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Acute abdomen and unspecific peritonitis as rare manifestations of Expanded Dengue Syndrome

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Abstract
Abdominal discomfort and inflammation of the serous membranes with minimal accumulation of fluid in the abdominal cavity are typical signs of dengue fever. Abdominal pain in dengue virus infection is commonly attributed to conditions such as gallbladder inflammation without gallstones, liver inflammation, inflammation of the pancreas, and peptic ulcers. It is extremely rare for patients with expanded dengue fever syndrome to experience acute abdominal symptoms and peritonitis.
We present a case of a young man with no prior medical history who arrived at the Emergency department with complaints of sudden abdominal pain, fever, and moderate to significant accumulation of fluid in the abdomen. His blood tests revealed a very low platelet count and an exceptionally high hematocrit value. The presence of expanded dengue viral infection syndrome was suspected, and further testing was requested.
Acute abdomen and peritonitis in a patient with suspected dengue fever make the diagnosis and management challenging.

Keywords: Dengue fever, Dengue hemorrhagic fever, Expanded Dengue Fever, peritonitis, acute abdomen

Introduction

The most prevalent flavivirus infection worldwide is the dengue virus infection. There are four separate serotypes of the dengue virus (DEN1–DEN4), and being infected with one serotype provides immunity only to that specific serotype for life. Mosquitoes of the genus Aedes, particularly Aedes aegypti and Aedes albopictus, transmit all serotypes between humans [1].
Dengue incidence has surged nearly eight-fold over the last two decades, escalating from 505,430 cases in 2000 to more than 2.4 million in 2010, and reaching 5.2 million in 2019, as reported by the World Health Organization (WHO) [8].
Between 4.3% and 12.04% of individuals diagnosed with Dengue fever have exhibited acute abdominal symptoms. Abdominal pain is regarded as a critical warning sign in the presence of a dengue virus infection and is generally managed with intravenous fluids. This condition may also manifest with symptoms such as edema, accumulation of serous fluid, and enlarged mesenteric lymph nodes, all of which are indicative of inflammatory pathology [2].
Acute abdomen and peritonitis are rare manifestations of dengue virus infection. It is crucial to consider dengue fever as a potential differential diagnosis for patients presenting with acute abdominal pain, particularly those with a history of travel to dengue-endemic regions and exhibiting thrombocytopenia. This consideration may aid in avoiding unnecessary surgical procedures for patients suffering from dengue fever.

Case Report

A 25-year-old male, working as a plumber, non-smoker, occasional alcohol consumer, with no other significant past medical history presented to our Emergency Department with history of fever for four days which subsided after taking antipyretic. Two days before presentation he had sudden severe abdominal pain associated with five to six episodes of vomiting and passed semi-loose stools several times.
On examination, the patient was conscious, oriented, sick looking. He was in pain and dehydrated. Systemic examination revealed distended abdomen, widespread rebound tenderness throughout the abdominal area, along with a positive finding of shifting dullness.
His routine laboratory investigations (Table1) revealed haemoglobin level 20.5, haematocrit 57.7, platelet count was 16000. Coagulation profile was within normal. Renal function test revealed mild increase in creatinine which improved with rehydration. Liver function tests showed mild transaminitis. Amylase and lipase levels were normal. Inflammatory markers were not markedly elevated.
Ferritin and Lactate Dehydrogenase were elevated.
Hepatitis and HIV serology was negative.
Pan-cultures (blood, sputum, and urine) were negative.
Dengue polymerase chain reaction and IgM antibodies were positive.
Abdominal Ultrasound revealed marked ascites. (Figure 2) CT abdomen with contrast was requested. It was reported as marked pelviabdominal ascites (Figures 3a and 3b), and mild bilateral pleural effusion (Figure 4) with underlying lung collapse.
Abdominal paracentesis was done for peritoneal fluid analysis. Peritoneal fluid analysis showed WBC 358 mainly lymphocytic, normal Lactate Dehydrogenase and glucose, protein 39 and albumin 19 and calculated SAAG was 1.0 g/dl. Tuberculosis polymerase chain reaction of peritoneal fluid was negative.
The patient was treated with Intravenous fluids and other supportive measures. After adequate hydration, hematocrit and Hb level normalized. His platelet count increased progressively and normalized on 4th day of admission. (Figure 1). He was started on empirical antibiotics which were subsequently stopped once cultures were available.
Post treatment, abdominal ultrasound showed regressive course of the minimal intra-peritoneal fluid collection.
His symptoms improved and he was discharged on 7th day in stable condition.

