



# HIGH LEVEL OF AMINOTRANSFERASES AT ADMISSION IS A RISK FACTOR OF ACUTE KIDNEY INJURY AND A PREDICTOR OF IN-HOSPITAL MORTALITY IN HOSPITALIZED PATIENTS WITH COVID-19

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## Background and Objective

- Initial reports indicate a high incidence of abnormal liver tests in the novel coronavirus infection (COVID-19).<sup>1,2</sup>
- However, outcomes in hospitalized patients with COVID-19 and elevated aspartate transaminase (AST) and alanine transaminase (ALT) at admission are not well understood.
- The aim of the study: to investigate the incidence of elevated aminotransferases at admission and its contribution to the COVID-19 severity and outcomes.

1-Qingxian C. et al. J Hepatol. 2020 Sep; 73(3): 566–574.  
2-Piano S. et al. Liver Int. 2020 Oct; 40(10): 2394-2406.

## Materials and Methods

- A retrospective analysis of the register of patients with COVID-19.
- COVID-19 was defined as the laboratory-confirmed infection and/or presence of the typical computer tomography (CT) picture.

### Methods:

- Abnormality in aminotransferases was defined as ALT and/or AST >40 U/L.
- Definition of acute kidney injury (AKI) was based on KDIGO 2012 criteria.
- Exclusion criteria: previously known liver diseases, re-hospitalization, acute surgical pathology.
- p<0.05 was considered significant

**Tab. 2. Baseline characteristics of COVID-19 patients stratified by ALT or/and AST at admission (n=462)**

Parameter	With elevated ALT or/and AST at admission (n=200)	With normal ALT and AST at admission (n=262)	P value
Male/female, n (%)	108(54)/91(46)	121(46)/141(54)	0.1
Age, years, M±SD	62±15	65±16	0.15
Body mass index, kg/m <sup>2</sup> , M±SD	29.7±6.6	29±5.9	0.08
Days of stay, n, Me (IQR)	11 (9;14.5)	11 (9;15)	0.5
Mechanical ventilation, n(%)	<b>54(27)</b>	<b>32(12)</b>	<b>0.04</b>
DM, n(%)	47(23.5)	68(26.4)	0.7
HTN, n (%)	133(66.5)	177(67.6)	0.8
Antibiotic outpatient intake, n (%)	76(38)	97(37)	0.96
Statins outpatient intake, n (%)	19(9.5)	26(10)	0.6
Serum creatinine, mmol/l, Me (IQR)	<b>91[78;118]</b>	<b>86[74;109]</b>	<b>0.008</b>
AST, U/l, Me (IQR)	54.5[44;72]	26[19;33]	-
ALT, U/l, Me (IQR)	45.9[34;66]	19[11;27]	-
Lymphocytes, 10 <sup>9</sup> , Me (IQR)	1(0.7;1.5)	1.1(0.8;1.4)	0.6
C-reactive protein, mg/l, Me (IQR)	<b>80.5(27;140)</b>	<b>59.7(24;102)</b>	<b>0.005</b>
Ferritin, mkg/l, Me (IQR)	<b>598[404;715]</b>	<b>391[189;587]</b>	<b>0.03</b>
D-dimer, ng/ml, Me (IQR)	307(180;560)	276(141;549)	0.3
Fibrinogen, g/l, Me (IQR)	6.1(5.3;7,1)	6.1(5;7)	0.6

## Results

- We included 462 patients (tab.1). 26,4% of patients spent at least 1 day in the ICU, 71,3% (87) of them were treated with mechanical ventilation. 20% of patients died.
- At admission 43% (200) of the patients had elevated level of aminotransferases. Elevated AST was more common than ALT: (39% (178) vs 29% (132)).
- The higher incidence of elevated ALT or/and AST in ICU patients compared with non-ICU (59% vs 37%, p<0.001) was observed.
- Patients with abnormal level of aminotransferases at admission had more severe lung injury by CT scan at admission, higher ferritin, CRP and serum creatinine levels (tab.2, fig. 2)
- Higher frequency of AKI and higher mortality rate was observed in patients with abnormal levels of aminotransferases (fig.1, fig.3).

