

Mobitz type 1 second degree heart block in defervescence phase of dengue fever

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ABSTRACT

Rhythm disturbances are rare but potentially fatal cardiac manifestations of dengue fever. However many are not recognised and not reported. The diversity of the clinical presentations throws a great challenge in the diagnosis of dengue myocarditis. Manifestations vary from the common uncomplicated febrile illness to the less common complete heart block with cardiogenic shock. We report the case of a 28-year-old lady who developed uncomplicated 2nd degree Mobitz type 1 heart block during the defervescence phase of a dengue illness. Although rare, 2nd degree Mobitz type 1 heart block has been reported in dengue fever. Therefore, this case emphasizes that ECG is a useful tool in the management of dengue. Any changes in vital signs especially the heart rate, should prompt the clinicians to look for possible underlying cause because this may be the early indication of cardiac arrhythmia which occurs in dengue.

Keywords: Dengue fever, arrhythmias, bradycardia, Wenckebach phenomenon

INTRODUCTION

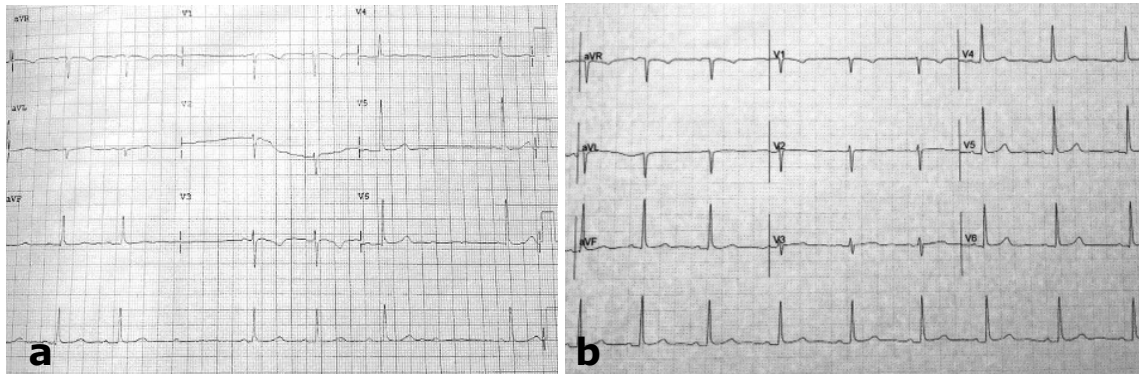
Dengue fever (DF) is one of the most common mosquito-borne viral diseases worldwide including Malaysia. Cardiac complications are uncommon and myocarditis is the commonest cardiac complication reported worldwide.¹ Its clinical manifestations vary considerably from being asymptomatic and self-limiting to dysrhythmias or myocardial ischaemia with cardiogenic shock. We report a case of 2nd degree Mobitz type 1 heart block that oc-

curred during the de-fervescence phase of dengue illness and discuss the implications of cardiac complications in DF. The findings of present case may be important for suspecting myocarditis at an early stage thereby emphasising the important of electrocardiography (ECG) in dengue patients.

CASE REPORT

A 28-year-old lady living a dengue endemic area, presented to the Emergency Department on the fourth day of illness with petechiae rashes and abdominal pain, which was preceded by fever. There were no other significant symptoms. On initial assessment, her

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Figs. 1: a) Electrocardiograph (ECG) showing bradycardia with Mobitz type 1, and b) a subsequent ECG showing complete resolution of the heart block with sinus rhythm of 70 beats/minute.

pulse rate was 80 beat/minute, the respiratory rate was 20 breath/minute, the blood pressure was 114/85 mmHg. She was afebrile. Physical examination revealed tender hepatomegaly and multiple petechial rashes on bilateral legs. No other examination was remarkable.

Laboratory findings showed the peripheral white cell count (WCC) was $7.1 \times 10^9/L$ (normal range, 4-10), neutrophils 36.4%, lymphocytes 52.2%, monocytes 10.4%, haemoglobin 12.6g/dL (11-13), haematocrit 0.397 I/L (0.36-0.46) and the platelet count was $38 \times 10^9/L$ (150-410). Liver function test showed raised liver enzymes; alanine transaminase (ALT) 130 U/L (<44 U/L) and alkaline phosphatase 148U/L (<104 U/L). Blood electrolytes were normal. Dengue serology taken on fourth day of illness was positive for both IgM and IgG, confirming the diagnosis of DF.

