Pericardial effusion in a pediatric patient with influenza A H3N2

Derrame pericárdico en paciente pediátrico con influenza A H3N2

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Case presentation

Influenza is an acute viral infection whose clinical presentation is characterized by fever and symptoms such as headache, lethargy, and myalgia. Very rarely it has clinical sequelae¹. The Influenza A virus, may lead to pulmonary, neurological, renal, musculoskeletal, and cardiac complications, including as myocarditis and pericarditis².

The patient in question was a twenty month-old male patient, born at 38 weeks of gestation, after an uncomplicated pregnancy. At birth it was noted that he had typical features of Down's syndrome. Genetic testing confirmed this at two months. He was admitted to the emergency department with a seventy-two hour history of fevers, productive cough, tachypnea and lethargy, without improvement. On physical exam, he was noted to be irritable and pale. His weight was 7 kg, his heart rate was 111 bpm with a respiratory rate of 50. His axillary temperature 35.3°C, with a blood pressure of 93/62 mmHg. His jugular vein was not raised. On further inspection, the thorax was symmetrical with mild subcostal retractions noted. On auscultation scarce bilateral basal rales of the right predominance and muffled heart sounds were noted. No murmurs were noted. The laboratory examinations including a full blood count, revealed a hypo-chromic, microcytic anemia and that the thyroid function was within normal limits. An arterial blood gas sample confirmed the presence of respiratory alkalosis. Thyroid function tests were

Figure 1. Chest X-ray. Anteroposterior projection, with arches horizontalization, free costophrenic and cardiophrenic angles, rounded heart silhouette, and increased in size. Interstitial pattern with no bronchopneumonic focus.

normal. A chest X-ray exhibited cardiomegaly (Fig. 1). Transthoracic echocardiogram showed moderate pericardial effusion (12 mm measured at the left ventricle [LV] posterior wall), without echocardiographic signs of tamponade, preserved biventricular systolic function, patent ductus arteriosus (PDA) with the left-to-right short circuit, moderate pulmonary regurgitation, and mild tricuspid regurgitation with pulmonary artery systolic pressure of 53 mmHg (Fig. 2). A nasopharyngeal

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Date of reception: 29-01-2019

Date of acceptance: 18-06-2019

DOI: 10.24875/ACME.M20000071

Available online: 12-03-2020

Arch Cardiol Mex (Eng). 2019;89(4):380-382

www.archivoscardiologia.com

Figure 2. Echocardiogram. **A:** four-chamber apical view, where circumferential pericardial effusion is observed, without cavity collapse during diastole; right cavities dilation. **B:** long parasternal axis; pericardial effusion is measured in the left ventricle posterior wall (15 mm). **C** and **D:** large vessels short parasternal axis, modified; patent ductus arteriosus-originating flow toward the pulmonary artery (arrows) and regurgitation jet in the pulmonary valve are observed with color Doppler. **E:** four-chamber apical view, with color Doppler on tricuspid valve; mild tricuspid regurgitation is shown. **F:** assessment with continuous Doppler on tricuspid regurgitation that registers a 48 mmHg gradient.

swab was positive for influenza H3N2 subtype. Pharmacological therapy was commenced and oseltamivir 30mg was administered twice daily in conjunction with acetaminophen 96 mg every eight hours. Follow-up echocardiography at the time of clinical resolution confirmed the pericardial effusion had resolved.

Influenza A is divided into 16 hemagglutinin subtypes (H1 to H16) and nine neuraminidases (N1 to N9)³. Myopericarditis is a rare but potentially lethal complication. Obese patients, pregnant women, children under the age of five, and immunosuppressed patients have a considerable risk of complications or death². Electrocardiographic abnormalities, cardiac enzymes elevation, and LV contractility abnormalities have been reported, which can present with or without accompanying clinical symptoms⁴.

Rarely is myocyte damage accompanied by direct virus cytolytic effects, which plays an important role in cases of early myocardial damage². TNF α plays an important role in the development of inflammatory cardiomyopathies. Previous reports have described that Influenza A associated myocarditis is related to the expression of TNF α and its myocardial receptors. Influenza A associated myocarditis typically presents during the first week of symptom onset. It is thought this is as

a direct result of the virus itself or by an immune mediated inflammatory response¹.

The Influenza A H1N1 virus, and in this case the H3N2 strain, are rarely associated with pericardial effusion, as was the case with this patient³. Infrequently, this may lead to cardiac tamponade.

Viral myocarditis can be caused by a wide variety of viral infections, most notably enterovirus, adenovirus, parvovirus, cytomegalovirus, and influenza virus².

To definitively diagnose viral pericarditis, one should consider histological, cytological, immunohistochemistry, pericardial fluid and both pericardial and epicardial biopsy molecular investigations. Whilst these investigations are desired to definitively confirm this diagnosis, they are not routinely performed in clinical practice⁶. In this case, a viral cause was confirmed with nasopharyngeal swab, which has sensitivity of 66-100%.

Typically, acute viral pericarditis is self-limiting and responds well to the administration of concomitant short course of non steroidal drugs and colchicine. These drugs are especially useful in the prevention of recurrent presentations. Corticosteroids are not indicated in viral pericarditis, as they can exacerbate viral infections prolong the inflammation⁵. Previous case reports have outlined the requirement for invasive supportive treatment including the need for extracorporeal membrane oxygenation⁷

in certain severe clinical presentations⁷. Pericardiocentesis was not performed in this patient as he had no clinical or echocardiographic signs of tamponade.

Down syndrome has an approximate incidence of 1/750 births. This genetic anomaly is characterized by intrinsic immune deregulation and both decreased intrinsic and acquired immune response secondary to premature aging of the immune system. There can also be respiratory tract anomalies that may predispose the patient to chronic infections⁸. In addition, hypothyroidism may be masked due to overlapping clinical characteristics accompanying Down's syndrome⁸. In this case, thyroid function was found to be within normal limits. Trisomy 21 is also frequently associated with atrial septal defect, ventricular septal, PDA, and atrioventricular canal defect, among others. These congenital heart defects may be associated with clinical or subclinical pulmonary hypertension and pericardial effusions. However, in this patient, pericardial effusion remission was confirmed at the time of clinical resolution and was therefore not as a result of the presence of pulmonary hypertension or PDA.

Funding

This research has not received any specific grant from public or commercial sector agencies or non-profit entities.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Ethical disclosures

Protection of people and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained written informed consent of the patients and/or subjects mentioned in the article. The corresponding author is in possession of this document.

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