Table 1: Initial lab work up of patient

Detail	Value w/Units	Normal Range
CRP	20.8mg/L	3.0-0.0
Phosphorus	1.38mmol/L	1.52-0.84
WBC	5.71x10E3/uL	10.00-4.00
Hgb	20.50g/dL	17.00-13.00
Platelet	16.0x10(3)/mcL	450.0-150.0
Neutro %	% 61.60	80.00-40.00
Lymph %	% 24.00	40.00-20.00
PT	11.10second(s)	14.00-9.00
PTT	49.30second(s)	35.00-25.00
INR	0.97Ratio	1.29-0.80
ESR	2.00mm/hr	15.00-0.00
Sodium Lvl	133mmol/L	145-136
Potassium Lvl	4.78mmol/L	5.10-3.50
Creatinine	147umol/L	115-80
Uric Acid	440umol/L	428-208
Urea Lvl	7.60mmol/L	6.40-2.50
eGFR	56mL/min/1.73m2	
Total Protein	57g/L	82-64
Albumin Lvl	29.5g/L	50.0-34.0
Bili Total	10.8umol/L	17.0-3.0
ALT	107IU/L	63-16
AST	163U/L	37-15
Alk Phos	60.15IU/L	116.00-46.00
Amylase Lvl	52IU/L	115-25
Calcium Lvl	2.07mmol/L	2.52-2.12
PCT	0.79ng/mL	0.10-0.00
Lipase Lvl	73U/L	393-73
Lactic Acid Lvl	3.1mmol/L	2.0-0.4

