

# 코로나19와 뇌전증



## 문 장 섭

서울대학교병원 희귀질환센터 신경과

## COVID19 and Epilepsy

Jangsup Moon, MD, PhD

Rare Disease Center, Department of Neurology, Seoul National University Hospital

### Contents

- Does COVID-19 cause seizure/epilepsy?
- Important considerations for patients with epilepsy in COVID-19 era

### Does COVID-19 cause seizure/epilepsy?

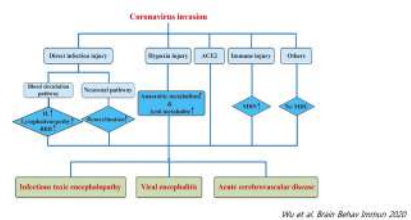
### COVID-19 and Seizure (Case reports)

- Pubmed: "COVID-19" and "Seizure"
- 193 articles (by 2020-10-24)



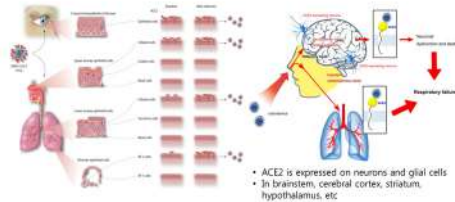
### CNS complications

- The neurological symptoms associated with COVID-19 include headache, dizziness, depression, anosmia, encephalitis, stroke, **epileptic seizures**, Guillain-Barre syndrome, etc
- The involvement of the CNS may be related with poor prognosis and disease worsening



## Pathomechanism of CNS complication

- SARS-CoV2 uses angiotensin-converting enzyme2(ACE2) as receptor for docking and cell entry



Xu et al. Cell Mol Neurobiol 2020

## COVID-19 and Seizure (Case Series)

Neurologic manifestations in hospitalized patients with COVID-19  
The JAMA COVID registry

	Total, n = 841	Seizures, n = 152 (18.1%)	Stroke, n = 120 (14.3%)	OR	95% CI	p Value
Neurologic symptoms	483 (57.4)	178 (21.5)	215 (26.1)	1.00	1.2-1.3	0.001
Seizures	152 (18.1)	152 (100)	0	0.00	0.0-0.1	0.00
Stroke	120 (14.3)	0	120 (100)	0.00	0.0-0.1	0.00
Any	303 (36.0)	152 (100)	120 (100)	0.00	0.0-0.1	0.00

- 841 hospitalized COVID-19 patients were analyzed (Spain)
- 57.4% developed some form of neurologic symptoms
- Seizure occurred in 0.7% of patients

Romero-Sanchez et al. Neurology 2020

## COVID-19 and Seizure (Case Series)

REVIEW  
A systematic review of neurological symptoms and complications of COVID-19

- 92 full-text publications were analyzed (Accepted: Jul 2020)
- Headache, dizziness, taste and smell dysfunctions, and impaired consciousness were the most frequently described neurological symptoms

Table 1. Summary of frequent neurological symptoms reported in COVID-19 patients

	Total n-studies	n (%)	Headache n-studies	n (%)	Dizziness n-studies	n (%)	Taste and smell dysfunctions n-studies	n (%)	Impaired consciousness n-studies	n (%)
Headache	31	33.6%	10	32.3%	10	32.3%	10	32.3%	10	32.3%
Dizziness	11	12.0%	11	100%	11	100%	11	100%	11	100%
Taste and smell dysfunctions	8	8.7%	8	100%	8	100%	8	100%	8	100%
Impaired consciousness	9	9.8%	9	100%	9	100%	9	100%	9	100%

- Generalized seizures were reported in 2 case reports
- 7 single-case reports on meningitis/encephalitis in association with COVID-19 have been published (some reported seizures)

Chen et al. J Neurol 2020

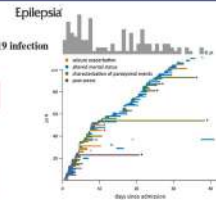
## COVID-19 and Seizure (Case Series)

FULL LENGTH ORIGINAL RESEARCH PAPER

Continuous EEG findings in patients with COVID-19 infection admitted to a New York academic hospital system

