International Journal of Medical and Pharmaceutical Case Reports

14(4): 13-18, 2021; Article no.IJMPCR.77277
ISSN: 2394-109X, NLM ID: 101648033

Symmetrical Polyarthropathy and Hepatosplenomegaly as a Manifestation of Parvovirus B-19: A Case Report

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJMPCR/2021/v14i430140
Editor(s):
(1) Dr. Erich Cosmi, University of Padua School of Medicine, Italy.
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Complete Peer review History, details of the editor(s), Reviewers and additional Reviewers are available here: https://www.sdiarticle5.com/review-history/77277

Case Study

Received 26 October 2021
Accepted 26 November 2021
Published 30 November 2021

ABSTRACT

This case was of a 35-years old Egyptian lady, who works as a primary school teacher, who presented to the OPD with complaints of persistent high fever for two days. Along with this fever, she also had severe pain in multiple joints of both hands, wrists, knees, and ankles. In addition, the woman also complained of having developed a rash on both her legs, which was so painful that she was unable to stand without pain. The pain was agonizing and it prevented her from performing her usual jobs as normal. But that was the extent of her symptoms. She did not complain of a cough, shortness of breath, chest pain, back pain, abdominal pain, or any other pain for that matter. In a summary, none of the factors and symptoms that could have pointed towards the patient suffering from a case of COVID19 were present. Moreover, there was no recent history of travel. She also had not contracted any gastrointestinal or genitourinary infections in the preceding few days. The clinical examination of the patient revealed no abnormalities at all. The only thing worth noting was remarkable swelling and tenderness over the metacarpophalangeal and proximal interphalangeal joints. The following series of events are discussed in detail in the subsequent section, and it was

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concluded that the woman might be suffering from the parvovirus B19 infection. She had several favorable causative factors that pointed toward this diagnosis, with the most important one being her in close contact with primary school children, who are most the likely age group, between five and twenty years, to carry this infection and also contract it. Adults can contract the infection from children, but the range of symptoms varies from person to person. In this case of the woman, further evaluations and investigations were needed to confirm the diagnosis, which was likely due to the obvious risk factors present in this case.

Keywords: COVID-19; Parvovirus B19; metacarpophalangeal; interphalangeal; hepatosplenomegaly; polyarthropathy.

1. INTRODUCTION

Erythema infectiosum, or “fifth disease”, is a common infectious disease that mostly affects children of all ages. In children, it is observed to be a mild, exanthematous disease for which no viral or bacterial cause could be found until 1975, when it was discovered that parvovirus B19 was the cause. This parvovirus is the only one that affects humans [1].

The B19 parvovirus belongs to the family ‘parvoviridae’ and to the genus ‘erythrovirus’. No other human parvovirus has been isolated to date. Structurally, the B19 parvovirus is considered to be a non-enveloped, single-stranded DNA virus. Although this virus has also been isolated from animals, it does not transfer to humans from animals. Humans can transmit this infection from person to person, with children being the most susceptible population [2].

Human B19 parvovirus causes ‘fifth disease’ or ‘erythema infectiosum’ in children. It is a self-limiting, rash-associated disease that causes nonspecific symptoms in those affected. There is a wide range of dermatological, rheumatological, and connective tissue-like disorders that affect an affected individual. These symptoms, both in adults and children, can resemble SLE [3].

However, erythema infectiosum is usually a short-term disease. It leaves the patient weak and febrile, but apart from that, there are no common long-term complications and impairments associated with the disease. Children might develop some complications, but that is dependent on how early the condition gets diagnosed and their symptoms get treated.

Parvovirus B19 can also cause symmetrical polyarthritis which is often difficult to distinguish from polyarticular rheumatoid arthritis. The symptoms that appear in the joints of the affected patients are found to be immunologically mediated and are also associated with the appearance of antibodies in the serum of these people.

This polyarticular arthritis is non-erosive in nature and is seen to affect the organs in the following order of frequency: metacarpophalengeal joints, knees, wrists, and ankles [4].

2. CASE STUDY

35-year old Egyptian primary school teacher presented to the OPD with complaints of symptoms of a persistently high-grade fever and severe pain in multiple joints of her body for the past two days. The patient was in agony and so was immediately admitted to the ward.

