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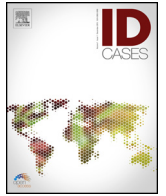
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Management of dengue hemorrhagic fever in a secondary level hospital in Bangladesh: A case report

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ABSTRACT

Dengue is an important tropical infection caused by an *arbovirus*. As a mosquito borne infection, this disease is widely spread in several tropical endemic countries and this implies the global importance of this infection. In this specific case report, the author discussed the case management of dengue hemorrhagic fever (DHF). A 42-year-old patient came to a secondary level hospital with complaints of diffuse abdominal pain (more in central region) continually for 3 days. Based on his clinical investigations the patient was diagnosed by DHF and managed with intravenously administered fluid resuscitation as he had a history of vomiting, close monitoring of vital status, and gave conservative treatment. Although, the plasma leakage had concerned the doctors about developing DSS. But after seeing his blood report, when the doctors found that the patient's platelet count was raised gradually and no other associated signs then they decided to give him discharge from the hospital. Prevention and control of dengue and DHF has become more urgent and the available vaccine is still limited. Hence, effective disease prevention programs, education of the medical community to ensure effective case management, community-based integrated mosquito control are necessary.

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Introduction

Dengue fever (DF) is a mosquito borne (family *Flaviviridae*, genus *Flavivirus*) disease of humans considered as a temporal worldwide public health concern [1]. The disease is now hyperendemic both in tropical and subtropical regions circulating all four serotypes (DENV-1 to DENV-4) [2]. Globally, almost 4 billion people from at least 128 countries are under the risk [3] and estimated 50 million dengue infections are occurring each year [4]. The World Health Organization declared South Asia as an endemic area for the disease due to favorable dissemination environment of *Aedes aegypti*, the main dengue vector [5].

The clinical spectrum of dengue disease manifestations ranges from asymptomatic to symptomatic forms like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) [6]. Most commonly determined signs and symptoms of DF includes high fever, myalgia, arthralgia, severe headache, retro orbital pain and maculopapular rash. In exception, dengue patients might have nonspecific symptoms like nausea, vomiting, cough, dizziness,

diarrhea [7]. Sometimes, it can be asymptomatic or self-limiting DF to severe dengue characterized by plasma leakage (DHF), (grades 1 and 2) that can lead to a life-threatening syndrome (DSS), (grades 3 and 4) [5]. Furthermore, subjects who develop DHF accompanied by DSS have 3–5 % higher chance of death [8]. We present a case report of a patient with DHF attempting to disclose related signs, symptoms and treatments.

Case report

A 42-year-old patient came to a secondary level hospital with complaints of diffuse abdominal pain (more in central region) continually for 3 days. On admission to the medical ward, he was afebrile (37.4 degree centigrade), with a pulse rate of 92 beats per minute and a blood pressure of 105/65 mmHg. He did not have history of fever at the time of admission. On inspection of his abdomen, reddish discoloration was found (Fig. 1) and no other localized complaints were reported except an abdominal tenderness just upper abdomen on palpation.

After taking a proper narrative history, the patient let inform about his 3 days continual fever. First day it was high grade (39.5 degree centigrade); and low grade (38.3 degree centigrade) in the next two days. Initially, he had visited to a local primary care hospital due to symptoms like vomiting, lose motion and diffuse

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Fig. 1. Band shaped skin rash on the abdomen.

abdominal pain, therefore, been advised to do some investigations. Results of the investigations were as follows: platelets $32,000/\text{mm}^3$; white blood cell count $3400/\text{mm}^3$ (neutrophils 40 %; lymphocyte 43 %); hematocrit 36 %; hemoglobin 11.6 g/dl; blood picture – leukopenia, lymphocytosis, and thrombocytopenia. No abnormalities were shown in his ultrasonogram of whole abdomen. But his physical condition was deteriorating, and he had been referred to a secondary hospital.

The on-duty doctor of secondary hospital primarily predicted the patient might have acute hemorrhagic pancreatitis due to tenderness on pancreatic region regardless of his previous reports. Based on this symptom, the doctor had started management and advised for routine blood investigations sooner after the admission. Results of the investigations were as follows: white blood cell count $9700/\text{mm}^3$ (neutrophils 54 %, lymphocytes 40 %); hematocrit 42.9 %; hemoglobin 11.7 g/dl, platelet $22,000/\text{mm}^3$; peripheral blood picture – thrombocytopenia; anti dengue IgM was positive (done on 4th day of fever-on admission day); random blood glucose was 5.8 mmol/l, alanine transaminase 39 IU/mL; serum creatinine 1.3 mg/dl; serum electrolytes: serum sodium (Na) 126.4 mmol/l; serum potassium (K) 4.29 mmol/l; serum chloride (Cl) 93.2 mmol/l; serum amylase 82 IU/L (normal up to 95); urinary amylase 650 IU/L (normal up to 490); blood group was AB positive; ultra-sonogram of whole abdomen showed moderate ascites, prominent pancreas, mild to moderate pleural effusion (as an

abnormal chest finding) and his urinary output was normal. There was no history of bleeding manifestations. As the platelet counts were below in respect to normal range, doctors made the clinical diagnosis of dengue hemorrhagic fever. Due to a history of vomiting, the patient was managed with intravenously administered fluid resuscitation, close monitoring of vital status, and gave conservative treatment. Besides, the plasma leakage was a concerned of the doctors in developing DSS.

On next day, the reports of repeat blood investigations advised by the doctors were: platelet $20,000/\text{mm}^3$; serum electrolytes: serum sodium (Na) 130.1 mmol/l; serum potassium (K) 4.30 mmol/l; serum chloride (Cl) 91.3 mmol/l. He was advised to arrange blood donors (for fresh frozen plasma) since his platelet count was deteriorating gradually even though the vital signs were completely normal.

