A dynamic association between myosteatosis and liver stiffness: Results from a prospective interventional study in obese patients

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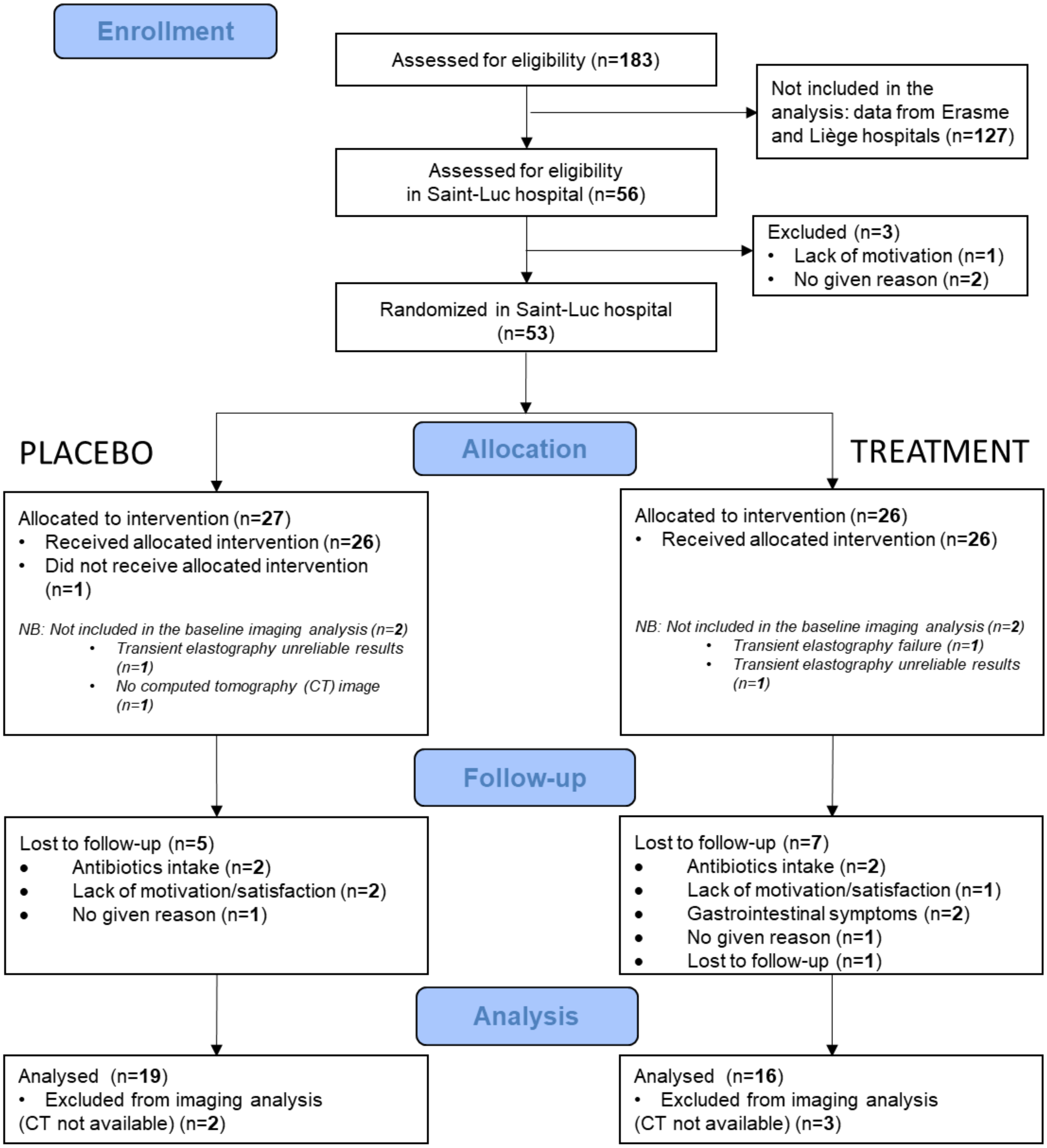

Fig. S1. CONSORT Flow diagram.

