Supplements

Malnutrition in patients with liver cirrhosis

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Supplementary Table 1: Summary of studies reporting the prevalence of malnutrition, sarcopenia, osteodystrophy and frailty in cirrhosis between 2015 and 2020

Study characteristics	Prevalence of malnutrition	Prevalence of sarcopenia/osteodystrophy	Reference
102 liver transplant candidates, the Netherlands	Not reported	29.4% presarcopenia 19.6% sarcopenia	(1)
232, liver transplant candidates, UK	47% high risk on RFH-NTP	Not reported	(2)
109 liver transplant candidates, Sweden	Low fat mass index 15% low fat-free mass index 9% Malnutrition assessment: 5% malnourished, 39% at risk		(3)
315 liver transplant candidates, Canada	60% SGA moderate/severe malnutrition	Low skeletal muscle index 38%	(4)
73 liver transplant candidates, Brazil	60% SGA moderate/severe malnutrition		(5)
117 liver transplant candidates, India	86% SGA moderate/severe malnutrition		(6)
70 liver transplant candidates, Canada	79% SGA moderate/severe malnutrition		(7)

110 liver transplant candidates, Spain	70% malnourished on 4 or more malnutrition scores		(8)
60 cirrhotic inpatients, Thailand	SGA 92% moderate/severe malnutrition	Not reported	(9)
381 cirrhotic inpatients, USA	57% RFH-NTP high risk	Not reported	(10)
120 patients with esophageal varices bleeding, Taiwan	38% high nutrition risk mNUTRIC score		(11)
13.141.324 nationwide inpatient sample, USA	Malnutrition 12.4% in cirrhosis with fracture, 9.6% in cirrhosis without fracture, 5.4 % in patients no cirrhosis with fracture	Not reported	(12)
247 cirrhotic inpatients, India	60% low protein calorie malnutrition score 67% malnutrition on body composition analysis	71% reduced handgrip strength	(13)
130 cirrhotic in- and outpatients, Portugal	41%SGA moderate/severe malnutrition		(14)
104 cirrhotic patients, Tunisia	63% SGA moderate/severe malnutrition		(15)
155 cirrhotic patients, China	RFH-NPT 63% at nutritional risk		(16)
170 cirrhotic patients, Greece	SGA 23% moderate/severe malnutrition	Not reported	(17)
122 cirrhotic patients, Pakistan	73% protein calorie malnutrition score 61% malnutrition on body composition analysis	Not reported	(18)
84 cirrhotic patients, Germany	51% high risk on RFH-NPT	Not reported	(19)
220 cirrhotic patients, Mexico	39% low phase angle		(20)
42 cirrhotic outpatients, Australia	SGA 40% moderate/severe malnutrition	Not reported	**(21)**
60 cirrhotic outpatients, Nepal	77% malnutrition by protein calorie malnutrition score	Not reported	(22)

406 cirrhotic outpatients, Australia	Not reported	Osteodystrophy 54%	(23)
120 patients with Hep B and C cirrhosis, China	SGA 60% moderate/severe malnutrition	Not reported	(24)
22 cirrhotic outpatients, USA	80% malnutrition by dietician assessment		(25)
118 outpatients, Brazil	Malnutrition 35%	Sarcopenia 17%	(26)
983 cirrhotic outpatients, USA		Liver Frailty Index: 15% frail	(27)
104 patients with chronic hepatitis C with and without cirrhosis, Brazil	Not reported	Low bone mineral density 34.6% low muscle strength 27.9% pre-sarcopenia 14.4% sarcopenia 8.7% sarcopenic obesity 3.8%	(28)
135 patients with chronic hepatitis C (noncirrhotic and compensated cirrhotic), Spain	22% low fat-free mass index 24% low phase angle		(29)
352 patients with cirrhosis and 189 patients with chronic hepatitis, India	56%, SGA moderate/severe malnutrition in cirrhosis; 24% in chronic hepatitis	Low handgrip strength 42% in cirrhosis, 18% in chronic hepatitis	(30)

Supplementary Table 2: Percentage of liver cirrhosis patients with inadequate energy intake and percentage reduction in energy intake

Study characteristics	Inadequate energy intake (percentage of patients)	Reference
159 liver cirrhosis patients on waiting list for liver transplant, Brazil	91%	(31)
153 patients with posthepatitic liver cirrhosis, China	73%	(32)
47 hepatitis C virus related cirrhosis, Japan	17%	(33)
73 cirrhosis patients on the waiting list for liver transplantation, Brazil	92%	(34)
81 liver cirrhosis patients, Brazil	100%	(35)
231 liver cirrhosis patients, Australia	56%	(36)

17 liver cirrhosis patients awaiting orthotopic liver transplantation, Australia	25%	(37)
51 cirrhotic candidates for liver transplant, Brazil	67%	(38)
19 liver cirrhosis patiens, Australia	100%	(39)
Study characteristics	Percentage reduction in energy intake	Reference
38 liver cirrhosis patients undergoing liver transplantation, Italy	14%	(40)
17 liver cirrhosis patients before liver transplantation, Brazil	34%	(41)
70 pre-liver transplant cirrhotic patients, Canada	13%	(7)

Supplementary table 3: Observed abnormalities in trace element, mineral and vitamin levels in patients with liver cirrhosis

Element	Liver cirrhosis
Zinc (42, 43)	↓
Selenium (42)	↓
Iron (44)	↓
Magnesium (42, 45)	↓
Copper (42, 46)	↑
Manganese (47)	↑
Vitamin A (48)	↓
Vitamin D (48)	↓
Vitamin E (48)	↓
Vitamin K (48)	↓
Vitamin C (49)	↓
Vitamin B1 (50)	↓
Vitamin B2 (50)	↓
Vitamin B6 (50, 51)	↓
Vitamin B12 (50, 52-54)	↑
Folic acid (53)	↓

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