



A Factor That Should Raise Awareness in the Practice of Pediatric Medicine: West Nile Virus

Çocuk Hekimliği Pratiğinde Farkındalığın Artması Gereken Bir Etken;
Batı Nil Virüsü

Duygu Uç¹, Tamer Çelik¹, Derya Gönen¹, Asena Sucu¹, Can Celiloğlu¹, Orkun Tolunay¹, Ümit Çelik¹

¹ Clinics of Pediatrics, Adana City Training and Research Hospital, Adana, Turkey

Abstract

West Nile virus is an RNA virus found in Flaviviridae family and its vector is of Culex-type mosquitoes and the population of these flies soar dramatically in August. Most of the infected people who have mild viremia experience this disease asymptotically or encounter situations similar to other viral infections. Patients suffer from fatigue, fever, and headache, pain in the eyes, myalgia, diarrhea, vomiting, arthralgia, rash and lymphadenopathy. Similar to many diseases transmitted through mosquitoes, the West Nile virus should also be considered as a problem of community health. In regions where this type of mosquito lives in summer in particular and when patients that consult hospitals may mention unexplained fever, malaise, abdominal pain, headache, encephalitis acute loose paralysis, this virus type should be borne in mind. In this article, two patients that consulted owing to the complaints such as fever, vomiting, weakness, headache, photophobia were diagnosed with West Nile virus positive in August after they were examined.

Keywords: West Nile virus, child, thrombocytopenia

Introduction

West Nile virus (WNV) is an RNA virus of the Flaviviridae family. It was first isolated in a blood sample of a patient from the West Nile region of Uganda in 1937 (1,2). WNV can be transmitted to humans through infected mosquito bites, although it has enzootic transmission cycle through mosquitoes and birds. About 20% of patients infected with WNV infection

Özet

Batı Nil virüsü Flaviviridae ailesinde yer alan bir RNA virüsü olup, vektörü Culex türü sivrisineklerdir. Culex türü sineklerin popülasyonu Ağustos ayında pik yapmaktadır. Ilımlı viremiye sahip enfekte bireylerin çoğu hastalığı asemptomatik geçirmekte ya da diğer viral enfeksiyonlara benzeyen tablolara karşımıza gelmektedir. Hastalarda sıklıkla halsizlik, ateş, baş ağrısı, gözlerde ağrı, miyalji, ishal, kusma, artralji, döküntü ve lenfadenopati görülebilmektedir. Sivrisinekler aracılığı ile bulaşan birçok hastalık gibi Batı Nil virüsü de toplum sağlığı problemi olarak ele alınmalı ve bu cins sivrisineğin yaşam alanı olan bölgelerde özellikle yaz aylarında hastanelere başvuran, nedeni bilinmeyen ateş, halsizlik, karın ağrısı, baş ağrısı, ensefalit, akut gevşek paralizi olan olgularda ayırıcı tanılar arasında yer almalıdır. Bu yazıda Ağustos ayında ateş, kusma, halsizlik, baş ağrısı, fotofobi nedeniyle başvuran ve tetkiklerinde Batı Nil virüsü pozitif saptanan iki hasta sunulmuştur.

Anahtar Kelimeler: Batı Nil virüsü, çocuk, trombositopeni

present with fever, myalgia and arthralgia and neuro-invasive diseases such as encephalitis and meningoencephalitis can be also seen among those who have these symptoms, although most patients infected with WNV infection are asymptomatic (2-5). In Turkey, the first seroprevalence studies of this disease date back to the 1970s. However, the first confirmed WNV infection was detected in 2009 (6). Two cases that presented to the Pediatrics Service with similar complaints in August in

Correspondence Address / Yazışma Adresi

Duygu Uç

Sağlık Bilimleri Üniversitesi, Adana Şehir Eğitim ve Araştırma Hastanesi,
Çocuk Sağlığı ve Hastalıkları Kliniği,
Adana-Türkiye

E-mail: duyguoz82@gmail.com

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which the population of mosquitoes is quite high in Adana province and were diagnosed to have WNV infection are presented here.