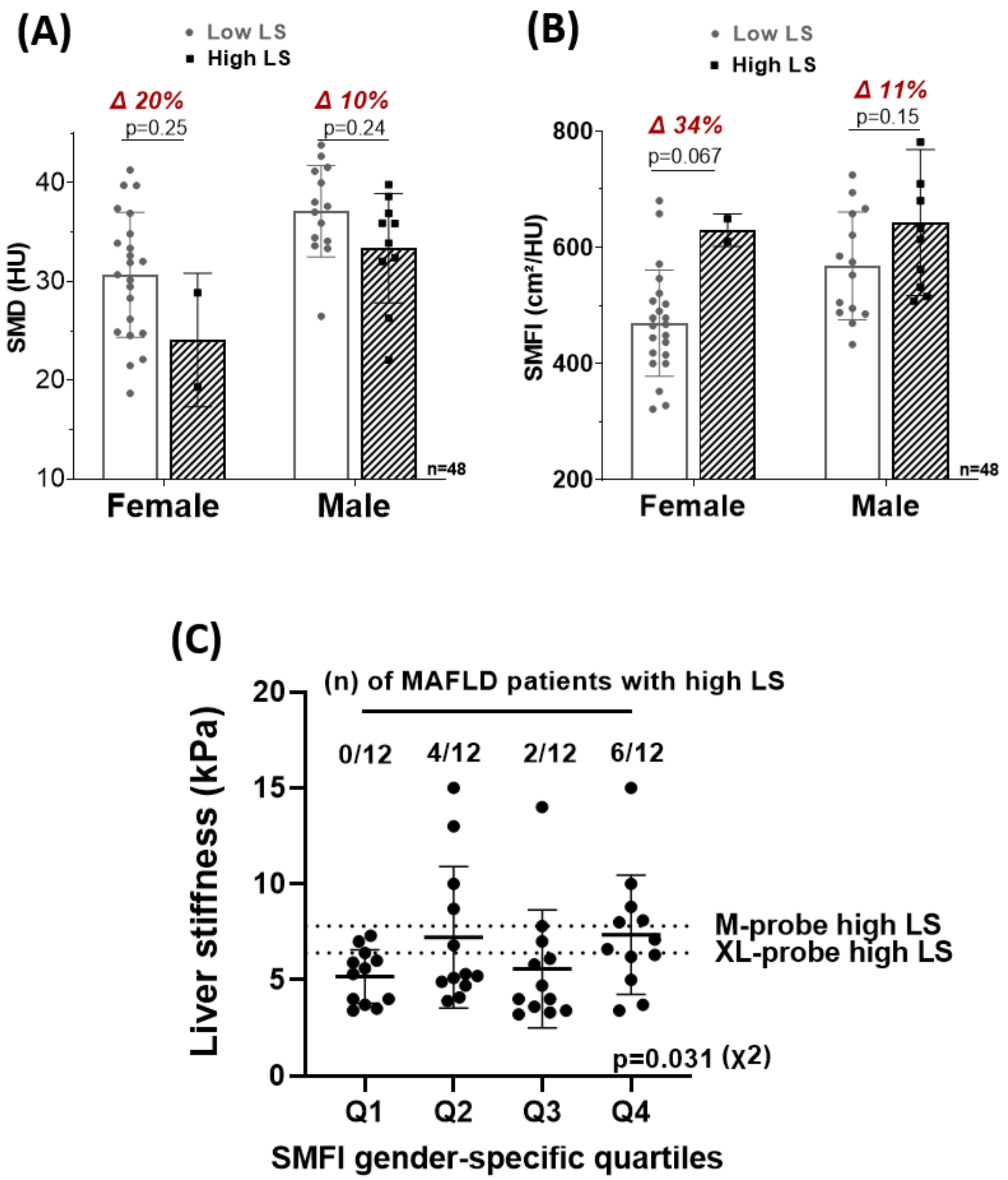

Fig. S2. Gender-stratification of SMFI in relation with liver stiffness. (a) Skeletal muscle density (SMD) and (b) skeletal muscle fat index (SMFI) in male and female patients sub-divided according to liver stiffness (LS) (Female n=24 and Male n=24) (two-way ANOVA, n=48). (c) Gender-specific quartile stratification of liver stiffness values according to SMFI values. Chi-squared test.