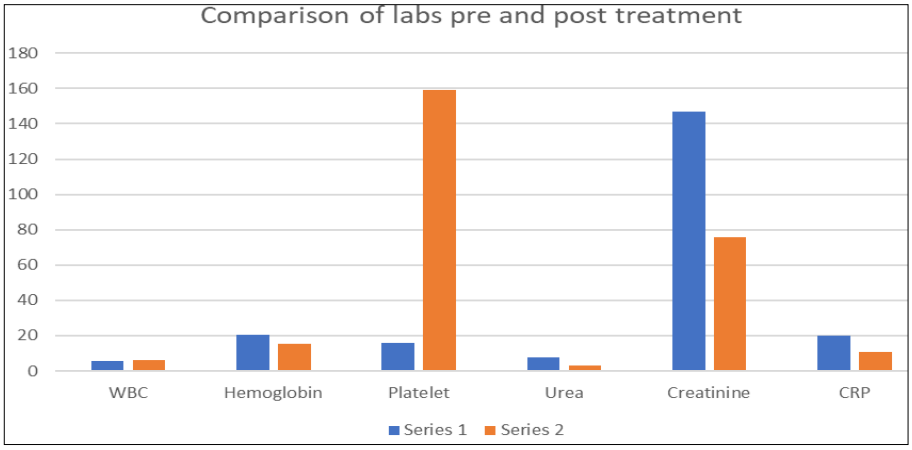

Fig 1: Comparison of labs pre and post treatment

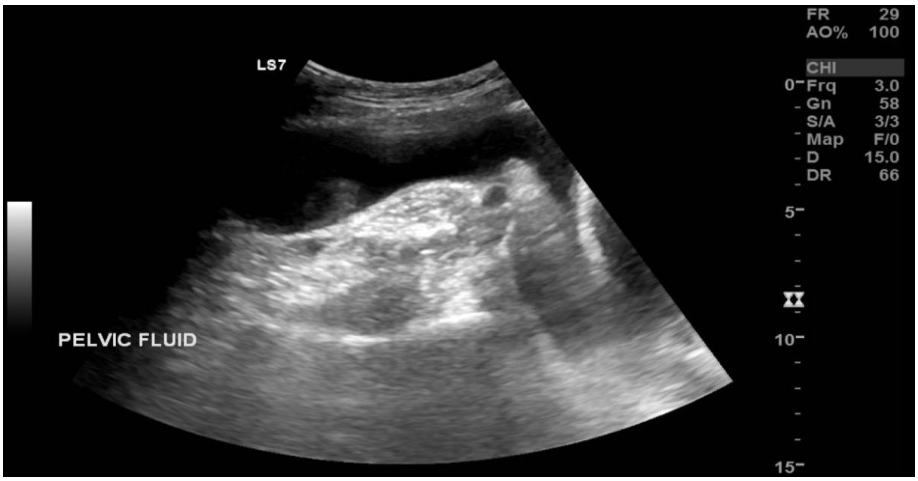

Fig 2: Pelvis ascitis on ultrasound

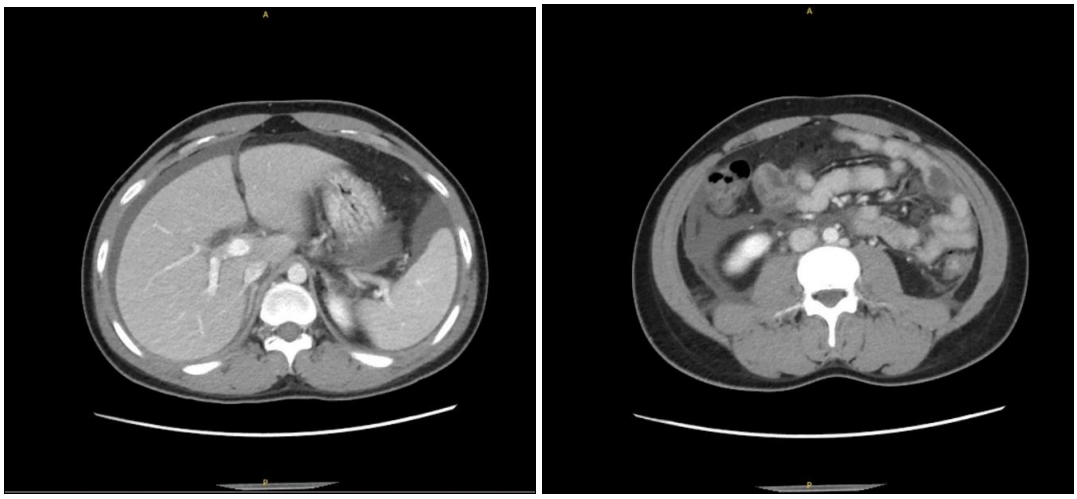

Fig 3a and 3b: CT abdomen showing pelvi-abdominal ascites

Fig 4: Bilateral pleural effusion on CT scan

Discussion

Background

Dengue virus infection represents the predominant cause of arboviral disease globally. It is estimated that there are approximately 100 million cases of dengue fever annually, alongside 250,000 instances of dengue hemorrhagic fever (DHF), resulting in a mortality rate of around 25,000 deaths each year. Over the past five decades, the incidence of dengue has surged thirtyfold, with its geographic reach extending to new nations and, in the current decade, spreading from urban areas to rural environments [3].

Dengue can present in a range of clinical forms, from asymptomatic cases and self-limiting dengue fever to more severe manifestations like dengue hemorrhagic fever (DHF) with shock syndrome. Common symptoms associated with dengue virus infection include fever, headache, retro-orbital pain, photophobia, back pain, and severe muscle and joint pain. Other possible signs and symptoms may include a widespread maculopapular rash, lymphadenopathy, a positive tourniquet test, petechiae, and other hemorrhagic manifestations. The World Health Organization (WHO) has set forth diagnostic criteria for dengue, distinguishing between cases with and without warning signs, as well as for severe dengue, based on clinical indicators and laboratory results [4]. In order to include a broad range of unusual dengue manifestations that affect several organ systems, such as the neurological, pulmonary, renal, gastrointestinal, and hepatic systems, a new entity called Expanded dengue syndrome was added to the classification system. The known manifestations of EDS include fulminant hepatic failure, acalculous cholecystitis, acute pancreatitis, hyperplasia of Peyer's patches, and acute parotitis.

