

Characteristics of the Rash Associated with West Nile Virus Fever

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We characterized rash in 15 patients with West Nile virus (WNV) fever. Generalized, maculopapular rash typically occurred on days 5–12 of illness. Dysesthesia was reported by 27% of patients, and pruritus by 33% of patients. Because the rash was nonspecific and serologic test results were often negative for WNV at presentation, convalescent-phase testing was frequently required to diagnose WNV fever.

The frequency of rash in patients who are infected with West Nile virus (WNV) varies considerably in published reports. Rash was described in approximately half the patients with WNV-related illnesses during 2 outbreaks in Israel in the mid-20th century [1, 2]. Rash was less frequent (occurring in 14%–28% of patients) in most recent reports of outbreaks of WNV disease in Israel [3], the United States [4–7], and Canada [8]. However, in one recent case series, 57% of 98 patients with WNV fever reported rash [9]. Additionally, surveillance data from Colorado in 2003 shows that ~60% of 2947 patients with laboratory-confirmed WNV-related illness reported rash, which suggests that rash is a common symptom of WNV-related illness (unpublished data, Colorado Department of Public Health and Environment [CDPHE]).

Thus far, rash associated with WNV-related illnesses has not

been well described, and published photographs are limited. In this report, we describe rash characteristics of 15 patients who contracted WNV fever during an outbreak in Larimer County, Colorado, in 2003. During this outbreak, there were 546 patients with laboratory-confirmed WNV disease in Larimer County; 483 had WNV fever and 63 had meningitis or encephalitis [10].

Methods. A convenience sample of patients with WNV fever and rash were identified through the Larimer County Department of Health and Environment, the Division of Vector-Borne Infectious Diseases, Centers for Disease Control and Prevention (CDC), and family practice clinics in Fort Collins, Colorado, from 27 July to 11 September 2003. Fifteen adults (aged ≥ 18 years) met the inclusion criteria (new rash associated with fever, headache, or myalgias; diagnosis of WNV fever without meningitis or encephalitis; and positive anti-WNV IgM antibody test results). One patient's serum sample was tested at a commercial clinical laboratory with a WNV IgM antibody capture (MAC) ELISA; the rest of the serum samples were tested or had test results confirmed at the CDPHE Laboratory Services Division or the CDC using MAC-ELISA [11]. Rectal swab specimens were collected from 4 patients and tested at the CDC for enterovirus by PCR and viral culture [12]. Family physicians or internists characterized the rash by physical examination in 13 patients. For 2 patients, photographs were taken by a public health nurse, and the rash was later characterized by a physician on the basis of these photographs. Clinical histories were obtained prospectively by patient interview (for 13 patients) and retrospectively by chart review (for 2 patients). Patients were subsequently contacted by phone or e-mail to obtain complete histories and to determine rash and illness duration. No skin biopsies were performed.

Results. The median patient age was 43 years (range, 24–65 years); 9 patients (60%) were female. Other than rash, the most common symptoms were myalgias, in 12 (92%) of 13 patients; headache, in 10 (67%) of 15 patients; and fever, in 8 (67%) of 12 patients for whom these symptom data were reported. Rash onset occurred at a median of 5 days (range, 0–7 days) after illness onset and lasted a median of 7 days (range, 3–28 days). The median illness duration was 14 days (range, 7–123 days).

Rash was most commonly described as maculopapular in 12 patients (80%) (figure 1), and macular in 3 (20%). For the 14 patients for whom the rash onset history was known, rash began on the trunk alone in 6 patients (43%), on the head or neck in 3 (21%), on the upper extremities in 2 (14%), on the lower

Received 21 April 2005; accepted 19 June 2005; electronically published 12 September 2005.

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Presented in part: 2005 National Conference on West Nile Virus, San Jose, California, February 2005.

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Clinical Infectious Diseases 2005;41:1204–7