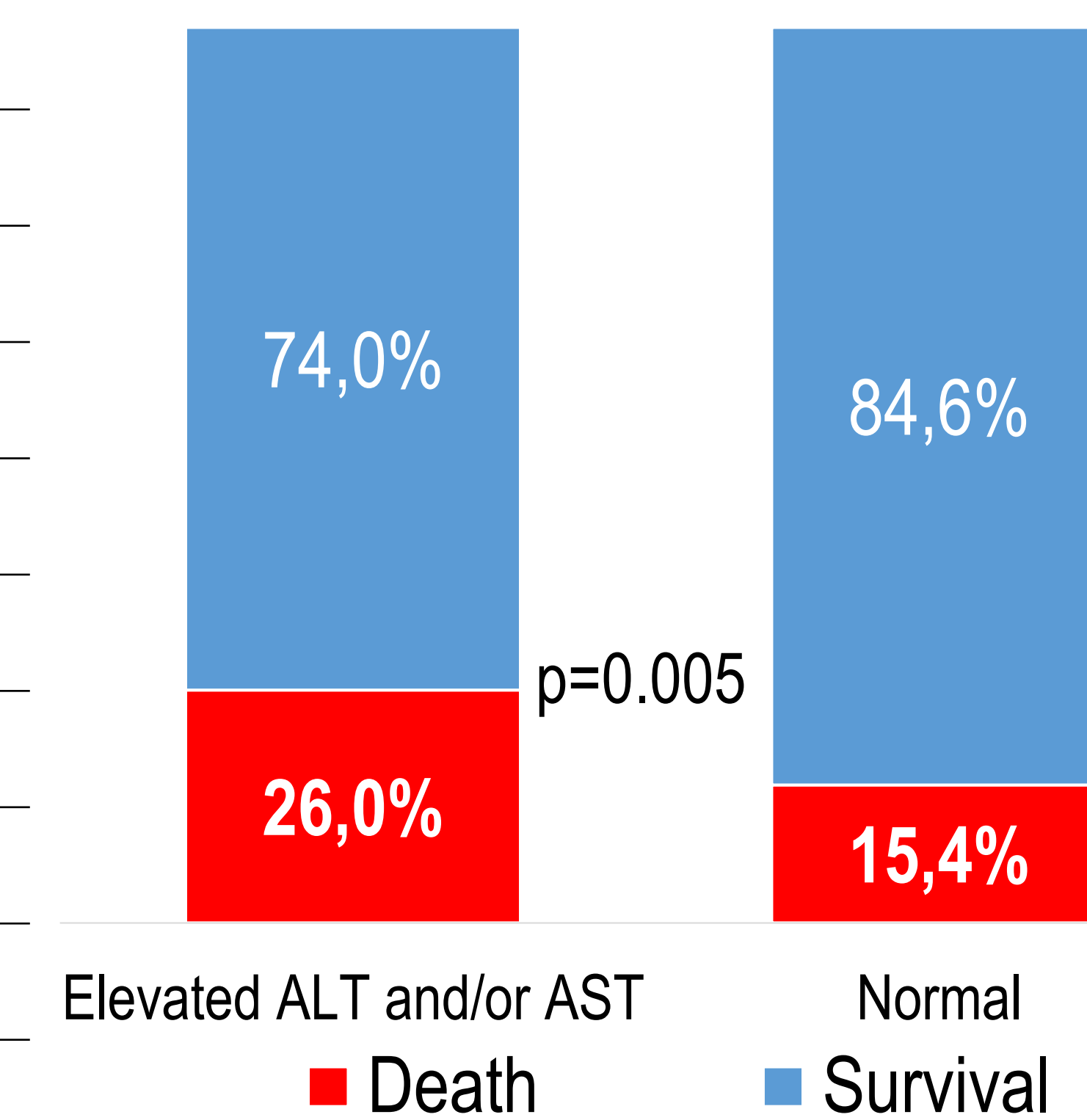
**Elevated ALT or/and AST at admission were the independent predictors for:**

- development of AKI (OR 1.87 95%CI 1.17-2.92, p=0.005)
- in-hospital mortality (OR 1.89 95%CI 1.17-3.08, p=0.006)

