

# Acute staphylococcal endocarditis following dengue haemorrhagic fever

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## Introduction

Dengue fever is a leading health problem in Sri Lanka. Clinical presentation can vary from a simple flu-like illness to haemorrhagic fever with shock. Available data show that 12,144 suspected dengue cases and 71 deaths have been reported in Sri Lanka from July to September 2010 (1). Most people who develop dengue fever recover completely within 2 weeks. Apart from the complications such as haemorrhage and dengue shock syndrome, concurrent bacteraemia in patients with dengue fever is a very rare complication (2) and has not been reported in Sri Lanka.

We report herein a patient initially diagnosed with dengue haemorrhagic fever, who subsequently developed a disseminated Methicillin Resistant *Staphylococcus aureus* (MRSA) infection and endocarditis.

## Case Report

A 20-year-old previously healthy male from Dehiwela, presented with two days history of fever vomiting, headache and reduced urine output. On examination he was febrile and dehydrated. His pulse rate was 98/minute and regular. Blood pressure was 80/50 mmHg with cold peripheries and there were no murmurs. Examination of cardiovascular system was normal; there were no murmurs and the ECG was normal. Examination findings of respiratory system and abdomen were normal.

Following initial treatment with intravenous and oral fluid, his blood pressure and urine output improved within 24 hours. He was subsequently treated as a case of probable dengue haemorrhagic fever with intravenous and oral fluids, antipyretics and antiemetics.

Over the next five days his fever persisted while the white blood cells (WBC) and platelets gradually decreased to  $1.7 \times 10^9$ /L and  $45 \times 10^9$ /L, respectively. At this time both Dengue IgM and IgG antibodies were found to be positive by immunochromatographic studies.

After five days in hospital, patient's fever improved. On day 6<sup>th</sup>, however, his fever reappeared. Two days later, WBC increased to  $11 \times 10^9$ /L. His blood and sputum were taken for culture and intravenous ceftriaxone was started.

After two days on antibiotic, fever persisted and on examination there were bilateral diffuse crepitations in the lungs. Heart rate was 120/minute, blood pressure was 100/70 mmHg and heart sounds were normal but there was a new soft (grade 1) systolic murmur in the tricuspid area and the left knee was swollen and tender.

His chest radiograph and CT of the chest showed two large opacities and multiple small rounded opacities distributed throughout both lungs. Blood and sputum culture showed a growth of methicillin-resistant *Staphylococcus aureus*. His ESR was 75 mm/1<sup>st</sup> hour and WBC count was  $12 \times 10^9$ /L with 82% neutrophils. 2D echocardiogram revealed mild tricuspid regurgitation and 1 cm vegetation attached to the tricuspid valve. The knee joint aspirate showed high LDH level of 14,844 U/L and culture was positive for MRSA.

Treatment for infective endocarditis was started according to the antibiotic sensitivity with intravenous vancomycin 1g two times a day and intravenous clindamycin 600 mg three times a day for a period of 28 days. Progress was monitored with ESR and CRP levels periodically. After one month of treatment pre-discharge 2D echocardiogram showed

reduction in severity of tricuspid regurgitation and almost complete resolution of the vegetation. Subsequently the patient was discharged on oral clindamycin for 2 weeks. He was followed up in the medical clinic for 3 months during which he was closely monitored with ESR, CRP and 2D echo for any possible recurrences and was subsequently discharged from the clinic following uneventful recovery.

### Discussion

This patient initially developed dengue haemorrhagic fever, subsequently complicated by disseminated MRSA infection with staphylococcus endocarditis of tricuspid valve with multiple lung abscesses and septic arthritis.

Several cases of *staphylococcus aureus* infection has been reported following dengue fever (2,3) however this is the first case of such a rare complication of dengue haemorrhagic fever to be reported in Sri Lanka. Several mechanisms have been proposed regarding increased susceptibility to secondary infections following dengue fever. One of the mechanisms proposed to explain these co-infections is endothelial dysfunction. Antibodies directed against dengue virus cross reacting with endothelial cells in association with nitric oxide causes endothelial cell apoptosis and disruption of the endothelial barrier (4). When this type of damage occurs in the endocardium, bacteraemia that could occur as a result of breaching of skin such as at a cannula site can lodge in the damaged endocardium and cause endocarditis.

In our patient increased susceptibility to *staphylococcus aureus* may also be due to the immunosuppression caused by the low neutrophil count. Apoptosis of polymorphonuclear leukocytes and their subsequent removal from circulation is probably responsible for neutropenia (5). Decreased in vitro proliferative response of peripheral blood mononuclear cells (PBMC) to mitogens and to several antigens during acute dengue infection has been well documented (5). Further it is also known that plasma levels of IL - 10 which is a known immunosuppressant are increased in patients with DF and DHF (5).

*Staphylococcus aureus* is a usual skin flora that can enter circulation through venepuncture site, cannula site or through any skin injury. Frequent blood tests performed in dengue fever may predispose to this infection. This mechanism may have predisposed our patient to develop bacteraemia and infection of the tricuspid valve.

This case illustrates the need to be aware of the possibility of secondary bacterial infection as a cause for recurrence of fever following initial dengue haemorrhagic fever.

### References

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