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We Perform Vasoreactivity Test in Pulmonary Hypertension, but Reproducibility?

CASE REPORT

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ABSTRACT

Sarcoidosis is a chronic, granulomatous disease that it can affect all organs. Pulmonary hypertension (PH) is one of the most important complications of sarcoidosis and indicates poor prognosis. PH is determined by right cardiac catheterization and mean pulmonary artery pressure is ≥25 mmHg at rest. Vasoreactivity test is recommended to this patients, to determine vasodilator drugs to response of pulmonary vascular bed. Calcium channel blockers are used in patients with a positive test vasoreactivity. We presented a case in this article whose vasoreactivity test was positive initially, but negative in follow-up.

Keywords: Pulmonary hypertension, vasorectivity test, sarcoidosis

INTRODUCTION

Sarcoidosis is a chronic granulomatous disease that can affect all organs. According to the clinical severity of sarcoidosis, patients clinically may vary to a life-threatening situation from an asymptomatic condition (1). Pulmonary hypertension (PH) is one of the most important complications of sarcoidosis and indicates poor prognosis (2). The prevalence of PH is uncertain in sarcoidosis. It is reported 73.8% in patients awaiting lung transplantation (3).

Pulmonary hypertension is determined by right cardiac catheterization and mean pulmonary artery pressure ≥25 mmHg at rest. Vasoreactivity test is recommended to these patients to determine vasodilator drugs to response of pulmonary vascular bed. Currently, inhaled nitric oxide (NO), intravenous (i.v.) epoprostenol, or i.v. adenosine is suggested to vasoreactivity test. Calcium channel blockers are used in patients with a positive vasoreactivity test. However, specific drugs, such as bosentan and tadalafil, can be used in test negative patients (4).

CASE REPORT

A 32-year-old woman who had previously been diagnosed with pulmonary sarcoidosis and PH was admitted to the Department of Cardiology of our hospital because of fatigue, weakness, and increased dyspnea. She was 11 years old with a diagnosis of PH. She consulted to other hospital 7 months due to advanced dyspnea. Echocardiography detected elevated systolic pulmonary artery pressure, and PH diagnosis was confirmed by right cardiac catheterization. Vasoreactivity test was performed using inhaled iloprost, and the test was positive. Thus, she took calcium channel blocker. However, dyspnea did not decrease, and fatigue and weakness occurred following this treatment. So, she was admitted to our clinic. There was no significant disease except pulmonary sarcoidosis. When she came to our clinic, diltiazem (Mustafa Nevzat, İstanbul, Turkey) 600 mg/day, methotrexate (Sandoz, İstanbul, Turkey) 15 mg/week, and oxygen was using. Physical examination showed that blood pressure of 100/68 mmHg, pulse rate of 98/min, and temperature of 37.0°C. There were decreased breath sounds, prolonged expiration, and 2/6 systolic murmur in the tricuspid area.

Electrocardiography demonstrated a normal sinus rhythm pattern, P pulmonale, and inverted T waves at D3, aVF. Echocardiography (Vivid E9, GE Healthcare, Norway) showed severe PH with dilatation of the right heart chambers, normal ejection fraction (65%),and severe tricuspid regurgitation. The systolic pulmonary arterial pressure was 50–55 mm Hg. Tricuspid annular plane systolic excursion (TAPSE) was 2.3 cm.

The 6-minute walking distance (6MWD) was 340 m. Diltiazem therapy was terminated because her complaints increased following this drug.

Right heart catheterization and vasoreactivity test were repeated. Mean pulmonary artery pressure and pulmonary capillary wedge pressure were 38 mmHg and 7 mmHg, respectively. Vasoreactivity test was performed with ade-

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nosine (Abfen Farma, Ankara, Turkey), and the drug dose could be increased 200 µg/kg/min due to hypersensitivity reaction. Mean pulmonary artery pressure was 37 mmHg following 200 µg/kg/min adenosine. Bosentan (Actelion, İstanbul, Turkey) was started because vasoreactivity test was negative. Her symptoms have tended to improve, and 6MWD was 375 m 12 weeks later. Informed consent was obtained from the patient to present as a case.

DISCUSSION

To identify patients who may benefit from calcium channel blockers, vasoreactivity test is recommended in PH. Positive vasoreactivity test rate decreases, increasing damage of the pulmonary vascular bed. Although inhaled nitric oxide (NO), intravenous (i.v.) epoprostenol, or i.v. adenosine is suggested to vasoreactivity test, the effect of inhaled iloprost and oral sildenafil is still unclear (4). A recent study suggested that inhaled iloprost can be used to perform acute vasoreactivity test. However, according to this study, sildenafil is not convenient agent because of its extended effects (5). Elkıran et al. (6) reported that inhaled iloprost combined with oxygen can be used for vasoreactivity test in children. The first test, carried out with inhaled iloprost, was positive in our case; therefore, she used a calcium channel blocker. However, this drug let to the deterioration of clinical status. This situation preoccupy that inhaled iloprost may not be suitable an agent to vasoreactivity test.

