Rates, patterns, and predictors of specialty palliative care consultation among patients with ACLF

Arpan Patel, Anne Walling, Fasiha Kanwal, Marina Serper, Ruben Hernaez, Vinay Sundaram, David Kaplan, Tamar Taddei, and Nadim Mahmud

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Table S1 – Identification of Acute Decompensations (ADs) for EASL-CLIF ACLF

Decompensation	Classification		ICD-9/10 or CPT Codes
Gastrointestinal Bleed*			
Algorithm: any of the following codes, in any position	UGIB – PUD		531.x, 532.x, 533.x, 534.x; K25.x, K26.x, K27.x, K28.x
	UGIB – non-PUD		456.0, 456.20, 535.x, 537.82, 537.83, 537.84, 578.0; I85.01, I85.11, K29.x, K31.819, K31.811, K31.82, K92.0
	Small bowel GIB		562.0x, 569.84, 569.85, 569.86; K57.1x, K55.20, K55.21, K63.81
	LGIB		562.1x, 569.3; K57.3x, K62.5
	GIB – NOS		578.1, 578.9; K92.1, K92.2
Infection**			
Algorithm: any of the following codes, in any position	Bacteremia		038.x, 790.7; A40.x, A41.x
	SST/ MSK	Cellulitis	681.x, 682.x; L03.x, K12.2
		Septic arthritis	711.0x excluding 711.08; M00.x
		Osteomyelitis	730.0x, 730.1x, 730.2x; M86.x
	Spontaneous Bacterial Peritonitis		567.23; K65.2
	Pneumonia		481.x, 482.x; J13, J14, J15.x, J18.1, A48.1
	Pyelonephritis/UTI		590.x, 599.0; N10, N11.x, N12, N15.1, N15.9, N16, N28.84, N28.85, N28.86, N39.0
	Other	Endocarditis	421.x; I33.0, I33.9, I39
		Meningitis	320.x; G00.x, G01, G04.2
	Fungal Infection		112.5x, 117.3x, 995.91; B37.7x, B44.9x
Hepatic Encephalopathy**			
Algorithm: any of the following codes in any position PLUS lactulose OR rifaximin administered during inpatient admission (see supplemental table 4 for medication identification)	Hepatic encephalopathy		572.2; K72.91
	Viral hepatitis with hepatic coma		070.0, 070.2x, 070.40, 070.41, 070.44, 070.49, 070.6; B15.0, B16.2, B19.11, B16.0, B17.11
Ascites			
Algorithm: any of the following codes, in any position	Ascites codes		789.51, 789.59; R18.x
	Paracentesis procedure codes		49080, 49081, 49082, 49083

* Adapted from Abraham et al., Wahl et al., and Siddiqui et al.
** Adapted from Schneeweiss et al. and Patkar et al.
*** Adapted from Lo Re et al.

Table S2 – Identification of Respiratory Organ Failure

Algorithm: presence of any of the following inpatient CPT codes

ICD-9/10, ICD-9/10-CM, or CPT Codes	Description
31500, 96.05	Endotracheal intubation procedure
94002, 94003, 94004, 94005, 94656, 94657, 94660, 94662, 96.7x, 5A1935Z, 5A1945Z, 5A1955Z	Mechanical ventilation and management
Z99.11	Ventilator dependent status

Table S3 – Identification of Brain Organ Failure

Algorithm: any of the hepatic encephalopathy ICD-9 codes in any position (see supplemental table 1) PLUS lactulose OR rifaximin administered within 28 days of inpatient admission. Identification of these medications was performed as follows:

Medication	SQL Query (VHA database)
Lactulose	WHERE medication LIKE '%LACTULO%' OR medication LIKE '%CONSTULO%' OR medication LIKE '%ENULO%'
Rifaximin	WHERE medication LIKE '%RIFAX%' OR medication LIKE '%XIFAX%'

Obtained from the "BCMADispensedDrug" table in the VHA CDW; applied within 28 days of admission

Table S4 – Identification of Inpatient Renal Replacement Therapy

Algorithm: presence of any of the following inpatient CPT codes

CPT Code	Description
90935, 90937	Hemodialysis
90945, 90947	Continuous renal replacement therapy

Table S5 – Identification of Vasopressors for Circulatory Failure

Vasopressors Classified	SQL Query (VHA database)
Norepinephrine Epinephrine Vasopressin	WHERE medication LIKE '%EPINEPHRI%' OR medication LIKE '%VASOPRESSI%' OR medication LIKE '%DOBUTAMIN%' OR