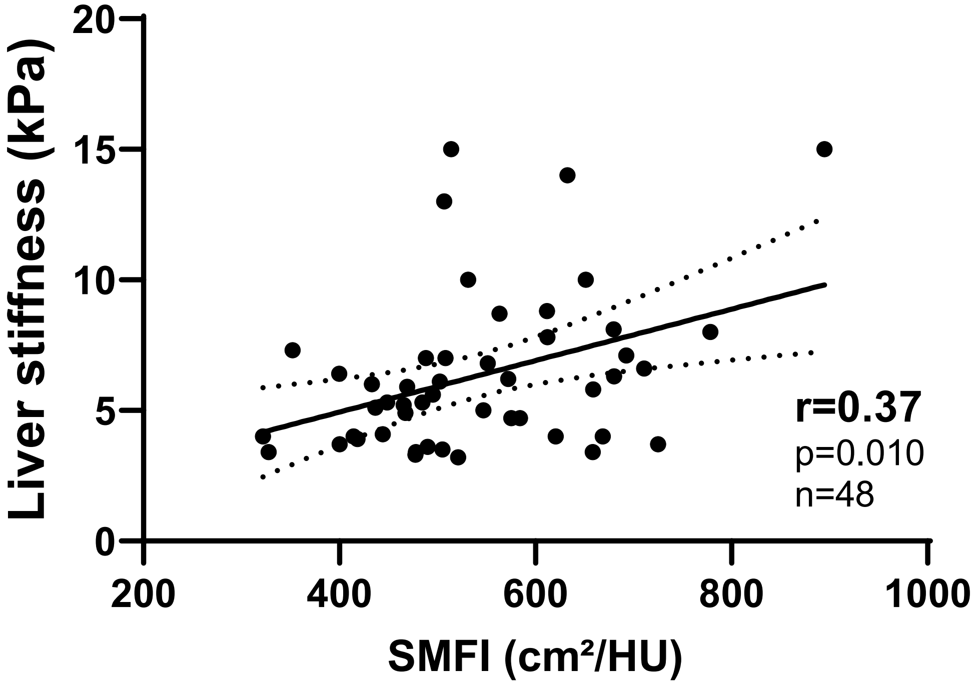

Fig. S3. SMFI significantly correlates with liver stiffness. Spearman's correlation between liver stiffness and skeletal muscle fat index (SMFI) at baseline. Dotted line = 95% confidence interval.