Pathogenesis

Many theories have been postulated about the pathogenesis of development of plasma leakage in dengue hemorrhagic fever. Most of the evidence points to enhanced capillary permeability more as a result of endothelial cell dysfunction rather than from injury. Electron microscopic studies show widening of the endothelial tight junctions during dengue virus infection.

Histological studies have shown minimal structural damage to capillaries. The endothelial cell dysfunction effect has been seen to transient and undergoes rapid resolution with no residual pathology. Plasma leakage has been seen to be maximum several days after the peak of circulating viral RNA or NS 1 protein, during the stage of rapid immuno clearance.

There are no specific inflammatory markers which will predict development of plasma leakage. However, several

mediators have been found to be associated with increased vascular permeability in severe dengue. The most important of these are nitric oxide (NO), tumor necrosis factor (TNF), complement, vascular endothelial growth factor (VEGF), interferon gamma, interleukin 2 and 3 (IL-2 and 3). The cytokines are liberated from virus infected monocytes, dendritic cells, mast cells, activated platelets and dengue virus specific CD4 and CD8 T lymphocytes. Measurement of plasma level of the substrates is not always possible due to the short half-life.

Clinical presentation

Abdominal pain is a common symptom seen in patients with dengue. This pain can be classified as either specific or non-specific and, in some cases, can resemble surgical emergencies. However, in many instances of severe abdominal pain, a clear cause may not be found [6].

Abdominal pains with symptoms of acute abdomen have been infrequently documented. The non-specific nature of the presentation makes it challenging to diagnose and manage these cases. The range of acute surgical emergencies that give rise to suspicion of an abdominal catastrophe in patients with dengue fever includes acute pancreatitis, acute acalculous cholecystitis, non-specific peritonitis, and acute appendicitis [7].

The symptoms and signs of our patient were similar to those that have been previously described for dengue fever. Also, the presence of thrombocytopenia, mild derangement of liver enzymes, evidence of plasma leakage (pleural effusion, ascites, hypoalbuminemia and raised hematocrit) and positive IgM serology for dengue all supported the diagnosis of Dengue fever. However, the whole clinical picture was masked by acute severe abdominal pain and tenderness.

Acute abdomen-like presentation of dengue is a diagnostic challenge. It is a common symptom of dengue; however, the underlying pathology is highly variable. Our patient was a young male without any comorbidity. He presented with an acute abdomen and had none of the usual complications of DF, including acalculous cholecystitis or dengue hemorrhagic fever. His symptoms could be appropriately managed by diagnosing and treating. Since dengue is a viral infection, antibiotics usually have no role in its management. Patient needs supportive care in the form of fluid management. Guidelines for intravenous fluid therapy of dengue fever have been developed by the WHO. For patients with shock, an initial bolus of 5% dextrose in normal saline or Ringer's lactate (10 to 20 mL per kg of body weight) infused rapidly is recommended, followed by continuous infusion (10 to 20 mL/kg per hour) until vital signs and urine output normalize. The infusion rate can then be gradually reduced until it matches plasma fluid losses [8].

Ignorance to the existence of such rare complications which cannot be managed with antimicrobial agents might be life-threatening to the patient. This case emphasizes on the fact that even in a patient with dengue without warning signs and no known comorbidities, EDS might manifest. On extensive review of literature, only two publications documenting a case similar to this were found [1, 2]. Other cases of dengue with abdominal manifestations like acalculous cholecystitis, hepatitis and pancreatitis have been reported with greater frequency.

Conclusion

Acute abdomen is an uncommon presentation of dengue fever. It is important to take dengue fever into consideration when making a differential diagnosis on acute abdomen for patients returning from dengue endemic regions. It may help in preventing unnecessary surgical intervention in such patients. It is also important for medical personnel to be aware of the epidemiology of tropical diseases. Thorough investigation should be undertaken in suspected cases before any kind of invasive intervention.

Conflict of interest

This study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Consent

Written consent was taken from the patient.

Ethics committee

Ethical approval is not required for case reports in our facility.

Author contributions

Dr Osama Alian- Data acquisition, Conceptual development
Dr Maryam Nazir Ahmed- Study design, Data analysis, Conceptual development
Dr Saima Majid Mattoo- Study design, Data analysis, Conceptual development
Dr Essa Ibrahim Muallemi- Conceptual development

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