Case Report

Case 1: A 16-year-old male patient had headache, malaise, vomiting, photophobia, fever and diarrhea starting five days previously and had presented to another medical center three times. While thrombocytopenia was detected in the patient, he was referred to our hospital. When a detailed anamnesis was obtained, the house of the patient was learned to be close to an irrigation channel and the patient had a pigeon. His physical examination was unremarkable other than a palpable spleen at 2 cm below the costa and icteric sclera. The patient was admitted to the clinic with the diagnoses of splenomegaly, thrombocytopenia and acute gastroenteritis. His test results were as follows: WBC: $9.3 \times 10^3/\text{mL}$, platelets: $73 \times 10^3/\text{mL}$, hemoglobin: 9.1 g/dL, total bilirubin: 3.34 mg/dL, direct bilirubin: 1.07 mg/dL, and CRP: 12 mg/dL. The peripheral smear of the patient was unremarkable. Intravenous ceftriaxone treatment was started and the patient was medically followed. Negative results were obtained from the tests that were performed to diagnose Toxoplasma, Rubella, Cytomegalovirus, Herpes Simplex Virus, Brucella, Epstein-Barr virus, Leishmania dipstick and Leptospiral infections. A blood sample of the patient was sent to the Community Health Care Laboratory for WNV analysis. WNV antibody was positive and his thrombocytopenia was resolved, bilirubin level returned to normal levels, and diarrhea and malaise were improved. BNV IgM IFA and intermediate value BNV IGG IFA of the patient were positive and control BNV IgG titer was found to be increased 4-fold after two weeks; therefore, the case was evaluated as an acute disease. The patient was discharged in good general condition to be followed-up at the outpatient clinic. No fever, vomiting, malaise, headache, thrombocytopenia or neutropenia was detected during outpatient follow-up visits.

Case 2: A 15-year-old patient had complaints of fever, vomiting, malaise and headache starting five days previously and had presented to another medical center with these complaints. Upon the detection of thrombocytopenia and neutropenia, the patient was referred to our hospital. His physical examination was unremarkable. A detailed anamnesis revealed that the patient worked as an irrigation worker in the field. The patient was admitted to the clinic and his test results were as follows: WBC: $2.42 \times 10^3/\text{mL}$, platelets: $134 \times 10^3/\text{mL}$, hemoglobin: 14.5 g/dL, absolute neutrophil count: $0.770 \times 10^3/\text{mL}$, and CRP: 5.3 mg/dL. His abdominal ultrasonography examination was reported to be normal. Peripheral smear was unremarkable. Negative results were obtained from the tests that were performed to diagnose Toxoplasma, Rubella,

Cytomegalovirus, Herpes Simplex Virus, Brucella, Epstein Barr virus, Leishmania dipstick and Leptospiral infections. A blood sample of the patient was sent to the Community Health Care Laboratory for WNV analysis. WNV antibody of the patient was positive. BNV IgM IFA and intermediate value BNV IGG IFA of the patient were positive and control BNV IgG titer was found to be increased 4-fold after two weeks; therefore, the case was evaluated as an acute disease. No fever, vomiting, malaise, headache, thrombocytopenia or neutropenia was detected during outpatient follow-up visits.

Discussion

The Culex type mosquito is the main vector of WNV and its population peaks in August (2,3). Both of our patients presented to the hospital in August. Virus inoculated in the skin as a result of infected mosquito bite infects the Langerhans cells and passes to the regional lymph nodes where it replicates and is included in the blood circulation via lymphatic channels. The disease course is asymptomatic in most infected individuals with a mild viremia or is like clinical pictures of other viral infections. The most common symptom of the disease is fatigue and also fever lasting for 5-10 days. Also, headache, pain in the eyes, myalgia, diarrhea, vomiting, arthralgia, rash and lymphadenopathy can be seen (7). Both of the patients presented here had fever and malaise. One patient had diarrhea. Thrombocytopenia was present in both patients and one also had neutropenia. The prognosis of WNV infections is usually good with symptomatic treatment, while it can be fatal in patients with immune deficiency or chronic diseases. Clinical suspicion is fundamental in the diagnosis since the disease can be overlooked due to nonspecific symptoms of the patients. According to the Centers for Disease Control and Prevention (CDC) criteria, there should be symptoms compatible with Arbovirus disease such as headache, myalgia, rash, arthralgia, dizziness, vomiting, paresis and/or neck stiffness with absence of a more probable clinical explanation (8). Both of our patients presented here had symptoms clinically compatible with WNV disease and bacterial/spirochete and protozoal diseases and tick-borne diseases were excluded. The laboratory criteria defined by the CDC in the diagnosis of West Nile virus infection are the isolation of the virus from the specific viral antigen or nucleic acids in the tissue, blood, cerebrospinal fluid (CSF) or other body fluids or 4-fold (or more) increase in the viral specific quantitative antibody titers or detection of virus specific IgM antibodies in serum containing confirmatory virus specific neutralizing antibody or detection of virus specific IgM antibodies in CSF or serum (8). IgM and IgG titer increase was detected in the sera of our patients. No plaque reduction neutralization test, which is accepted as the reference method in the laboratory diagnosis of WNV, was performed in