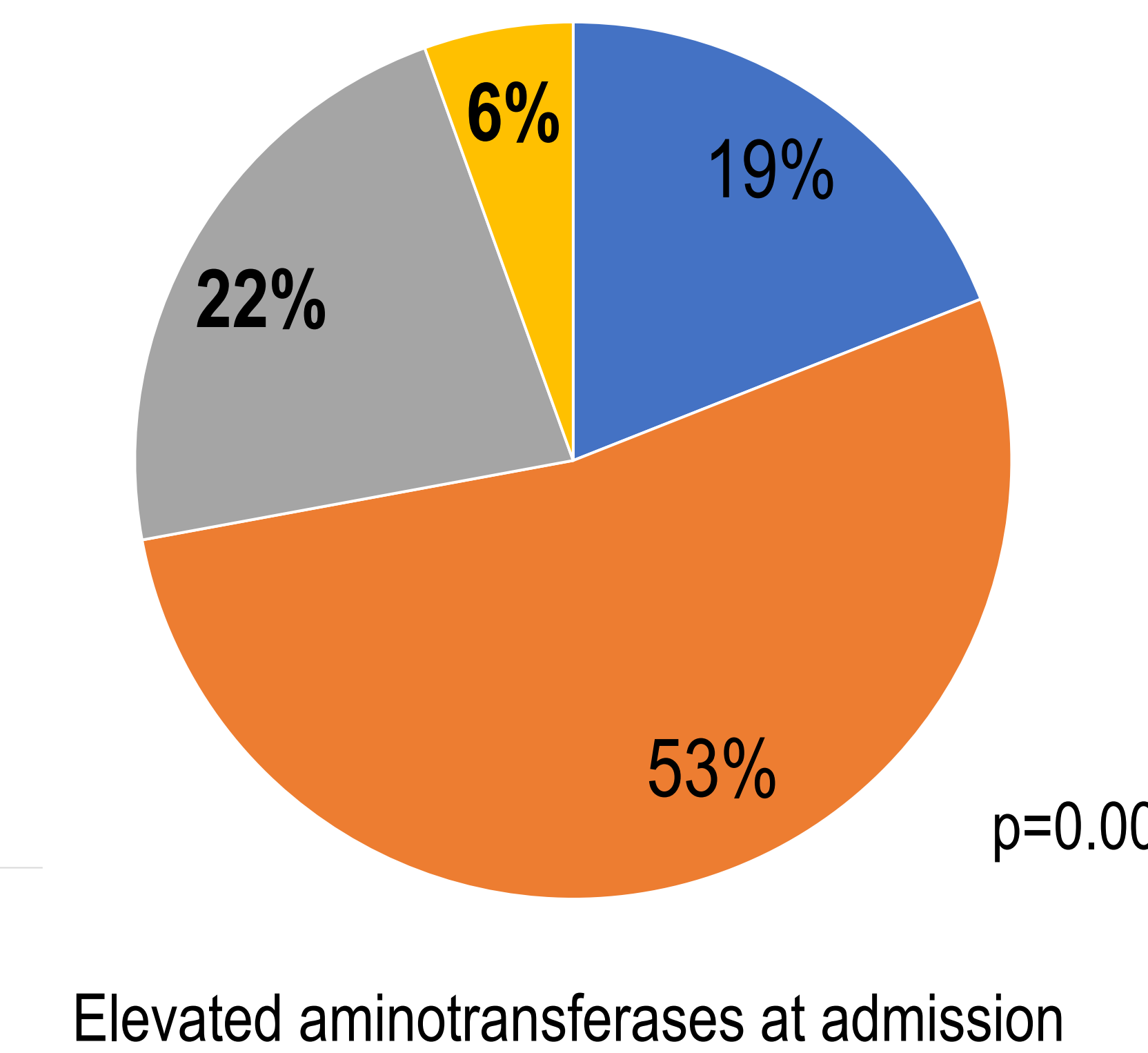
**Tab. 1. Study population (n=462)**

Parameter	Value
Male/female, n (%)	233(50.4)/229(49.6)
Age, years, M±SD	63±16
Obesity, n(%)	222(48)
Diabetes mellitus (DM), n(%)	116(25)
Hypertension (HTN), n (%)	310(67)
AST at admission, U/l, Me (IQR)	35(25;51)
ALT at admission, U/l, Me (IQR)	25(17;42)
C-reactive protein at admission, mg/l, Me (IQR)	69(25;120)
Ferritin at admission, mkg/l, Me (IQR)	477(221;656)

