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## Anticoagulant treatment is associated with decreased mortality in severe coronavirus disease 2019 patients with coagulopathy

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### Abstract

**Background:** A relatively high mortality of severe coronavirus disease 2019 (COVID-19) is worrying, and the application of heparin in COVID-19 has been recommended by some expert consensus because of the risk of disseminated intravascular coagulation and venous thromboembolism. However, its efficacy remains to be validated.

**Methods:** Coagulation results, medications, and outcomes of consecutive patients being classified as having severe COVID-19 in Tongji hospital were retrospectively analyzed. The 28-day mortality between heparin users and nonusers were compared, as was a different risk of coagulopathy, which was stratified by the sepsis-induced coagulopathy (SIC) score or D-dimer result.

**Results:** There were 449 patients with severe COVID-19 enrolled into the study, 99 of them received heparin (mainly with low molecular weight heparin) for 7 days or longer. D-dimer, prothrombin time, and age were positively, and platelet count was negatively, correlated with 28-day mortality in multivariate analysis. No difference in 28-day mortality was found between heparin users and nonusers (30.3% vs 29.7%,  $P = .910$ ). But the 28-day mortality of heparin users was lower than nonusers in patients with SIC score  $\geq 4$  (40.0% vs 64.2%,  $P = .029$ ), or D-dimer  $>6$ -fold of upper limit of normal (32.8% vs 52.4%,  $P = .017$ ).

**Conclusions:** Anticoagulant therapy mainly with low molecular weight heparin appears to be associated with better prognosis in severe COVID-19 patients meeting SIC criteria or with markedly elevated D-dimer.

**Keywords:** D-dimer; coagulopathy; coronavirus disease 2019; low molecular weight heparin; sepsis.

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