POST COVID GUILLAIN BARRE SYNDROME (GBS) IN PAEDIATRIC COVID UNIT OF DHAKA MEDICAL COLLEGE HOSPITAL: A CASE SERIES

AKTER N[1], SHAMSAD IA[2], ISLAM R[3], AKTER J[4], SULTANA K[5], YEASMIN Y[6], ANWAR S7

Abstract:

SARS Cov-2 infection presents with mild respiratory illness but has evidence of multisystem involvement in little percentage, though the severity of infection is variable in children. Neurological manifestations may vary from headache, dizziness, olfactory or taste dysfunction to specific syndromes including meningoencephalitis, stroke, and acute transverse myelitis and Guillain-Barre syndrome (GBS). But there is little evidence worldwide about neurological complications of COVID-19 in children. Here we reporting five cases of post COVID-19 GBS with relevant literature review.

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Introduction:

First cases of COVID-19 was confirmed from Wuhan city of Hubei province, China on 31st December, 2019 with respiratory symptoms which quickly spread worldwide and causes COVID-19 pandemic[1]. From the situation analysis it was initially confirmed that pediatric population remain immune against the severity of COVID-19 and most of the studies found that adult with co morbidities are the worst victim of COVID-19[2].But still there is paucity of data regarding the exact incidence of pediatric COVID infection. A review done by the Chinese Center for Disease Control and Prevention showed that <1% of COVID-19 were the children <10 years of age[3]. Bangladesh confirmed their first cases in March, 2020. Since the first case detection at 8th March, 2020[4] we have now more than 2 million COVID-19 infected population in our country, as most of the children remain asymptomatic, percentage of case detection among the children is less and 3% of children under 10 years were identified as COVID-19 infected cases among them 10% of children under 1 year of age had evidence of severe or critical disease[5].

According to the data available from different studies it has been shown that most of the children with COVID-19 infection presented with mild respiratory symptoms like fever, cough, sore throat, nasal congestion, nausea, vomiting and diarrhea, besides this non-specific respiratory symptoms some patients may have nonspecific neurological symptoms like new loss of taste or smell, headache, fatigue, myalgia, dizziness, altered sensorium and paresthesia etc[6]. Over the time period it was also documented multiple reports of atypical symptoms in children worldwide, among them multisystem inflammatory syndrome in children (MIS-C) related to SARS-CoV-2 was first described from United Kingdom and Italy in April, 2020[7,8]. Neurological manifestations is also regarded as one form of atypical presentations, childrens may presents with these features without having any classical features of COVID. There are several reports of neurological manifestations of adults reported worldwide like encephalopathy, meningoencephalitis, stroke, ADEM (Acute disseminated encephalomyelitis), GBS, autoimmune encephalitis, while few have been reported from children[9,10,11].

1. Dr. Naznin Akter Assistant Professor, Department of Pediatric Neurology, Dhaka Medical College.
2. Prof. Iffat Ara Shamsad, Professor of Pediatrics, Dhaka Medical College
3. Dr. Rumana Islam, Assistant Professor, Department of Pediatric Neurology, Dhaka Medical College
4. Dr. Jesmin Akter, Assistant Professor, Department of Neonatology, Dhaka Medical College.
5. Dr. Kaniz Sultana, Assistant Professor, Department of Pediatric Gastroenterology, Dhaka Medical College
6. Dr. Shamima Yeasmin, Assistant Professor, Department of Pediatrics, Dhaka Medical College
7. Prof. Sayeeda Anwar, Professor of Pediatrics, Dhaka Medical College.

Correspondence : Dr. Naznin Akhter, Assistant Professor, Department of Pediatric Neurology, Dhaka Medical College.
E mail: nazninruby73@gmail.com. Mobile: 01712552740

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Dhaka Medical College Hospital (DMCH) has the largest child corona unit of Bangladesh for pediatric patients. Here we found several children with neurological manifestations which features varied from headache, altered sensorium, seizures, weakness of limbs, ataxia, and involuntary movements.

