Open Access

ISSN: 2996-3788
Article Type: Case Report
Volume 2 Issue 3 - 2024

SCIBASE Journals

SciBase Neurology

Guillain-Barre Syndrome with a Severe Course as a Complication of Coxsackievirus Type A7 and B1 Infection: A Case Report with a Mini Literature Review

Elżbieta Jasińska*; Olaf Jadanowski; Julia Krawczuk Vel Walczuk

Collegium Medicum, Jan Kochanowski University, Kielce, Poland.

Corresponding Author: Elżbieta Jasińska

Collegium Medicum, Jan Kochanowski University, Kielce, Poland.

ORCID ID: 0000-0003-0016-9896

Email: ejasinska@ujk.edu.pl

Article Information

Received: Oct 07, 2024

Accepted: Nov 18, 2024

Published: Nov 25, 2024

SciBase Neurology - scibasejournals.org

Citation: Jasińska E, Jadanowski O, Krawczuk vel Walczuk J. Guillain-Barre Syndrome with a Severe Course as a Complication of Coxsackievirus Type A7 and B1 Infection - A Case Report with a Mini Literature Review. SciBase Neurol. 2024; 2(3): 1024.

Abstract

The authors present a case of a 32-year-old female patient who, after a mild viral infection of the upper respiratory tract with a small-nodular rash, developed full-blown Guillain Barre Syndrome (GBS). The interview confirmed the patient's long-term contact with a child infected with the Coxsackie virus. The characteristic clinical course with increasing quadriparesis and bilateral facial nerve paralysis, as well as auxiliary tests, allowed the diagnosis of severe AIDP. The neurological complications with a severe course described in the literature available on the day of publication preparation were most often associated with infection with the human enterovirus HV-A71. The authors did not find a Polish publication presenting the relationship between the occurrence of AIDP symptoms and childhood eruption (HFMD) in an adult. HFMD, which often occurs in the pediatric population, usually has a mild course, while in adults it is a rare disease and may be associated with serious neurological sequelae. The aim of this publication is to draw attention to the possible association of a mild viral infection such as HFMD with acute inflammatory polyneuropathy, a serious, life-threatening disease of the peripheral nervous system.

Keywords: Guillain-Barre syndrome (GBS); Hand Foot and Mouth Disease (HFMD); Coxackievirus A7 and B1; Flaccid paralysis.

Abbreviations: AIDP: Acute Inflammatory Demyelinating Poliradiculoneuropathy; GBS: Guillain Barre syndrome; HFMD: Hand, Foot and Mouth Disease.

Introduction

The co-occurrence of rare diseases requires increased clinical vigilance, and the ability to diagnose them can be a challenge even for an experienced specialist. Both acute inflammatory demyelinating polyradiculoneuropathy - the most common form of GBS (Guillain Barre syndrome) in Europe and hand, foot and mouth inflammation are diseases that rarely occur in the adult population. In the presented case, the etiological factor was determined based on the result of an immunological test, which was performed already during the convalescence period. The incidence of GBS in the European population is approximately 0.81-1.89/100,000 [1] and in most cases concerns adult patients. The incidence of HFMD in young adults (age ≥ 15 years) is 0.38/100,000. The highest incidence of HFMD was observed in children aged 1 year (2186.24/100,000) and 2 years (1828.04/100,000) [2]. The prevalence of Hand, Foot, and Mouth Disease (HFMD) in the adult Polish population has not been determined yet.