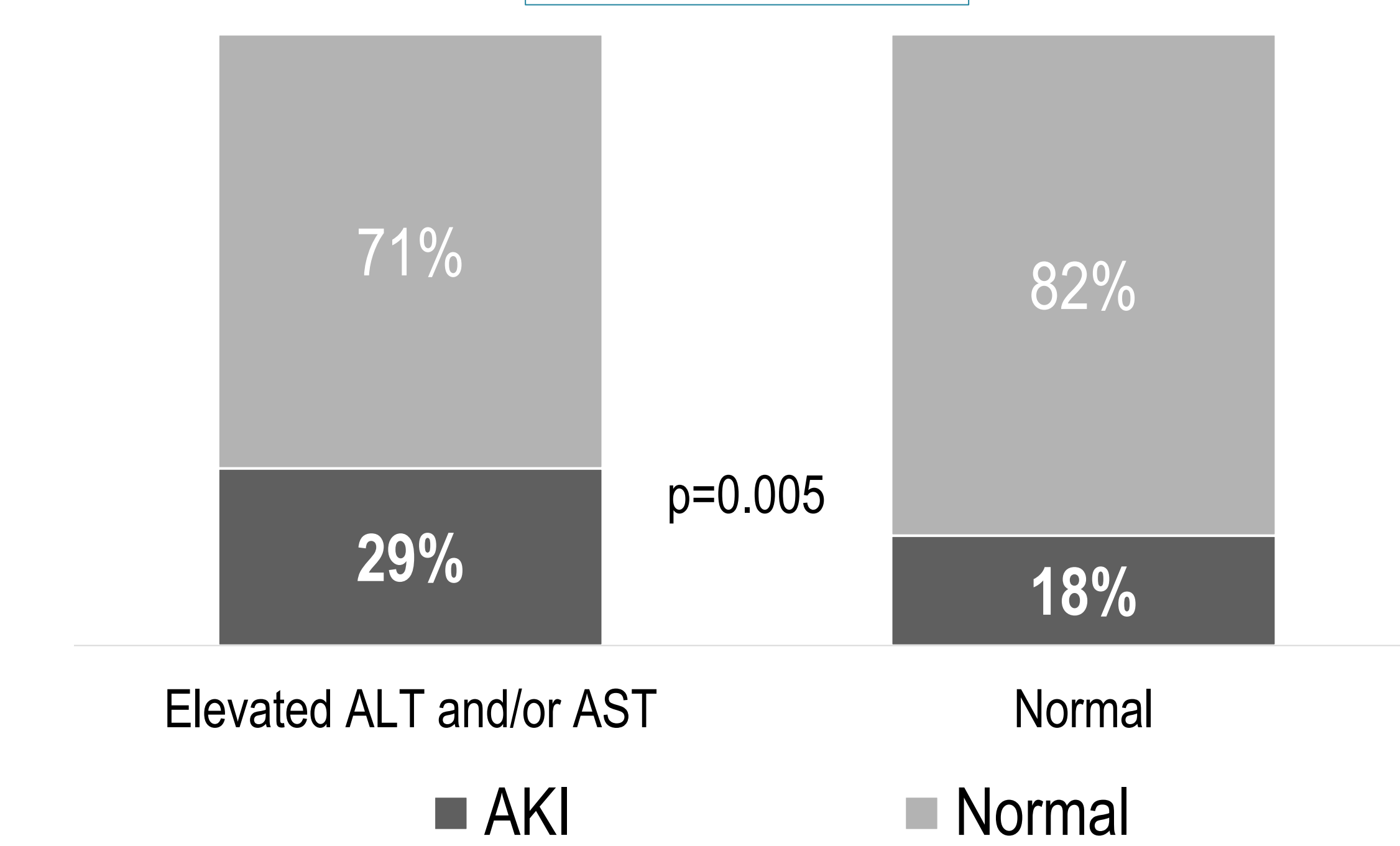
**Fig. 1. Mortality**



**Fig. 2. Lung injury by CT scan**



**Fig. 3. AKI**



## Conclusions

Elevated aminotransferases at admission are common among patients hospitalized with COVID-19, are associated with disease severity and AKI development and may be considered as the predictors of in-hospital mortality in this population.

Disclosure: none