RESEARCH NOTE

DENGUE FEVER AND DENGUE SHOCK SYNDROME IN FRENCH POLYNESIA

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An epidemic of dengue 3 (DEN-3) occurred in Tahiti from August 1989 to April 1990. This was at the end of an epidemic of DEN-1 which began in December 1988 and lasted until June 1989. In September 1989 the first case of death by dengue shock syndrome (DSS) was notified. This paper deals with DSS in 232 children hospitalized for dengue fever during the epidemic in 1989-1990 among 287 cases presenting with dengue-like fever.

The diagnosis of dengue fever in the studied population was confirmed by virus isolation and/or IgM detection. The symptoms and biological findings were recorded each day during the course of hospitalization on standardized code sheets. We classified a patient as DSS if a narrowing pulse pressure or hypotension were recorded in the presence of clinical manifestations of shock such as cold, blotchy skin and cyanosis. To determine whether the infection was a primary or a secondary one, we performed hemagglutination-inhibition (HI) tests, using standard classification (WHO, 1988). For comparative analysis purposes, each child who suffered from DSS was matched with two who did not : clinical and biological findings recorded the day prior to the onset of DSS for each case were compared to those reported on the same day of illness for two corresponding controls.

The mean day of illness on day of admission was day 3 (range 1-10). The median duration of fever ($>38°C$) during illness was 3.5 days (range 1-12), with a median peak of 39.3°C. The children were aged 1 month to 15 years (median 24 months). Sex ratio (M/F) was 1.2. Among the 232 patients, 146 (63%) had thrombocytopenia $<10^5$/ml, 38 (16%) had a hematocrit $>45\%$, 107 (46%) had SGOT >99 IU, 127 (55%) had hepatomegaly, 93 (40%) had a neurologic disorder (defined as the association of restlessness, headache and vomiting); 21 fulfilled the criteria published by WHO (1988) for dengue hemorrhagic fever (DHF): 1 grade I, 1 grade II and 19 grade III. Of the remainder, 72 were classified as dengue fever (DF) with hemorrhage and thrombocytopenia and would have been classified as DHF if the criterion "hemoconcentration" was withdrawn from the WHO definition of DHF, 36 had DF with hemorrhage but without thrombocytopenia and 103 had DF without hemorrhage. In total, 71 children had DSS as defined by WHO. DSS occurred between day 1 and day 7 of illness (median 4). Mean age of DSS cases (33 months) was significantly lower than that of non DSS cases (60 months, $p<0.001$). DSS was not related to the sex of the child. The day prior to the onset of DSS, we did not find a higher proportion of cases with fever $>39°C$, hemorrhagic manifestations, hepatomegaly, neurologic disorder, hematocrit $>45\%$ thrombocytopenia $<10^5$/ml or SGOT >37IU than in controls.

The type of HI antibody response was determined in 178 individuals (Table 1), the 54 missing results were due to an inadequate interval between the two samplings. Among them 69 (39%) had a primary infection, of whom 28 presented with DSS ie 46% of 61 DSS cases. The mean age of individuals classified as primary infection was lower (16 months) than that of patients classified as secondary infection (69 months, $p<0.0001$). After adjustment for age, the occurrence of DSS was not found to be related to the type of infection. The pathogenesis of DSS is still not completely understood and has been related to the host, to the vector or to the virus strain (Halstead, 1990; Rosen, 1989; Scott *et al*, 1976). Our study confirms that DSS can be ob-

Table 1

Occurence of DSS in 178 individuals, according to type of infection and age.

Age	Primary infection	Secondary infection	Total
< 1 year			
DSS	24 (49%)	3 (27%)	27
non DSS	25 (51%)	8 (73%)	33
1-3 years			
DSS	2 (15%)	15 (43%)	17
non DSS	11 (85%)	20 (57%)	31
4-5 years			
DSS	1 (33%)	6 (33%)	7
non DSS	2 (67%)	12 (67%)	14
> 5 years			
DSS	1 (25%)	9 (20%)	10
non DSS	3 (75%)	36 (80%)	39
Total	69 (39%)	109 (61%)	178

Median HI titers in primary infections: acute sera: 25%ile: 0, median 10, 75%ile: 10 convalescent sera: 25%ile: 20, median 40, 75%ile: 80

Median HI titers in secondary infections: acute sera: 25%ile: 40, median 160, 75%ile: 5,120 convalescent sera: 2,560, median 10,240, 75%ile: 10,240

convalescent sera: 25%ile: 2,560, median 10,240, 75%ile: 10,240

The occurrence of DSS was not found to be related to the type of infection after adjustment for age (Mantel-Haentzel x^2 test: $p > 0.05$).

served in primary infection as well as in secondary ones. Moreover, we could not find a clinical nor a biological predictive variable for occurrence of DSS.

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