Correlation of clinical and laboratory parameters in dengue fever patients and its usefulness as bedside markers

Sir,

Dengue fever (DF) is a serious public health problem in South-East Asia.[1] Clinical diagnosis of dengue is challenging as it presents with nonspecific symptoms, including fever, headache and myalgia. Since there are many infectious diseases which have similar clinical features, a combination of clinical and laboratory parameters (positive tourniquet test, relative bradycardia, Leucopenia, and specific aspartate aminotransferase [AST] elevation with activated partial thromboplastin time [APTT] prolongation) in any acute febrile illness could be used as bedside markers to diagnose dengue infection to institute early supportive therapy.

This prospective observational study was carried out in 100 patients who were diagnosed as DF (serologically [IgM ELISA]/NS1positive) admitted to our hospital intensive care unit from March to November 2012. Patients with negative dengue serology, age <18 or >60 years, pre-existing substantial heart or lung disease, on drugs like beta-blockers, calcium channel blockers or pacemakers were excluded. Peak temperatures with simultaneous pulse rate were recorded to observe for relative bradycardia. The tourniquet test was done in all patients and considered positive when 20 or more petechiae were observed in 2.5 cm² area. Leucopenia (total white blood cell count <4000 /cumm). APTT prolongation (>20 of control). AST (>60 IU/L), Gallbladder wall edema and polyserositis were also noted. All data were analyzed using IBM SPSS statistics 20. Among the study cohort 60% were males and 40% were females. Mean age of the study group was 34.60 years. The clinical parameters are shown in Table 1.

In our study group, nearly 42% had relative bradycardia, Recently works of Lateef *et al.* had shown similar association with DF.[2] The tourniquet test was found to be positive in 40% of the patients. Many of the studies showed that presence of either leucopenia or positive tourniquet test or both are helpful in identifying dengue patients.[3] Gallbladder wall edema was seen in 87%, pleural effusions were noted in 63% and hepatomegaly in 17% . Out of 100 patients, three patients died (case fatality rate 3%).These patients presented late to our hospital with shock and disseminated intravascular coagulation. The laboratory parameters are shown Table 2.

Bleeding manifestations are highly variable in dengue patients. Laboratory parameters showed hemoglobin (Hb) >16 g% in 8% (mean = 12.35, median = 13.4) of the patients. Hematocrit (HCT) levels did not correlate consistently with the Hb%. HCT >45% were seen in 32% (mean = 37.94, median = 36.9). Total white blood cell <4000/cumm was found in 57% (mean = 4913, median = 3980) of the total patients enrolled. Platelet count lower than 50,000/cumm observed in 46% (mean = 53,462. median = 72,000) of patients. AST elevation was observed in 76% (mean = 95.17, median = 89). Out of the 76 patients with AST elevation, 78.9% (60/76) showed much higher values compared with remaining 21% (16/76), (P < 0.001). Alanine aminotransferase

Table 1: Clinical parameters

Parameters	Percentage of patients (N=100)
Relative bradycardia	42
Tourniquet test	40
Gallbladder wall edema	87
Pleural effusion	63
Hepatomegaly	17

Table 2: Laboratory parameters

Laboratory parameters	(N=100) %
Hemoglobin>16 g %	8
Hematocrit>45%	32
Platelet count<50,000/cumm	46
Total leucocyte count<4000/cumm	57
AST elevation (>60 IU/L)	76
ALT elevation (>60 IU/L)	43
APTT prolongation (>20% than control)	69
PT prolongation (>3 s than control)	10

AST: Aspartate aminotransferase; APTT: Activated partial thromboplastin time;
PT: Partial thromboplastin, ALT: Alanine aminotransferase

elevation was noted in only 43% (mean = 59.59, median = 64). Though exact cause is not known, excess release of AST from damaged monocytes during the infection has been suggested.[4]

APTT prolongation was noted in 69% (mean = 39.288, median = 39.4).Out of these 69 patients, 56 (81%) had greater prolongation compared to rest of the 13 cases (18.8%), ($P < 0.001$). It indicates that there is a defect in the intrinsic cascade of coagulation system during the dengue hemorrhagic fever (DHF). DF can be without hemorrhage or have unusual hemorrhage, while DHF can be without shock or with shock, that is, dengue shock syndrome.[5] Liver injury further decreases coagulation factor synthesis. Partial thromboplastin prolongation was seen in only 10% (mean = 15.03, median = 15.8) of the cases.

Using parameters such as relative bradycardia, specific AST elevation with APTT prolongation, thrombocytopenia, leucopenia with fever, positive tourniquet test and gallbladder edema we might be able to predict DF in 81% of cases.

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