Similarly, the platelet count was done again at evening resulted around $50,000/\text{mm}^3$. He had no fever and stomach pain was likewise died down steadily. Doctors completed an ultra-sonogram of whole abdomen and it demonstrated no noteworthy variations from the norm. At that point they proceeded with similar treatment like platelet count once a day, for the following 2 days. When they found the patient's platelet count was raising gradually ($70,000/\text{mm}^3$ and $110,000/\text{mm}^3$) and no other associated signs, they decided to give him discharge from the hospital (Table 1).

Discussion

Only a countable number of case reports in respect to DHF have been documented in medical literature. Pathophysiology of severe clinical manifestation observed in DHF remains poorly understood, since a common belief is secondary infection put the subjects at great risk of DHF [8]. Besides, vasculopathy, deficiency and dysfunction of platelets and defects in the blood coagulation pathways are the attributed factors [9].

The clinical course of DHF is characterized by three phases: Febrile, leakage, and convalescent phase. The initial febrile illness is marked by a morbilliform rash and hemorrhagic tendencies [10]. The fever persists for 2 days to 1 week and then drops to normal or subnormal levels when the patient either convalesces or advances to the plasma leakage phase. High plasma escape cases are marked by frank shock with low pulse pressure, cyanosis, hepatomegaly, pleural and pericardial effusions, and ascites. Hence, high clinical

Table 1
Investigations report and vital signs recorded from admission to discharge day.

Investigations	Day 0	Day 1	Day 2	Day 3
White blood cell count	$9700/\text{mm}^3$	–	–	–
Hematocrit	42.9 %	47 %	–	–
Hemoglobin	11.7 g/dl	–	12.1 g/dl	–
Platelet	$22,000/\text{mm}^3$	At morning- $20,000/\text{mm}^3$ At night- $50,000/\text{mm}^3$	$70,000/\text{mm}^3$	$110,000/\text{mm}^3$
Random blood glucose	5.8 mmol/l	4.8 mmol/l	–	–
Anti-dengue IgM	Positive	–	–	–
Serum electrolytes	Na - 126.4 mmol/l K - 4.29 mmol/l Cl - 93.2 mmol/l	Na - 130.1 mmol/l K - 4.30 mmol/l Cl - 91.3 mmol/l	–	–
Serum amylase	82 IU/L	76 IU/L	–	–
Alanine transaminase	39 IU/mL	–	–	–
Serum creatinine	1.3 mg/dl	–	–	–
urinary amylase	650 IU/L	530 IU/L	–	–
Ultra-sonogram of whole abdomen	moderate ascites, prominent pancreas, mild to moderate pleural effusion (as an abnormal chest finding)	–	no noteworthy variation was found	–
Urinary output	normal	normal	normal	normal
Vital Signs				
Temperature	37.4 degree centigrade	37.1 degree centigrade	36.7 degree centigrade	37.0 degree centigrade
Pulse rate	92 beats/minute	84 beats/minute	80 beats/minute	82 beats/minute
Blood pressure	105/65 mmHg	110/70 mmHg	110/65 mmHg	112/73 mmHg

suspicion and close monitoring of patient are important for early diagnosis and management of such cases. Management is usually conservative.

DHF is frequently seen during a secondary dengue infection. An interview with the patient did not reveal that a previous dengue viral infection had occurred. Around that time, the fever begins to subside (usually 3–7 days after symptom onset), the patient had developed warning signs of severe disease like abdominal pain, persistent vomiting, change in temperature (from fever to afebrile). In our case report, the patient was closely monitored with a caution of developing hemorrhagic manifestations, or/and changes in mental status (irritability, confusion, or obtundation).

Conclusion

The factors associated with dengue transmission include demographic and societal changes like uncontrolled population growth, unplanned urbanization, substandard housing, crowding, and deterioration in water, sewer, and waste management systems. Along with these, lack of public health awareness, and appropriate disease have created ideal conditions for increased transmission of mosquito-borne diseases especially in tropical and subtropical developing countries like Bangladesh. Nonetheless, prevention and control of dengue and DHF has become more urgent with the expanding geographic distribution and increased disease incidence in the past decades. There is a need for understanding the changing epidemiology through continuous monitoring, including extending the surveillance areas and addressing the challenges to reduce the impact of the disease on public health. It may be very challenging to root up the disease from the supply side depending on economic condition of the country. A long-term investment is needed to achieve behavioral changes in the urban population to join the fight against the *Aedes* mosquitoes.

By far, one dengue vaccine (Dengvaxia), developed by Sanofi Pasteur, has been approved by the World Health Organization and licensed in 20 countries [11]. The vaccine is only available for people living in some dengue endemic countries yet to be available commercially for travelers. Currently, the CDC and Indian research organizations are collaborating [12], to come forward to initiate and coordinate a large-scale randomized clinical trial of the dengue vaccine in Bangladesh. Further studies are needed to explore. Finally, this case report urges a need for up taking awareness on possible occurrence of serious secondary bacterial infections related to dengue viral infection, especially in patients with prolonged fever (more than 5 days) and highlights the likelihood of shock occurring commonly in DHF.

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Ethical approval

Informed consent was obtained from the patient to publish the case.

Authors statement

The authors have stated that they have addressed all issues mentioned in the reviewers' comments very carefully and made the necessary corrections accordingly in the text with track changes. YJ wrote the first draft of the manuscript and AR critically reviewed and revised the manuscript. All the authors read and approved the final paper.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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