

West Nile Fever during the 2015 season: A view from a regional hospital in Israel



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Background: West Nile Fever (WNF) is caused by a mosquito-borne flavivirus, maintained in nature by mosquito-bird cycles (reservoir). Humans are dead-end hosts, and of all infected individuals only 20% become symptomatic, and 1% will develop acute neuroinvasive disease.

WN virus was first isolated in Uganda in 1937. Since then the virus has adapted to most mosquito species (Aedes, Culex, Anopheles) and bird migration contributes with the global spread. WNF is endemic in Africa, Europe, Asia, and lately throughout the USA.

Israel is geographically located in the bird migration routes between Africa and Eurasia, and small outbreaks have been reported since 1951. The largest outbreak in Israel occurred in 2000, with 400 cases and 10% mortality rate.

In 2015, 149 cases of WNF were reported by the Israeli Ministry of Health during WNF-season (summer-autumn), a 4 fold increment compared to 2014, and 2 fold compared to 2013 and 2012. Among the 149 WNF cases, 17 were identified in the Ashkelon district, 13 of which were hospitalized at Barzilai Medical Center (BMC), a 550-bed hospital in Ashkelon. We characterized 13 admitted cases, analyzed their health burden on overall CNS disorders and their economic impact during hospitalization.

Methods: Patients with meningitis, encephalitis or Guillain-Barre syndrome (GBS) (from now on “CNS disorders”), between 1/6/15–1/1/16 were included in the study. Under Barzilai’s ethical committee approval, patient charts were reviewed retrospectively. During hospitalization, serum, CSF and urine samples of suspected cases were sent to the National center for zoonotic viruses at the central virology laboratories, Sheba Medical Center. Diagnosis of acute disease was achieved by the detection of specific IgM in serum and CSF by ELISA (WNV IgM capture DxSelect, FOCUS) and confirmed if possible by RNA detection of WNV by RT-real time PCR. Results were compared to previous years. Cost analysis was performed based on length of hospital stay (LOS) in days/patient, with a daily hospitalization cost of 2169 NIS (approximately 600 US dollars).

Year	Acute CNS disorders (n=cases)	Mean length of stay (days)	Approximate overall cost (converted from NIS to US dollars)*
2013	24	8.9	\$127,300
2014	26	8	\$124,000
2015	51	9.7	\$300,000
Cases of West Nile Fever only			
2015	13	20.6	\$164,000

Cost analysis of West Nile Fever in overall CNS related hospitalization costs. 2015 was a highly prevalent season in Israel

*updated April 2017

Results: Out of 51 patients who presented with acute CNS disorders during the 2015 WNF-season, 13 were diagnosed with WNF (25.4%) in contrast to previous years (1/26 positives (3.8%) in 2014; 1/24 (4.1%) in 2013).

Of all acute CNS disorders, WNF was suspected in 30 patients and 43.3% were confirmed as positive cases (13/30). Most patients were city dwellers (10/13, 77%) residing in Ashkelon, Ashdod and Kiriath-Gat. Only 2/13(15%) reported a recent history of mosquito bite. Of the 13 (7 males; 6 females) 12 were adults (mean age 65.4) and 1 was a 9 years old child. Within the adults, most (10/12;83%) had associated chronic conditions (diabetes, hypertension, cancer).

All WNF cases in 2015 presented with CNS disorders: 9 (69%) with encephalitis, 3 (23%) meningitis, and 1 (2%) GBS. Four patients (30.7%) required mechanical ventilation and 3/13 (23%) died (2 during hospitalization and 1 within 4 weeks after discharge).

Mean LOS for WNF patients was 20.6 days, significantly more extended than 9.7 days for all acute neurological disorders in the same year.

The hospitalization cost of WNF during 2015 (596,268 NIS), accounted for 55% of the overall costs of all CNS disorders (1,073,000 NIS), and was independently higher than the overall cost of all CNS disorders in previous years (451,152 NIS in 2014; 463,398 NIS in 2013).

Conclusions: For the first time, we have characterized confirmed cases of WNF and their economic burden in a regional hospital in Israel during an intense year of WNV infestation.

When WNF is clinically suspected in a highly prevalent year, the **diagnostic yield of the current tests is very high** (almost half of the cases were positive (13/30=43%)).

Consistent with previous reports from Israel (2000) and elsewhere, we characterized a disease with neurological clinical presentation, high mortality rates, prolonged LOS, and occurrence in patients with advanced age and comorbidities. Accordingly, the economic impact of WNF in a highly prevalent season accounted for more than half of all acute CNS disorders’ hospitalization costs.

Our case load of 13 patients comprises 8.7% of the national incidence for 2015. The urban dwelling of most of our cases suggests a source of infected mosquitos in the household environment. Intense control environmental measures at the municipal and national level are required to control this zoonotic seasonal disease in Israel.