A characteristic feature of acute inflammatory polyneuropathy, which includes GBS, is rapidly increasing muscle weakness, and involvement of respiratory muscles can lead to death in a short time. In 1916, GBS was first described as a separate clinical entity. Until then, the cause of acute flaccid muscle weakness was considered to be poliomyelitis [3]. Currently, GBS is one of the most common acquired polyneuropathy. Initial symptoms usually concern distal limb segments with gradual involvement of proximal parts, intercostal muscles and cranial nerves (the most common ascending form). Neurological examination shows weakening or loss of deep tendon reflexes, weakening of muscle strength, paresis or paralysis of cranial nerves. Bilateral

damage to both facial nerves has been described exceptionally rarely. The disease is confirmed by electrophysiological examination and characteristic protein-cell cleavage in the cerebrospinal fluid. The disease is believed to be autoimmune in nature and a significant risk factor for GBS is a history of upper respiratory tract or gastrointestinal infections [4]. Among the etiological factors, there are Campylobacter jejuni infections, infections with cytomegaloviruses and Epstein-Barr viruses, Mycoplasma pneumoniae, and in rare cases - Haemophilus influenzae, influenza A and B viruses, parainfluenza, herpes and varicella [5]. In 2000, the first description of GBS after a history of Hand, Foot and Mouth Disease (HFMD) was given [6].

HFMD is a common, mild infectious disease of childhood, usually occurring before the age of 10 [7]. Infection of adults is rare, most often caused by infection with Coxsackievirus A16, enterovirus A71, Coxsackievirus A10. There are also reports in the literature of an increasing number of Coxsackievirus B1-B6 infections in adults [8]. Small vesicular-papular lesions appear in spring and summer in the oral mucosa, skin of the feet, and palms of the hands. The incubation period is 3-5 days, and rash symptoms appear 2-3 days after infection. The symptoms disappear gradually, are self-limiting, and usually completely without sequelae.

Case presentation

Patient MD, born in 1989, previously healthy, was admitted to the Neurology Clinic on 04/10/2021 due to lowering of the right angle of the mouth and sensory disorders in the hands and feet. The symptoms were preceded by an upper respiratory tract infection with subsequent tingling in the distal parts of the hands and feet and the presence of single papular lesions on the tongue and hands. In the interview two weeks earlier, the patient's daughter had similar papular lesions on the tongue and palate, combined with fever. Based on the interview and characteristic symptoms occurring in the child, a suspicion of mild viral disease HFMD was raised (Figure 1).

Initially, the patient's condition was assessed as good, the neurological examination revealed right-sided peripheral paresis of the facial nerve, flaccid quadriparesis with abolition of deep reflexes in the lower limbs and weakness in the upper limbs, without pathological symptoms. The symptoms were accompanied by elevated blood pressure values - 180/120 mm/Hg.

A CT scan of the head without contrast was performed at the emergency room and did not reveal any pathology. On the first day of hospitalization, a Cerebrospinal Fluid (CSF) test was performed, confirming the presence of protein-cell fission. The protein level was 1.28 g/l, in relation to the number of cells 11/5 (Table 1). An electrophysiological study (ENG 05/10/2021) confirmed the slowing of nerve conduction, revealing changes of the type of polyradiculoneuritis, which allowed for the diagnosis of Guillain-Barré syndrome.

Table 1: Selected values of the cerebrospinal fluid test as of October 4, 2021.

	The patient's CSF values	CSF reference values
Total protein in CSF g/l	1,28	0,20-0,50
CSF cytosis kom/ml	11	0-5

Figure 1: Clinical image.

Figure 2: Clinical image.

On the 2nd day of hospitalization, the patient's neurological condition deteriorated - peripheral paresis of the VII nerve on the left side appeared, muscle weakness of the limbs increased (massive paresis of the upper limbs, paralysis of the lower limbs). The patient was lying down (Figure 2). Immunoglobulins (Ig Vena) were included in the treatment, administered intravenously for 5 days in a total dose of 220 g, which resulted in a gradual improvement in the patient's condition. The inhibition

of progression of damage in the tested nerves was confirmed by a nerve conduction study (ENG) performed on 12/10/2021. The neurological examination at discharge revealed bilateral peripheral paralysis of the VII nerve with a predominance on the right side, dysarthria, lack of deep oo in the lower limbs (-) and weakness in the upper limbs (+/-), without sensory disorders. Independent gait. The treatment was continued on an outpatient basis: oral steroid therapy (Encorton), Nivalin i.m., vitamin B preparations. Further gradual improvement in the patient's neurological condition was observed until the symptoms disappeared within several months. Due to information regarding contact with a sick child, it was decided to supplement the diagnostics with a test for antibodies against the Coxackie virus, which allowed the identification of the triggering factor - Coxackie viruses type A7 and B1 (22/02/2022).