GBS is a condition of post infectious polyneuropathy characterized by ascending type of muscle paralysis, occasionally sensory symptoms and autonomic involvement. Organism responsible for preceding infection are Campylobacter jejuni, Cytomegalovirus, Mycoplasma pneumonia, Epstein-Barr virus, influenza virus[12]. Here SARS-CoV-2 regarded as novel virus responsible for post infectious polyneuropathy. In this case series we reported five cases of post COVID Guillain- Barre Syndrome (GBS) from child corona unit of DMC.

Case descriptions:

From May, 2020 to 30th May 2022, total 1818 under 14 children of suspected COVID were tested RT-PCR for COVID-19, where virologically confirmed cases were 634(34.87%), among them 79(12.46%) cases had neurological complications. We confirmed our five cases of post COVID GBS based on the diagnostic criteria of willison HJ[13].

Among the 05 cases 04 came from the urban area, one from rural area. All are from middle to higher socioeconomic background. They were all symptomatic COVID patients one to three weeks prior to development of weakness of lower limb. All five patients had history of fever, three of them had high grade fever.

Table-I

Clinical and demographical profile of Cases

Clinicodemographic findings	Number (%)
Age 8-12 years	
Sex (M:F)	3:2
Residence (urban:rural)	4:1
Features of COVID infection	
1. History of Fever	05
2. High grade fever	03
3. Respiratory features	05
4. H/O Gastroenteritis	02
5. Hypoxemia	00
6. Positive RT-PCR	05
H/O Recent Vaccination	00
Vaccination against COVID-19	00
H/O trauma	00
Onset of paralysis from precedent infection	Mean-16.6 days (12-23) days

Table II

Clinical features and laboratory findings and treatment summery of five post COVID GBS patients with their outcome (n=5)

No	Clinical features	CSF findings	Serology of SARS-CoV-2	NCS findings	MRI findings	Treatment
1	Ascending type,flaccid paralysis,resp involvement D5	D8, protein 178mg/dl Cell -04/cmm3	Not done	AMAN	Brain- Normal Spine- Normal	IVIG Recovery after 6 months
2	Flaccid paraplegia with areflexia	D7, protein 102mg/dl Cell-03/cmm3	Raised IgG	AMAN	Spine - Normal	Spontaneous recovery after 15 day
3	Ascending type paralysis with autonomic involvement	D11, protein 85mg/dl, cell-10/cmm3	Raised IgG	AMSAN	Not done	IVIG, presence of residual weakness after 6 month
4	Flaccid type of paralysis with areflexia	D7, protein 90mg/dl, cell-0/cmm3	Not done	AMAN	Spine- caudal nerve root enhancement	IVIG, Recovery after 3 month
5	Flaccid type of paralysis, ascending in nature with respiratory involvement	D8 Protein 1.2 gm/dl, cell -0/cmm3	Raised IgG	AMAN	Spine- caudal nerve root enhancement	IVIG, Complete recovery after 3 weeks

Table II have shown that our all cases presented with ascending flaccid type of paralysis where two of them had respiratory involvement and one had autonomic manifestations. CSF findings of all have shown albuminocytological dissociation, AMAN (Acute motor axonal neuropathy) was the most common variant, four cases were treated with Intravenous Immunoglobulin (IVIG) leaving residual weakness in one case at 6 months after treatment.