Dobutamine Dopamine Phenylephrine	medication LIKE '%LEVOPHED%' OR medication LIKE '%DOPAMINE%' OR medication LIKE '%PHENYLEPHRIN%'

* Obtained from the "iv_pharmacy_patient" table in the VHA CDW; applied within 28 days of admission

Table S6 – Mixed-Effects Logistic Regression Models for Late Inpatient Palliative Care Consultation in 90-Day Mortality Subgroup*

Variable	OR (95% CI)	p-value
Body Mass Index (per 5 unit change)	1.09 (1.03-1.15)	0.001
MELD-Na	0.97 (0.96-0.98)	<0.001
ACLF Grade		
1	(ref)	
2	1.42 (1.19-1.68)	<0.001
3	2.07 (1.74-2.48)	<0.001
Prior Palliative Care Consultation	0.46 (0.39-0.55)	<0.001
Hepatocellular Carcinoma	0.58 (0.49-0.69)	<0.001
High CIRCOM Score	0.87 (0.76-0.99)	0.04
Rural Center Location	0.47 (0.25-0.88)	0.02

*Mixed effects models, designating VA facility as a random intercept, were used to generate odds ratios and p-values
**Level of significance: *p*-value <0.001
CIRCOM: cirrhosis comorbidity score

Table S7 – Mixed-Effects Logistic Regression Models for Inpatient Palliative Care Consultation, Evaluating the Potential Impact of ACLF Organ Failures*

Variable	OR (95% CI)	p-value
Age (per year)	1.03 (1.03-1.04)	<0.001
Body Mass Index (per 5 unit change)	0.93 (0.90-0.95)	<0.001
MELD-Na	1.01 (1.01-1.02)	<0.001
Albumin (per 1 unit change)	0.69 (0.65-0.73)	<0.001
WBC Count (per 5 unit change)	1.05 (1.02-1.08)	<0.001
OF: Kidney	1.69 (1.54-1.87)	<0.001
OF: Liver	2.47 (2.20-2.76)	<0.001
OF: Coagulation	1.26 (1.15-1.39)	<0.001
OF: Brain	1.36 (1.23-1.50)	<0.001
OF: Circulatory	1.82 (1.66-1.99)	<0.001
Prior Palliative Care Consultation	2.41 (2.17-2.69)	<0.001
Hepatocellular Carcinoma	2.18 (1.95-2.42)	<0.001
High CIRCOM Score	0.70 (0.64-0.76)	<0.001
Cirrhosis Decompensation	1.17 (1.08-1.27)	<0.001
Prior TIPS	0.66 (0.53-0.82)	<0.001

*Mixed effects models, designating VA facility as a random intercept, were used to generate odds ratios and p-values
**Level of significance: *p*-value <0.001
CIRCOM: cirrhosis comorbidity score

Table S8 – Mixed-Effects Logistic Regression Model with Individual CIRCOM Components and Any Cancer History Variable*

Variable	OR (95% CI)	p-value
Age (per year)	1.04 (1.03 - 1.04)	<0.001
Body Mass Index (per 5 unit change)	0.95 (0.92 - 0.98)	0.001
MELD-Na	1.02 (1.02 - 1.03)	<0.001
Albumin (per 1 unit change)	0.72 (0.67 - 0.77)	<0.001
WBC Count (per 5 unit change)	1.03 (1.00 – 1.07)	0.02
ACLF Grade		
1	(ref)	
2	1.74 (1.58 - 1.91)	<0.001
3	3.05 (2.73 - 3.41)	<0.001
Prior Palliative Care Consultation	2.62 (2.35 - 2.93)	<0.001
COPD	0.86 (0.79 - 0.94)	0.001
Chronic Kidney Disease	0.61 (0.56 - 0.66)	<0.001
Heart Failure	0.83 (0.76 - 0.91)	<0.001
Drug Abuse	1.01 (0.92 - 1.12)	0.78
Peripheral Artery Disease	0.82 (0.74 - 0.92)	<0.001
Epilepsy	0.88 (0.76 - 1.01)	0.08
History of Acute MI	1.19 (0.99 - 1.43)	0.06
Active MI	1.02 (0.88 - 1.18)	0.83
Any Cancer History	1.42 (1.31 - 1.54)	<0.001
Cirrhosis Decompensation	1.15 (1.06 - 1.25)	0.001
Prior TIPS	0.64 (0.52 - 0.80)	<0.001

*Mixed effects models, designating VA facility as a random intercept, were used to generate odds ratios and p-values
**Level of significance: *p*-value <0.001
CIRCOM: cirrhosis comorbidity score