

Supplemental Table 1 Clinical characteristics of all cirrhosis patients, including LOS and hospital mortality, based on HN developing in the hospital *vs* admitted to the hospital with HN.

	Total (n = 595)	At admission (n = 518)	In-hospital (n = 77)
[Na ⁺], mmol/L ^a	125.0 (7.0)	124.0 (7.0)	129.0 (2.0)
BUN, mg/dL ^b	19.0 (17.0)	20.0 (19.0)	16.0 (14.0)
Cr, mg/dL	1.0 (0.6)	1.0 (0.6)	0.9 (0.4)
BUN:Cr ratio	18.5 (10.4)	18.9 (10.4)	16.6 (10.7)
Tbili, μmol/L	4.3 (7.5)	4.3 (7.4)	4.3 (8.6)
Alb, g/dL	2.5 (0.8)	2.5 (0.8)	2.4 (0.8)
INR, s	1.7 (0.6)	1.7 (0.6)	1.6 (0.7)
Severe Ascites, n (%) ^c	321 (54)	284 (55)	37 (48)
Severe HE, n (%) ^c	132 (22)	116 (22)	16 (21)
C-P Score	11.0 (3.0)	11.0 (3)	10.0 (3.0)
MELD Score	20.1 (9.6)	20.2 (9.7)	18.9 (8.2)
MELD-Na Score ^b	26.9 (6.4)	27.3 (6.3)	25.2 (5.8)
LOS, d ^a	7.0	6.0	9.0
Death/Hospice n (%)	61 (10)	49 (10)	12 (16)

^a*P* <0.001; ^b*P* = 0.01 for hyponatremia (HN) at admission *vs* developing HN in hospital.

^cPatients with most severe cases.

Values for length of stay (LOS) reported as median; values for sodium concentration ($[\text{Na}^+]$), blood urea nitrogen (BUN), creatinine (Cr), BUN:Cr ratio, total bilirubin (Tbili), albumin (Alb), international normalized ratio (INR), and Child-Pugh (C-P), Model for End Stage Liver Disease (MELD), and MELD-NA scores are median (interquartile range). HE, hepatic encephalopathy.

Supplemental Table 2 Clinical characteristics of cirrhosis patients admitted with HN based on initial HN therapy.

Therapy	NST (n = 103)	FR (n = 171)	NS (n = 184)	HS (n = 11)	TO (n = 27)
Initial [Na ⁺],mmol/	127.0 (4.0)	124.0 (6.0)	124.0 (8.0)	116.0 (14.0)	121.0 (7.0)
HN severity (mild/moderate/severe), %	68/27/5	37/47/15	35/40/26	18/18/64	22/44/33
BUN, mg/dL	19.0 (19.0)	19.0 (17.0)	21.0 (20.0)	21.0 (49.0)	18.0 (17.0)
Cr, mg/dL	1.0 (0.6)	1.0 (0.6)	1.1 (0.8)	1.1 (1.4)	1.2 (0.5)
BUN:Cr ratio	18.5 (12.2)	19.2 (8.9)	17.9 (9.8)	18.9 (14.4)	18.1 (9.7)
Tbili, μmol/L	3.7 (8.1)	4.7 (6.8)	4.2 (7.7)	3.2 (1.8)	7.5 (8.0)
Alb, g/dL	2.4 (0.7)	2.4 (0.6)	2.5 (0.8)	2.8 (0.9)	2.7 (0.4)
INR, s	1.6 (0.7)	1.7 (0.7)	1.6 (0.6)	1.6 (1.0)	1.7 (0.4)
Severe HE, n (%)	16 (16)	37 (22)	46 (25)	4 (36)	6 (22)
Severe Ascites, n (%)	56 (54)	101 (59)	91 (50)	8 (73)	15 (56)
C-P Score	10.0 (3.0)	11.0 (2.0)	10.0 (3.0)	11.0 (3.0)	12.0 (2.0)
MELD Score	20.3 (10.4)	20.0 (8.3)	18.9 (10.4)	15.3 (14.0)	21.3 (5.2)

MELD-Na Score	26.8 (7.4)	27.3 (6.0)	26.7 (7.0)	24.6 (8.8)	28.3 (3.4)
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Values for initial sodium concentration [Na⁺], blood urea nitrogen (BUN), creatinine (Cr), BUN:Cr ratio, total bilirubin (Tbili), albumin (Alb), international normalized ratio (INR), Child-Pugh (C-P), Model for End-Stage Liver Disease (MELD), and MELD-Na scores are median (interquartile range). *P* <0.05 for *initial [Na⁺]*: no specific therapy (NST) vs fluid restriction (FR), normal saline (NS), hypertonic saline (HS), and tolvaptan (TO), FR vs HS and TO, NS vs HS, and HS vs TO; *Tbili*: NST vs TO; *Alb*: FR vs TO; *INR*: FR vs NS; *severe ascites*: NST vs FR, and FR vs NS; *C-P score*: NST vs FR, FR vs NS, and NS vs TO; HE, hepatic encephalopathy; HN, hyponatremia

Supplemental Table 3 Outcomes of cirrhosis patients admitted with HN based on initial HN therapy.