TABLE 2. Continuous EEG findings

	Total (n = 111)	Excluding post- ictal (n = 100)
Seizures recorded on EEG	6 (7.2%)	5 (5.0%)
No clinical signs	2 (2.0%)	1 (1.0%)
Subtle clinical signs	1 (1.0%)	1 (1.0%)
NCSE	2 (2.0%)	1 (1.0%)
Any epileptogenic abnormalities (foci, PEOs or seizures)	30 (31.5%)	27 (27.0%)



- 111 COVID-19 patients who underwent continuous EEG monitoring (USA)
- Male (71%), ICU admission (77%), comatose (70%)
- Epileptiform discharges were observed in 30% and seizures in 7%

Pollanen et al. J Epilepsia 2020

## Important considerations for patients with epilepsy in COVID-19 era

## Do Epilepsy patients have higher risk for COVID-19?

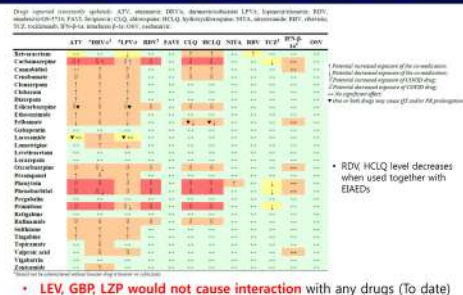
- "Neurological comorbidities (including epilepsy) may be a risk factor for COVID-19"
- Suggested by CDC, without any evidence
- To date, history of epilepsy has not been reported to be a risk factor for COVID-19
- Epilepsy itself seems unlikely to be a risk factor for COVID-19
- Immunomodulatory drugs, steroid may increase the risk of infectious disease

## Effect of COVID-19 on patients with epilepsy

- **Changing AEDs** in patients with well-controlled seizure are **not recommended**
  - Seizure exacerbation or SE may increase the risk of COVID-19
- Patients should **avoid running out of AEDs**
  - Going to ER may expose the patient to COVID-19
- Do COVID-19 increase the risk of **SUDEP**?
  - Some reports suggest that infections might increase the risk of SUDEP
  - **No data** on the association between COVID-19 and SUDEP until now

David et al. *Endocrine Reviews* 2015

## Drug interaction between AEDs & COVID-19 drugs



- RDV, HCLQ level decreases when used together with FIAFDs

- **LEV, GBP, L郑 would not cause interaction** with any drugs (To date)

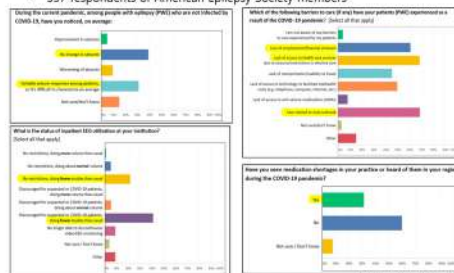
## Epilepsy monitoring units and Surgery

- During the serious pandemic of COVID-19, **Video-EEG monitoring & Elective surgical treatments** for epilepsy **may be postponed** to prevent further spread of COVID-19 among medical staff and patients
- However, some patients have progressive condition of epilepsy
- The real risk of proceeding and the real risk of delay on intervention should be considered **case by case**

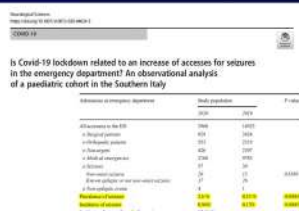
David et al. *Endemic Bats* 2010

## Impact of COVID-19 on Epilepsy care (Survey)

- 337 respondents of American Epilepsy Society members

Albert et al. *Environ. Curr.* 2020

## Other studies...



- During Italian lockdown, prevalence of seizures increased among ER Adm
  - Difference in daily screen time (DST) ( $p = 0.001$ ) and total sleep time (TST) ( $p = 0.045$ )
- Sleep time change and/or higher mobile media devices → could act as triggers for seizures → increased visit to ER

Balladine et al. *Musculi Sci* 2010

## Summary

- COVID-19 can cause CNS complications
- Seizure is not the major manifestation of the CNS complication
- Seizure or EEG abnormalities (epileptiform discharges) may occur more often in severely-ill COVID-19 patients
- Epilepsy seems unlikely to be a risk factor for COVID-19
- Changing AED in well-controlled patients is not recommended during the COVID-19 pandemic
- EIAEDs may reduce the blood level of some COVID-19 drugs
- Accessibility to medical service may be reduced in patients with epilepsy during the COVID-19 pandemic