Discussion

The best identified infectious agents in the etiology of GBS include Campylobacter Jejuni (CJ) [9], although according to information from the publication by AK. Jasti from 2016, less than 0.1% of all CJ infections cause GBS [10].

Single scientific reports of GBS cases after HFMD indicate the need to supplement the data on the relationship between Coxsackie virus infection and the immune reaction leading to serious damage to the peripheral nervous system.

According to [11], most patients with a history of GBS did not have tests performed to determine the pathogen [11]. In the publication cited above, Campylobacter jejuni infection was found in 53 patients (23%), cytomegalovirus was detected in 19(8%) and Epstein-Barr virus in 4(2%) patients. Due to the heterogeneity of the clinical picture, neurophysiological and immunological test results of the disease in patients infected with the same type of virus, it was concluded that the course of the disease depends on many factors. The type of infection preceding the onset of clinical symptoms may be just one of these elements. In the largest epidemiological study of HFMD conducted in China to date, covering the years 2008-2012, which included over 7 million patients, the presence of a specific pathogen was laboratory confirmed in only 3-7% of patients. The most frequently identified viruses were enterovirus 71 (EV71) and Coxackie Virus A16 (CVA16) [12].

In the publication by [13] describing the disease of GBS after a history of HFMD, no etiological factor was identified. Tests showed a positive titer of IgG antibodies against viral hepatitis A and Epstein-Barr virus. The diagnosis was made on the basis of protein-cellular cleavage in CSF characteristic of GBS, demyelinating changes found in ENG and the clinical picture, which indicated a history of HFMD.

There are a small number of papers published in the world literature showing a relationship between the occurrence of symptoms of acute polyradiculoneuritis and HFMD confirmed by the presence of antibodies against Coxackie viruses [13].

In 2000, Masahiro Mori published the first case of GBS after HFMD. At that time, the infection was diagnosed with Coxackie A16 virus and EV 71 [14].

It is the Coxackie A16 virus that is the most common cause of childhood HFMD in the USA. The less common Coxackie A6 virus, first identified in 2008, is associated with the occurrence of more severe and atypical cases of HFMD worldwide, including in the adult group [15].

The HFMD lesions in adults infected with A6 virus are more diffuse, patchy in nature than in children, and the infection may be associated with neurological complications such as encephalitis or myoclonus [16].

The EV71 virus, detected more frequently in East and South-East Asia, is responsible for a severe course of the disease with neurological complications such as encephalitis, meningitis, opsoclonus-myoclonus, transverse myelitis, encephalitis, GBS, ataxia, and benign intracranial hypertension [17]. In the case of 16 children described by Cho HK, neurological complications occurred preceded by HFMD. These included meningitis, GBS, meningoencephalitis, polio-like syndrome, and myoclonus [18].

A review of HFMD cases in Carlos Oman-Cepeda's publication confirms that in the case of adult patients, infections with EV71 and CVA16 viruses occur most frequently, and in the literature, infections with CVA10 and CVA6 viruses are also found in adults [19].

Publications include descriptions of CVA4 infections in 4 patients, and CVB5 associated with the occurrence of symptoms of polyradiculoneuropathy [20,21].

In the case described by us, antibodies against 2 types of Coxsackie virus were identified, although the authors have not yet found a description of GBS as a complication of HFMD in the course of CV A7 and B1 infection.