Therapy	NST (n = 103)	FR (n = 171)	NS (n = 184)	HS (n = 11)	TO (n = 27)
Final [Na ⁺], mmol/L	128.0 (7.0)	127.0 (7.0)	127.0 (7.0)	127.0 (10.0)	130.0 (6.0)
Duration, d	3.0 (3.0)	3.0 (3.0)	2.0 (2.0)	2.0 (2.0)	3.0 (2.0)
Rate of [Na ⁺] change, mmol/L/d	0.5 (1.5)	1.0 (2.0)	1.6 (3.3)	3.5 (5.0)	1.8 (1.3)
[Na ⁺] ≥5/<131 mmol/L, %	7	13	22	54	37
[Na ⁺] <5/>131 mmol/L, %	18	8	6	9	4
[Na ⁺] ≥5/>131 mmol/L, %	21	19	17	18	33
Total, %	46	40	45	81	74
Switch therapy, %	29	34	51	18	15
Discharge with HN, %	24	30	8	0	7
Death/Hospice, %	1	0	0	0	0
LOS, d	7	6	6	8	5

Values for final $[Na^+]$, duration, and rate of change are median (interquartile range). $P < 0.05$ for $[Na^+] > 130 \text{ mmol/L}$: NST vs FR and NS; $[Na^+] \geq 5 \text{ mmol/L}$: NST vs NS and TO, FR vs TO, and NS vs TO; and *switch therapy*: NST vs NS, FR vs NS and TO, and NS vs TO. HN, hyponatremia; LOS, length of stay.

Supplemental Table 4 Second therapy of patients admitted with HN based on initial HN therapy.

First therapy							
Secondary therapy, n (%)	NST	FR	NS	HS	TO	Other	Total
NST	0	11 (16)	30 (22)	1 (13)	0	1 (5)	43 (16)
FR	21 (54)	1 (2)	76 (57)	4 (50)	5 (71)	5 (25)	112 (41)
NS	14 (36)	30 (45)	7 (5)	1 (13)	0	3 (15)	55 (20)
HS	0	2 (3)	5 (4)	0	1 (14)	2 (10)	10 (4)
TO	4 (10)	18 (27)	7 (5)	0	0	5 (25)	34 (12)
Other	0	5 (7)	9 (7)	2 (25)	1 (14)	4 (20)	21 (8)
Total	39 (14)	67 (24)	134 (49)	8 (3)	7 (3)	20 (7)	275 (100)
Switched to second therapy	39 (39)	67 (39)	134 (73)	9 (73)	7 (26)	20 (91)	NA

Supplemental Table 5 Clinical characteristics and outcomes of second therapy.

Second therapy	NST (n = 43)	FR (n = 112)	NS (n = 55)	HS (n = 10)	TO (n = 34)
Initial [Na ⁺], mmol/L	127.0 (4.0)	126.0 (7.0)	125.0 (5.0)	117.5 (5.0)	124.0 (3.0)
HN severity (mild/moderate/severe), %	67/30/2	41/38/6	38/47/9	NA/30/70	21/62/15
MELD score	21.7 (7.9)	20.8 (7.1)	21.7 (9.3)	14.8 (5.8)	21.3 (9.6)
Final [Na ⁺], mmol/L	131.0 (4.0)	129.0 (7.0)	127.0 (7.0)	127.0 (3.0)	131.0 (7.0)
[Na ⁺] >5/<131 mmol/L, %	5	9	15	80	12
[Na ⁺] <5/>131 mmol/L, %	26	8	19	0	3
[Na ⁺] >5/>131 mmol/L, %	16	18	12	20	55
Total, %	47	35	46	100	70
Total LOS	7.0 (4.0)	7.0 (5.0)	8.0 (6.0)	10.5 (6.0)	8.0 (4.0)
LOS after second therapy	5.0 (4.0)	6.0 (5.0)	5.0 (6.0)	8.0 (6.0)	6.0 (3.0)

Values for initial sodium concentration ($[Na^+]$), Model for End-Stage Liver Disease (MELD) score, final $[Na^+]$, total length of stay (LOS), and LOS after second therapy are median (interquartile range). $P < 0.05$ for *initial $[Na^+]$* : no specific treatment (NST) vs isotonic saline (NS), hypertonic saline (HS), and tolvaptan (TO), fluid restriction (FR) vs NS, HS, and TO, NS vs HS, and HS vs TO; *final $[Na^+]$* : NST vs HS and NS, and FR vs NS; and *change from initial $[Na^+]$* : NST vs HS and TO, FR vs HS and TO, NS vs HS and TO, and HS vs TO. NA, not applicable.