A FOLLOW UP ON BIOCHEMICAL PARAMETERS IN DENGUE PATIENTS ATTENDING BIRDEM HOSPITAL

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Abstract

During a one-year period between January to December 2002, a total of 84 cases were clinically diagnosed as dengue in the medical unit I of BIRDEM. They were classified into 4 groups: dengue fever (28), DHF-I (31), DHF-II (17), and DHF-III (8). Amongst the patients, 52 (61.9%) were males and 32 (38.1%) were females. SGPT and SGOT were above normal cutoff (40 IU) points in 64 (76.2%) and 73(86.9%) cases respectively. SGOT was higher than SGPT in most cases. S. Bilirubin was almost normal in all cases. S. Calcium level was low in a significant number of cases. Mean S. Ca was 8.69 $\pm$ 0.68 in case of DF and lower, i.e. 7.83 $\pm$ 0.66 in DHF-III. Mean Hb% also correlated with severity, i.e. 13.3 (SD $\pm$ 1.6) in DF and 14.8 $\pm$ 1.3 in DHF-III. ESR was lowest in DHF-III. Anti dengue IgM and IgG were done on 58 cases; 41 (70.7%) were IgM positive while 37 were positive for IgG.

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Indexing words: Dengue, biochemical parameters, hospitalized patients.

Introduction

Dengue virus infection is a serious cause of morbidity and mortality in most countries in the tropical and subtropical areas of the world and is considered to be one of the most important infectious diseases in these regions[1]. In most of the cases the disease can be managed well according to the guidelines provided by WHO[2]. In this study the biochemical parameters of 84 dengue patients admitted in medical unit I of BIRDEM were prospectively followed for 1 year between January to December 2002, with the view to relate important biochemical parameters (changes) to the severity of the disease.

Methods

Patients suffering from dengue fever were recruited based on their diagnosis using the prescribed WHO criteria. Blood levels of Fasting Sugar, 2HABF, urea, S. creatinine, SGOT, SGPT, S. bilirubin, CPK, CKMB, LDH, S. Calcium, TC of WBC, ESR, Hb%, anti Dengue IgM and anti Dengue IgG with antibody Index were done and correlated with severity of the disease. Statistical analyses was done using SPSS package to see correlation between biochemical parameters and severity of dengue infection.

Results

A total of 84 clinically diagnosed dengue infection were recruited. They were classified into 4 groups: 28 cases of dengue fever, 31 cases of DHF-I, 17 of DHF-II and 8 in DHF-III category. There were no patients in DHF-IV category (Table 1 and 2). The study population were all adults, age ranging between 26 to 63 years, 52 (61.9%) were males and 32 (38.1%) were females. The study showed that levels of SGOT and SGPT were significantly higher. SGPT and SGOT were above normal cutoff value (40IU) in 64 (76.2%) cases and in 73 (86.9%) cases respectively. SGOT was higher than SGPT in most cases. Highest value of SGOT and

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Table-1: *Sex distribution of study population*

Sex	Diagnosis				Total
	DF	DHF-I	DHF-II	DHF=III	
Male	16	20	12	5	53
Female	12	11	5	3	31
Total	**28** (33.3%)	**31** (36.9%)	**17** (20.2%)	**8** (9.5%)	**84** (100%)

SGPT were 3320 IU/L and 2645 IU/L. S. bilirubin was normal in most cases. S. bilirubin above 2 mg/dl was found in 3 cases only. S. Calcium level was low in a significant number of patients. Mean S. Ca was 8.7 ± 0.7 mg/dl in case of DF and lower, i.e. 7.8 ± 0.7 mg/dl in DHF-III. The lowest value was 6.8 mg/dl. LDH, CPK and CKMB were found invariably raised, highest value of LDH, CPK and CKMB were 2500 (DHF I), 402 (DHF II) and 48 (DHF I). Mean Hb% also correlated with severity, i.e. 13.3 ± 1.6 in DF and 14.8 ± 1.3 in DHF-III. Overall TC was low. The lowest value of WBC count was 1200/cmm while the highest was 12800 with an average of 5000/cmm. The lowest ESR was 2 mm in 1st hr (DHF-III); highest was105 (DHF-II with secondary bacterial infection). Average was 22.7 mm in first hour. PCV and platelet count showed typical association – highest PCV and lowest platelet count were 53% (DHF III) and 7000/cmm (DHF II). Anti dengue IgM and IgG were done on 58 cases. 41 (70.7%) were IgM positive and 37 (63.7) were positive for IgG. Both IgM and IgG were positive in 22 (38%) cases.

