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RESEARCH ARTICLE

A STUDY OF CLINICAL AND RANDOM BLOOD SUGAR PROFILE ALONG WITH THE EXTENT OF RENAL INVOLVEMENT IN PATIENTS OF DENGUE INFECTION PRESENTING AT A TERTIARY CARE HOSPITAL IN ROHILKHAND REGION

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ABSTRACT

Dengue is one of the most commonly occuring epidemic in rohilkhand region. Many studies are available with regards to the effects of dengue virus on haematological profile and hepatic involvement of patients. We in this research paper aim to study the effects of dengue infection on renal function, electrolyte profile and random blood sugar profile. We found that males were predominantly affected (73.3%). Most patients belonged to 15-45yr age group (85.5%). The incidence of DF, DHF, DSS were 64.4%, 26.7% and 8.9% respectively. Fever (100%) followed by headache (68.8%) was most common symptom. Malena (17.8%) followed by petechial rash (12.2%) and hematuria (3.3%) was most common hemorrhagic manifestation. Thrombocytopenia (platelet < 1lac/mm3) was present in 79% of patients. IgM antibody positive was seen in 40% patients and IgM was weekly positive in 15.5% patients. Serum sodium was normal in 71%, hypernatremia and hyponatremia was seen in 1 patient each (out of 90). Serum potassium was normal in 76.7% cases and hyperkalemia and hypokalemia was seen in 7.7% and 15.6% patients. Random blood sugar was elevated in 11% patients. Blood urea & serum creatinine was found elevated in 25.6% and 13.3% respectively. 3 patient died (out of 90) and only 1 patient required hemodialysis.

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INTRODUCTION

Dengue fever is one of the common mosquito borne infections caused by flavivirus. It is one of the most frequently encountered epidemic in clinical practice in rohilkhand region. Clinical expression of dengue fever varies from mild febrile illness to Dengue hemorrhagic fever and Dengue shock syndrome. Dengue virus affects almost every organ of the body like liver, brain, kidney, lungs and various blood cells. Various studies are present in literature with respect to hepatic involvement in dengue fever but there a very few studies on renal involvement in patients of dengue fever. Case reports have shown occurrence of proteinuria, hematuria, glomerulonephritis and acute renal failure in dengue fever. Acute renal failure is a potential complication of severe dengue infection and is usually associated with hypotension, hemolysis and rhabdomyolysis. We in this study intend to understand the impact of dengue fever on renal function (to study the frequency and severity of derangement of renal function) and the need for hemodialysis support in such patients.

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MATERIALS AND METHODS

All the patients of either sex in the age group of 18-65yrs admitted in medicine department of SRMS IMS, Bareilly during the period from Jan 2014 to Dec 2014 who consented to be a part of our study were included. Patients with pre-existing liver disease (alcoholic liver disease or chronic liver disease), patients with HBV positive or HCV positive or malaria or widal positive, patients with diabetes mellitus or chronic renal disease and patients on anti platelets or anticoagulants were excluded. The diagnosis of Dengue infection (DI) was done in patients with fever of short duration (<15 days) and thrombocytopenia (platelet count <100x109/L), irrespective of the presence or absence of haemorrhagic manifestations. Using the WHO criteria, patients were grouped into dengue fever (DF), dengue haemorrhagic fever (DHF) or dengue shock syndrome (DSS).

DF was defined as fever accompanied by constitutional symptoms, the only haemorrhagic manifestation being a positive tourniquet test. DHF was defined as spontaneous bleeding in addition to manifestations of DF and DSS was defined as circulatory collapse manifested by a rapid and weak pulse, narrowing of pulse pressure to < 20 mmHg, or hypotension with a cold, clammy skin. A detailed history was taken in all patients and a detailed clinical examination was done.

