

## Pandemic Influenza A (H1N1) virus-associated acute myopericarditis

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### Summary

Although pandemic influenza A (H1N1) virus may cause upper respiratory tract infection similar to that caused by seasonal influenza, it can lead to serious complications such as pneumonia, encephalitis and myocarditis. We describe a 2-year-old girl admitted with fever, cough and vomiting followed by acute respiratory distress and diagnosed as H1N1-related myocarditis. (*Turk Arch Ped* 2011; 46: 328-30)

**Key words:** Influenza A (H1N1), myocarditis, oseltamivir, pericarditis

### Introduction

Pandemic influenza A (H1N1) virus was defined for the first time in April 2009 in Mexico and spread around the whole world in a short time (1). The clinical picture which this virus leads to includes fever, cough, sore throat, malaise, headache, myalgia and arthralgia and is similar to seasonal influenza. Especially during childhood it may also include vomiting and diarrhea which are not frequently observed in seasonal influenza (2). The most common complication of the infection is pneumoniae and it can lead to central nervous system signs, severe dehydration, renal failure, rhabdomyolysis, septic shock and multiple organ failure with a lower rate (3). Myocarditis is a rare complication which can develop in relation to influenza A and B virus (3,4).

In this article, a patient who referred to our center because of rapidly developing respiratory distress following influenza symptoms and who was diagnosed as influenza A (H1N1)-related myocarditis was presented. This case was presented to emphasize that myocarditis should also be considered in addition to lower respiratory infection in the differential diagnosis in patients in whom respiratory distress increases following influenza signs.

### Case presentation

A 2-year-old female patient presented to our clinic with complaints of malaise and dyspnea which increased in the last

two days. Her history revealed that fever, cough and vomiting started 6 days ago and a diagnosis of viral upper respiratory tract infection was made in the center she was referred to and antipyretic and cough suppressant drugs were given. Physical examination revealed low general status and a body temperature of 36.6°C. Edema, icterus and cyanosis were not present. Body weight: 13 kg (75<sup>th</sup> percentile), height: 90 cm (75<sup>th</sup> percentile), apical heart beat: 160/min, respiratory rate: 36/min, arterial blood pressure: 65/30 mmHg. Peripheral pulses were weakly palpable. Cardiovascular examination revealed weak cardiac sounds in addition to tachycardia and hypotension. Additional sounds or heart murmur were not heard. The examination of the respiratory system revealed nasal flaring and intercostal and subcostal retractions in addition to tachypnea. Respiratory sounds were normal. The liver was 3 cm palpable. Examinations of other systems were normal.

Laboratory findings were as follows: hemoglobin 9 g/dL, hematocrite 29.6%, white blood cells 17.000/mm<sup>3</sup> (lymphocyte 66%, neutrophile 28%, monocyte 6%, no atypical cell), platelets 370.000/mm<sup>3</sup>, C-reactive protein 0.9 mg/L (N<5 mg/L), erythrocyte sedimentation rate 17 mm/h, creatinine phosphokinase (CK) 18 439 IU/L, CK-MB 1504 IU/L, cardiac troponin-T 1.4 ng/mL (N<0.1 ng/mL). Arterial blood gases, lactate and ammonia levels and other biochemical values were normal. Telecardiogram revealed cardiomegaly (cardiothoracic ratio 60%) and no involvement was observed in the lung

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paranchyma. On electrocardiogram (ECG), sinus tachycardia and ST elevation were observed in V4-V5 and V6 chest derivations. Echocardiography (ECHO) revealed left ventricular systolic dysfunction (ejection fraction 50%) and hypoechoic pericardial fluid surrounding the whole heart with a diameter of 7 cm at the widest region (Picture 1a-b).