our patients (9). WNV disease was diagnosed with clinical findings and the present laboratory findings. WNV with increasing prevalence worldwide has erupted with outbreaks recently in Europe and America and has gained a rapid geographic dissemination with enlargement of biotope of the mosquito species (10). Distribution of WNV was found to be disseminated in a study performed between 2011 and 2013 in Turkey and conducted in serum samples from human, horse, sheep and ducks in 15 different cities (11). Transmitted by mosquitos, WNV should be considered as a community health problem and should be included in the differential diagnosis of cases presenting particularly in summer with fever of unknown origin, fatigue, abdominal pain, headache, encephalitis and acute flask paralysis. The two patients presented here were diagnosed with consideration of WNV disease among the differential diagnosis based on the regional circumstances.

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References

1. Smithburn K, Hughes T, Burke A, Paul JH. A neurotropic virus isolated from the blood of a native of Uganda. *Am J Trop Med* 1940;20:471-92.
2. Suthar MS, Diamond MS, Gale M Jr. West Nile virus infection and immunity. *Nat Rev Microbiol* 2013;11:115-28.
3. Barzon L, Pacenti M, Ulbert S, Palù G. Latest developments and challenges in the diagnosis of human West Nile virus infection. *Expert Rev Anti Infect Ther* 2015;13:327-42.
4. Ergünay K, Aydoğan S, Menemenlioğlu D, et al. Investigation of West Nile virus in central nervous system infections of unknown etiology in Ankara, Turkey. *Mikrobiyol Bul* 2010;44:255-62.
5. Barros SC, Ramos F, Fagulha T, et al. Serological evidence of West Nile virus circulation in Portugal. *Vet Microbiol* 2011;152:407-10.
6. Yeşilkaya A, Kurt Azap Ö, Arslan H, et al. Ölümçül seyreden Batı Nil virüsü ensefaliti olgusu. *Mikrobiyol Bul* 2012;46:488-92.
7. Watson JT, Pertel PE, Jones RC, et al. Clinical characteristics and functional outcomes of West Nile fever. *Ann Intern Med* 2004;141:360-5.
8. Centesr for Disease Control and Prevention (CDC). <https://wwwn.cdc.gov/nndss/conditions/arboviral-diseases-neuroinvasive-and-non-neuroinvasive/case-definition/2015/> Erişim tarihi: 02.06.2018.
9. Ayturan Ş, Aydoğan S, Ergünay K, Özcebe O, Us D. Hacettepe Üniversitesi Hastanesi kan donörlerinde Batı Nil Virüsü seroprevalansının araştırılması ve pozitif sonuçların plak redüksiyon nötralizasyon testi ile doğrulanması. *Mikrobiyol Bul* 2011;45:113-24.
10. Rizzoli A, Jimenez-Clavero MA, Barzon L, et al. The challenge of West Nile virus in Europe: knowledge gaps and research priorities. *Euro Surveill* 2015;21;20.
11. Ergunay K, Gunay F, Erisoz Kasap O, et al. Serological, molecular and entomological surveillance demonstrates widespread circulation of West Nile virus in Turkey. *PLoS Negl Trop Dis* 2014;8:3028.