A Study of Clinical Profile of Dengue Fever in Kollam, Kerala, India

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Abstract
A large urban epidemic of dengue fever occurred in Kollam city of Kerala in 2003. During this epidemic, a study was conducted among 250 IgM dengue antibody-confirmed cases admitted to three major hospitals in Kollam city. The presenting symptoms were: fever (96.8%), headache (77.2%), abdominal pain (62.4%), diarrhoea (15.2%), bleeding (15.2%), skin rash (13.2%), pruritus (10.4%), sore throat (5.2%), and seizures (0.8%). The major physical findings noted included positive tourniquet test (33.67%), hepatomegaly (17.6%), bradycardia (16.8%), pleural effusion (13.2%) and ascites (12%). The most frequent abnormal laboratory findings included haemoconcentration (27.8%) and severe thrombocytopenia (<10 000 in 8.5%). Eight out of 250 patients died (case-fatality rate (CFR) = 3.2%). In all the 8 cases of death, disseminated intravascular coagulation (DIC) was the cause of death. DIC was associated with thrombocytopenia (platelet count-50 000/cmm) and haemoconcentration (7 out of 8 cases).

Keywords: DF/DHF, clinical profile, Kollam, Kerala.

Introduction
Dengue fever (DF) has been identified as an emerging infectious disease in Kerala state. Sporadic occurrence of DF cases has been reported in Kerala since 1997 when 116 suspected cases with 4 deaths were reported from Kottayam. In 2001, a total of 877 suspected cases with one death were reported from four districts, viz. Kottayam, Idukki, Ernakulam and Thiruvananthapuram[1]. The year 2003 recorded a large outbreak of DF in urban areas of Kollam city with significant mortality. According to the WHO report, the mortality in untreated cases of dengue fever was reported to be as high as 20% while the hospitalized patients had a mortality rate of less than 1%[2].

The elucidation of the exact clinical profile is important for patient management and thus crucial for saving life. The present study is an attempt to describe the salient clinical as well as laboratory findings of serologically confirmed hospitalized cases of dengue fever during the period June to December 2003. The study group represented the adult population only and the paediatric population was not included in this study. The location of Kollam city in Kerala state is indicated in Figure 1.

The clinical outcome of dengue infections depends upon many factors, important being virulence of circulatory DENV serotype/genotype, primary/secondary infection and a combination of sequential infections. Since in the present study these aspects have not been investigated, the comparison of clinical outcome with other studies in the Region or elsewhere require further studies – Editor.

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Materials and Methods

The study was undertaken as a hospital-based descriptive study with prospective data collection. The information was captured using a questionnaire developed and based on a review of literature and in consultation with selected experts. Two hundred and fifty adult patients with confirmed dengue fever, admitted to any of the three referral hospitals in Kollam during a 7-month period from June to December 2003 were selected for this study. Only IgM dengue antibody-positive cases were included. These patients were admitted with fever, retrobulbar pain, abdominal pain, myalgia, headache or bleeding manifestations. IgM dengue antibody was estimated using PANBIO dengue IgM capture ELISA. The diagnosis of dengue fever, dengue haemorrhagic fever and dengue shock syndrome was based on the WHO criteria[3].

χ² analysis was used to detect the trends.

Results

Of the 250 serologically confirmed cases, 166 (66.4%) conformed to dengue fever and 84 (33.6%) to DHF/DSS as per WHO case definition. There were 130 males and 120 females. The disease incidence was equally distributed among both sexes in all the three age groups, viz. 12–30, 30–50 and >50 years (Figure 2). The patients’ mean age was 42.6 (SD 20) years. The mean duration of symptoms was 6 days.

Clinical Features

Figure 3 presents the clinical manifestations. Fever was documented in 242 (96.8%) patients. Eight patients (3.2%) who did not have documented fever had been symptomatic 5 to 7 days prior to admission and it is possible that they had been febrile during that period. Twenty patients (8%) had the typical biphasic pattern of fever with an afebrile period of 3 to 5 days between the episodes. Headache was a very common symptom occurring in 193 patients (77.2%). The older age group (>50 yrs) had lower incidence of headache.

Only 13 patients (5.2%) complained of sore throat. Thirty-eight patients (15.2%) had diarrhoea while 156 patients (62.4%) complained of abdominal pain. Thirty-three
patients (13.2%) had skin rashes, the majority of which were in the DHF/DSS group. In most of the cases the rash was noted in the first phase of fever while in a few (2 out of 33) had rash noted in the convalescent phase of the disease. Twenty-six patients (10.4%) had pruritus.

Figure 4 shows the details of bleeding manifestations, which occurred in 38 patients (15.2%). Gastrointestinal tract (GIT) bleeding in the form of melaena was the most frequent, while intracranial (IC) bleed occurred in two patients of which one expired. Two male patients developed seizures, one of whom had fatal intracranial haemorrhage. The other patient had no residual neurological deficits.

Bradycardia (heart rate <60/minute) was observed in 42 patients (16.8%), most of whom (40 patients) had sinus bradycardia. Transient AV block occurred in 2 patients – one had Wenckebach block and the other had Mobitz type 2 block, both of which reverted spontaneously. Sinus bradycardia was noted in the convalescent phase in classical dengue.

The tourniquet test was positive in 66 of the 196 patients (33.7%) on whom it was carried out. The test was positive more commonly among younger male patients.

Forty-four patients (17.6%) had hepatomegaly detected clinically, which was significantly more in the group with DHF/DSS.
Ascites was detected either clinically or by ultrasound in 30 patients (12%), 23 of whom had associated hepatomegaly. Thirty-three patients (13.2%) had pleural effusion. Twenty-five patients (10%) had poly-serositis. Disseminated intravascular coagulation (DIC) was noted in 8 patients (3.2%). All the eight patients who had DIC died.