Discussion:

Different studies have shown that COVID-19 infection is responsible for some immune mediated disease like GBS, and majority of case reports and systematic review that was published during the period of COVID-19 pandemic was carried on adult patients, a few case reports is available regarding paediatric post COVID GBS till date, this case series aimed to report five confirmed cases of GBS from the largest child corona unit of Bangladesh during period of 24 months of COVID pandemic. The immune mediated reaction was triggered by COVID-19 infection. SARS-CoV-2 virus may produce an autoimmune response after a lag period following overt infection which based on the hypothesis of molecular mimicry between microorganisms and self-antigens where the sudden flaccid type of paralysis occurred due to cross reaction against ganglioside components of the peripheral nerves[13,14]. Our five children was between age of 8 to 12 years and 80% of them from Dhaka city, most of the literature review observed post COVID GBS among the advance age group mostly above fifty years of age[15,16]. Among our five reported cases three were male and two were female, which findings matched with the findings of Jaberi MA et al, where they reported 22 male patients among 35 of total[17]. The mean time from the preceding infection to the development of weakness of limb was 16.6 days, lowest time interval was 12 days and highest 23 days, study done by Landi F et al and Vanja R et al have found this median time is longer in post COVID GBS compared to non-post COVID GBS[18,19]. All the five of our studied cases had different grade of fever during COVID infection, three of them had high grade fever, their respiratory symptoms varied from mild to severe but none of them had features of hypoxemia. Two of our patient had history of gastroenteritis without any features of dehydration. As all of our patient below 12 years of age, they were not vaccinated against COVID-19, they also had no history of recent vaccination or trauma to head. All of our patients presented with ascending type of flaccid paralysis, one had autonomic involvement and two of them had features of respiratory involvement, Abdullahi A et al have similar observation on their cohort study on post COVID-19 GBS[20]. On Nerve Conduction Study (NCS) the most common subtype that was found is AMAN (Acute Motor Axonal Neuropathy) among our four patient, one had AMSAN (Acute Motor and Sensory Axonal Neuropathy) variety, this changes was found within 7 to 11 days of onset of symptoms of GBS. AMAN subtypes is the commonest form of GBS in Asia, especially in China and Japan. Case reports and literature review done by Jaberi MA et al have shown NCS findings of 35 children with post COVID GBS, where they found the prevalent subtypes of GBS is AIDP, as most of the reports from USA and UK. Stojanov A et al and Shahrizalia N et al also reported higher prevalence of AIDP variant of post COVID GBS[21,22]. We did serology test of SARS-CoV-2 in three cases and all of had positive results for serology. Albumino-cytological dissociation is one of the pertinent findings of CSF examination to support the diagnosis of GBS, this findings reflects the disruption of blood – CSF barrier due to inflammation of nerve[23]. Some studies hypothesized that higher proteinorrhachia might be associated with direct neuroinvasive abilities of the SARS-CoV-2 virus or neuroinflammation[24]. Here all of our five patient had 0-3/ cmm3 cell count with raised protein, varied from 85 mg/dl- 1.2 gm/dl, and CSF examination was performed between 7-11 days of appearance of lower limb weakness, Tandon M et al had the same observation[25]. Anti SARS-CoV-2 antibodies from plasma were performed in three patients after four weeks of COVID infection, they all had higher antibody titre.

Four patients out of five were treated by Intravenous Immunoglobulin (IVIG), one patient could not afford the price, but she recovered

spontaneously at fifteen days of illness without any residual weakness. One patient with autonomic involvement and one with respiratory involvement have shown delayed recovery after six months with some residual weakness. All the reported cases of Jaberi et al also have complete recovery or significant improvement[17].

Though this study was not aimed to find out the difference between GBS triggered by COVID-19 and those of other origins, but a study of Vanja R concluded that there was no difference between post COVID-19 and non-COVID-19 GBS patients regarding clinical, electro-physiological findings and also no difference in treatment outcome[26].

Post COVID GBS is one of the rare neurological complications, an immune mediated reaction with possible induction of cytokine storm may be the underlying mechanism. Based on this underlying mechanism early initiation of immune modulatory therapy will help to minimize early and long term complications arising from delayed treatment.

Conclusion:

From this study it can be concluded that post COVID GBS in paediatric age group is not an uncommon entity, early diagnosis with prompt initiation of immunotherapy will help to provide better outcome. So high index of suspicion should be kept in mind.

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