Patients who are treated with a calcium channel blocker should be closely monitored in terms of efficacy and safety and should undergo right cardiac catheterization after 3–4 months of therapy (6). Sitbon et al. (7) evaluated long-term response to calcium channel blockers in idiopathic PH. They found that calcium channel blockers are effective in less than 10% of patients. In our case, though with vasoreactivity test was positive, long-term response to a calcium channel blocker did not seem good.

To the best of our knowledge, there is no major study investigating the treatment of PH caused by sarcoidosis. Data are based on case and retrospective small studies. Fisher et al. (8) reported that i.v. epoprostenol led to improvement in functional capacity of patients. In a series of 12 diseases, patients were treated with sildenafil, and mean pulmonary artery pressure declined while cardiac output increased. However, there was no significant difference in 6MWD (9) Endothelin-1 is put forward to play an important role in the pathophysiology of PH associated sarcoidosis. Therefore, it is believed that endothelin receptor antagonists such as bosentan can be used in treatment of PH associated sarcoidosis. Baughman et al. (10) treated 23 patients with bosentan. They found significant reduction in mean pulmonary artery pressure. We treated a patient with PH associated with sarcoidosis and found an increase in 6MWD.

CONCLUSION

Patients who are positive for vasoreactivity test and treated with calcium channel blockers should be closely monitored because high doses of calcium channel blockers does not seem to be well tolerated by patients. In addition, vasoreactivity test may be negative in follow-up of these patients. Bosentan seems like a good option for treatment of sarcoidosis-associated PH.

Informed Consent: Written informed consent was obtained from the patient.

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REFFERENCES

1. Judson MA. The Clinical Features of Sarcoidosis: A Comprehensive Review Clinic Rev Allerg Immunol 2015; 49: 63.
2. Baughman RP, Engel PJ, Taylor L, Lower EE. Survival in sarcoidosis-associated pulmonary hypertension: the importance of hemodynamic evaluation. Chest 2010; 138: 1078-85. [CrossRef]
3. Shorr AF, Helman DL, Davies DB, Nathan SD. Pulmonary hypertension in advanced sarcoidosis: Epidemiology and clinical characteristics. Eur Respir J 2005; 25(5): 783-8. [CrossRef]
4. Galie` N, Hoeper MM, Humbert M, Torbicki A, Vachiery J, Barbera JA, et al. Guidelines for the diagnosis and treatment of pulmonary hypertension: the Task Force for the Diagnosis and Treatment of Pulmonary Hypertension of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS), endorsed by the International Society of Heart and Lung Transplantation (ISHLT). Eur Heart J 2009; 30(20): 2493-537. [CrossRef]
5. Sompradeekul S, Wattanasiriphakdee S. Hemodynamic effect of iloprost inhalation and oral sildenafil during acute vasoreactivity test in pulmonary arterialhypertension J Med Assoc Thai 2015; 98(2): 144-9.
6. Elkiran O, Karakurt C, Koçak G. Combined effect of aerosolized iloprost and oxygen on assessment of pulmonary vasoreactivity in children withpulmonary hypertension. Anadolu Kardiyol Derg 2014; 14(4): 383-88. [CrossRef]
7. Sitbon O, Humbert M, Jaïs X, Ioos V, Hamid AM, Provencher S, et al. Long-Term Response to Calcium Channel Blockers in Idiopathic Pulmonary Arterial Hypertension. Circulation 2005; 111(23): 3105-11. [CrossRef]
8. Fisher KA, Serlin DM, Wilson KC, Walter RE, Berman JS, Farber HW. Sarcoidosis-associated pulmonary hypertension: outcome with long-term epoprostenol treatment. Chest 2006; 130(5): 1481-8. [CrossRef]
9. Milman N, Burton CM, Iversen M, Videbaek R, Jensen CV, Carlsen J. Pulmonary hypertension in end-stage pulmonary sarcoidosis: therapeutic effect of sildenafil? J Heart Lung Transplant 2008; 27(23): 329-34. [CrossRef]
10. Baughman RP, Culver DA, Cordova FC, Padilla M, Gibson KF, Lower EE, et al. Bosentan for sarcoidosis-associated pulmonary hypertension: a double-blind placebo controlled randomized trial. Chest 2014; 145(4): 810-7. [CrossRef]