving nutritional autonomy was further analysed using death as a competing risk, and cumulative incidences were estimated using an Aalen-Johansen estimator. Cox regression was further performed to assess prognostic factors of achieving nutritional autonomy.

RESULTS

Demographics and clinical characteristics

458 cases fulfilled inclusion criteria and were included in the analysis. Median follow-up time until death or censoring was 4.5 years (range 0.3 – 19.7 years). The mechanism leading to IF was classified as SBS group 1 in 258 (56.3%) cases, SBS group 2 in 19 (4.1%) cases, SBS group 3 in 5 (1.1%) cases and intestinal fistulas in 176 (38.4%) cases. The most common diagnosis leading to IF were surgical complications in 192 (41.9%) cases, followed by Crohn's disease in 118 (25.8%) cases and mesenteric ischaemia in 107 (23.4%) cases.

Reconstructive surgery

202 (44.1%) patients underwent reconstructive surgery, with median time between initiation of HPN and surgery of 11.3 months (IQR 5.7 - 21.1). Surgery type included fistula repair in 70 (34.7%) cases, restoration of continuity in 123 (60.9%) cases and small bowel transplant in 9 (4.5%) cases. Median additional small bowel length after surgery was 60cm (IQR 0cm – 140cm). After surgery 143 (70.8%) patients changed their digestive circuit from ostomy to small bowel in continuity with colon.

Nutritional autonomy

Median length of HPN for all patients included in the analysis was 2.6 years (IQR 1.2 - 4.9), with a total time on HPN of 1703.7 patient years. Overall, 167 (36.5%) of patients achieved nutritional autonomy. The probability of achieving nutritional autonomy was 13.5% at 1 year, 26.3% at 2 years, 39.5% at 5 years and 48.5% at 10 years (Figure 1). Adjusting for death as a competing factor using the Aalen-Johansen estimator reduced the probabilities to 13.3% at 1 year, 24.2% at 2 years, 34.0% at 5 years and 38.3% at 10 years.