Platelet count, random blood sugar & renal function tests (including blood urea, serum creatinine, serum sodium, serum potassium) were done. Patients' sera was tested for IgM anti-dengue virus antibodies using a commercially available IgM capture ELISA assay. At the end of study the number of patients who needed hemodialysis was noted and who died or survived was documented.

Observations and Tables

Sex Distribution

SEX	TOTAL (90)	%
MALE	66	73.3 %
FEMALE	24	26.7 %

Age Distribution

AGE GROUP	TOTAL (90)	%
15 - 25 yrs	38	42.2%
26 - 35 yrs	18	20%
36 - 45 yrs	21	23.3%
46 - 55 yrs	07	7.9%
56 - 65 yrs	03	3.3%
66 - 75 yrs	03	3.3 %

Symptomatology

SYMPTOMS	TOTAL (90)	%
1.Fever	90	100%
2.Headache	62	68.8%
3.Bodyache/Joint Pain	56	62.2%
4.Petechial Rash	11	12.2%
5.Abdominal		
A.Pain Abdomen	31	34.4%
B.Vomiting	18	20%
C.Loose Stool	5	5.6%
D.Jaundice	2	2.2%
E.Malena	16	17.8%
6.Urinary		
A.Burning Micturition	11	12.2%
B.Hematuria	3	3.3%
C.High Coloured Urine	8	8.9%
7.Breathing Difficulty	3	3.3%
8.Palpitation	1	1.1%

Systolic Blood Pressure

SYSTOLIC BP	TOTAL (90)	%
< 90 mmHg	8	8.9%
90-100 mmHg	14	15.6%
100-110 mmHg	16	17.9%
110-120 mmHg	28	31.1%
120-140 mmHg	8	8.9%
140-150 mmHg	8	8.9%
>150 mmHg	8	8.9%

Diastolic Blood Pressure

DIASTOLIC BP	TOTAL (90)	%
< 60 mmHg	8	8.9%
60-70 mmHg	42	46.6%
70-80 mmHg	34	37.7%
80-90 mmHg	6	6.8%
>90mmHg	0	0%

Incidence of DF/DHF/DSS

	TOTAL (90)	%
1.DENGUE FEVER	58	64.4%
2.DENGUE HEMORRHAGIC FEVER	24	26.7%
3.DENGUE SHOCK SYNDROME	8	8.9%

Platelets

Platelet count	TOTAL	%
1.<10,000/mm^3	4	4.5%
2.10,000 - 20,000/mm^3	7	7.8%
3.20,000 - 50,000/mm^3	36	40%
4.50,000 - 1 lac/mm^3	24	26.7%
5.1-1.5 lac/mm^3	14	15.5%
6.>1.5 lac/mm^3	5	5.6%

Dengue Serology (ELISA – 7 to 14 days)

ELISA	TOTAL	%
1.IgM +	36	40%
2.IgM weakly +	14	15.5%
3.IgM -	40	44.5%

Blood Urea

Blood Urea	TOTAL	%
1.<15 mg/dl	10	11.1%
2.15-40mg/dl	57	63.3%
3.40-80 mg/dl	15	16.7%
4.>80mg/dl	8	8.9%

Serum Creatinine

Serum Creatinine	TOTAL	%
1.< 1.4g/dl	78	86.7%
2.2- 2.8 g/dl (1.5-2 times N)	8	8.9%
3.2.8 – 4.2 g/dl (2-3 times N)	2	2.2%
4.>4.2 g/dl (>3 times N)	2	2.2%

Serum Sodium

Serum Sodium	TOTAL	%
1.< 130 mmol/l	1	1.1%
2.130-135 mmol/l	24	26.8%
3.136-145 mmol/l	61	67.7%
4.146-155 mmol/l	3	3.3%
5.> 155 mmol/l	1	1.1%

Serum Potassium

Serum Potassium	TOTAL (90)	%
1.< 2.5mmol/l	0	0%
2.2.5 - 3.5mmol/l	14	15.6%
3.3.6 - 4.5 mmol/l	60	66.8%
4.4.6 - 5.5 mmol/l	9	9.9%
5.> 5.5mmol/l	7	7.7%

