



THE UNIVERSITY OF ARIZONA  
COLLEGE OF MEDICINE TUCSON

Internal Medicine  
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## Hepatic Laboratory Abnormalities Associated with Disease Severity in Patients with COVID-19: A Pooled Analysis: of 6 Retrospective Cohort Studies Including 755 Patients

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### Introduction

- Patients with COVID-19 are at high risks of developing significant pulmonary complications.
- However, its possible hepatic involvement has not been researched extensively.
- This study is aiming to analyze liver abnormality associated with disease severity in patients with COVID-19

### Methods

- A pooled analysis of 6 retrospective, cohorts studies including 755 Chinese adult patients (> 18 years) diagnosed with COVID-19
- Admitted from January 2020 through February 2020. These patients were classified into two groups: **non-severe** and **severe**, based on interim guidelines of World Health Organization and the National Health Commission of China.
- Classified into severe group if one of three following criteria were met: 1) respiratory rate > 30 breaths/min, 2) SpO<sub>2</sub> < 93% on room air, or 3) PaO<sub>2</sub>/FiO<sub>2</sub> ≤ 300mmHg.
- Results were analyzed with Student's t-test, Pearson's Chi-Squared test and Wilcoxon rank-sum test.

### Results

Table 1: Lab Results and Age with Disease Severity

Variables	Severe	Non-severe	t Value	P-Value
Albumin (g/dL)	3.5±1.1	4.1±1.0	4.6	0.001
ALT (U/L)	29.3±47.6	21.1±12.0	-1.71	0.1607
AST (U/L)	34.1±24.8	22.3±17.9	-5.06	0.001
T Bilirubin (mg/dL)	0.75±0.68	0.54±1.43	-1.67	0.1454
D-dimer (mg/L)	0.95±1.75	0.79±3.17	-0.4	0.7113
CRP (mg/L)	54.1±122.2	9.3±59.0	-3.46	0.0135
INR	1.07±0.56	1.06±0.81	0.13	0.9042
	Severe	Non-severe	Wilcoxon Statistic	
Age of year (Median)	64.58	43.96	37	0.0928

\*\*Mean ± standard deviation

Table 2: Gender and Region

Variables	Severe	Non-severe	OR(95% CI)	P-Value
Gender				
Male	63(18%)	286(82%)	1.95(1.26,3.0)	0.0022
Female	38(10%)	336(90%)		
Region				
Wuhan	70(18%)	312(82%)	2.17(1.4,3.34)	0.0004
Non-Wuhan	35(9%)	338(91%)		