Laboratory Parameters

The Table includes the laboratory parameters. Fifteen patients (6%) had haemoglobin >16 gm%. However, haemoglobin levels were not consistently related with Hct. Haematocrit (Hct) was measured in 226 patients, of whom 163 patients (72%) had Hct <45%. Males outnumbered females in the higher Hct range. The total white cell count was found to be <4000/cmm in 100 patients (40%).

Two hundred and twenty-five patients (90%) had a platelet count of <100 000/cmm. Among them, 108 patients (48%) had a count <50 000/cmm and 19 patients (8.4%) had a count <10 000/cmm. Almost two-thirds of the patients (23/38) with platelet count <20 000 had a haematocrit >45%. None of the patients with Hct more than 45% had a platelet count more than 100 000/cmm. The onset of DIC correlated with severe thrombocytopenia, except in one case, who developed DIC when the platelet count was around 50 000/cmm. None of the patients in the older age group had DIC.

Bilirubin was above 2 mg% in 14 of the 144 patients (9.7%) in whom it was estimated. Aspartate amino transferase (AST) was >45 IU/L in 193 of the 230 patients (83.9%). In those patients with a normal AST, no mortality was observed. Among those patients with an abnormal AST, 4.1% (8/193) died.

Outcome

Three out of 78 patients (3.8%) in the <30-year age group and 5 out of 112 patients (4.5%) in the 30–50-year age group died. All the 60 patients above 50 years survived. The sex-wise break up indicated that out of 125 males, five (4%) and out of 120 females 3 (2.5%) died.

Correlating outcome with haematocrit, out of the 63 patients with a Hct over 45%, 6 patients (9.5%) died in comparison to 2 of the patients (23/38) with platelet count <20 000 had a haematocrit >45%. None of the patients with Hct more than 45% had a platelet count more than 100 000/cmm. The onset of DIC correlated with severe thrombocytopenia, except in one case, who developed DIC when the platelet count was around 50 000/cmm. None of the patients in the older age group had DIC.

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163 patients (1.2%) with a Hct <45%. Correlating outcome with the platelet count, none of the 24 patients with platelets >100 000/cmm died. Seven out of the 8 patients who died had a platelet count <50 000/cmm; in three, the count was <20 000/cmm. One patient who died with severe pulmonary alveolar haemorrhage had a platelet count over 50 000/cmm.

**Discussion and Conclusion**

This study describes the clinical profile, laboratory features and outcome of DF/DHF/DSS in adult patients. In this study, 66.4% were classified as DF patients while 33.6% were classified as DHF/DSS. In our series, the increased proportion of DHF in contrast to the observation of 13.5% from Sharma et al.[4] might have been due to misclassification with a large number of patients with a positive tourniquet test or minimal bleeding included as DHF.

A high incidence of gastrointestinal symptoms was noted in this epidemic. In this study 62.4% patients had abdominal pain in contrast to 38% reported by Sharma et al.[4]. This symptom was predominantly noted in the early leak phase and is attributed to hepatomegaly and serosal inflammation.

Sore throat was reported in 5.2% of patients. Sore throat being a very common manifestation of influenza, the rarity of this symptom may be useful in differentiating between the two fevers.

In a study from Nimmannitya et al.[5], around 96% of patients had congested pharynx, and rhinitis was reported in 13% of the patients.

Bleeding from various sites was seen much less in the present series. This is in contrast to the finding of Horvath from Australia[6] and Sharma from India[4] who reported 63% and 69% of bleeding episodes respectively. Increased bleeding from venepuncture sites was not counted as a bleeding tendency in this study, which perhaps would account for the lower incidence of bleeding manifestations. The gastrointestinal tract was the predominant site of bleeding observed in the present series in comparison to other series reported by Sharma et al. from India[4] and Chairulfatah from Indonesia[7].

Although thrombocytopenia was a common finding, there was poor correlation between thrombocytopenia and bleeding tendencies, an observation similar to the one made by Sharma et al.[4]. Rapid fluctuations in platelet count were noted in some of our patients.

Liver function abnormalities, especially elevated transaminases, were noted in this study. AST was elevated (>250 IU/L) in 84% of patients who died, suggesting an association of abnormal AST with a worse outcome. Dengue virus-induced damage to the hepatocytes, hypoxia, shock or associated liver disease have all been postulated to be the pathogenic mechanisms for the occurrence of transaminitis. DF patients also showed increased AST but to a lesser extent, compared to DHF. No case of fulminant hepatic failure was noted in our study. The series from Sharma et al. from India[4] reported elevated transaminases in 90% of patients. Hepatomegaly in this series was 17.6%, compared to 12.5% of Sharma from India[4] and 13.5% from Thailand[5].

In our study, mortality was significantly associated with an increased haematocrit (6 out of 8 cases). Two patients who had a haematocrit less than 45% had DIC with severe GI haemorrhage, which could have caused the low/normal haematocrit.
DIC detected by clinical parameters and supported by laboratory parameters occurred in 3.2% of cases, none of whom survived. DIC was associated with profuse bleeding from GIT and skin and, in some cases, with massive pulmonary alveolar haemorrhage. Although severe thrombocytopenia was noted in 7 out of 8 cases, DIC was thought to be the ultimate cause of death. Although severe thrombocytopenia of <10 000/cmm was reported in 8.5% patients, the overall mortality rate was only 3.2%, indicating that a low platelet count was not directly correlated to bad prognosis.

Among the 8 patients who died, seven had thrombocytopenia with platelets <50 000 while one patient was noted to have DIC with platelet >50 000.

The most notable features in this study were the high proportion of DHF cases, more gastrointestinal symptoms, association of increased haematocrit with worse disease outcome and recognition of DIC as the major cause for mortality.

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**References**


