

editorial

Determining the Incidence of Dengue Hemorrhagic Fever in Puerto Rico

Dengue hemorrhagic fever (DHF) might more appropriately be called “dengue hypotensive fever”, because its distinguishing feature is not hemorrhage, but plasma leakage due to increased vascular permeability. Shock may develop insidiously and rapidly and may result in a case fatality rate over 10%. Prevention of shock is the key to successful therapy, but this may only be achieved if health care professionals are actively looking for the early signs of severe disease, such as the concurrence of an increasing hematocrit and a decreasing platelet count near the time of defervescence. Accurate, early detection and reporting of DHF cases should result in improved patient care and survival, and prompt community action to prevent epidemics.

The incidence and geographic distribution of dengue, a mosquito-transmitted viral disease of tropical and subtropical areas, have greatly increased in recent years, especially in the Americas. Dengue fever is an acute febrile illness with two or more of the typical manifestations (headache, retro-orbital pain, myalgias, arthralgias, rash, hemorrhagic manifestations, nausea or vomiting), while a case of DHF must fulfill all four of the following criteria established by the World Health Organization: 1) fever, 2) any hemorrhagic manifestation, 3) thrombocytopenia ($\leq 100,000/\text{mm}^3$), and 4) objective evidence of increased vascular permeability (e.g., hemoconcentration [hematocrit increased by $\geq 20\%$], pleural or other effusion [by radiography or other imaging method], or hypoproteinemia). Dengue shock syndrome (DSS) consists of DHF plus hypotension or narrow pulse pressure (≤ 20 mm Hg). Cases with unusual manifestations (severe hemorrhage, encephalopathy, hepatic failure, cardiomyopathy) are often fatal. Two hypotheses to explain the mechanism of DHF have been debated: secondary infection and viral virulence. A combination of both phenomena now appears to be the acceptable explanation.

The dengue surveillance system in Puerto Rico has detected laboratory-positive cases of DHF annually since 1985. The occurrence of true DHF epidemics on the island has been questioned, because the number of cases and deaths detected, even during dengue epidemics, has been low compared to the epidemics experienced in Cuba and Venezuela (to name two American locations), and because many cases in Puerto Rico are reported in adolescents and young adults, contrary to the experience in southeast Asia (although Puerto Rico, in this respect, is similar to other countries in the Americas). As indicated in the accompanying articles, such comparisons must take into account important factors that go beyond disease incidence and virus genotype. To determine the validity of incidence figures for DHF it is necessary to consider how the requirements of the case definition are applied, the routines of health care, and the mechanics of disease reporting. Recently, the World Health Organization (WHO) published a new definition for cases with a “provisional diagnosis” of DHF, but did not provide information on the accuracy (sensitivity, specificity, positive and negative predictive value) of these criteria, or an estimate of their impact on DHF incidence statistics, if used as recommended. Our studies provide estimates for the sensitivity and specificity of alternative DHF definitions, compared to the standard WHO definition stated above, and suggest that the incidence of DHF in Puerto Rico is considerably higher than disease reports or even hospital records would document. Clinical, epidemiologic, biologic, and social research of the syndrome in the Americas are essential to develop better mosquito control methods, medications, and a safe and effective vaccine.



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