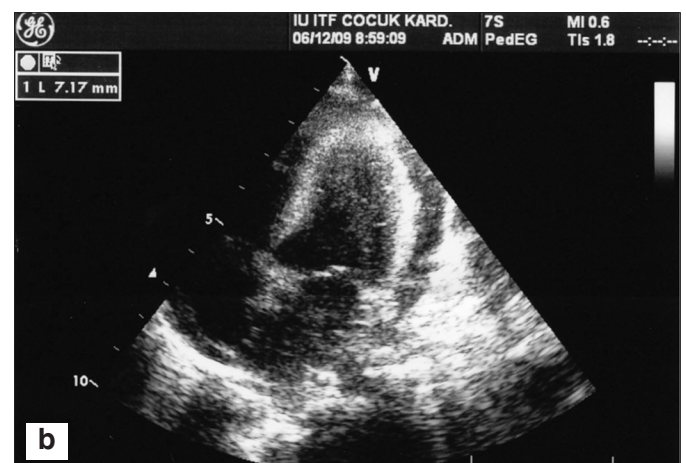
A diagnosis of myocarditis was made with clinical and physical examination findings, high levels of CK, CK-MB, troponin-T, cardiomegaly and ECG and ECHO findings. Dobutamin, dopamin and furosemide treatment was started for heart failure. Since findings developed following fever, cough, malaise and vomiting, a nasopharyngeal swab sample was obtained for possible influenza A (H1N1) virus in addition to viral serologic tests for myocarditis. Polymerase chain reaction (PCR) test was found to be positive for H1N1. Serum Coxsackie A IgM, Coxsackie B IgM, Echovirus IgM, Ebstein-Barr virus IgM, Cytomegalovirus IgM and antiHIV antibodies were found to be negative. Adenovirus was not found on PCR test. Blood, throat, urine and stool cultures were negative. With these findings a diagnosis of influenza A (H1N1)-related myocarditis was made. Oseltamivir treatment was started and administered for 5 days at the therapeutic dose. On follow up, clinical findings started to improve and inotropic support and diuretic treatment were decreased and discontinued at the end of the first week. Serum CK, CK-MB and troponin values and ECHO findings improved and the patient was discharged. The patient had no complaints and physical examination findings were normal on the follow-up visit performed 2 weeks later.

## Discussion

In the childhood, myocarditis may occur in relation to viral, bacterial, rickettsial, mycotic and parasitic infections. Especially Coxsackie virus type B, Adenovirus and Echovirus are responsible of most cases. In addition, Ebstein-Barr virus, cytomegalovirus, HIV, measles, mumps, rubella, influenza type A

and B may also cause a picture of myocarditis (5,6). Most cases of pericarditis are caused by viruses and usually most viruses which lead to myocarditis are responsible of the etiology (6). In some cases of myocarditis, a history of upper respiratory tract infection is present. Clinical findings are dependent on the age of the patient and common clinical findings include tachypnea, tachycardia incompatible with fever, weak cardiac sounds and heart failure. For diagnosis cardiomegaly on telecardiogram, sinus tachycardia, low QRS voltage, ST-T wave changes on ECG, high levels of CK, CK-MB and troponin and left ventricular dysfunction on ECHO are important in addition to clinical findings (5,6). Although definite diagnosis is made by viral culture via cardiac catheterization or displaying the virus via reproduction of cardiac tissue sample by PCR, the risks of performing biopsy on the inflamed myocardium in the acute stage are well known especially in young children (7). Generally, supportive treatment is administered and the treatment period may vary according to the severity of myocardial involvement and clinical findings (6). Our patient was diagnosed as myocarditis with tachypnea, dyspnea, tachycardia incompatible with fever, weak cardiac sounds, cardiomegaly, high cardiac muscle enzymes and ECG and ECHO findings. Since findings of upper respiratory tract infection were present previously, viral serologic tests were performed on blood and nasopharyngeal swab samples.

Although pandemic influenza A (H1N1) virus infection is frequently manifested with upper respiratory tract findings similar to those observed in seasonal influenza, the disease has been observed to progress more severely especially in children younger than 2 years of age and in children with underlying chronic diseases (3). The diagnosis is made by displaying the virus on the nasal swab or nasal discharge sample using PCR (8). Oseltamivir or zanamivir treatment is recommended in patients with severe findings including pneumonia, central nervous system involvement, severe dehydration findings, renal failure, rhabdomyolysis and myocarditis and in patients whose underlying chronic disease exacerbates (3). We administered oseltamivir in our patient who



Picture 1a-b: Pericardial fluid without hypoechoic divisions surrounding the whole heart and observed to be more prominent in the left ventricular posterior wall with a diameter of 7 cm at the widest region on two-dimensional transthoracic echocardiogram.

developed myopericarditis following influenza symptoms and in whom influenza A (H1N1) was found to be positive on nasopharyngeal swab sample using PCR.

Although the most common complication of pandemic influenza A (H1N1) virus infection is pneumonia, myopericarditis should be considered in the differential diagnosis when acute respiratory distress develops following signs of upper respiratory tract infection. Since virus-related myocarditis is a finding of severe disease, oseltamivir should be given to these patients in addition to supportive treatment.

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