Note: Liu C, et al (n=32) was not included in the male vs. female analysis

Variables Comparison Severe vs Non-severe

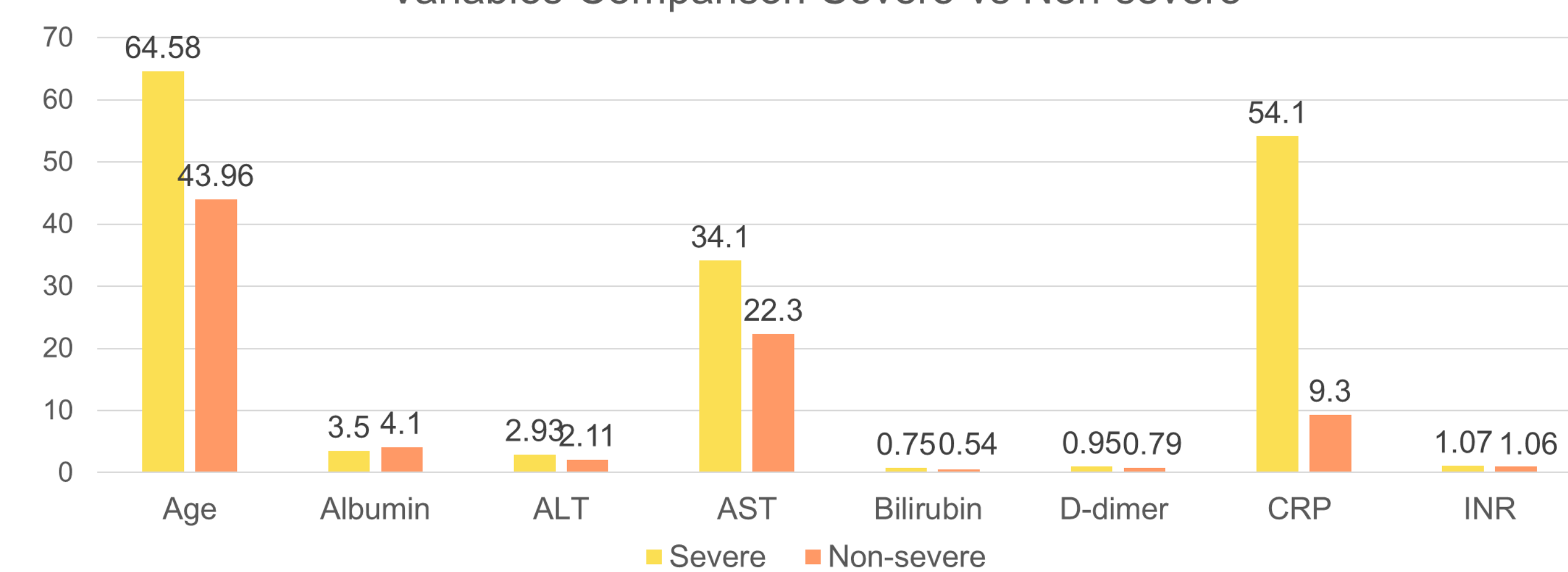
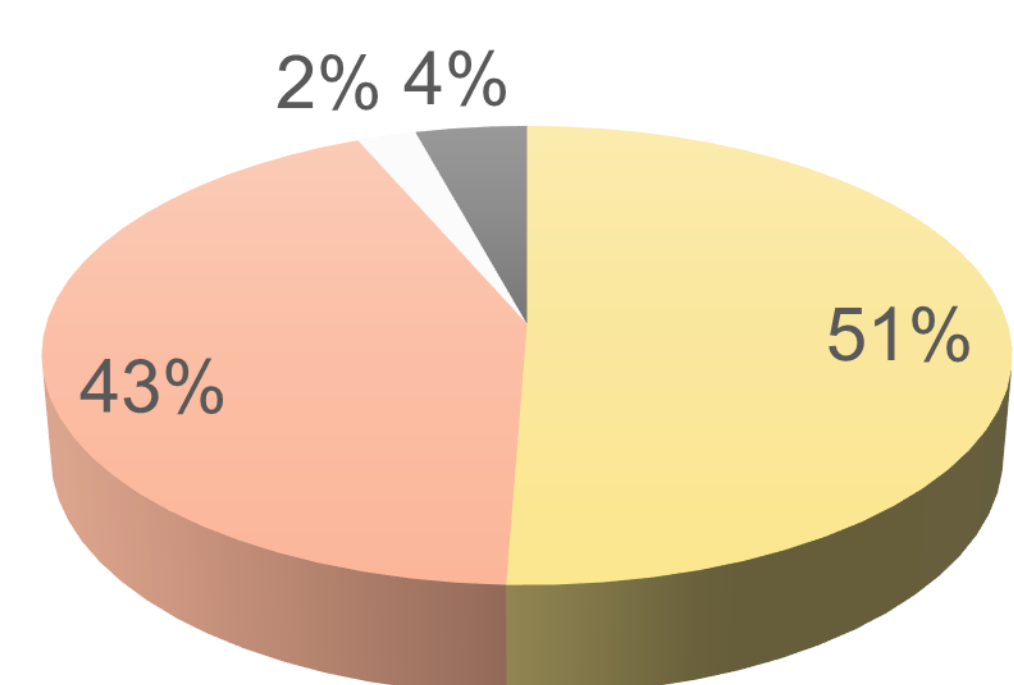
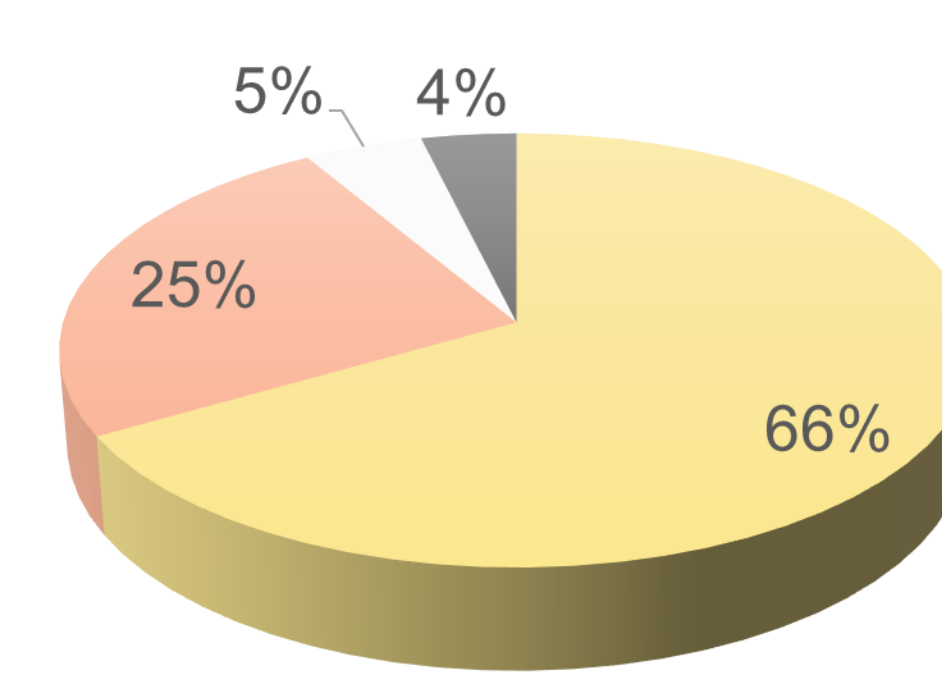