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1058-4838/2005/4108-0021

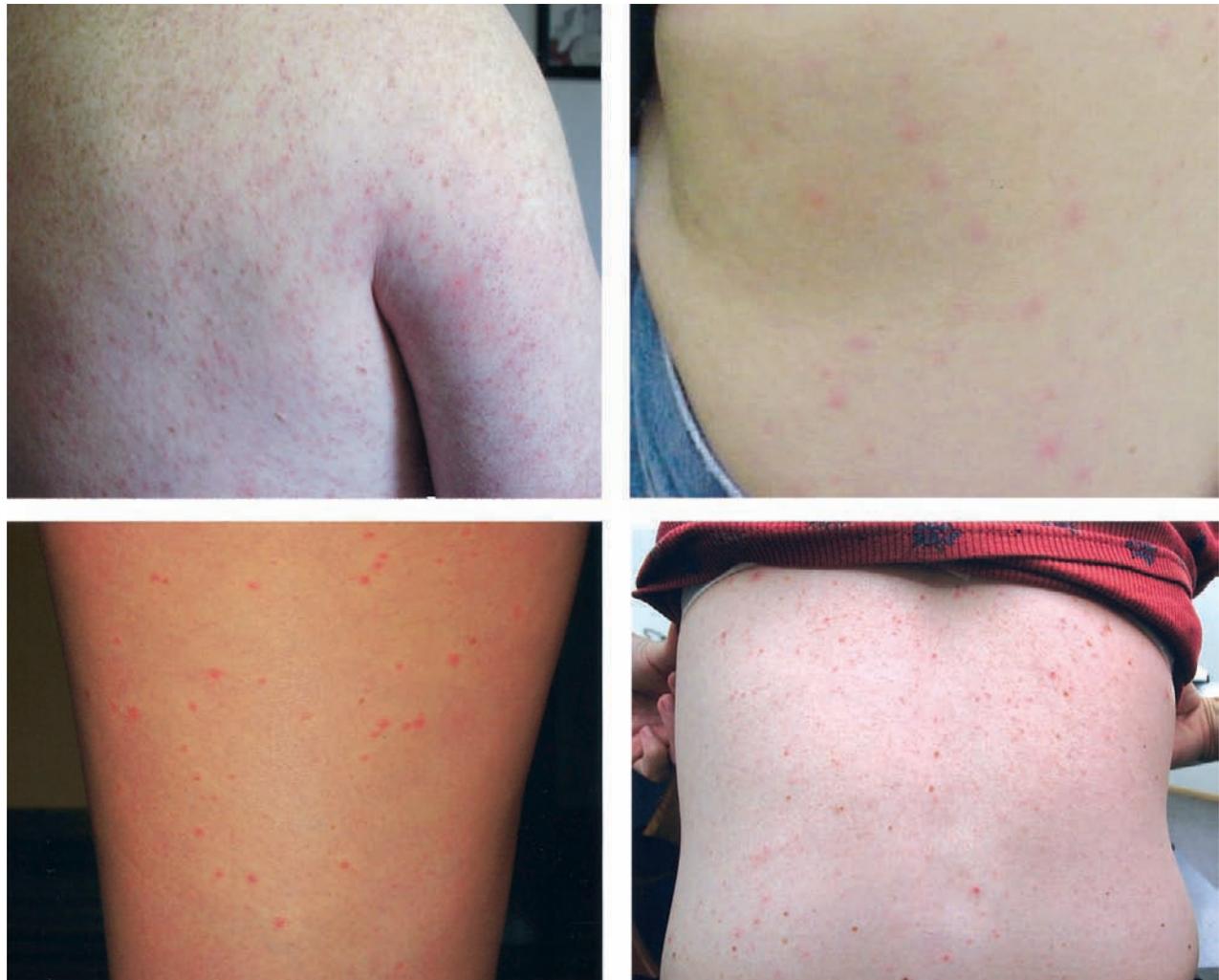


Figure 1. Four patients with West Nile virus fever and erythematous, maculopapular rashes on the back (*top left*), flank (*top right*), posterior thigh (*bottom left*), and back (*bottom right*).

extremities in 1 (7%), and on a combination of sites in 2 (14%). At some point in the illness, rash was noted on the trunk in 14 (93%) of 15 patients, the upper extremities in 14 (93%), the lower extremities in 12 (80%), and the head or neck in 8 (53%).

For 2 patients with generalized maculopapular rash, 1 reported oral and palmar lesions and 1 reported palmar lesions. One patient with generalized macular rash also reported popliteal bruising that he noticed ~2 days after rash onset. The oral and palmar lesions and the popliteal bruising developed after the initial onset of the rash; these lesions were reported in the patients' histories and not confirmed by an examining physician.

Four patients (27%) described dysesthesias (generalized tingling or burning) associated with rash. Three of these patients reported hyperesthesia precipitated by touch; 1 described severe pain. Five patients (33%) reported pruritus associated with rash.

