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Case Report

Case report of pediatric triple infection: Brucellosis, leptospirosis, and infective mononucleosis in Georgia

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ABSTRACT

Zoonotic infections are rare in the pediatric population of Georgia. We report a case of co-existing infections with brucellosis, leptospirosis, and infectious mononucleosis in a pediatric patient. An 11-year-old girl presented to our facility with a 12-day history of fever, chills, fatigue, arthralgia, myalgia, and refusal to walk. On evaluation, she was febrile and tachycardic, with hepatosplenomegaly and lymphadenopathy. The patient responded well to combination therapy of doxycycline and gentamicin, had a full recovery and was doing well with no relapse for 2 months follow-up.

1. Introduction

Infectious diseases can present with a wide range of symptoms, making diagnosis and treatment challenging, especially when multiple pathogens are involved. We present a rare case of a pediatric patient in Georgia who simultaneously contracted three distinct infections: brucellosis, leptospirosis, and infectious mononucleosis. This case serves a noteworthy illustration of the complexity of diagnosing and managing co-existing, even in nonendemic regions.

Georgia, situated in the South Caucasus region, is not commonly associated with zoonotic infections in the pediatric population. However, this case emphasizes the importance of considering these diseases in children with acute febrile illnesses, particularly when there is a history of close contacts with animals and consumption of unpasteurized dairy products.

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2. Case Report

A previously healthy 11-year-old girl of Armenian nationality presented with fever, fatigue, myalgia, arthralgia, and refusal to walk for 12 days.

At the onset, she developed daily low-grade fever, accompanied by a severe sore throat.

Marked myalgia and arthralgia mainly affect the large joints. She refused to walk, because of severe fatigue and right leg pain and had anorexia with a 1.4 kg weight loss throughout this period. The family doctor prescribed antibiotics (ceftriaxone and, azithromycin) and corticosteroids to the patients. Despite the treatment, there was no significant improvement was observed.

On arrival at our clinic, the patient was ill-appearing, pale, and febrile up to 40.3°C. Vital signs were as follows: Pulse rate 153/min; Respirations, 22/min; and Arterial blood pressure, 110/70 mm/Hg. She was alert but had a severe headache. Skin findings and joint effusions were not observed. Cardiac examination revealed a systolic murmur. Bilateral cervical lymphadenopathy and mild non-tender hepatosplenomegaly was observed. No other abnormalities

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were found in the patient.

In a detailed history, the mother noted that the girl loved to play with domestic animals. She consumes cow and goat milk and dairy products daily. The family lives in the southern part of Georgia in agricultural regions.

Complete blood count showed WBC 22.5 cells/mm3 with differential of 68,9% neutrophils, 28,7% lymphocytes, and 2,4% monocytes. Hemoglobin 126 g/l, hematocrit 34%, platelet count 301 cells/mm3.

Laboratory testing was otherwise significant for C-reactive protein 71.1 mg/l; ESR 50; Ferritin 275 ng/ml; LDH 503 U/L; ASO titer 157.9 IU/ml; Procalcitonin 2.14 ng/ml; Fibrinogen 320 mg/dl; Prothrombin time 14.1 sec.

Urinalysis, bilirubin, liver enzymes levels, and kidney function test results were within normal limits.

Radiography of the chest revealed no abnormalities. Abdominal ultrasonography revealed moderate hepatosplenomegaly, without focal lesions. Computed tomography (CT) of the head, abdomen, and chest revealed significant pathological changes. Echocardiography revealed mildly dilated ascending aorta and congenital stenosis of the aortic valve.

Initial infectious work up was negative for parvovirus, human immunodeficiency virus, cytomegalovirus, and tuberculosis. Epstein-Barr virus (EBV) serology showed evidence of acute infection (ElISA/EUROIMMUN EA IgM 2.4 (0.8-1.1), ELISA/IBL Brucella IgM (9-11) 14.88, ElISA/Virion-Serion Leptospira IgM 38 (15-20)) Blood culture revealed the growth of gram-negative aerobic bacilli.

