9

A 52-Year-Old Man from Vietnam With Evolving Shock

NICK JONES AND SOPHIE YACOUB

Clinical Presentation

History

A 52-year-old man is brought to an urban hospital in Ho Chi Minh City, Vietnam because of abdominal pain and vomiting. He describes 4 days of retro-orbital headache, lethargy, myalgia and fevers that had begun to improve over the last 24 hours. He has a history of type 2 diabetes mellitus and poorly controlled hypertension. His last travel outside the city was several years ago.

Examination findings

The patient is drowsy, but rousable. His Glasgow Coma Score (GCS) is 14/15, temperature 36.5°C, blood pressure 105/90 mmHg, heart rate 120 bpm, respiratory rate 28 breaths per minute and peripheral oxygen saturation 93% on air. He has a weak radial pulse, but normal heart sounds. Respiratory examination reveals a dull percussion note and reduced breath sounds at both lung bases. He has mild abdominal distension, with shifting dullness and a tender 3cm liver edge. Skin examination is unremarkable.

Laboratory results

See Table 9.1.

Questions

1. What are the main differential diagnoses to consider?
2. What are the priorities for management?

Discussion

The short duration of symptoms before presentation is suggestive of an acute infective process, and the relatively low CRP and absence of neutrophil leucocytosis make a viral aetiology likely. Clinical signs of shock are present: tachycardia, narrow pulse pressure (<20 mmHg), reduced GCS and raised serum lactate. The degree of thrombocytopenia and presence of hepatic impairment are important markers of disease severity, and his raised haematocrit level is suggestive of haemoconcentration.

What are the main differential diagnoses to consider?

Having presented in a high-endemicity area, the clinical picture is typical of dengue infection with apparent progression to severe disease with vascular leak and compensated shock. Even without an eschar, rickettsial infections, such as scrub typhus, are the most important differential diagnoses. Malaria should also be considered, but there is no evidence of haemolysis to support this, and risk of malaria is very low in most urban areas of Vietnam. Many aspects of the presentation could be compatible with leptospirosis, but the absence of suspected rodent exposure makes this less likely.

TABLE 9.1 Laboratory Results on Admission

Parameter	Patient	Reference Range
Haemoglobin (g/dL)	14.6	12.5–17.2
Haematocrit (%)	53.9	40–52
Platelets ($\times 10^9$/L)	58	160–370
WCC ($\times 10^9$/L)	2.1	3.6–10.5
Neutrophils ($\times 10^9$/L)	0.9	1.5–7.7
Lymphocytes ($\times 10^9$/L)	0.8	1.1–4.0
C-reactive protein (mg/L)	20	<4
Urea (mmol/L)	7.8	2.5–7.8
Creatinine (μmol/L)	114	62–115
Alanine aminotransferase (U/L)	812	7–40
Alkaline phosphatase (U/L)	260	30–130
Total bilirubin (μmol/L)	18	0–20
Lactate (mmol/L)	3.5	0.6–1.4

Another differential diagnosis to consider in a diabetic from South East Asia with possible sepsis is melioidosis.

What are the priorities for management?

With a diagnosis of severe dengue highly likely, supportive management of the patient's cardiovascular and respiratory systems should be prioritized. This involves careful fluid resuscitation, with thorough and frequent assessment for evidence of fluid overload. Ultrasound scans should be undertaken to ascertain the extent of pleural effusions and ascites; and if available, an echocardiogram could be considered to assess myocardial contractility and intravascular volume.

The case continued…

The patient is diagnosed with compensated shock and is admitted to a high-dependency unit for close observation and supportive care. Ultrasound scans confirm the presence of moderate bilateral pleural effusions and ascites, as well as mild hepatomegaly and a thickened gallbladder wall. He is infused with Ringer's lactate solution at a volume of 10mL/kg over 1 hour before his fluid status is reassessed. He remains tachycardic and oliguric with a haematocrit rise to 55.1%, therefore the rate of fluid therapy is increased to 15mL/kg/hr until sufficient haemodynamic improvement is shown. The rate of fluid delivery is subsequently reduced to 7mL/kg/hr for 2 hours and by a further 2mL/kg/hr every 2 hours until no longer required. Repeat clinical assessments are undertaken at two-hourly intervals throughout, with haematocrit checks every 6 hours. The patient is discharged from hospital 3 days later, after complete recovery. Reverse transcriptase PCR (RT-PCR) and a positive NS1 ELISA confirm dengue diagnosis.

SUMMARY BOX

Dengue

Dengue is the commonest arthropod-borne virus to infect humans, with an estimated annual incidence of 390 million infections worldwide. The virus is a member of the flavivirus family and has four closely related, but antigenically distinct serotypes. Transmission to humans is through *Aedes* mosquitoes; predominantly the daytime-biting *Aedes aegypti. Aedes albopictus* is a secondary vector in Asia, and its ability to survive temperate climates has allowed spread to many countries in Europe and North America. Although most clinically apparent infections result in a self-limiting febrile illness, a minority progress to severe disease with organ impairment, bleeding, capillary leakage and distributive shock. Severe disease usually progresses through three phases: a febrile phase of 2 to 7 days' duration, characterized by high fever, headache, myalgia, thrombocytopenia and leukopenia; a critical phase with high risk of capillary leak, shock and occasionally bleeding at the point of defervescence; and a recovery phase, in which clinical improvement is accompanied by extravascular fluid resorption and organ recovery.

Dengue diagnosis is confirmed in the first 4 to 6 days of illness by detection of the NS1 antigen by RDTs or ELISA or detection of viral RNA using RT-PCR, after which the sensitivity of these methods declines because of the short viraemia in peripheral blood. Paired serology tests for IgM/IgG can also be performed, (at least 3 days apart) demonstrating seroconversion; however, cross-reaction with other flaviviruses remains a problem, especially in Zika endemic areas.

Warning signs for severe disease include abdominal pain or tenderness, persistent vomiting, fluid accumulation, mucosal bleeding, lethargy or restlessness, hepatomegaly, and increasing haematocrit with concurrent worsening of thrombocytopenia, six of which were present in this case. With no antiviral treatment available, cautious intravascular volume replacement and supportive treatment are the mainstays of management, accompanied by careful monitoring for signs of fluid overload. In many countries the epidemiology of dengue is changing in line with aging populations. Older patients often present with atypical features and have higher risk of complications and death as a result of difficulties in controlling haemodynamic status in the context of high-level comorbidity. Uncontrolled hypertension and diabetes, as in this case, have been shown to be risk factors for poor outcomes. Promising attempts at vaccine deployment have been thwarted by the fact that re-infection of immune-primed individuals is associated with greater risk of severe disease; therefore the searches for effective therapeutics and a pan-specific dengue vaccine continue.

Further reading

1. Yacoub S, Farra J. Dengue. In: Farrar J, editor. Manson's Tropical Diseases. 23rd ed. London: Elsevier; 2014 [chapter 15].
2. Bhatt S, Gething P, Brady O, et al. The global distribution and burden of dengue. Nature 2013;496(7446):504–7.
3. World Health Organisation. Dengue and severe dengue fact sheet. WHO.int. April 2019.
4. Lin R, Lee T, Leo Y. Dengue in the elderly: a review. Expert Rev Anti Infect Ther 2017;15(8) 729–5.
5. Diamond MS, Pierson TC. Molecular insight into Dengue virus pathogenesis and its implications for disease control. Cell 2015;162(3):488–2.