Figure 1: Variable Comparison Severe vs. Non- Severe



Wuhan Shanghai Nanchang Other

Figure 2: Locations of Patients by Cities



Wuhan Shanghai Nanchang Other

Figure 3: Locations of Severe COVID-19 Patients by Cities

### Discussion

- 755 Chinese adult patients (>18 years) with COVID-19 included.
- Severe vs. Non-severe Group:
  - Gender of male (OR 1.95; 95% CI 1.26-3.0; P=0.0022)
  - Wuhan region (OR 2.17; 95% CI 1.4-3.34; P= 0.0004)
  - Lower albumin (g/dL) (3.5±1.1 vs. 4.1±1.0, P= 0.001)
  - Higher AST (U/L) (34.1±24.8 vs. 22.3±17.9, P= 0.001) higher CRP (mg/L) (54.1±122.2 vs. 9.3±59.0, P= 0.0135)
  - No significant difference of age between these two groups was identified.
  - No significant difference of ALT, Total bilirubin, D-dimer or INR with disease severity were identified

### Conclusion

- Male gender and of Wuhan origin were significantly higher in proportion in the severe group.
- Of Wuhan origin as a risk factor of severe COVID-19 could be explained by limited medical resources for overwhelming COVID-19 patients in Wuhan during the period of January and February 2020.
- It is unclear why male was the risk factor of severe COVID-19 based on our data.
- Based on the hepatic laboratory results of our study, hepatic abnormalities were not a prominent features of COVID-19.
- However due to limited data and studies, future studies are needed to elucidate risks factors associated with severe COVID-19.

### Reference

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