The patient was suffering from excruciating pain in the joints of her hands, wrists, knees, and ankles. Moreover, it was observed that she had developed a rash on both sides of her lower limbs. The location of this rash was limited to above the ankles, but the pain was so intense that the patient complained that she was unable to stand or do anything due to the severity of it.

The symptoms were limited to these only. There was no other complaint of the woman having cough, breathing difficulties, chest pain, back pain, abdominal pain, or any other muscle or body pain. She did not have any other problems or disorders due to these symptoms. Her vision was reported to be normal.

Upon asking, she said that she had no recent travel history and, similarly, no history of suffering from any sort of infection.

3. EXAMINATION

The patient was examined thoroughly to assess her condition and to reach a conclusive

diagnosis. She looked severely ill in appearance and her facial expressions depicted the pain that she was suffering from at that time.

Investigations*:* Since further examination was needed to confirm the diagnosis, some lab investigations were ordered for the woman. The summary of the results of these investigations are as follows.

- Urinalysis: RBCs 4-6
- ANA global was negative.
- RF was negative.
- Anti-CCP was negative.
- Serum Ferritin = 86.4mcg/lit (30-400)
- Blood culture was negative.
- Urine and stool cultures were unremarkable.

3.1 ECG/ECHO

- ECG = RBBB (Right Bundle Branch Block)
- Transthoracic Echo = normal findings.
- Hand, ankle and feet X-rays revealed no evidence of joint erosion, effusion, or any other related or unrelated abnormality.

3.2 Differential Diagnosis

Based on the symptoms and the associated lab investigations, the following differential diagnoseswere obtained:

3.4 Infections

- Septic arthritis
- Disseminated gonococcal arthritis
- HBV & HCV-induced arthritis
- Brucellosis
- Infective endocarditis
- Active rheumatoid arthritis
- SLE

3.5 Seronegative Spondyloarthropathies

- AS
- PA
- Reactive arthritis
- Enteropathic arthritis
- Gout
- Pseudogout
- Familial mediterranean fever

Chart 1. The following information was obtained about the patient's condition:

Blood Pressure	131/81 mm Hg
Pulse Rate	79/min
Temperature 39.1 C	39.1 C
Respiratory Rate	18/min
Heart Auscultation	● Clear chest, normal S1. ● Fixed splitting second heart sound. ● (S2) ● No murmurs.
Organomegaly	● Palpable spleen 3 cm BCM. ● Palpable non-tender left lobe of theliver.
Lymph nodes	No lymphadenopathy.
Neurological Exam	No evidence of neurological involvement wasfound.
General Physical Assessment Findings	● Symmetrical extremely tender swellingin wrists, metacarpophalangeal (MCP)and proximal interphalangeal (PIP)joints with evidence of tenosynovitis &marked stiffness. ● Bilateral tender knees and ankles with painful restricted movements but nojoint effusion. ● Pinkish maculopapular rash above both ankles extending to mid-legs.

Chart 2. CBC Report

CBC	HB 13 g/dl dropped to 10.6 g/dl
PLT	193000
TWBC	3500
MCV	83 fL
MCH	31pg
Urea (0-8.3)	3.4 mmol/L
Serum Creatinine (62-106)	50 micromol/L
AST (0-38)	67 IU/L
ALT (0-41)	71 IU/L
CRP (<=5)	120 mg/L
ESR (0 - 29 mm)	70 mm/hr
LDH (135-220)	228 IU/L

3.6 Diagnosis and Management

Looking at the history of the patient and the risk factors involved, the patient was sent for a parvovirus B19 serology as a last resort, which turned out to be positive. This confirmed the final diagnosis as parvovirus B19 symmetrical polyarthropathy. The patient had been in close contact with young primary school children, who are not only susceptible to suffering from this disease but can also transmit it to others.

Therefore, moving forward with this diagnosis, the initial management patient plan was for a parenteral course of paracetamol, ceftriaxone, and a normal saline infusion. In addition, the patient was started on methylprednisolone 1000mg in pulses for five days straight. The results were dramatic and positive as expected, and resulted in the significant alleviation of the patient's symptoms.

