COVID-19 Vaccine Associated New Onset Pediatric Systemic Myasthenia Gravis

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Myastenia gravis (MG) is an autoimmune disorder characterized by abnormal neuromuscular conduction. The thymus is believed to play a key role in the pathogenesis of MG so that thymectomy is an important treatment option for the disease. As MG exacerbations and new-onset MG cases following COVID-19 vaccinations have been previously reported in the literature, a variety of complications that are highly related to autoimmunity, such as Guillain Barre Syndrome, have been reported after vaccination.

In this study, we presented a previously healthy paediatric MG patient who experienced the first MG attack after having been vaccinated against COVID-19 and who had symptomatic relief after video-assisted thoracoscopic (VATS) thymectomy. We aimed to contribute to the literature about this rarely encountered condition by reporting the first paediatric case presenting with BNT162b2 vaccination-associated generalized weakness and severe respiratory distress, who was diagnosed with MG and thymoma during follow-up, in the light of the contemporary literature.

OBJECTIVE

The vaccine against SARS-CoV-2 that was introduced after the declaration of the COVID-19 pandemic by the World Health Organization (WHO) in March 2020 markedly limited the spread of the virus and reduced mortality. Although it has been proved that the vaccines have a satisfactory safety profile in the randomized clinical studies, severe and unexpected neurological complications were reported on 2022: Guillain Barré syndrome, cerebrovascular events, and autoimmune disorders including myasthenia gravis (MG) [1, 2]. Myastenia gravis (MG) is an autoimmune neurological disorder characterized by abnormal neuromuscular conduction. Antibodies against acetylcholine receptors (AChR's), Muscle specific kinase (MuSK), and protein 4 bound to the low-density lipoprotein receptor (LRP4) are the dominant autoantibodies in MG. The disease is more common in women (3:1) in young people between 20 and 30 years of age whereas it affects both sexes equally later in life. Thymus is believed to play an important role in the pathogenesis of MG; it shows morphological changes such as lymphofollicular hyperplasia, thymoma, and thymic atrophy. The general guidelines of the Centre for Disease Control (CDC) recommended that most MG patients should be vaccinated with any COVID-19 vaccine [1-3].

OBJECTIVE

In this study, we aimed to report a previously healthy paediatric MG patient having the first disease attack after having been vaccinated with the BNT162b2 mRNA Covid-19 (Pfizer-BioNTech) vaccine, who had persistent attacks despite immunotherapy and experienced regression in the frequency of the attacks short time after she underwent video-assisted thoracoscopic (VATS) thymectomy.

CASE PRESENTATION

A 15-year-old female patient presented to our paediatric emergency department with difficulty swallowing followed by generalized weakness and respiratory distress 36 hours after having the first dose of the BNT162b2 mRNA Covid-19 (Pfizer-BioNTech) vaccine. Her physical examination was remarkable for difficulty swallowing, respiratory distress, and tachypnoea. She had normal deep tendon reflexes; her gag reflex was positive, but she had difficulty when talking. She had a body temperature of 36.8 0C, a blood pressure reading of 116/72 mm/Hg, and a pulse rate of 103/minute. She was suffering swallowing and mastication. Her eye movements were normal, and she had no ptosis. Twenty-four hours after she was admitted to the paediatric ward, her symptoms, most notably respiratory distress, worsened; thus, she was transferred to the paediatric intensive care unit. She was intubated shortly thereafter. A repeat neurological examination revealed positive DTRs and no ophthalmological abnormalities including ptosis. Her blood tests (serum biochemistry, creatine kinase, CRP, sedimentation rate, free T4, TSH) were normal. None of her smear and blood PCR tests including COVİD -19 PCR was positive.

CASE PRESENTATION

An electromyelogram (EMG) taken with the polyneuropathy protocol revealed no abnormality. A repetitive stimulation test produced a decremental response. After sending the Anti-AChR and Anti-Musk tests, she was put on IVIG (0.4 mg/kg/day x 5 days), pyridostigmine, and methylprednisolone at a dose of 30 mg/kg/day (3 days). The patient's complaints quickly regressed after the start of treatment; she was extubated at 18th hour and transferred to regular ward 60 hours later. All of her symptoms regressed after the 72nd hour of therapy. Anti-AChR antibody level was found 2.6 nmol/L (<0.25 nmol/L) while Anti-MUSK antibodies were negative. Azathioprine treatment was added to the patient, whose steroid treatment was planned to be completed for 6 months, as her complaints recurred after the steroid dose was tapered. As her symptoms did not abate despite azathioprine adnd pyridostigmine treatments, she underwent thymectomy with video-assisted thoracoscopic (VATS) technique. The examination of the pathology specimen revealed micronodular Stage 1 thymoma. She did not suffer recurrent attacks during 1-year follow-up after thymectomy.

CONCULSION

In conclusion, although MG is a rare condition, high morbidity and mortality rates associated with COVID-19 infection requires raising the awareness of the vaccines. The fact that COVID-19 vaccines have adverse effects as rare as other vaccines should not discourage patients and, more importantly, should not prevent neurologists from recommending vaccination to MG patients. However, if there is severe involvement such as severe bulbar symptoms and myasthenic crisis, it will be safer to postpone COVID-19 vaccine. The first newly discovered pediatric MG case after the BNT162b22 vaccine, which we presented in our study, indicates that, just like in adults and similar to other autoimmune conditions, MG can affect children after vaccination. This condition should be remembered after mRNA vaccines, which have become increasingly important, particularly so in children giving a vaccination history. It corroborates the notion that MG should be remembered if the tests for Coronavirus are negative in case of clinical worsening.

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