Robert Grist, in a 1962 publication examining the Scottish population, describes the Coxackie A7 virus as type 4 of the poliomyelitis virus responsible for severe flaccid paralysis in 7 of 37 patients with confirmed infection (1 infected person died) [22].

There has been no description of a case of GBS associated with Coxackie A7 infection, with the aforementioned author emphasizing that there are no characteristic features of CVA7 infection that would allow clinical differentiation from poliovirus infection. In turn, in an observational Belarusian study from 1995-2005, aimed at monitoring flaccid paralysis of etiology other than polio, viruses belonging to three serotypes of Coxsackie B viruses were isolated - including B1, B4 and B6, along with 6 serotypes of Echo viruses (6,7,11,14,24,25) in 8.1% of patients [23].

In the case described by us, the presence of antibodies against CVA7 and, similarly to the Belarusian population, CVB1 was found.

Conclusion

Both GBS and HFMD are rare diseases in the adult population, therefore the identification of etiological factors seems to be extremely important.

A better understanding of the mechanisms of the disease and the risk of developing GBS after HFMD will facilitate early diagnosis, reduce the risk of complications and reduce mortality.

In the described case, information from the course of the disease in the child supplemented with laboratory tests and then confirmed by immunological tests performed already during the recovery of the 32-year-old patient allowed to confirm the association of HFMD with the previous severe GBS.

Due to the clearly increasing incidence of Coxsackie virus infections, Hand-Foot-and-Mouth Disease (HFMD) should be

considered in the differential diagnosis in the case of an adult with a rash or other clinical symptoms suggesting a viral disease and increasing neurological symptoms indicating damage to the peripheral nervous system.