Random Blood Sugar

RBS (mg/dl)	TOTAL	%
1.<100	57	62.2%
2.100-140	24	26.8%
3.140-180	7	7.7%
4.> 180	3	3.3%

Outcome

	Number	%
1.OUTCOME	90	100%
A.SURVIVED	87	96.7%
B.EXPIRED	3	3.3%
2.HEMODIALYSIS		
A.REQUIRED	1	1.1%
B.NOT REQUIRED	89	98.9%

DISCUSSION

Dengue virus infection manifests variously as undifferentiated fever, dengue fever, dengue haemorrhagic fever or dengue shock syndrome. Renal injury comprising creatinine increase, proteinuria, glomerulonephitis, acute kidney injury and hemlytic uremic syndrome (Karlo and Ali Nayer, 2014). All dengue related AKI have occurred in association with shock, rhabdomyolysis or hemolysis. Mesangial proliferation and immune complex deposition are the dominant histologic features of dengue associated glomerulonephritis (Bhagat *et al.,* 2012). Hematuria (12.5%) and proteinuria (74%) have been reported in various studies (Hutspardol *et al.,* 2011). From Table 1, we observe that males (73.3%) were predominantly affected with dengue. The ratio of male: female was 2.75:1.

From Table 2, we can see that majority of the patients affected belonged to 15-45 yr age group (85.5%). The most commonly involved age group was 15-25yr (42.2%) followed by 36-45yrs (23.3%) and 26-35yrs (20%). The least commonly involved age group was elderly age group. From the table 3, almost all the patients had fever (100%). Other major complaints of the patients were headache (68.8%) and body ache (62.2%). Abdominal complaints were predominantly pain abdomen (34.4%), vomiting (20%) and malena (17.8%). Urinary symptoms were burning micturition (12.2%) and high coloured urine (8.9%). Farhan Fazal, Sangram Biradar (2015) in there study observed, all the cases had fever (100%). Other common symptoms they noted were myalgia (61%), joint pain (54%), headache (66%), vomiting (55%), pain abdomen (48%), rash (41%), hepatomegaly (20%), bleeding (21%) and shock (8%) (Farhan Fazal, 2015). Jain *et al*., 2011 in there study noted generalized body ache in 84%, headache in 77%, high grade fever in 73%, joint pain in 42%, symptomatic bleed in 32%, malaise in 27% and apparent jaundice in 15% of the dengue positive cases. Atypical complication seen in dengue fever was as cites in 10% and pleural effusion in 32% (Jain *et al*., 2015). The hemorrhagic manifestations were mainly malena (17.8%) followed by petechial rash (12.2%) and hematuria (3.3%). Respiratory and cardiovascular manifestations were rarely complained off and constitututed only 3.3 % and 1.1% respectively. Jain *et al*. in there study of, found bleeding manifestations occurred in 32% cases (20) and out of which 65% was presented as having malena (13 patients), 20% as hematuria (4 patients), 10% as epistaxis (2 patients) and remaining 5% as hematemesis (1patient) (Jain *et al*., 2015). Chandrakanta *et al*. (2008) reported the incidence of bleeding in dengue fever to be 38.8% out of which 23.7% cases had gastrointestinal tract bleeding (61%) (Chandrakanta *et al*., 2008). From the table 4, we observe that shock was present in 8 out of 90 patients (8.9%) – these constituted our patients with dengue shock syndrome. From the table 5, we observe that diastolic BP < 60 mm Hg was present in 8 out of 90 patients (8.9%). All others had diastolic blood pressure within range of 60-90 mm Hg (91.1%). From the Table 6, it is evident that the incidence of dengue fever was maximum with 64.4% (58 out of 90) followed by dengue hemorrhagic fever (26.7%) and dengue shock syndrome (8.9%). Farhan Fazal, Sangram Biradar (2015) in there study on Clinical and Laboratory Profile of Dengue

