

Reduction in Nosocomial Infections in Patients with Cirrhosis During the COVID-19 Era Compared to Pre-COVID-19 Era: Impact of Masking and Restricting Visitation?

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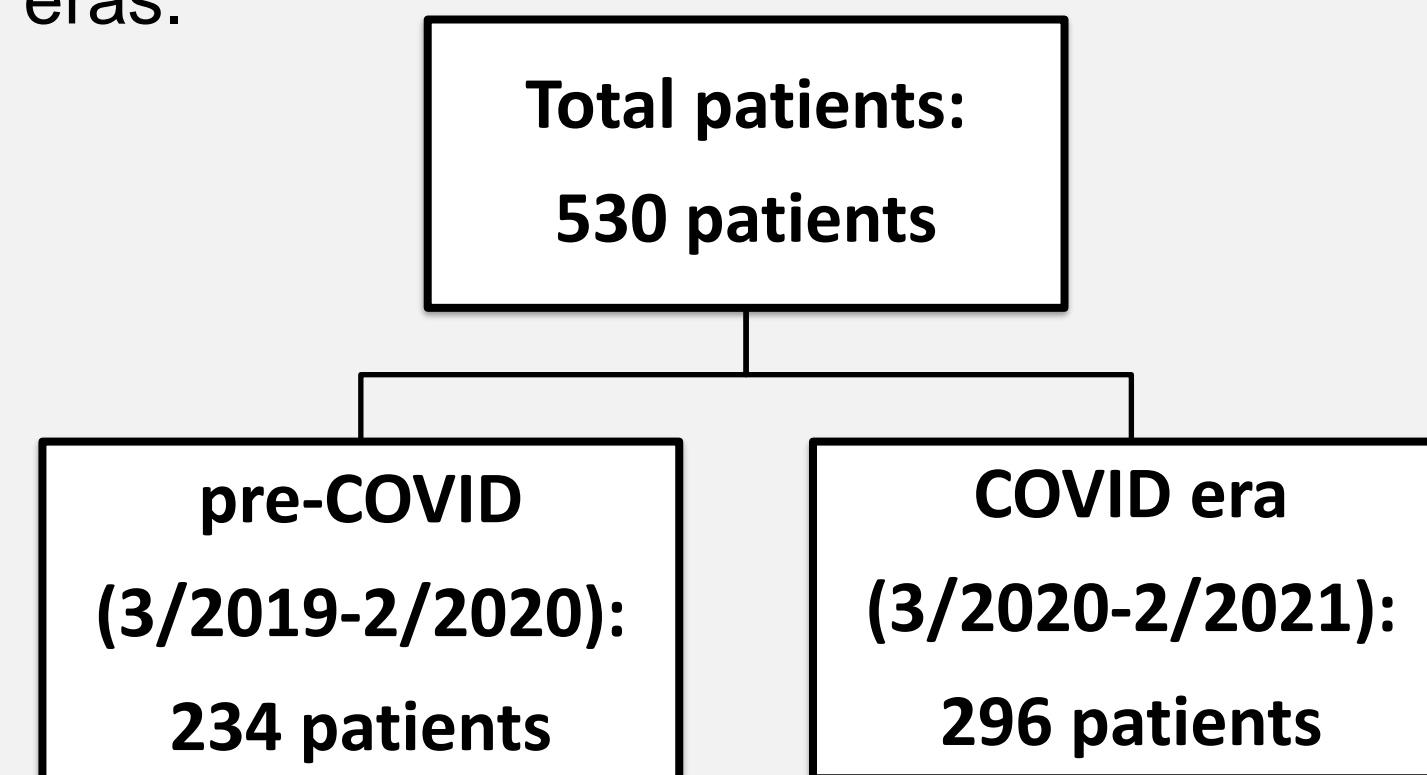
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Introduction

- Patients with cirrhosis admitted to the ICU have a high incidence of nosocomial infections that worsens prognosis and can impair liver transplant candidacy.
- Aim:**
Determine the impact of COVID-19 restrictions on nosocomial infections in patients with cirrhosis admitted to an ICU a year prior to and during 1 year of COVID-19 restrictions.

Methods

- ICU patients with cirrhosis at a transplant center from March 2019-2021 were enrolled and divided into pre-COVID and COVID eras.



