

***Enterobacter cloacae* co-infection in a child with primary dengue fever**

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Introduction

Dengue is the most common arboviral disease worldwide with 58.4 million cases and nearly 13,586 deaths in 2013^{1,2}. There were 29,777 and 23,781 dengue infections in 2015 and first six months of 2016 respectively with 51% of cases reported from the Western Province, Sri Lanka³.

Case report

A ten year old previously healthy boy presented with fever, myalgia and headache for 4 days. Urine output was satisfactory. Neck stiffness and photophobia were absent. Examination on day 4 revealed an adequately grown, febrile child with a capillary refill time of less than 2 seconds. Height was on the 50th centile and weight on the 10th centile. Cardiovascular examination showed a pulse rate of 108/minute, blood pressure (BP) of 100/64 mmHg (50th centile 102/60 mmHg) and normal heart sounds. Respiratory, neurological and abdominal systems were normal.

He was managed as for febrile dengue since admission. Urinary catheter was inserted with difficulty due to lack of cooperation of child on day 5 of illness. He became irritable with spiking fever.

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Blood was taken for culture and intravenous (IV) cefotaxime started on day 5. He was started on IV meropenem on day 6 after omitting cefotaxime as he showed clinical deterioration. On day 7, he developed a fever spike of 107^oF with delirium. BP was recorded as 80/44 mmHg with bounding peripheral pulses. Child was treated as septic shock. Conventional blood culture on day 5 and repeat blood culture to BACTEC blood culture system on day 7 revealed coliform species which was identified as *Enterobacter cloacae* producing extended spectrum beta lactamase (ESBL). It was sensitive to amikacin, imipenem and meropenem and resistant to ampicillin, cefotaxime, cefepime, co-amoxiclav and gentamicin.

Dengue IgM was positive and Dengue IgG was negative on day 7 of illness which confirmed the diagnosis of primary dengue infection. Lumbar puncture performed on day 10 of illness was blood stained and cerebrospinal fluid (CSF) showed lymphocytes 8/cu mm, RBC 200/cu mm, protein 99 mg/dl and no sugar difference between CSF and random blood sugar. It was not suggestive of CNS infection. Urine culture taken on day 5 of illness, prior to starting antibiotics, did not show a bacterial growth. Serum ferritin was 836 ng/ml (Reference range: 20–400) and serum fibrinogen level was 2.62 g/L (1.8 – 3.5) on day 7 of illness. Serum ferritin and fibrinogen levels were done to look for evidence of haemophagocytic lymphohistiocytosis (HLH) and results were not suggestive of HLH.

Throughout the hospital stay, child did not show any clinical evidence of plasma leakage. There was no abnormality or evidence of plasma leakage seen in ultrasound scans of abdomen done on day 5, day 6 and day 8. Summary of investigations are shown in Table 1.

Child was treated with IV meropenem 40 mg/kg 8 hourly for 14 days. Fever settled on day 9 of illness. He made a full recovery from the illness.

Table 1: Summary of investigations

Investigation	Day 2	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
White blood cell count per microlitre	4500	2220	2250	2460	4540	6300	5630	5520
Neutrophils (%)	55	62	46	84	72	61	55	48
Lymphocytes (%)	40	30	47	11	20	31	35	49
Platelet count per microlitre	219	163	147	93	74	99	199	319
Haematocrit (%)	40.1	38.8	34.8	36.8	34.5	33.2	34	35.9
Haemoglobin (g/dl)	13.5	13.8	13.1	12.6	11.7	11.1	12.1	13
Alanine transaminase (U/l)			50.8	206.6	131.9	88.3		
Aspartate transaminase (U/l)			90	305.7	155	81		
C-reactive protein (mg/l)			<5		54.4			

Discussion

A study in Singapore showed 0.3% prevalence of bacteraemia among adult patients with dengue and *Staphylococcus aureus* was the commonest pathogen⁴. Being critically ill at presentation, comorbidities, advanced age and more severe dengue manifestations are risk factors for bacteraemia in adults^{4,5}. A study in Sri Lanka showed that 25% of adult dengue patients with fever lasting more than 5 days have bacteraemia⁶. Bacterial co-infection increases the morbidity and mortality of dengue. Bacterial co-infections are associated with 14.3-44.4% mortality⁵. *Salmonella typhi* co-infection was reported in a child with dengue fever in India⁷.

Enterobacter is a Gram-negative, facultative anaerobic, rod-shaped, non-spore-forming bacterium. *Enterobacter aerogenes* and *Enterobacter cloacae* are opportunistic bacteria with clinical significance as nosocomial pathogens especially in intensive care patients⁸. *Enterobacter cloacae* is the most frequently observed clinical isolate among *Enterobacter* species⁸. It occurs as commensal microflora in the intestinal tracts of humans and animals⁸. *Enterobacter cloacae* is resistant to a wide range of antibiotic classes⁹. Culture positivity is higher and time to detection is shorter with BACTEC commercial system compared to conventional blood culture¹⁰. It was helpful in early diagnosis in our patient. In our patient, *Enterobacter cloacae* was resistant to multiple antibiotics and possibly hospital acquired. Also secondary bacterial infection was not associated with marked leukocytosis in this case. Patients with dengue fever undergo multiple invasive procedures including urinary catheterization, intravenous cannulation and repeated blood sampling. Adherence to strict aseptic techniques and practice of universal precautions are essential to prevent nosocomial infections.

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