During the period of observation in the ED, the patient developed an episode of bradycardia which was initially detected during a repeat physical examination. Patient

was otherwise asymptomatic with heart rate of 50 beat/minute, good pulse volume and warm peripheries. Other parameters remained stable. A 12 lead Electrocardiograph (ECG) revealed 2nd degree Mobitz Type 1 AV block (Wenckebach phenomenon). She was then continuously put under cardiac monitoring while in ED. However, the episode of bradycardia spontaneously resolved after two hours. Serum cardiac markers revealed elevated Creatine Kinase (CK) of 705 U/L (24-173) and Troponin T was 0.013 ug/L. She was later admitted to coronary rehabilitation ward (CRW) for monitoring and was treated with supportive care in accordance with to the World Health Organisation (WHO) guidelines for the management of dengue fever. ²

During her stay in the CRW, no further episodes of heart block or arrhythmia were observed. A repeat ECG showed complete resolution of the AV nodal block. Trans-thoracic echocardiography showed good left ventricular function (ejection fraction of 57%) with normal regional wall motion and valves. The repeat blood investigation showed improvement in her platelet count and CK had

dropped to 479 U/L while Troponin T was within normal range. The serum ALT also improved to 117 U/L. She was transferred to the General Ward and subsequently discharged after 4 days of stay in the hospital. She was well prior to discharge with absence of any cardiac related symptoms or other dengue complications.

DISCUSSION

DF was first documented in Malaysia in 1902.³ It is currently endemic in Malaysia with recurring outbreaks every 3-4 years, after the first major epidemic was recorded in 1973.⁴ Globally, Asia bears 70% of the global burden with India alone, being another endemic country, accounting for 34% burden.⁶ Meanwhile, the Americas contributed to 14% of the infection worldwide and highest incidence were reported in Brazil and Mexico.⁶

Although dengue myocarditis is the most common cardiac manifestation of DF, it is still rare. Diagnosis is usually made based on clinical suspicion as definitive diagnosis is only possible by endomyocardial biopsy. Clinical manifestations of dengue myocarditis range from a spectrum of being asymptomatic self-limiting course at one end, to life threatening ischaemia with acute heart failure at the other end.⁷ Some severe forms of myocarditis may even masquerade myocardial infarction⁸, which clearly pose a diagnostic and management dilemma for the treating physicians. Overt myocarditis features such as sinus tachycardia, raised jugular venous pressure, bilateral pulmonary crepitations and peripheral oedema were absent in our case.⁹

Cardiac rhythm disorder of dengue myocarditis that have been reported in the

literature include ventricular arrhythmias⁹, premature ventricular ectopic beats¹⁰, atrial fibrillation¹¹ and varying degrees of conduction blocks including Mobitz type 1; Wenckebach phenomenon.¹² In this present case, asymptomatic bradycardia with 2nd degree Mobitz type 1 heart block was observed during the defervescence phase of a dengue illness. It was fortunate that the bradycardia was detected during physical examination as patient was otherwise completely asymptomatic. This in turn led to a proper monitoring while in ED and appropriate disposition to CRW. The episode resolved within 24 hours without progressing to a higher degree block or affecting other parameters. Khongphattalayothin *et al.* reported a similar case of heart block in Thailand that occurred during the recovery phase which also resolved spontaneously without any sequelae.¹² The exact mechanism of this condition is still unclear but several mechanisms have been postulated. These include autonomic dysfunction, adenosine metabolism and abnormalities affecting myocardial cells that use calcium for membrane depolarisation.¹² A study in Colombia showed that intracellular calcium (Ca²⁺) was increased in myocytes and skeletal muscle, resulted from a direct infection of dengue virus (DENV).¹³ The increased Ca²⁺ in the infected myocardium has been attributed to the development of cardiac arrhythmias and altered contractility in dengue myocarditis.¹³ Alternatively, bleeding in the vicinity of the AV node may also cause AV blockade, as subendocardial haemorrhage in the septal region was seen in about 47% of autopsy cases of Dengue Haemorrhagic Fever (DHF).

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