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The Effects of SARS COV 2 Infection – Does a Depression Pandemic Follow?

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Abstract: *Viral infections can be a cause of CNS infection, causing mental and neurological symptoms. Even under normal conditions, good mental health is of paramount importance to the functioning of society. Healthcare workers are critical to the COVID-19 pandemic and beyond, but may have to leave work if their mental health is affected.*
We present the favorable evolution of a patient, a 55 year-old woman, medical staff with a history of viral infection with SARS CoV-2 (August 2020), which is brought by a crew of the Ambulance service in the emergency department (ED) service (December 2020) for multi-drug ingestion for suicide. After treatment and investigations she is transferred to the "Elena Doamna" Psychiatric Hospital. After 4 days of hospitalization, he returns to the emergency department by transfer from the Psychiatric Hospital for underlying seizures, confusion syndrome. During her admission to the neurology service of the "Sf Ap. Andrei" Emergency Clinical Hospital, the patient benefited from numerous clinical and paraclinical investigations, which provided information about the patient's neuropsychiatric evolution.

Keywords: *depression, suicide attempt, pandemic, SARS CoV 2 infection.*

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1. Introduction

The COVID-19 pandemic has an **adverse impact** on the world's population, but little is known about its effects on mental health (Grigoras & Ciubara, 2021).

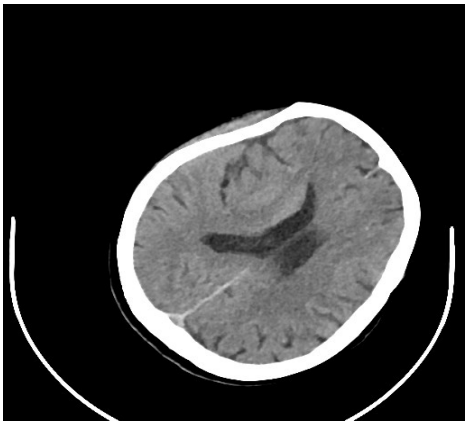
Coronaviruses are RNA viruses and numerous strains (HCoV-229E, MERS-CoV, HCoV-OC43, HCoV-NL63, HCoV-HKU1, SARS-CoV-1) have been identified, causing mild respiratory tract infections (Desforges et al., 2019; Liu et al., 2021). Coronaviruses have been identified in the brain and cerebrospinal fluid of patients with seizures, encephalitis and encephalomyelitis (Bohmwald et al., 2018; Haider et al., 2020).

The scope of this case report id to describe and analyze the neuropsychiatric symptoms post SARS CoV-2 infection.This case remind us that it is important to have a high degree of mental health alteration suspicion, especially at the patients with a history of viral infection with SARS CoV-2. Thus, an appropriate treatment can be administered without any delays, considering the neurological and psychiatric components.

2. CASE REPORT: Description of a case from the Clinic Emergency Hospital „Sf Ap. Andrei" Galati from 2020.

We present the case of a patient, woman, 55 years old, medical staff, with a history of viral infection withSARS CoV-2 and systemic sclerosis, chronic hepatitis type B, is admitted in the Emergency Department for multi-drug ingestion, lack of air sensation and psychomotor agitation.

At the moment of Emergency department take over the patient showed the following neurologic and cardiopulmonary parameters: Glasgow Coma Scale (GCS) score15 points, psychomotor agitation, RR= 20r/min, SaO2= 98%, HR=100b/min anda BP=130/90 mmHG. Anamnesis, the patient declares that she swallowed approximately 20 tables in the last hour in a suicide attempt, she cannot mention the types of pills. The clinical, paraclinical and imagery examinations have been in normal limits, except the transaminases which were slightly increased, ALT=47U/L and AST=50U/L. At the CT scan hyperdense structures or expansive intracranial processes were not seen**. (Figure 1, 2)**



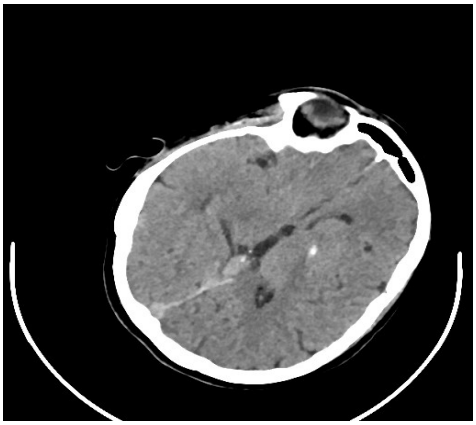


Figure 1 **Figure 2**

Figure1, 2. CT scan. Source: Authors' own conception

Without hyperdense structures or intracranial expansive process. Visible calcifications at the level of lenticular nucleus. Preserved medial axis, symmetrical cerebral venticulal system., normally sized. Normal cortical relief.