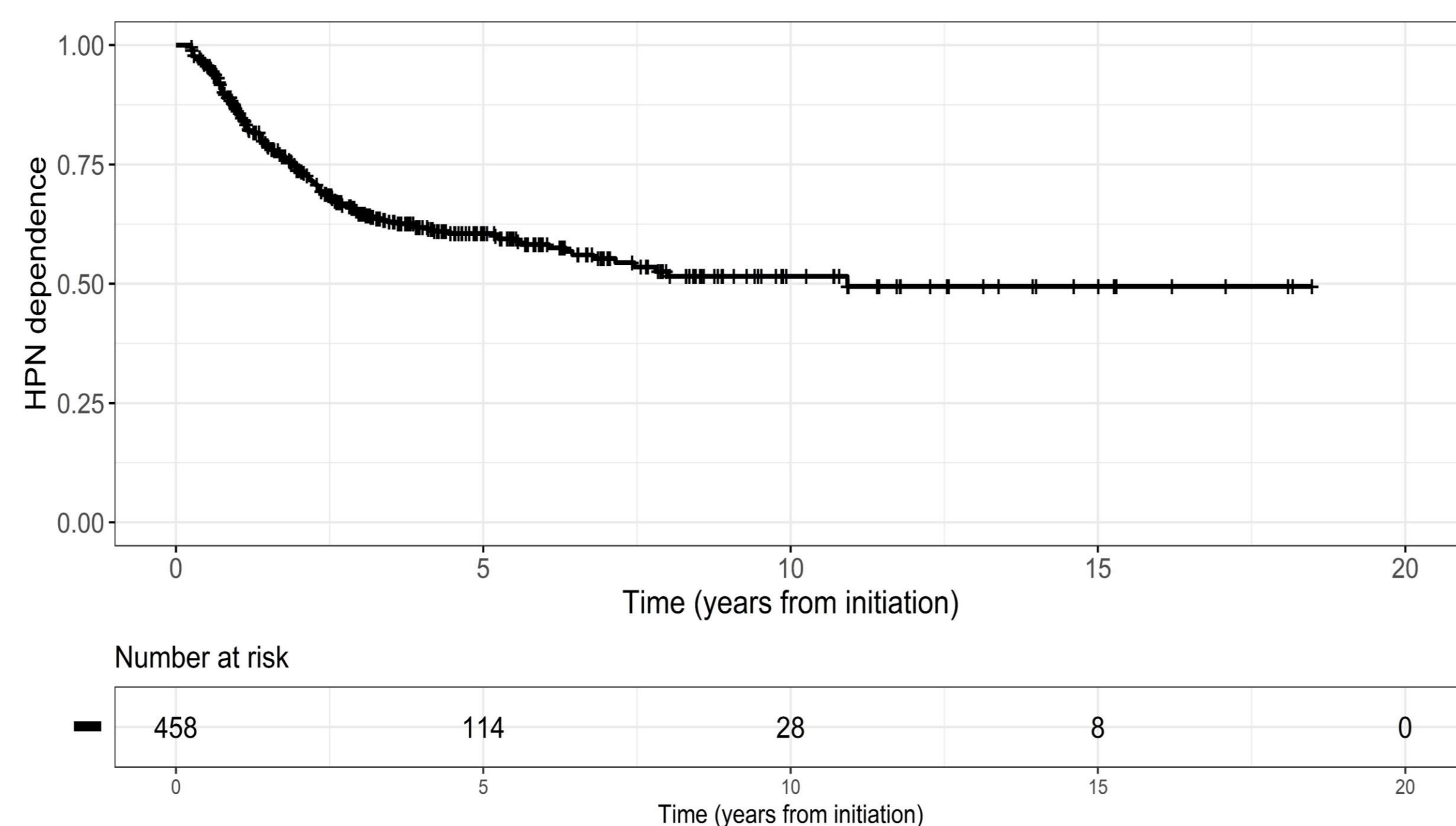


Fig 1. KM curve for achieving nutritional autonomy

Prognostic factors of nutritional autonomy

The likelihood of achieving nutritional autonomy was higher for patients who underwent reconstructive surgery and was affected by the final small bowel length in continuity (Figure 2).

