Case series

DOI: 103126/JNPS.V4113

Guillain Barre Syndrome as a Presentation of post Covid-19 Infection among Children: A Case Series

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Article History
Received On: 18 May, 2022
Accepted On: 10 Apr, 2023

Funding sources: None

Conflict of Interest: None

Keywords:
Acute Flaccid Paralysis, Children, Covid-19, Guillain Barre Syndrome

Online Access

DOI:
https://doi.org/10.3126/jnps.v42i3.45157

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Abstract

During the second wave of Covid-19 pandemic, children presented with myriad of central nervous system manifestations and one of them was Guillain-Barré syndrome (GBS). It is caused by various viruses including recent Covid-19 infection by either direct invasion or post infectious process. Most of these cases were reported in adults and very few in children. Here, we report a case series of five children with GBS along with positive Covid-19 antibodies. All patients responded well to intravenous immunoglobulin without any residual weakness. We could probably link casual association of Covid-19 infection with GBS.

Introduction

The second wave of Covid-19 pandemic had affected all age groups including children in many countries of the world including India. Covid-19 patients presented with myriad of central nervous system manifestations in children and one of them was Acute Flaccid Paralysis (AFP). The commonest cause of AFP is Guillain-Barre Syndrome (GBS) in India.[1] It occurs by damage of lower motor neurons in the anterior horn cell of the spinal cord or peripheral nerves either by direct invasion or para-infectious and /or post-infectious immune mediated mechanisms.[2] The triggers could be minor respiratory or gastrointestinal illness due to viral or bacterial infections.[2] Amongst viruses, polioviruses, enterovirus71, flavivirus, herpes virus and rabies virus are well known.[2] However, few case reports from various western countries, more in adults than children, reported Covid-19 and GBS as either post or para infectious presentation.[3]

Till date to our knowledge, there were limited case studies of GBS in children with concurrent Covid-19 positivity from India.[4] As there is paucity of literature, here we report a case series of five children with GBS presentation with positive Covid-19 antibodies suggestive of recent Covid-19 infection. Interestingly, they all were presented within a span of three months (May 2021 - July 2021) during the peak of Covid-19 pandemic which leads to suspicion of causal association of Covid-19 and GBS.

Cases Presentation: All five cases are presented in Table 1.

Particulars	Case 1	Case 2	Case 3	Case 4	Case 5
Age (Years)	14	8	12	9	11
Gender	Male	Male	Male	Male	Male
Clinical Features	Ascending symmetrical paralysis	Ascending symmetrical paralysis	Ascending symmetrical paralysis	Ascending symmetrical paralysis	Ascending symmetrical paralysis
Cranial nerve involvement	Bulbar palsy	Bilateral LMN facial palsy	No	Bilateral LMN facial palsy	Bulbar palsy
Power (MRC Grading)	Upper Limbs 1/5 Lower Limbs 1/5	Upper Limbs 3/5 Lower Limbs 2/5	Upper Limbs 3/5 Lower Limbs 2/5	Upper Limbs 2/5 Lower Limbs 1/5	Upper Limbs 1/5 Lower Limbs 1/5
Tone	Hypotonia in all limbs	Hypotonia in all limbs	Hypotonia in all limbs	Hypotonia in all limbs	Hypotonia in all limbs
DTR	Absent	Absent	Absent	Absent	Absent
Autonomic instability	No	No	No	No	Present Tachycardia and hypertension
CSF analysis	Proteins 95 mg/dl, No cells	Proteins 59 mg/dl, No cells	Proteins 52 mg/dl, No cells	Proteins 85 mg/dl, No cells	Proteins100 mg/dl, No cells
Nerve Conduction Studies	Not done	Acute demyelinating polyneuropathy	Acute Motor Axonal Neuropathy	Acute Motor Axonal Neuropathy	Not done
Laboratory Inflammatory Markers	NAD	D-Dimer 950 ng/ml (Raised)	NAD	NAD	NAD
Covid-19 antibody	Positive (IgG 4.02)	Positive	Positive	Positive (IgG 9.66)	Positive
Covid-19 RTPCR	Negative	Positive	Negative	Negative	Negative
Mechanical Ventilation	Required for 30 days	Not required	Not required	Not required	Required for 45 days
Hospital Stay	days 45	days 10	days 12	days 14	days 65
Status at Discharge	Off Ventilator Power Upper Limbs 4/5 Lower Limbs 3/5	No progression of weakness	No progression of weakness	No progression of weakness	Off Ventilator Power Upper Limbs 3/5 Lower Limbs 2/5