The patient received intravenous fluids, and empirical antibiotic therapy (Cefepime, Vancomycin) was initiated.

The girl continued to have high-grade fever (up to 41°C) with chills, especially in the evening and nighttime. Although zoonotic infectious diseases are not common in the Georgian pediatric population, brucellosis or leptospirosis is suspected. IgM antibody titers, were strongly positive for Brucella and Leptospira, using enzyme-linked immunosorbent assay (ELISA). The results prompted a change in antimicrobial therapy to doxycycline orally 100 mg twice daily and gentamicin intravenously 5 mg/kg/day.

The patient showed good response to treatment with rapid improvement in clinical symptoms and resolution of fever and was discharged after 1 week. After four weeks of treatment, the patient recovered completely. All laboratory tests were normal CBB: Hemoglobin 129 g/l, WBC- 7 cells/mm3, Platelet – 223 cells/mm3, C-reactive protein 5.3mg/l, Ferritin 76ng/ml, Creatinine 40 μmol/L, ALT 26.6 U/l, AST 28.2 U/l, Total protein 63.4 g/L, Albumin 38.6 g/L We continued to monitor the patient after the completion of therapy. No signs or symptoms were observed within 2 months of follow-up.

3. Discussion

Brucellosis is considered as the most common zoonotic bacterial infection worldwide, especially in countries surrounding the Mediterranean Sea. About 11-56% of patients affected in endemic regions are younger than 14 years. Gram-negative *coccobacilli* affect wild and domestic animals, particularly goats and sheep. Transmission occurs through direct contact with infected animal or consumption of unpasteurized dairy. [1,2]

Childhood brucellosis produces mild- to- moderate disease and rarely progresses to chronicity. Fever and constitutional symptoms, including chills, sweating, fatigue, malaise, anorexia, weight loss, abdominal pain, headache, myalgia, and arthralgia, are the most common in children. [3]

Leptospirosis is also a zoonotic infection; humans can be infected through direct exposure to an infected animal or indirectly through contaminated water and soil. Leptospires tend to damage endothelial lining of the small blood vessels and cause ischemic damage to the kidneys, liver, meninges, and muscles.

A low index of suspicion of this disease, coupled with the diversity and non-specificity of the presentation, accounts for a significant number of cases that go unrecognized. In the mild form, it may present as an influenza-like illness, with headache and myalgia. The severe for, characterized by jaundice, renal dysfunction, and hemorrhagic diathesis, is referred to as Weil's syndrome. [4–9]

Infectious mononucleosis is a clinical syndrome caused mostly by the Epstein-Barr virus (EBV), or Human Herpes Virus 4 (HHV-4). Acute infectious mononucleosis is a self-limiting clinical syndrome that frequently affects adolescents and young adults. The classic symptoms include malaise, fever, sore throat, fatigue, hepatosplenomegaly, and generalized adenopathy. [10–13]

Overlap of the clinical features of brucellosis and leptospirosis with other infections, such as influenza, enteric fever, viral hepatitis A, Q fever (*Coxiella burnetti*), EBV infection, leishmaniasis, histoplasmosis, bartonella, and mycobacterial diseases, makes zoonotic infections hard to distinguish clinically and should be included in the differential diagnosis of acute prolonged febrile illness. [7]

4. Conclusion

This is a rare case of triple co-existing infection with brucellosis, leptospirosis, and infectious mononucleosis in a pediatric patient. All these diseases have a broad spectrum of signs and symptoms and are difficult to diagnose. Although Brucellosis and leptospirosis are not common diseases in pediatric age groups in Georgia, our case highlights that all of them should be considered as a differential diagnosis in children with acute febrile illness, even in non-endemic areas, especially when there is frequent contact with animals and consumption of

unpasteurized milk products, particularly goat's milk.

5. Author Contributions

Ia Khurtsilava and Darejan Kanjaradze contributed to the design and implementation of the research and to the analysis of the results and to the writing of the initial draft of the manuscript. Tistsino Parulava conceived the original and supervised the project. All authors read and approved the final version of this manuscript.

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