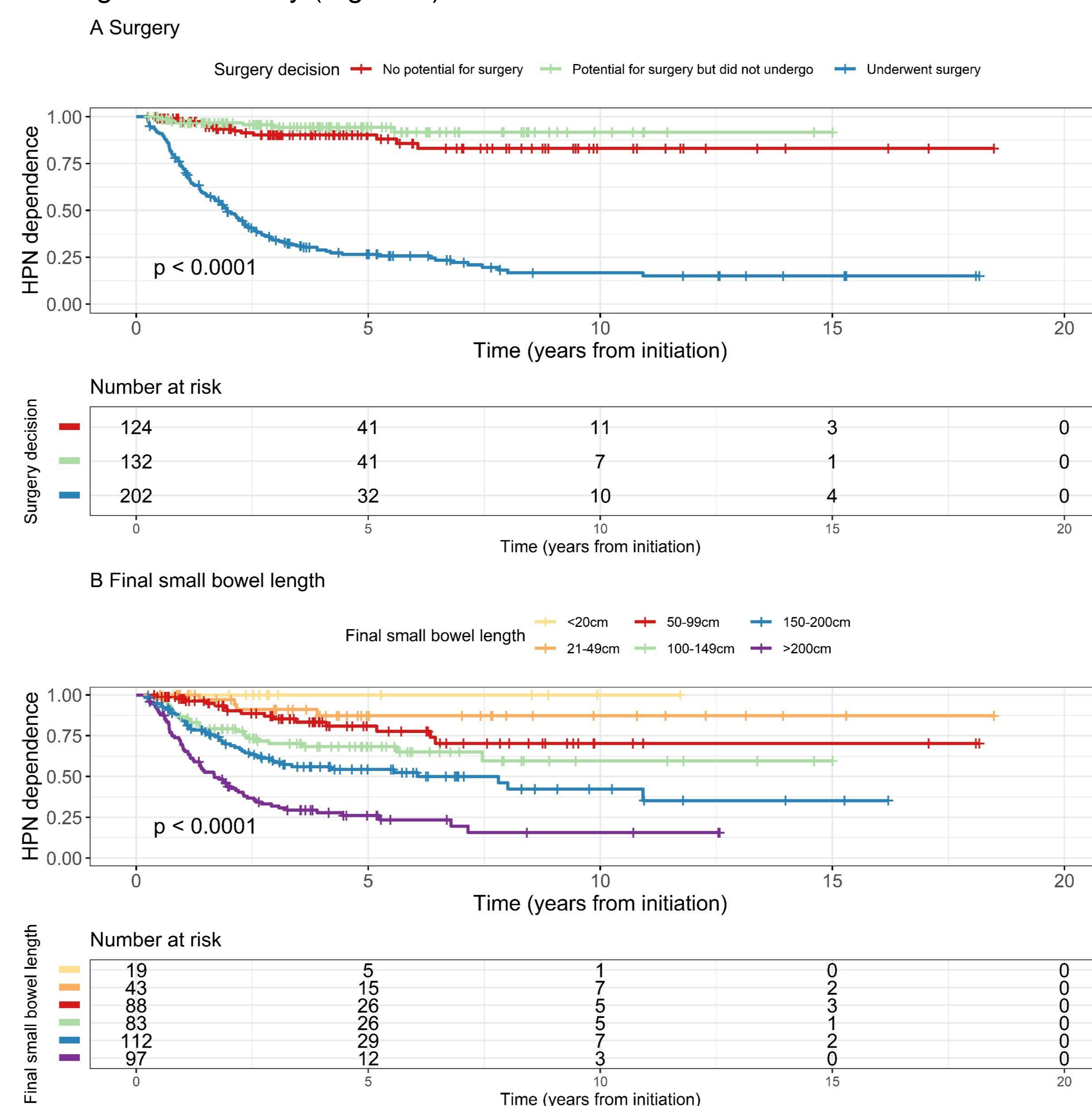


Fig 2. KM curve for achieving nutritional autonomy stratified by (A) Decision regarding reconstructive surgery, (B) Final small bowel length in continuity

Small bowel length and digestive circuit type (colon in continuity) were the most important factors for achieving nutritional autonomy (Table 1). 147/202 (72.8%) of patients who underwent surgery achieved autonomy, significantly more than patients who did not undergo surgery (20/256, 7.8%, $p < 0.001$).

Predicted to achieve nutritional autonomy

Of 290 patients predicted to achieve autonomy only 159 (54.8%) achieved it. Those unable to achieve autonomy were older (median age 59.0 vs. 49.0, $p < 0.001$) and had a higher Charlson Comorbidity Index (median score 3 vs. 1, $p < 0.001$).

Characteristics	HR (multivariable)
Sex	
Male	-
Female	1.08 (0.78-1.51, $p=0.640$)
Age	
Mean (SD)	0.99 (0.98-1.00, $p=0.034$)
Underlying disease	
Crohn's disease	-
Mesenteric ischemia	1.48 (0.89-2.47, $p=0.129$)
Surgical complications	1.08 (0.71-1.62, $p=0.726$)
Number of HPN nights	
Mean (SD)	0.90 (0.79-1.04, $p=0.145$)
Final small bowel length in continuity	
<50cm	-
50-99cm	6.72 (1.51-29.97, $p=0.012$)
100-149cm	16.13 (3.71-70.23, $p<0.001$)
150-200cm	21.35 (4.99-91.40, $p<0.001$)
>200cm	37.79 (8.86-161.09, $p<0.001$)
Digestive circuit	
Colon not in continuity /No colon remaining	-
Colon in continuity and <50% remaining	3.60 (1.47-8.82, $p=0.005$)
Colon in continuity and >50% remaining	5.33 (3.56-7.99, $p<0.001$)

Table 1. Cox proportional hazard regression of achieving nutritional autonomy

CONCLUSIONS

Reconstructive intestinal surgery significantly facilitates HPN weaning in patients with severe IF. While final bowel anatomy is the most important predictor for achieving nutritional autonomy, this may be less likely in older people with greater co-morbidity. Of note, death as a competing factor impacts on the estimation of nutritional autonomy and we would recommend obtaining probabilities using the Aalen-Johansen estimator.

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