References

1. Sejvar JJ, Baughman AL, Wise M, Morgan OW. Population incidence of Guillain-Barré syndrome: A systematic review and meta-analysis. Neuroepidemiology. 2011; 36(2): 123-33.
2. Peng D, Ma Y, Liu Y, et al. Epidemiological and aetiological characteristics of hand, foot, and mouth disease in Sichuan Province, China. Sci Rep. 2020; 10: 6117.
3. Van den Berg B, Walgaard C, Drenthen J, Fokke C, Jacobs BC, et al. Guillain-Barré syndrome: pathogenesis, diagnosis, treatment and prognosis. Nat Rev Neurol. 2014; 10(8): 469-82. doi: 10.1038/nrneurol.2014.121.
4. Hughes RA, Cornblath DR. Guillain-Barré syndrome. Lancet. 2005; 366: 1653-66.
5. Peng D, Ma Y, Liu Y, et al. Epidemiological and aetiological characteristics of hand, foot, and mouth disease in Sichuan Province, China. Sci Rep. 2020; 10: 6117.
6. Mori M, Takagi K, Kuwabara S, Hattori T, Kojima S. Guillain-Barré syndrome following hand-foot-and-mouth disease. Intern Med. 2000; 39(6): 503-5. doi: 10.2169/internalmedicine.39.503.
7. Hughes RA, Wijdicks EF, Barohn R, et al. Quality Standards Subcommittee of the American Academy of Neurology: Practice parameter: immunotherapy for Guillain–Barré syndrome: report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology 2003; 61: 736-740.
8. Esposito S, Principi N. Hand, foot and mouth disease: current knowledge on clinical manifestations, epidemiology, aetiology and prevention. Eur J Clin Microbiol Infect Dis. 2018; 37(3): 391-398. doi: 10.1007/s10096-018-3206-x.
9. Hadden RD, Cornblath DR, Hughes RA, et al. Electrophysiological classification of Guillain-Barré Syndrome: clinical associations and outcome. Plasma Exchange/ Sandoglobulin Guillain-Barré Syndrome Trial Group. Ann Neurol 1998; 44: 780-8.
10. Jasti AK, Selmi C, Sarmiento-Monroy JC, Vega DA, Anaya JM, et al. Guillain-Barré syndrome: Causes, immunopathogenic mechanisms and treatment. Expert Review of Clinical Immunology. 2016;12(11):1175-1189.doi:10.1080/1744666X.2016.1193006.
11. Hadden RD, Cornblath DR, Hughes RA, et al. Electrophysiological classification of Guillain-Barré Syndrome: clinical associations and outcome. Plasma Exchange/ Sandoglobulin Guillain-Barré Syndrome Trial Group. Ann Neurol 1998; 44: 780-8.
12. Xing W, Liao Q, Viboud C, et al. Hand, foot, and mouth disease in China, 2008-12: an epidemiological study. Lancet Infect Dis. 2014; 14(4): 308-318. doi: 10.1016/S1473-3099(13)70342-6.
13. Teixeira A Sr, Torres Lima D, Almeida Pereira A, Amaral-Silva M, Miguéns AC. Guillain-Barré Syndrome Following Hand, Foot, and Mouth Disease in an Adult Patient. Cureus. 2023; 15(9): e45423. doi: 10.7759/cureus.45423.
14. Mori M, Takagi K, Kuwabara S, Hattori T, Kojima S. Guillain-Barré syndrome following hand-foot-and-mouth disease. Intern Med. 2000; 39(6): 503-5. doi: 10.2169/internalmedicine.39.503.
15. Kimmis BD, Downing C, Tyring S. Hand-foot-and-mouth disease caused by coxsackievirus A6 on the rise. Cutis. 2018; 102(5): 353-356.
16. Merzel Šabović EK, Točkova O, Uršič T, Žgavec B, Dolenc-Voljč M. Atypical hand, foot, and mouth disease in an adult patient: A case report and literature review. Acta Dermatovenerol Alp Pannonica Adriat. 2019; 28(2): 85-88.
17. McMinn P, Stratov I, Nagarajan L, Davis S. Neurological manifestations of enterovirus 71 infection in children during an outbreak of hand, foot, and mouth disease in Western Australia. Clin Infect Dis. 2001; 32(2): 236-42. doi: 10.1086/318454.
18. Cho HK, Lee NY, Lee H, Kim HS, Seo JW, et al. Enterovirus 71-associated hand, foot and mouth diseases with neurologic symptoms, a university hospital experience in Korea. Korean J Pediatr. 2010; 53(5): 639-43. doi: 10.3345/kjp.2010.53.5.639.
19. Omaña-Cepeda C, Martínez-Valverde A, del Mar Sabater-Recolons M, Jané-Salas E, Marí-Roig A, et al. A literature review and case report of hand, foot and mouth disease in an immunocompetent adult. BMC Res Notes. 2016; 9: 165. doi: 10.1186/s13104-016-1973-y.
20. Estrada González R, Mas P. Estudios virológicos en las polirradiculoneuritis agudas tipo LGBS. Algunos hallazgos en relación con el virus Coxsackie A4. Virological studies in acute polyradiculoneuritis, LGBS type. Various findings in relation to Coxsackie A4 virus. Neurol Neurocir Psiquiatr. 1977; 18(2-3 Suppl): 527-31. Spanish.
21. Usui Coxackie B5 Usui T, Hamada Y, Arita M. A case of Guillain-Barré syndrome associated with Coxsackie b-5 virus infection. Tokushima J Exp Med. 1974; 21(00): 17-9.
22. Grist R. Type A7 Coxsackie (type 4 poliomyelitis) virus infection in Scotland. J Hyg (Lond). 1962; 60(3): 323-32. doi: 10.1017/s002217240002043x.
23. Samoĭlovich EO, Ermolovich MA, Kotova IF, Svirchevskaia EIu, Shimanovich VP, Kozhemiakin AK, Protas II, Fel'dman EV. [Surveillance of acute flaccid paralysis in Belarus]. Zh Mikrobiol Epidemiol Immunobiol. 2007 Mar-Apr;(2):24-31. Russian. PMID: 17523475.