



A Case Report of Creutzfeldt-Jakob Disease after mRNA COVID-19 Vaccine

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Abstract

We report a rare case of Creutzfeldt-Jakob disease whose complaints started after a few weeks' mRNA COVID-19 vaccine. Prion diseases are neurodegenerative diseases which have long incubation periods. After clinical symptoms appear, it progresses rapidly to death. Beside clinical symptoms, EEG, Brain MRI and Protein 14-3-3 positivity support to diagnose. There is no effective treatment. In this paper, we present a case admitted to our clinic with rapidly progressive cognitive impairment after mRNA COVID-19 vaccine along with protein 14.3.3 positivity.

Keywords: Creutzfeldt-Jakob disease; COVID-19; Vaccine; Immunity

Introduction

Many neurological diseases have been reported after COVID-19 infection [1,2]. Neurological manifestations may be associated such as direct effects of the virus on the nervous system, para-post-infectious immune mediated disease, and neurologic complications of COVID-19 [2]. One of the rare neurologic manifestations after covid infection is Creutzfeldt-Jakob disease [3]. Although it is seen after covid infection, few cases have been reported due to covid vaccine in literature [4,5]. Prion diseases are characterized by a long incubation period and rapidly progressive, fatal clinic [6]. It is one of the main reasons of rapidly progressive cognitive disorders [7]. In this report; we aimed to discuss the diagnosis and treatment in the light of the literature by sharing a case admitted to our clinic with rapidly progressive cognitive impairment and general condition disorder after mRNA COVID-19 vaccine along with protein 14.3.3 positivity.

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Case Presentation

A 68-year-old male patient was admitted to our clinic with increasing speech disorder, confusion and agitation for two days, intermittent tonic contraction in the left arm and leg, and pedaling movements at night. He had the mRNA Covid vaccine 3 to 4 months ago, after 1 to 2 weeks simple forgetfulness that would not affect daily living activities started. His speech disorder in the form of not being able to find words was added 2 months ago, in his background, he had hypertension, mitral valve replacement, and Atrial Fibrillation (AF). He was using Warfarin sodium. In his Neurological Examination (NM), he was apathetic, there was no spontaneous word output, and he rarely took single orders. Left nasolabial sulcus was slightly indistinct-sol. Medical Research Council (MRC) grades were 4/5 on bilateral upper and lower limbs. No acute pathology was observed in the brain tomography of the patient, who could not undergo MRI because the metal valve was not compatible with MRI.

Due to the onset of symptoms after vaccination, he was hospitalized in the neurology service with the preliminary diagnoses of infectious, autoimmune, paraneoplastic encephalitis, Creutzfeldt-Jakob disease, and to investigate the etiology of rapidly progressive cognitive impairment. In the clinical follow-up, the patient had an episodic and stereotypical pattern of focal seizures which started absence for a few seconds by followed spasms in the left arm and then agitation. Considering focal seizures. levetiracetam was added to his treatment, and 3 × 1000 mg/day was administered gradually. Although his seizures decreased, lacosamide 50 mg 2 × 1/day was added. After that, no similar attacks were observed. EEG examinations performed 5 times in total during 2 weeks. They showed diffuse disorganization in the patient. In malignancy screening examinations to investigate paraneoplastic processes it was discovered mediastinal lymph nodes on thorax CT, but malignancy was not considered. There was no FDG uptake in favor of malignancy in the whole-body PET examination. Brain PET showed hypometabolism in the right parietofrontal cortex and superior

