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Early View

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Re: Predictors of mortality for patients with COVID-19 pneumonia caused by SARSCoV-2: a prospective cohort study

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As an emerging infectious disease, COVID-19 pneumonia which was caused by a novel coronavirus (SARS-CoV-2) has resulted in a severe global public health emergency. According to the WHO COVID-19 epidemic interactive dashboard, as of 19 June 2020, there have been 8,385,440 confirmed cases all over the world, including 450,686 deaths, reported to the WHO. Under such urgent conditions, it is of great clinical significance to distinguish patients with poor clinical outcome (such as severe, critical or death) from so large number of patients with COVID-19 using regular parameters (such as demographic data, past health history, and common laboratory examination results). Du R. H. and his colleagues have performed a single center prospective cohort study to investigate the possible risk factors associated with the poorest clinical outcome (dying from COVID-19 pneumonia) [1]. They reported that age $\geqslant$65 years, pre-existing concurrent cardiovascular or cerebrovascular diseases, CD3+CD8+ T-cells $\leqslant$75 cells·μL^{-1} and cardiac troponin I $\geqslant$0.05 ng·mL^{-1} of patients

with COVID-19 pneumonia were associated with increased risk of death from this disease [1]. They further identified that CD3+CD8+ T-cells $\leqslant$75 cells·μL^{-1} and cardiac troponin I especially $\geqslant$0.05 ng·mL^{-1} could be used as predictors for mortality of patients with COVID-19 pneumonia using matched case-control study [1]. With great interest, we have read the full text of the paper and found that there are several issues which are worth to clarifying.

First, both in the Abstract and Results Sections, Du R. H. *et al* reported that preexisting cardiovascular or cerebrovascular diseases in patients with COVID-19 pneumonia was associated with elevated risk of dying from this disease using multivariate logistic regression analysis, with odds ratio (*OR*) and 95% confidence interval (95% *CI*) being equal to 2.464 (0.755-8.044) and *p*-value being equal to 0.007 [1]. Obviously, the 95% CI includes 1, indicating the estimated population *OR* is possible to be equal to 1. According to the principle of statistics, the conclusion made from parameter estimation and hypothesis test should be consistent. In another words, if the *p*-value for *OR* of preexisting cardiovasclular or cerebrovascular disease is 0.007, the lower limit of 95% *CI* should at least be more than 1, considering this factor is risk one for poor clinical outcome. Thus, we suggest that the authors should check on their data and to ascertain whether there was typing errors or wrongly statistical result.

Second, in the Methods section, Du R. H. *et al* said "The information for all patients, including demographic data, clinical characteristics, laboratory parameters and outcomes, were collected prospectively [1]." And in the Results section, the authors showed the summary statistics for demographic data, life sign data and laboratory examination data in tables 1 and 2 of their original article [1]. However, the authors did not denote definitively the summary statistics for laboratory findings and life sign data were based on which time of the patients' examination results. In clinical practice, it is common that one patient with COVID-19 pneumonia receives several times laboratory examination (such as blood regular test) and the results of the same item of the same patient are different from one time to another.

Third, in the Discussion section, the authors said "As of midnight on 24 March

2020, the numbers of Chinese confirmed COVID-19 pneumonia cases and deaths were 81 218 and 3281, respectively, indicating that the overall death rate from COVID-19 pneumonia was 4%.[1]" Obviously, the so-called overall death rate of 4% was calculated using the formula: number of cumulative death/ cumulative number of confirmed cases, *i.e.* 3281/81218. This simple formula is problematic especially considering the COVID-19 epidemic was ongoing then. And there were still certain proportion of COVID-19 patients (confirmed on or before 24 March 2020) whose clinical outcomes were unknown. As the authors said in the latter part of their Discussion section, "On 24 March 2020, China had 4287 current cases with confirmed COVID-19 pneumonia, and 1399 (32.6%) of them were very severe cases [1]" Besides, we think that using case fatality rate (*CFR*) to replace death rate or mortality rate in the Discussion section of Du R. H. *et al* is appropriate. Death rate or mortality rate of certain disease often defined as the ratio of deaths from certain disease in an area to the population of that area. *CFR* means that the proportion of cases who eventually die from the disease. To estimate to the *CFR* of COVID-19 pneumonia, Du R. H. *et al* can refer to the methods proposed by Ghani A. C. *et al* [2].

Taken together, the findings of the study reported by Du R *et al* are of great significance, though some possible error and inappropriate expression were found. We hope our comments will be helpful to improve the expression and increase the quality of the paper published by Du R et al.

References:

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2. Ghani AC, Donnelly CA, Cox DR, *et al.* Methods for estimating the case fatality ratio for a novel, emerging infectious disease. *Am J Epidemiol* 2005: 162(5): 479-486.