Fever. Out of 100 cases in this study 70 cases belongs to DF, 23 cases to DHF and 7 cases to DSS based on WHO criteria (Farhan Fazal, 2015). From the Table 7, we found that thrombocytopenia (platelet count < 1lac/mm^3) was present in 79% of cases. The incidence of platelet count <10,000/mm^3 was found in 4 patients (4.5%). Majority of patients (40%) had platelets in 20,000-50,000/mm^3 followed by 0.5-1 lac/mm^3 (26.7%). Chandrakanta *et al.* (2008) reported the incidence of thrombocytopenia to be 60% (Jain *et al*., 2015). Jain *et al*. in there study noted the incidence of thrombocytopenia was found to be 92% (Chandrakanta *et al*., 2008). Farhan Fazal, Sangram Biradar (2015) in there study on Clinical and Laboratory Profile of Dengue Fever. Out of 100 cases in this study, low platelet count of less than 100, 000/cu mm according to WHO criteria was present in 73% patients. From the above table 8, it is evident that IgM antibody was positive in 40% of the patients. IgM weakly + was seen in 15.5% of patients.

From the Table 9, we observe that blood urea was within normal limits (<40mg/dl) in 74.4% of patients and raised urea was found in 25.6% patients. From Table 10, we note that majority of patients (86.7%) had creatinine within normal limit. Raised creatinine (AKI) was observed in 13.3% (12/90) patients with only 1 patient (sr creatinine 7.9g/dl) needing hemodialysis for acute renal failure. Mild AKI was seen in 8.9% patients and moderate to severe AKI was seen in 4.4% patients. In a retrospective study done by Muhammad khalil et al on acute kidney injury (AKI) in dengue virus infection and published in 2015. They found that out of 532 patients, 71 had AKI (13.3%). Approximately 64.8% of these patients ha mild AKI and 35.2% had moderate to severe AKI (Muhammad *et al.,* 2012). Independent predictors for AKI are male gender, presence of dengue haemorrhagic fever, dengue shock syndrome, neurological involvement and prolonged APTT. 11.3% patients of AKI died whereas there were no mortalities in patients without AKI (Muhammad *et al.,* 2012). From the table 11, it is clear that most of the patients had sodium within normal range (71%) followed by 26.8% patients where serum sodium was 130 - 135mmol/l. Hypernatremia (Na+ > 155mmol/l) and hyponatremia (Na+ <130mmol/l) was present in one patient each. From the Table 12, serum potassium was found normal in 76.7% of the patients. Hyperkalemia (K+ > 5.5 mmol/l) was noted in 7 patients (7.7%) with maximum recorded being 8 mmol/l. Mild hypokalemia was noted in 14 patients (15.6%). From the table 13, random blood sugar was < 100 mg/dl at admission in 62.2%, 100-140mg/dl in 26.8%, 140-180mg/dl in 7.7%, > 180mg/dl in 3.3% respectively. We observe majority of patients (89%) had random blood sugar within normal limits. From the Table 14, mortality was seen in only 3 patients out of 90 (3.3%). From Table 14, we observe that only 1 patient required hemodialysis (1.1%). The patient who died was one who needed hemodialysis support.

Conclusion

Renal involvement is relatively uncommon in dengue infection. Hematuria was noted in 3.3% of patients. AKI was seen in 13.3% of our patients. Most of our patients with AKI were of mild variety (8.9%). Severe AKI (serum creatinine > 3 times normal) was seen in 2.2% patients and only 1 of these patient required hemodialysis support. Mortality rate was 1.1% (1 out of 90 patients). We conclude that renal involvement is relatively uncommon in dengue infection. AKI due to dengue infection is reversible if detected early and appropriate preventive measures are taken. Only very few patient (1.1%) with AKI need hemodialysis.

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