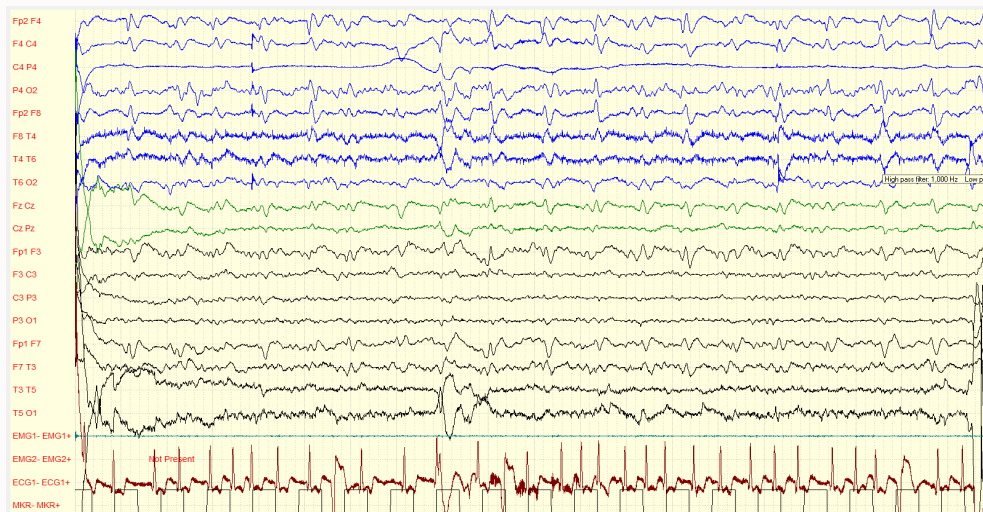


Figure 1: Periodic wave activity showing asymmetry.

temporal lobe, which could be interpreted in favor of cerebrovascular disease or subacute autoimmune encephalitic processes. Lumbar puncture was made for investigating the etiology Cerebrospinal Fluid (CSF) protein: 35 mg/dL (N: 15-45 mg/dL), 3 leukocytes were seen. Oligoclonal band, autoimmune encephalitis panel viral panel, atypical cell, 14.3.3 protein, paraneoplastic antibodies were sent in CSF and serum. With the preliminary diagnosis of autoimmune encephalitis, 1 g/day Intravenous Methylprednisolone (IVMP) was given for 2 days.

Upon the development of CRP elevation on the second day, aspiration pneumonia was observed in the thorax CT. IVMP was discontinued and anti-biotherapy was started.

The patient whose steroid treatment could not be completed was given 125 g Intravenous Immunoglobulin (IVIG) at 2 g/kg. The patient, who had partial orientation to sound in the NM follow-ups, but could not fully recover, was transferred to the Intensive Care Unit (ICU) due to rapid ventricular response AF and deterioration in general condition. Autoimmune encephalitis and paraneoplastic antibodies resulted in negative when he was in ICU. Protein 14.3.3 was positive. Very low amplitude suspicious sharp wave paroxysms were observed in the EEG examination taken at the 4th month of his ICU follow-up (Figure 1).

The patient, whose clinical course progressed, died in the 5th month of her complaints and in the 2nd month of clinical worsening.

Discussion

Prion diseases should be considered in patients applied clinic of rapidly progressive cognitive impairment. The recent increase in the frequency of diagnosis is remarkable. In the literature, more than one case with CJD diagnosis and findings after covid vaccination has been reported [4,5]. Discussions on the subject are mostly based on the fact that the mRNA in the mRNA COVID-19 vaccine has the potential to bind to specific proteins and cause pathological misfolding [8-10]. Classen et al. analyzed the mRNA of mRNA COVID-19 vaccine for its potential affinity to TAR DNA binding protein (TDP-43) and Fused in Sarcoma (FUS) which are intracellular RNA binding proteins [8-10]. They found that the mRNA of COVID-19 vaccine has sequences that could convert these proteins into pathologic prion

proteins [8-10]. They made a basic manual reading of the vaccine mRNA sequence. They discovered a total of sixteen UG tandem repeats (ΨGΨG) besides the UG (ΨG) rich sequences in the vaccine nucleic acid sequence. Two GGΨA sequences were also found. It is unclear whether these mRNA sequence differences or the resulting amino acid sequence differences lead to different levels of risk for developing prion disease. Considering our patient and other patients presented in the literature, it should be kept in mind and questioned that symptoms may occur with vaccination in sporadic CJD cases.

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