After the treatment received in the Emergency Department and the results of the paraclinical examinations, the diagnosis is given: voluntary ingestion of multi-drug for suicide purpose. Psychomotor agitation and she is transferred to the "Elena Doamna" Psychiatric Hospital, where apparently she had a good evolution. After 4 days of hospitalization, she returns to the emergency department by transfer from the Psychiatric Hospital for underlying seizures, confusion syndrome.

The treatment is started with repeated doses of benzodiazepine to control the seizures.

Biological, the patient at admission presented leukocytosis (13.900/mcL), with neutrophils 69,93%, normal renal samples, mildly increased hepatic samples, total bilirubin 1.17 mg/dl, direct bilirubin 0,34mg/dl, normal blood sugar, serum bicarbonate 23mmol/L.

Imagistic: CT scan – withouthyperdense structures. Preserved medial axis. Visible calcifications at the level of lenticular nucleus. Symmetrical ventricular system, normally sized. Normal cortical relief. **(Figure3, 4)** Chest X-ray: accentuated hila. Bilateral accentuated interstitium. Normal heart. **(Figure 5)**

During the neurologic examination: the patient is lethargic, non-cooperative, the head and the eyeballs deviated towards right, left hemifacial paresis, left hemiplegia, positive Babinski sign on the left side.

Figure 3

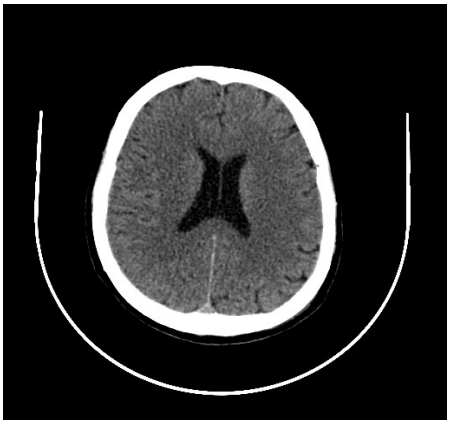


Figure 4

Figure 3,4. CT scan – without hyperdense structures. Preserved medial axis. Visible calcifications at the level of lenticular nucleus. Symmetrical ventricular system, normally sized. Normal cortical relief. Source: Authors' own conception

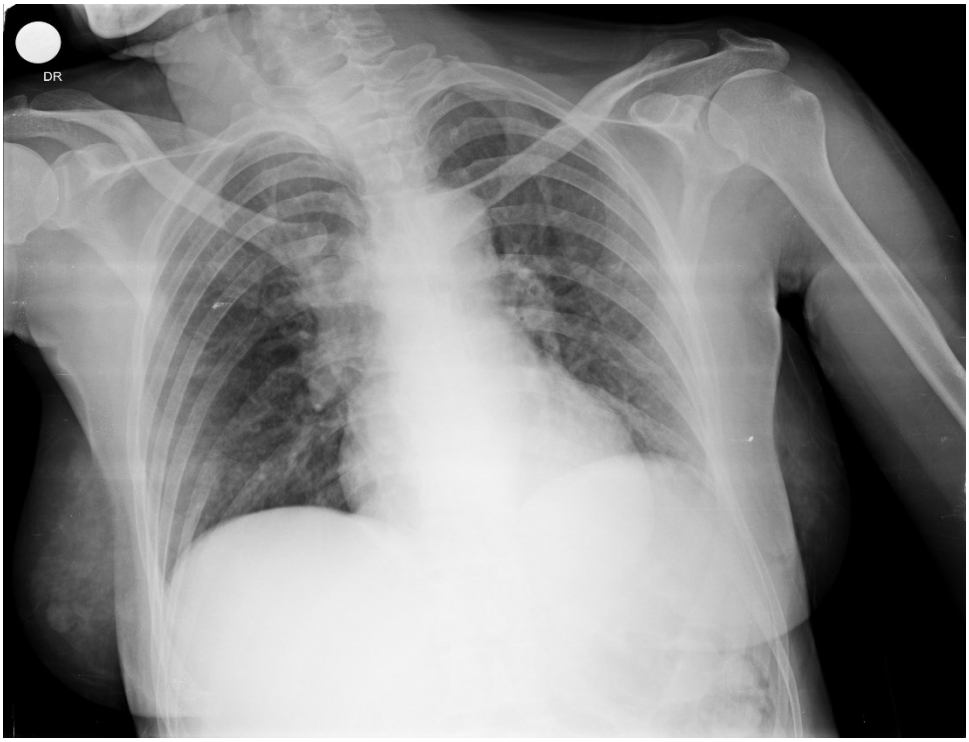


Figure 5. CHEST X-ray: accentuated hila. Bilateral accentuated interstitium. Normal heart. Source: Authors' own conception