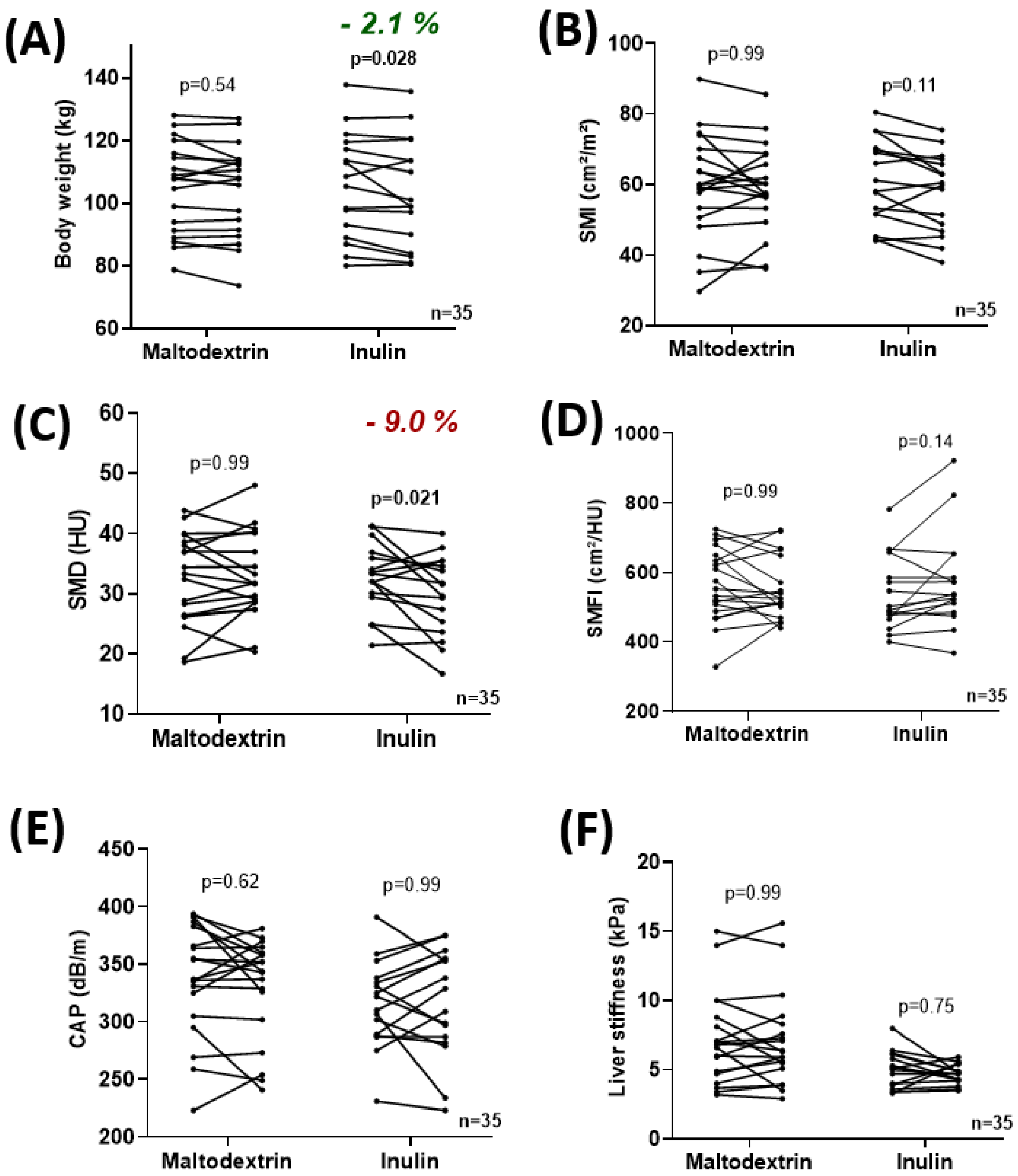

Fig. S4. Inulin supplementation is associated with significant weight loss and decreased muscle mass and density. (a) Body weight, (b) skeletal muscle index (SMI), (c) skeletal muscle density (SMD), (d) skeletal muscle fat index (SMFI), (e) controlled attenuation parameter (CAP) and (f) liver stiffness in patients sub-divided according to dietary intervention (Maltodextrin, n=19 or Inulin, n=16) at baseline and after dietary regimen completion (3 months) (Paired sample t-test, n=35). All data are mean ± SD. Significant differences considered at p<0.05.

