Dengue: Relationships between the severity of illness, virus serotype, immune status and viremia

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Background: In 2010, Martinique experienced a severe DENV-1 and DENV-4 coepidemic involving more than 10% of the population. A study was conducted in the Emergency Department (ED) to investigate the relationships between clinical severity of illness and virological characteristics.

Methods & Materials: Dengue-like patients admitted within 8 days after the onset of fever were eligible. Data were recorded at presentation. Final outcome data were collected in all patients. Dengue cases were confirmed and serotyped by a hemi-nested RT-PCR. Dengue-specific antibodies were detected by using IgM capture, IgG capture, and IgG indirect enzyme linked immunosorbent assays. Based on disease severity and the patient care methods, we distinguished three groups of clinical forms: uncomplicated forms treated at home with simple monitoring (G1), intermediate severity forms warranting intravenous rehydration in the ED and followed-up under ambulatory conditions (G2) and severe forms including DHF/DSS that most often warranted hospitalization (G3)

Results: The study included 201 patients (107 females, median age 38 years, range 15-89). DENV-1 was demonstrated in 126 (63%) patients and DENV-4 in 75 (37%). Secondary infections were recorded more frequently in DENV-4 than in DENV-1 infections (64.5% versus 50%, respectively, $p < 0.001$). Regarding clinical severity, G1 included 118 patients (58.7%), G2 included 50 patients (24.5%) and G3 included 33 patients (16,4%). The distribution of severe forms was not significantly different between serotypes and between primary and secondary infections. When sampled between day-1 and -3 of illness, primary infections demonstrated higher viremias than secondary infections (respectively, median 9.09 log, [IQR 8.01-10.62] and 8.41.log [IQR 7.15-9.47], $p < 0.01$). In all, DENV-1 infections demonstrated higher viremias than DENV-4 infections (respectively, median 8.56 log [IQR 7.17-9.82] and 7.69 log [IQR 6.17-8.64], $p < 0.001$). Median viremias were 8.60 log (IQR 7.32-9.76) in G1, 7.65 log (IQR 6.78-8.71) in G2 and 7.47 log (IQR 5.36-8.79) in G3 ($p = 0.003$). However, the patients with severe and intermediate severity forms were admitted and sampled later than patients with uncomplicated forms (respectively, median day 5 [IQR 4-5], day 5 [4-6], day 3 [2-4], $p < 0.001$).

Conclusion: During the 2010 epidemic inMartinique, DENV-1 and primary infections demonstrated higher viremias. Clinical severity was independent from serotypes and immune status.

Epidemiological features of sindbis fever in South Africa

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Background: Sindbis virus (SINV), a mosquito-borne alphavirus, is a cause of outbreaks of febrile arthralgia in Scandinavia, Russia and South Africa. Sindbis virus circulates in several bird species, but is also occasionally transmitted to humans. The occurance of SINV in South Africa has been known since the 1970s but the true burden of the disease is not know due to inadequate surveillance.

Methods & Materials: A retrospective study was conducted using data from submissions for laboratory investigation for patients with suspected arboviral disease from 2006 to 2010 in South Africa. Data (including count, demographic information, geographic origin and clinical presentation) were collected from test requisition forms and questionnaires and statistical analysis performed using EpiInfo software. The laboratory criteria for confirmation of SINV infection includes detection of SINV RNA by RT-PCR or virus isolation. The detection of anti-SINV IgM antibodies by ELISA was considered to be highly suggestive of recent infection with SINV.

Results: Between 2006 and 2010, a total of 3 631 specimens for patients with suspected arbovirus disease were submitted for laboratory investigation. During this period a total of 229 specimens tested positive for anti-SINV IgM antibodies. The detection rate for IgM antibodies increased nearly 10-fold during 2010 (from average of 1.3% to 10%). In the 2010, the majority of cases were reported from the semi-arid regions of South Africa, forming part of the Northern Cape and Free State Provinces. The number of cases peaked during the late summer and early autumn months. Sindbis fever was more common in males and rate of infection increased linearly with age. Typical symptoms included muscle pain, fever, joint pain, headache and fatigue.

Conclusion: The study provided an update of Sindbis fever in humans in South Africa. There was a marked increase of cases during 2010, which coincided with the outbreak of Rift Valley fever and West Nile fever at the same time. The need for systematic surveillance for Sindbis fever in order to better understand the public health burden of the disease is highlighted.