The initial evolution with the persisting seizures, needed barbiturice administration, induced coma with prosthesis of respiratory tract. The patient is admitted in the intensive care / neurology service between 13.12.2020 –21.12.2020 with the following diagnoses: Status epilepticus, drug induced coma, General anesthesia with OTI (oro-tracheal intubation), left hemiplegia, severe depression, voluntary multi-drug ingestion 3 days ago.

During the hospitalization in the intensive care section, the patient benefitted of repeated imagistic and paraclinical examinations to ensure a proper and timely management of the admission pathology. **(Figure 6, 7)**

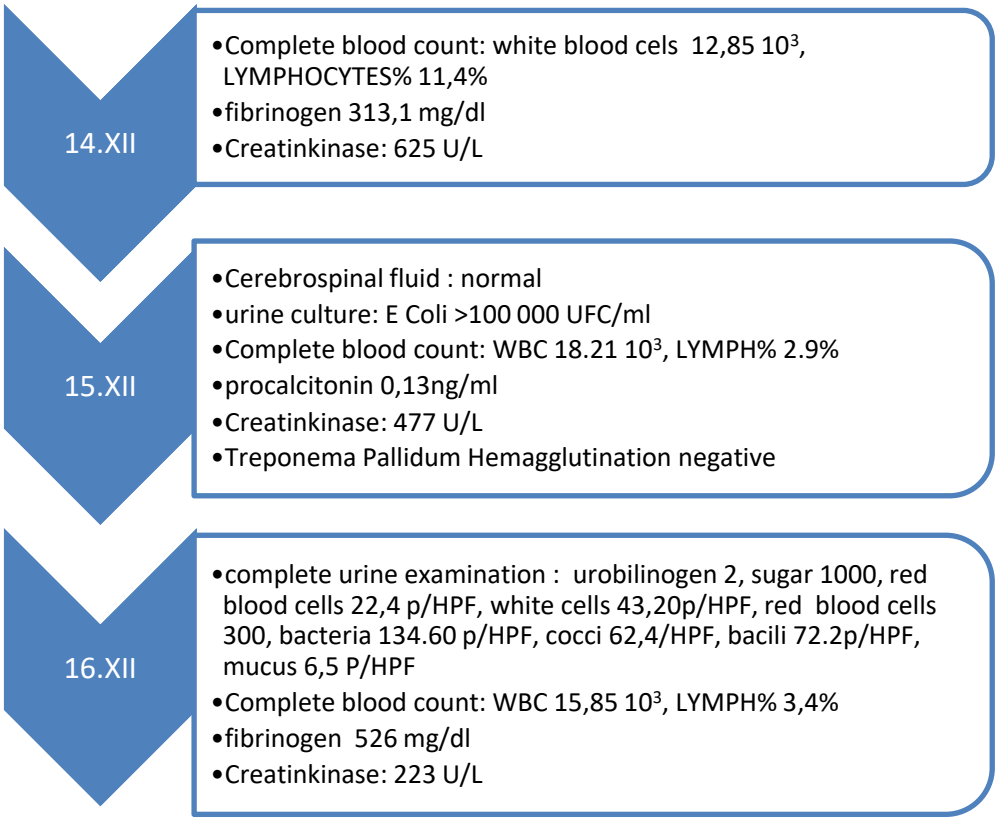


Figure 6. paraclinical examinations during the hospitalization in the intensive care section. Source: Authors' own conception

On 17.12.2020 the following were executed:

- Cerebral angiography: without blood accumulations or other visible space replacing processes intra-cerebral RM. Without signal anomalies at the level of periventricular or subcortical white matter. Symmetrical ventricular system with normal dimensions. Interhemispheric fissure in normal position. Normal cortical relief. Cerebellopontine angle normal bilateral. Internal auditory conduct normal dimensions. Arterial vascular trajectories from the brain base with topography, caliber and RM flow in normal limits. Dural venous sinuses with normal RMaspect.