4. DISCUSSION

Human B19 parvovirus is a one-of-a-kind virus that causes disease in humans, particularly kids. It is a self-replicating, autonomous virus, meaning that it does not require the assistance of a helper virus to replicate and give rise to viral genomes of its kind.

An acute infection of this B19 parvovirus occurs in the form of rash-associated illness in childhood, or sometimes erythema infectiosum, fetal death, and a temporary phase of aplastic anemia in the already susceptible population of children. This does not occur with every child: only children with compromised immune systems develop these unfavorable effects due to the B19 parvovirus. Other children with normal immune systems had a short-lived, acute illness and, when the thiamine response took over, the effects were seen to disappear as soon as they had appeared [5].

Erythema infectiosum is the most common manifestation of the human B19 parvovirus. It occurs as an epidemic, especially in the late winter and early spring seasons. However, in many children, the virus can persist in their bodies and give rise to complications and diseases later on which may mimic serious connective tissue disorders and autoimmune diseases [6].

In adults, human B19 Parvovirus begins as an acute arthropathy. Women are seen to be more susceptible to contracting the disease and, in them, the arthropathy begins in the small joints of the hands. Parvovirus-associated arthritis is another possible concerning turn of events for the patient, but in those cases, the rheumatoid factor and antinuclear antibody tests will be positive and so diagnosis does not pose any great difficulties [7]. It may also spread to the joints of the back too, but occurs at a later stage of the disease and is not an early manifestation [8].

Women are also predisposed to develop symmetrical polyarthritis, which mimics Lyme disease. This condition may be short-lived or it may persist for months. Usually, it resolves within four weeks, with only exceptional cases lasting for six months. In all the observed cases of parvovirus- associated arthropathy, the arthritis and arthralgias were symmetrical and involved the short joints of the body, such as knees, hands, and wrists, more often than the large joints [9].

In some patients, the involvement of different organs is also noticed. For example, febrile lymphadenopathy and splenomegaly mimicking lymphoma, transient and cytolytic hepatitis, pleural effusion, and myopericarditis were some of the commonly observed extra-hematological manifestations of the disease [5].

Adults are seen to suffer from a more serious cases of parvovirus disease than children. Fatigue, depression, and malaise can be present more severely in women than men, who are predisposed todevelop only a flu-like illness [10].

A rash may or may not be present in adults. In patients suffering from erythema infectiosum, the laboratory investigations can easily turn out to be normal. Depending on the symptoms of the patient, they could be suffering from reticulocytopenia, anemia, lymphopenia, neutropenia, or thrombocytopenia. The erythrocyte sedimentation rate (ESR) is rarely elevated, and in some cases of parvovirus-associated arthritis, the rheumatoid factor is positive [11].

The final diagnosis is done using IgM antibodies. These antibodies are detected within a few days after the onset of illness and are present for up to six months in the majority of cases, with minor declines in some patients. The sensitivity of IgM is seen to be up to 70%. In immunodeficient or immunocompromised individuals, the Parvovirus antibody is often not detected [12].

Erythema infectiosum and parvovirus arthropathy are usually resolved in approximately two weeks but can recur or persist for months. If untreated, a transient aplastic crisis can be fatal, but most patients recover within a week. Fetal hydrops can lead to fetal death, if not treated soon enough.

There is no specific treatment available for a parvovirus B19 infection. Usually, no treatment is required, except for supportive therapy for the relief of fatigue, malaise, pruritus, and arthralgia. Sometimes, a blood transfusion and oxygen support may be needed in serious cases [13].

5. CONCLUSION

The human B19 parvovirus is the only virus to affect humans and cause a disease known as erythema infectiosum. This disease mostly affects children but adults can also contract it. It spreads through respiratory droplets and is usually resolved within a week or two of the person contracting it. It is usually an uncomplicated disease, when diagnosed early and managed appropriately. Without timely diagnosis, the patient's condition may deteriorate.

A woman suffering from this disease presented in the OPD, but she was diagnosed within time and her life was saved. She was most likely exposed through the children she taught and developed the disease.

Since the disease is uncommon in adults and not a big source of concern, only supportive treatment is offered to patients, but that tends to be very successful and often life-saving.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/77277