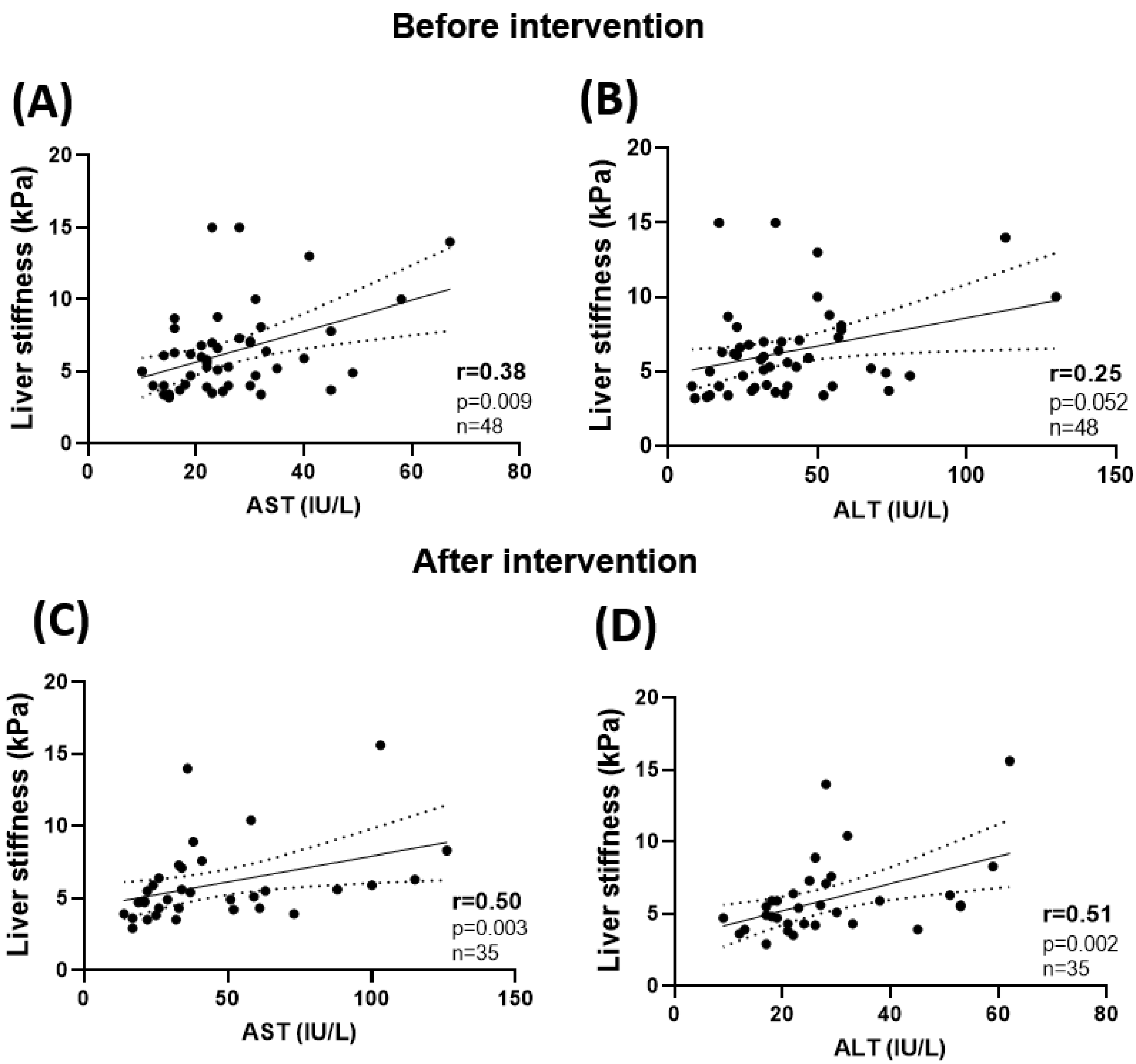

Fig. S5. Liver stiffness correlates with ALT and AST serum levels before and after intervention. Spearman's correlations between ALT or AST and liver stiffness at baseline (a and b) and after intervention (c and d). Dotted line = 95% confidence interval.