All patients in this series tested positive for anti-WNV IgM by MAC-ELISA, with a median interval of 6 days (range, 2–16 days) between illness onset and initial specimen collection. However, initial MAC-ELISA results were positive for only 5 patients (33%), with a median interval of 8 days (range, 5–16 days) between illness onset and specimen collection in this group. For 10 patients (67%), the results of the initial WNV test were negative, and the results of a convalescent-phase test were positive by MAC-ELISA, with a median interval of 5.5 days (range, 2–8 days) between illness onset and the initial test, and a median interval of 23.5 days (range, 9–42 days) between onset and the convalescent-phase test. All of these 10 patients had a rash at the time of the initial test that yielded negative results. Rectal swab specimens collected from 4 of these patients were tested for enterovirus, with negative results.

Discussion. Consistent with previous reports, we found that ~80% of patients in our series had maculopapular rash associated with WNV disease [8, 13]. Although clinicians were

not specifically asked to assess blanching, none described petechial rash. Rash typically occurred 5 days after illness onset and lasted 7 days. WNV fever generally started before and persisted after the rash.

Approximately 27% of patients in this report reported dysesthesias associated with rash, and 33% reported pruritus. To our knowledge, dysesthesias have not previously been reported with WNV-associated rash, and pruritic rash has only been described once [13].

A recent report described 3 patients with WNV-associated rash and noted that rash was concentrated on the extremities [13]. In contrast, in the current investigation, rash was reported to occur as commonly on the trunk (in 93% of patients) as on the upper extremities (in 93% of patients), and more frequently than on the lower extremities (in 80% of patients). However, clinicians were not asked to quantify lesion numbers. It is possible that lesions occurred in greater density on the extremities.

Case patients in this series did not have rash with a characteristic appearance or pattern of onset and spread that distinguished WNV-associated rash from rash due to other causes, such as viral exanthems, drug eruptions, and nonspecific hypersensitivity reactions. Enteroviruses, for example, have a seasonal pattern similar to that of WNV and can cause similar rash [14]. Serologic testing remains necessary if confirmation of WNV infection is required.

At least 3 patients in this series had atypical rash findings, including 1 with maculopapular rash and palmar lesions, 1 with maculopapular rash and palmar and oral lesions, and 1 with macular rash and popliteal bruising. Enterovirus was considered a possible alternate cause of these rashes, particularly for patients with palmar lesions. In Colorado in 2003, there were more reported cases of aseptic meningitis (694) than there had been in the previous 5 years (range, 117–372 cases per year), and several enteroviruses in circulation were identified, including enterovirus 71, coxsackievirus A9, echovirus 9, and echovirus 30 (unpublished data, CDPHE). Enterovirus test results were negative for 4 patients in this series, including 1 patient with palmar lesions. Other than enterovirus, we did not test for other potential infectious causes of rash.

Nevertheless, WNV infection most likely caused rash in the 3 patients with atypical rash; all 3 initially tested negative for anti-WNV IgM, but the results of a convalescent-phase test were positive, which documented recent infection. Because descriptions of these atypical rashes were based on patient history and not confirmed by a physician, further study is needed to determine whether WNV might cause atypical rash in some patients.

Although WNV disease was confirmed by anti-WNV IgM in all 15 patients in this study, acute-phase serum specimens tested negative in nearly 67% of patients. This was not sur-

prising because serum samples were collected soon after illness onset in this group (at a median of 5.5 days). Data from Romania indicate that approximately half of patients with neuroinvasive disease might not have demonstrable serum IgM antibody (as determined by MAC-ELISA) within 5 days after illness onset [15].

This investigation was subject to at least 4 limitations. First, the sample size was small. Second, this was a convenience sample. Patients with more-severe rash, dysesthesias, or pruritus might have been more likely to seek medical care and to be enrolled in this study. This might limit the generalizability of these findings. Third, a dermatologist did not confirm the descriptions of rash, and some of the less common findings were not confirmed by a physician. Fourth, all patients in this investigation had light skin. Photographs and descriptions of rash associated with WNV fever are still needed for patients with darker skin.

WNV infection should be suspected in patients with fever and generalized, erythematous, maculopapular rash during the late spring through the fall months in areas where WNV is endemic and epidemic. Dysesthesias and pruritus can occur with the rash. The rash commonly affects the head or neck, trunk, and upper and lower extremities, but it lacks a specific appearance or pattern of onset and spread that is diagnostic for WNV disease. Initial serologic test results for WNV might be negative for patients with WNV fever and rash; convalescent-phase serum should be tested if clinically indicated.

Acknowledgments

We thank Dr. James Sprowell and Averil Strand for their assistance in collecting data, and Dr. Tom Török for editorial assistance.

Financial Support. Centers for Disease Control and Prevention (cooperative agreement number U50/CCU812430).

Conflict of Interest. All authors: no conflicts.

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