Table 1: Clinical Presentation of cases.

CSF: Cerebrospinal Fluid, DTR: Deep Tendon Reflexes, LMN: Lower Motor Neuron, MRC: Medical Research Council, NAD: No Abnormality Detected

Discussion

All these five cases of GBS with Covid-19 antibodies positivity presented during the peak of second wave of Covid-19 pandemic from Kolhapur, Maharashtra, India during May 21 to July 21. During that period, children were highly affected due to Covid-19 and few children presented with central nervous system manifestations like headache, anosmia, febrile seizures, stroke, acute encephalitis and GBS. From our case series of GBS, all five patients were males, with age group between eight to 14 years (10.8 ± 2.39 years). They all presented with acute flaccid, symmetrical, ascending paralysis along with albumin-cytological dissociation and four had cranial nerve involvement (Two with bilateral lower motor neuron facial palsy while two with bulbar palsy). One patient had autonomic instability in the form of tachycardia and hypertension. We could perform nerve conduction velocity studies and MRI spine in only three (Two had acute motor axonal neuropathy and one had acute postinfectious polyneuropathy) and one patient respectively due to financial constraints and logistic issues. A study done by Sen S et[1] al in his non Covid-19 GBS cohort from India observed demyelinating variety more common than axonal

subtype. All patients were tested positive for Covid-19 antibodies while a single patient also tested positive for Covid-19 RTPCR. Rarely, Covid-19 RT-PCR test may remain positive longer even after recovery from primary SARS-CoV-2 infection.[5] Also, all patients received immunotherapy in the form of intravenous immunoglobulin (IVIG) in the dose of 1 gm / kg / day for two days immediately on admission after confirming clinical diagnosis. Three patients responded well to IVIG therapy, while two patients progressed further with respiratory muscle paralysis needing mechanical ventilation support in the Intensive Care Unit. One patient who was on mechanical ventilator support received repeat second dose of IVIG. All patients recovered completely eventually without any residual weakness over the period of next three to four months with good prognosis.

Initial case reports of Covid-19 and GBS with its variants were documented in adults, and supposed to be as a post infectious process.[6-8] Curtis M[3] and Das KY[5] reported a first case of Covid-19 and GBS in children from Indianapolis from United States (para-infectious) and India (post-infectious) respectively. Both these cases were responded well to IVIG therapy without any mortality and morbidity. The average duration to develop post Covid-19 GBS was less than two weeks.[9] The exact mechanism for association of Covid-19 and GBS is still not clear. The possible mechanisms include neurotropism and post infectious aberrant immune response.[10]

From our case series, we could link probable casual association of Covid-19 infection with GBS. The reason could be firstly, we haven't seen a single case of GBS at our institute in the previous year and we got all five cases within a span three months during Covid-19 second wave. Secondly, no past history of other viral or bacterial illness obtained within one month in all patients which ruled out other etiological causes of GBS. Also, we could not able to perform CSF RT-PCR for Covid-19 and other viral antigen markers due to financial constraints. Even, GBS is post infectious autoimmune condition, viral markers may not be positive at the time of presentation. Most of the antibody tests for viruses other than Covid-19 are also costly and not available, we couldn't perform these tests. Further studies and research may be necessary to establish causal association of Covid-19 with GBS.

Conclusions

We could link probable casual association of Covid-19 infection with GBS. All children responded well to IVIG and supportive treatment without any residual muscle weakness which was suggestive of good prognosis.

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