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# Meta-analysis of 175 patients with COVID-19 and seizures, status epilepticus, or cortical myoclonus: An individual patient data analysis

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*Objective*
To characterize management and outcomes of seizures, status epilepticus, and cortical myoclonus in COVID-19, with individual patient data analysis of published literature.

*Methods*
Systematic literature review was conducted in accordance with PRISMA guidelines. Criteria included new-onset seizures, status epilepticus, and/or cortical myoclonus with concomitant COVID-19. COVID-19 severity was dichotomized into mild and severe cases. Good outcome was defined as discharge without severe deficits, and/or return to baseline.

*Results*
A total of 105 studies reporting 176 patients (male 56.3%;mean age 47.8,SD 25.6) were included. Status epilepticus occurred in 47 patients (26.7%) and myoclonus in 41 (23.3%). Severe COVID-19 occurred in 90 (53.6%) patients. Seizure-like activity on electroencephalography (EEG) was noted in 52/103 patients (50.5%). The most common underlying diagnosis was encephalitis in 47/91 patients (51.6%), followed by infarct (n=18; 19.8%) and intracranial hemorrhage (n=14;15.4%). The most common antiepileptic was levetiracetam (93/130; 71.5%). Pulse-dose steroids were used in 32 (19.3%) patients, whereas IVIg was used in 22 (13.4%). Overall, 101 patients (63.9%) had good outcomes while 24 (14.6%) died. In multi-variate regression, severe COVID-19 (OR=0.116), age (OR=0.980) and intubation (OR=0.303) were associated with worse outcomes. In a separate regression model, encephalitis was associated with good outcomes (OR=6.07), while severe COVID-19 predicted worse outcomes (OR=0.17).

*Conclusion*
Severe COVID-19 strongly determines outcomes, whereas status and myoclonus do not. Most patients responded to standard seizure treatments and achieved good outcomes. Aggressive seizure treatment and identification of etiology are strongly recommended to direct targeted treatments. Further research should focus on long-term seizure and neurocognitive outcomes.