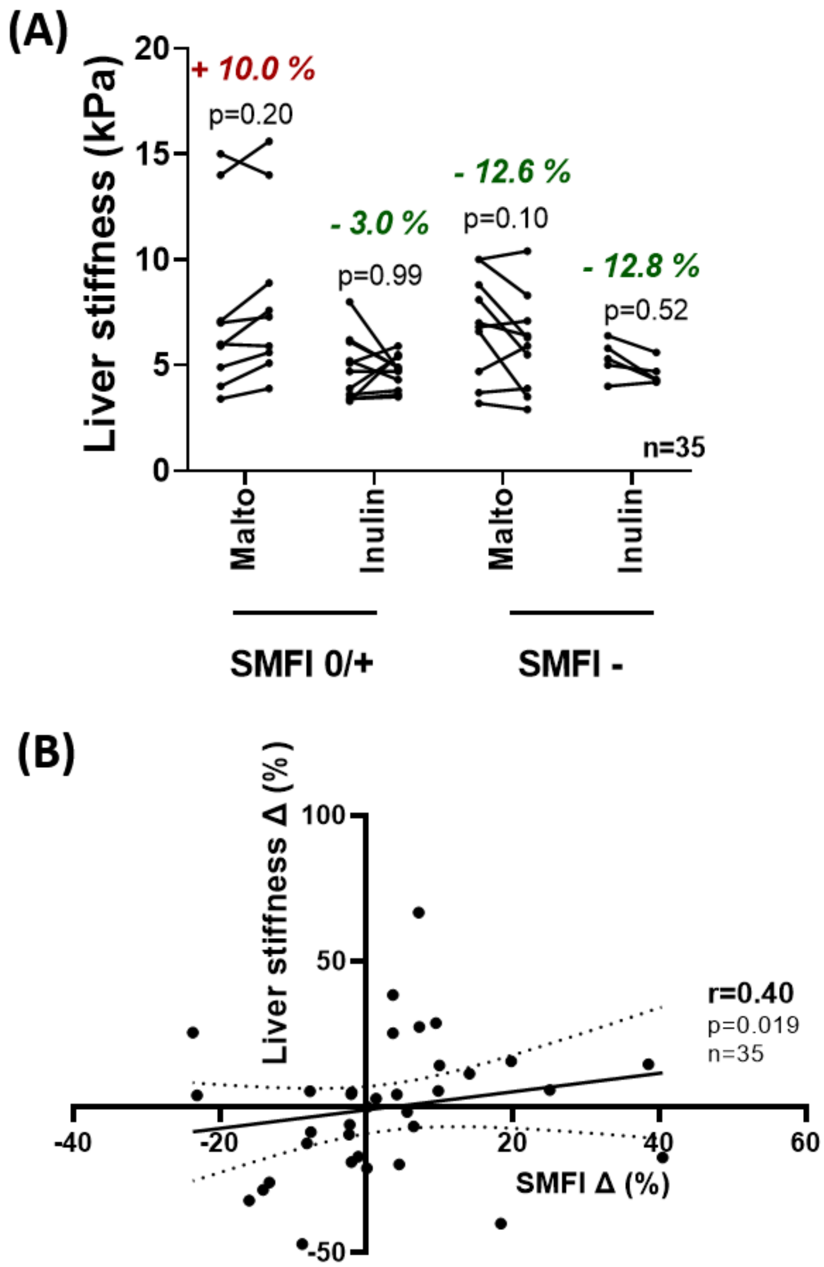

Fig. S6. Decreased liver stiffness is not explained by intervention in patients that decreased SMFI. (a) Liver stiffness in patients stratified according to skeletal muscle fat index (SMFI) changes and dietary supplementation (two-way ANOVA, n=35 with maltodextrin n=19 and inulin n=16). Significant differences considered at $p<0.05$. (b) Spearman's correlations between liver stiffness change (%) and SMFI change (%) after intervention. Dotted lines = 95% confidence interval.

Table S1. Pearson correlation analysis of CT-SMI vs BIA muscle parameters : BIA-SMI_{ht^2} is the most correlated with gold standard CT-SMI

	CT - SMI
CT- Psoas muscle index	$r = 0.79$ $p < 0.0001$
BIA – Fat free mass	$r = 0.56$ $p < 0.0001$
BIA-SMI_{bw}	$r = 0.49$ $p = 0.001$
BIA-SMI_{ht^2}	$r = 0.70$ $p < 0.0001$

Abbreviations: CT – Psoas muscle index = psoas muscle area at L3 divided by height², BIA – Fat Free mass : Fat free mass derived from bioelectrical impedance analysis; BIA-SMI_{bw} = BIA – Body weight scaled muscle mass index = BIA – Fat Free mass x 100 divided by body weight; BIA-SMI_{ht^2} = BIA – Height scaled muscle mass index = BIA - Fat Free Mass divided by height². Pearson's correlation.

Table S2. SMFI is a significant predictor of liver stiffness.

	Liver stiffness (kPa)
Parameters	**p value**
Age	0.737
Gender	0.525
Waist circumference (cm)	0.198
Probe type (M or XL)	0.083
SMFI (cm^2/HU)	**0.032**

Multivariate linear regression model to predict liver stiffness

Abbreviations: SMFI, Skeletal Muscle Fat Index

Table S3. Body weight, muscle and liver changes after dietary intervention

	Patients (n=35)		
	M0	**M3**	**p value**
Body weight (kg)	105.47 ± 15.30	103.94 ± 15.58	**0.015**
BMI (kg/m²)	35.98 ± 4.95	35.48 ± 4.84	**0.025**
SMI (cm²/m²)	60.21 ± 13.42	58.63 ± 11.77	0.136
SMD (HU)	32.53 ± 6.70	31.40 ± 6.97	0.155
SMFI (cm²/HU)	552.2 ± 105.3	562.1 ± 113.0	0.461
Liver CAP (dB/m)	326.94 ± 44.83	323.34 ± 45.57	0.477
Liver stiffness (kPa)	6.16 ± 2.78	5.95 ± 2.75	0.388

Abbreviations: BMI, Body Mass Index; SMI, Skeletal Muscle Index; SMD, Skeletal Muscle Density; SMFI, Skeletal Muscle Fat Index; CAP, Controlled Attenuation Parameter.
Repeated t test. Mean ± SD.

Table S4. Baseline parameters were similar between SMFI non-improvers and improvers

	SMFI 0/+ (n=20)	SMFI - (n=15)	p value
Age	50 ± 11	48 ± 12	0.624
Weight (kg)	103.5 ± 11.9	108.0 ± 19.0	0.396
CAP (dB/m)	316 ± 46	341 ± 41	0.109
Liver stiffness (kPa)	6.0 ± 3.2	6.4 ± 2.1	0.719
SMI (cm^2/m^2)	60.8 ± 13.4	59.4 ± 13.9	0.766
SMFI (cm^2/HU)	525.3 ± 107.9	588.3 ± 93.2	0.080
HOMA-IR	29.5 ± 15.3	40.6 ± 24.1	0.264

Abbreviations: CAP, Controlled Attenuation Parameter; SMI, Skeletal Muscle Index; SMFI, Skeletal Muscle Fat Index; HOMA-IR, Homeostatic Model Assessment for Insulin Resistance.
Student's t test. Mean ± SD.