- Chest x-ray: pulmonary interstitium accentuated bilateral, normal cord

- Bacterial culture – tracheobronchial aspiration:

• Germs: Corynebacterium striatum

• Cytosmear: frequentpolymorphonuclear leukocytes, cocci gram-positivein diplo, bacilli gram-positiverod-shaped

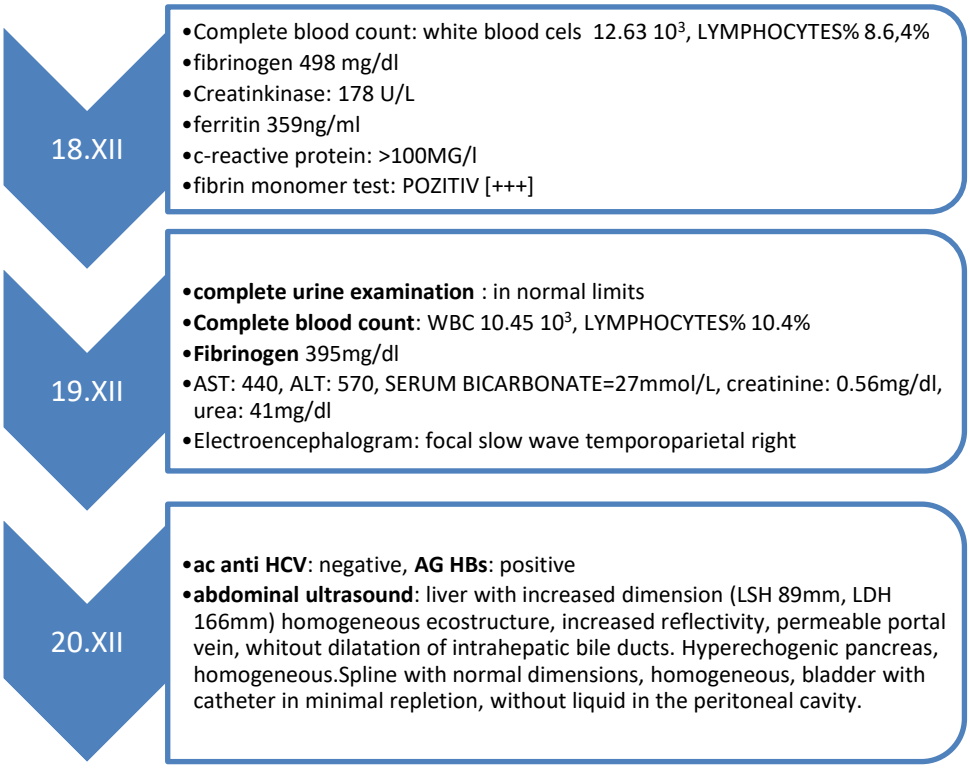


Figure 7. Paraclinical and clinical examinations during the hospitalization in the intensive care section Source: Authors' own conception

In addition, the following were carried out:

- Gastrointestinal examination: acute hepatic cytolysis syndrome with the recommendation to avoid hepatic cytolysis medication.
- Rheumatology examination: scleroderma with minimal pulmonary affection.
- Orthopedic examination: without recent post-traumatic joint injuries. Left **scapulohumeral periarthritis**.

The focal motor seizures are remitted, the patient is extubated and transferred to the Neurology department. The patient's evolution during the hospitalization was favorable, without repeating the motor seizures, remitted motor deficiency, and also the confusion state. The patient is discharged conscious, cooperative, without motor deficiency with the recommendation to continue the treatment against epilepsy and depression, with neuropsychiatric reassessment in need.

3. Discussions

The etiology of the neuropsychiatric pathology of coronavirus infection includes the adverse effects of the brain infection, ischemic strokes and transient ischemic attacks (coagulation changes), social distancing, the negative psychological effects of a new severe and possibly lethal disease, concerns about infecting others and stigma. (Baroiu et al., 2021; Luca et al., 2021; Rogers et al., 2020).

The immunopathological response to coronavirus infection is major and is represented by a hyperinflammatory reaction found in hemophagocytic lymphohistiocytosis (Retamozo et al., 2021). Hemophagocytic lymphohistiocytosis is characterized by cytopenia and progressively increasing inflammatory tests, although it is possible that this state to be a short-time one (Mehta et al., 2020). The connection between inflammatory markers and depression is mentioned in the literature and may explain some of the psychiatric pathology (Wohleb et al., 2021; Radulescu et al., 2020).

Even under normal conditions, good mental health is of paramount importance to the functioning of society. Healthcare workers are critical to the COVID-19 pandemic and beyond, but may have to leave work if their mental health is affected (Silistraru et al., 2021).