- Excluded patients with both cirrhosis and COVID-19; unclear diagnosis of cirrhosis; and prior organ transplant.
- From March 2020, masking, hand sanitizations, social distancing, and restriction of visitors were implemented.
- Admission demographics and labs, hospital course, reason for ICU transfer, type of infection, nosocomial infections, and outcomes were collected.
- Logistic regression for nosocomial infection development across time periods was performed.

Results

Table A: Patient and Infection Characteristics

Table A:	Pre-COVID(n=234)	COVID-era (N=296)	P value
Age	58.6±12.2	55.0±13.7	0.001
Male Gender	103 (44%)	135 (46%)	0.72
Latinx Ethnicity	7 (3%)	10 (3%)	0.92
qSOFA total	1.84±0.60	2.43±0.68	<0.0001
Admission WBC count	10.9±7.6	12.5±8.2	0.02
Admission MELD-Na	23.8±10.1	26.0±10.2	0.01
Reason for ICU			
Altered mental status	117 (50%)	141 (48%)	0.59
Infection	115 (50%)	138 (47%)	0.56
CVA	12 (5%)	13 (4%)	0.69
Hypotension	134 (57%)	153 (51%)	0.20
Renal support	35 (15%)	88 (20%)	<0.0001
Respiratory failure	115 (49%)	129 (45%)	0.20
Post-procedure	16 (7%)	27 (9%)	0.34
Type of infection			
Nosocomial infection	24 (10%)	10 (3%)	<0.001
UTI	11 (5%)	27 (9%)	0.05
Abdominal	31 (13%)	32 (11%)	0.39
Bacteremia	32 (14%)	28 (9%)	0.13
Respiratory	48 (21%)	57 (19%)	0.72
Skin/soft tissue	10 (4%)	7 (2%)	0.22

Table B. Organism type and patient outcomes

Table B	Pre-COVID (n=234)	Post-COVID (N=296)	P value
Organisms			
Gram positive	39 (17%)	36 (12%)	0.14
Gram negative	31 (13%)	25 (8%)	0.08
Fungus	10 (4%)	12 (4%)	0.90
>1 organism	11 (5%)	5 (2%)	0.04
VRE	6 (3%)	5 (2%)	0.49
MRSA	7 (3%)	2 (1%)	0.04
Fluoro resistance	5 (2%)	2 (1%)	0.14
ESBL	11 (5%)	5 (2%)	0.04
Outcomes			
ICU length of stay	4.78±4.34	7.66±8.58	<0.0001
Renal failure	35 (15%)	83 (19%)	<0.0001
Grade 3-4 HE	55 (24%)	98 (32%)	0.02
Shock	78 (33%)	121 (43%)	0.08
Ventilation	82 (35%)	115 (39%)	0.37
Coagulation failure	144 (62%)	175 (59%)	0.57
Death or hospice	82 (35%)	119 (40%)	0.22
Liver transplant	6 (3%)	31 (10%)	0.001

*Significant p values bolded

Results

Patient characteristics: COVID-era patients were younger, had worse cirrhosis severity, qSOFA total, and higher WBC on admission. Apart from higher need for renal support, reasons for ICU transfer were similar across groups (Table A).

Infection characteristics: UTI was higher in COVID-era patients, but other infection types and overall infection rate was similar across periods. There was a significantly lower nosocomial infection rate, patients with >1 organism cultured, MRSA and ESBL (extended spectrum beta-lactamase) production in the COVID-era (Table A).

Outcomes: COVID-era patients had a higher ICU LOS, renal, and brain failure, but similar death and hospice referrals. Liver transplant rate was higher in COVID-era patients (Table B).

Regression for nosocomial infection: The only predictor for nosocomial infection was the study period with lower infections in the COVID-era (OR 0.31, 95% CI 0.14-0.65, p=0.001).

Conclusion

- Despite a higher qSOFA, MELD-Na and ICU length of stay, the rate of nosocomial and resistant infections with MRSA and ESBL producers was significantly lower in patients with cirrhosis admitted to the ICU in the COVID era compared to the pre-COVID era.
- This led to a higher liver transplant rate in the COVID-era patients.
- Low rate of nosocomial infections could be due to lower transmission of infectious organisms from staff, visitors, and surrounding environment due to the restriction necessitated by the COVID-19 pandemic and should encourage continuation of these restrictions in patients with cirrhosis who are admitted to the ICU.