



## Letter to the Editor

## Hemoglobin level as a predictor of clinical outcome in patients with ischemic stroke



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Dear Editor,

Guo et al. investigated the association between hemoglobin at acute phase and clinical outcomes in patients with ischemic stroke [1]. The authors selected major disability and death at 3 months as the primary outcomes after stroke onset and events that were separately evaluated as the secondary outcomes. Adjusted odds ratios (ORs) (95% confidence intervals [CIs]) of the highest quartile of hemoglobin against the lowest quartile for the primary outcomes, major disability and death, were 1.38 (1.03–1.86), 1.49 (1.11–1.99), and 0.79 (0.41–1.52), respectively. Additionally, there was a linear significant association between hemoglobin levels and primary outcomes. Elevated hemoglobin levels in the acute phase of ischemic stroke were at risk, although it was not associated with mortality. I have some concerns about their study.

The authors cited some reports regarding the risk of anemia on subsequent clinical outcomes in patients with ischemic stroke, which was inconsistent with their data. Among them, Barlas et al. performed a meta-analysis on the impact of hemoglobin levels and anemia on stroke mortality [2]. The pooled OR (95% CI) of anemia on admission for mortality in patients with ischemic stroke was 1.97 (1.57–2.47). Kubo et al. also examined the association between hemoglobin levels and 3-month mortality after ischemic stroke, and OR (95% CI) of anemia status for 3-month mortality was 2.81 (1.46–5.43) [3]. These reports clarified the risk of anemia on subsequent mortality in patients with ischemic stroke.

In contrast, Furlan et al. conducted a retrospective cohort study to examine the effect of blood hemoglobin concentration on poorer prognosis after acute ischemic stroke [4]. Hazard ratios (95% CIs) of low and elevated hemoglobin concentration on the initial admission against normal values for 90-day mortality were 1.15 (1.02–1.29) and 1.43 (2.58). Sharma et al. conducted a retrospective cohort study to evaluate the effect of anemia on 3-month unfavorable clinical outcome following acute ischemic stroke and recognized no significant effects [5]. These reports presented that no linear relationship existed in

mortality risk by blood hemoglobin concentration. Moreover, there was a report of no association between hemoglobin concentration and adverse clinical outcome. Further studies are needed to verify the association, with special reference to type of events, such as mortality and disability, and linearity of the association.

## Disclosure statement

The author has indicated no financial support.

## Conflicts of interest

There is no conflict of interest in this study.

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