The developing literature measures the impact of the factors associated with the development of neuropsychiatric pathology post SARS CoV-2 infection. COVID-19 has already lead to various mental health disorders, including obsessive-compulsive disorder, disposal disorders,

addiction, depression, post-traumatic stress and other neurologic disorders (Chew et al., 2020; Huang & Zhao, 2021).

The literature mentions a psychological impact on the high-risk population, such as the elderly, children, patients with chronic conditions, but also front-line workers, including medical staff (Banerjee & Viswanath, 2020; Cheng et al., 2004). The large work amount, the absenteeism, the exhaustion and the guilt contribute to these results at this king of people. The presence of depression, disposal disorders and suicide have been reported around the world, worsened by the consequences of social isolation (Hwang & et al., 2020).

Factors related to the development of neuropsychiatric pathology **(figure 8)** as a consequence of the pandemic are represented by: hospitalization, serious COVID-19 disease, witness to suffering and death of others; the people who have been informed of the death or severe illness of a family member or friend caused by the virus; and people who are exposed to many traumatic events (medical staff) (Valcea et al., 2016). Furthermore, studies have identified other stressors that amplify a person's emotional load, such as social isolation, job loss, and economic loss, as well as teleworking while caring for others. At healthcare workers, the stress factors include the inappropriate individual protection equipment (IPE), the fears regarding the exposure to the virus, exhaustion, patients who died despite the great efforts of the doctor to treat them and the difficult medical decisions regarding the patients who benefit only from limited medical care (Tucker & Czapla, 2021).

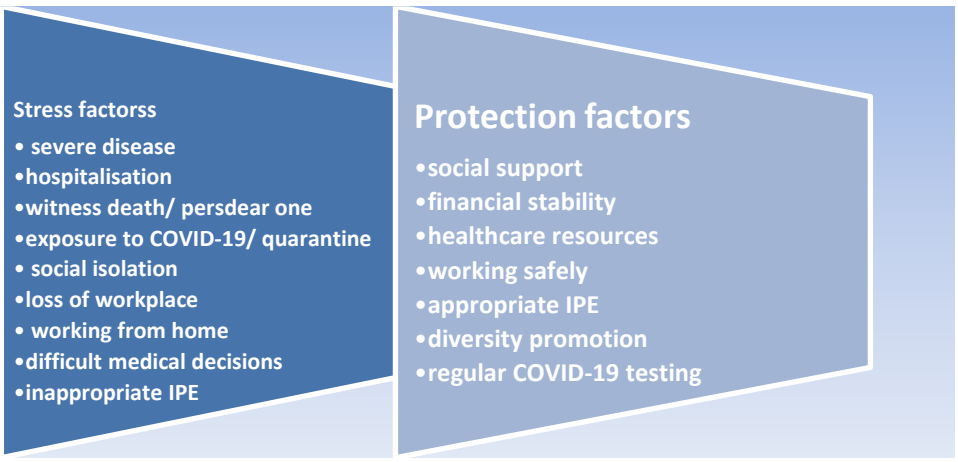


Figure 8. Stress and protection factors leading to neuropsychiatric disorders
Source: Authors' own conception

The patients with Sars Cov-2 infection in acute stage could exhibit delusion, confusion, hearing hallucinations, agitation and conscious alteration, also depression, anxiety and insomnia symptoms (Wing & Leung, 2012).

After the recovery from SARS CoV-2 infection, sleep disorders, anxiety, post-traumatic stress disorders, emotional liability, concentration disorders, fatigue, memory disorders have been reported at more than 15% from the patients during a surveillance period between 6 weeks and 39 months (Rogers et al., 2020).

The symptoms of traumatic and stress related disorder have been reported with 26,3%, depression or anxiety symptoms with 30,9%, drug consumption to cope with 13,3%, and considering the suicide with 10,7% (Czeisler et al., 2020).

What captures our attention at this case is the psychological impact on the patient after the recovery from SARS CoV-2 infection. The severe depression symptoms and taking the suicide into account, afterwards alteration of the neurocognitive function, emphasize the importance of the quick intervention and diagnosis applying the appropriate treatment.

4. Conclusions

Mental health and well-being of the individual may be adversely affected by a pandemic, patients may experience neurological or psychiatric disorders after coronavirus infection, and physicians should be aware of the possibility of neuropsychiatric disorders occurring after coronavirus infection.

The identification of population with high risk of mental health alteration is of major importance. The neurologic and psychiatric disorders related to coronavirus infection emphasize the significant impact of the pandemic and the necessity to prevent and treat these affections.

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