Table-2: *Hematological and biochemical parameter of study population*

	DF	DHF **I**	DHF **II**	DHF **III**
Total count (cmm)	4915	5013	4638	6316
Platelet count (cmm)		43719	25868	24750
ESR (mm)	21	24	26	11
Hb (gm/dl)	13	14	14	15
PCV	39.6	42.3	41.5	44.4
SGOT(IU/l)	204	193	385	904
SGPT(IU/L)	140	110	182	582
S.Bilirubin (mg/dl)	0.6	0.8	0.9	1.1
Serum Ca (mg/dl)	8.7	8.3	8.9	7.8
Fasting blood glucose (mmol/l)	8.15	6.57	8.08	9.35
Post prandial blood glucose (mmol/l)	10.9	9.2	10.3	14.2
Blood urea (mg/dl)	19.7	23.9	27.7	38.8
Serum creatinine	1.0	1.0	1.1	1.4
LDH	572	1082	856	1038
CPK	125	113	212	154
CKMB	21	25.1	23.7	38
Anti dengue IgM (%)	83	62	61	83
Anti dengue IgG (%)	33	76	85	67

Discussion

In this study we primarily focused on the biochemical indices of severity. Alhough WHO severity parameter does not include biochemical changes, several studies[3,4] suggest that only WHO criteria of severity may not be sufficient to categorize and treat the patients of dengue, particularly those receiving tertiary level care, where mostly the complicated cases are dealt with. Within the several biochemical derangements found in this study, the detection of hypocalcemia demands special consideration. There is a scarcity of literature reporting hypocalcemia as a complicating factor of dengue. Only one case report[5] is available describing severe hypocalcemia in a complicated dengue patient. Interestingly a significant number of patients in this series had hypocalcemia, and some of them were symptomatic. Hypocalcemia was correlated with conventional severity parameter; i.e. mean calcium level was lowest in DHF III patients. Another important biochemical parameter was amino-transferase: SGOT and SGPT were found to be isolated severity index; although they were not always correlated with grading of dengue but higher values were found to be associated with a higher morbidity. It was seen in another study that a higher transaminase level was associated with greater morbidity and mortality irrespective of grade of dengue[6]. Bilirubin was usually not raised significantly whatever the transferase levels were, which is very peculiar in dengue. Alkaline phosphatase was also not elevated significantly. Another interesting finding in this study was the invariable elevation of muscle enzymes, concentrations were higher in higher grade of dengue. This is may be due to subclinical myositis[7]. There are some reported cases of ARF in dengue following severe rhabdomyolysis with very high CPK values. In our cases serum creatinine and blood urea were not significantly raised, though there are reports of ARF following dengue infections[8,9] which may be due to immune-complex deposition or severe rhabdomyolysis. In this study blood glucose was found higher in more severe cases. Control of blood sugar in diabetic dengue patients need special

attention, as diabetes had shown to be a complicating factor of dengue[10,11] There were some cases in which glucose intolerance developed with dengue, but more study is needed to establish an association between dengue and glucose intolerance. Hemoglobin, PCV and ESR maintained the usual correlations. ESR is not raised in uncomplicated cases[12]. In early stages raised ESR or high TC indicates secondary bacterial infection.

Conclusion

Hypocalcemia is commonly associated with dengue and correlate with severity. Blood sugar is deranged more in severe cases. Control of blood glucose needs special attention as diabetes is seen as a complicating factor of dengue[13]. Transaminases are isolated indices of severity. Rise of SGOT is more than SGPT. Normal serum bilirubin does not rule out the hepatic involvement. Subclinical muscle damage is often associated with dengue.

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