

## Case Report

# A Case of Pneumococcal Endocarditis Following a Nose Trauma

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Pneumococcal endocarditis is an uncommon disease. Here, we describe a case of endocarditis caused by *Streptococcus pneumoniae* in a young man following a nose trauma. In traumas that involve the respiratory system and the mucous membrane, bacterial complications such as colonization and bacteremia and end-organ involvement should be considered by physicians. *J Med Microbiol Infect Dis*, 2017, 5 (1-2): 35-37.

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## CASE REPORT

The patient was an Iranian 18-year-old male living in Sanandaj, Kurdistan province of western Iran. He referred to a hospital in Sanandaj on June 08, 2014 after experiencing non-specific symptoms such as myalgia, fever, chills, and diarrhea for several days. The patient had a nose trauma during sport one month before the admission which had led to nose bleeding and nasal congestion with no fractures. The patient was visited by an otorhinolaryngologist 4 days after the trauma since he could not breathe through the nose and had a severe headache and dizziness. He was diagnosed with a nasal septal hematoma for which nasal septum hematoma drainage was performed. After a partial recovery of almost two weeks, the patient developed signs and symptoms including voluminous non-bloody watery diarrhea (2-3 times per day), eye irritation, cough with sputum, abdominal pain and vomiting, fever and chills at night, and weakness and fatigue. On the day of admission to hospital, the patient had a fever of 39°C, blood pressure of 105/75mmHg, heart rate of 120 beats per minute (PR: 120) and respiratory rate of 24 breaths per minute (RR: 24). The result of ultrasonography of the abdomen, pelvis, chest and also brain CT scan was normal. Additionally, the patient had no signs in favor of pneumonia and meningitis. Regarding prolonged fever and hearing of systolic heart murmur at the night of hospitalization, infective endocarditis was suspected, and empiric antibiotic therapy with ceftriaxone (2 g twice daily) and vancomycin (1 g twice daily) was initiated. Also, being suspected of having *Streptococcus pneumoniae* infection, the physician asked for a three-time blood culture and antibiotic susceptibility tests. Also, specialized tests including growth on blood agar plate at 35-37°C with 5% CO<sub>2</sub>, gram stain, catalase test and bile solubility test were performed. Small grey moist colonies with a zone of alpha-hemolysis were seen on the plates, and microscopy showed a gram-positive diplococcus with a capsule. The catalase and the optochin result were

negative, and the bacteria was a bile soluble pathogen, confirming the identity of *S. pneumoniae*.

After consultations with otorhinolaryngologists, a CT scan was performed in which the paranasal sinuses (PNS CT) and the sinuses seemed to be healthy with no sinusitis, but a saddle nose due to nasal septal hematoma was noticed. A cardiologist examined the patient on June 09, 2014. He had a fever during the examination, and a 3/6 grade systolic murmur was heard in the cardiac apex. In the next step, transthoracic echocardiography was conducted, and vegetation was not seen. The next day, thoracic echocardiography revealed contraction of the left ventricle (LVEF) normal. The function of tricuspid aortic and pulmonary valves was normal, however mitral valve prolapse of the anterior leaflet and a free amorphous mass with multiple angles by the size of 0.9 to 1.6 cm<sup>2</sup> was found on the atrial surface of the anterior leaflet of the mitral valve with no destruction of leaflets. There was also mitral valve regurgitation. About this issue, trans-esophageal echocardiography was requested for the patient the next day, and all the above items were observed, as well as mitral regurgitation (MR) on both sides, one on the tip of the valve (among cuspids) and another one on the eccentric affected cuspid toward left atrium appendage. The amount of the MR was moderate. Left atrial (LA) enlargement was not observed indicating a lack of chronic MR. The erythrocyte sedimentation rate (ESR) test was 68mm /

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/hour, CRP +4, platelet count  $109 \times 10^3$  /ml, hemoglobin low (9.6 g/dl), and white blood cell count high ( $11.3 \times 10^3/\mu\text{L}$ ). Examination of peripheral blood smear revealed toxic granulation, giant platelet and platelet aggregation, all indicating toxic and infectious conditions. Regarding the three positive separate tests of blood culture that revealed *S. pneumoniae* sensitive to ceftriaxone on June 12, 2014, and results of complementary tests, the antibiotic therapy was continued for him as before. The abdomen and pelvic ultrasound showed no problem in the liver, spleen, and kidneys. Also, HIV-Ab test on June 15, 2014, was negative.

On June 28, 2014, the transesophageal echocardiography (TEE) examination was conducted to examine the size of vegetation and destruction of the valve. The mass was seen in the previous location but was much smaller in size ( $0.3 \times 1.2$  cm). The amount of MR also had decreased, and there was no degeneration of cusps. The continuation of antibiotic treatment was suggested followed by the monitoring the patient for any cardiac symptoms such as the growth of vegetation, valvular disease or heart failure (CHF). Regarding the risk of meningitis in individuals with pneumococcal endocarditis, the patient was examined for signs of CNS involvement. No sign and symptoms, e.g., decreased consciousness and headache indicating meningitis was observed. The patient also had no signs in favor of Austrian Syndrome. He was discharged from the hospital after a month on July 08, 2014, concerning the disappearance of the symptoms, normal chest CT and ESR result (12 mm/Hour).

Invasive pneumococcal infection is an infectious disease which will be confirmed by isolation of the bacteria *S. pneumoniae* from sterile areas of the body such as blood and cerebrospinal fluid. Entry of bacteria in the blood, which leads to bacteremia can occur after pneumococcal pneumonia or in its absence [1]. The American disease care center reported 33500 cases of the invasive pneumococcal disease in 2013 [2]. The majority of invasive pneumococcal infections happen in middle-aged men with risk factors such as chronic alcoholism, and immunocompromised individuals undergoing chemo-therapy and organ transplants, HIV patients, people with cirrhosis of the liver, and ear or sinus infection [3,4]. Also, smoking cigarettes is a substantial risk factor for invasive pneumococcal disease and considered a predisposing factor for invasive bacterial colonization within nasopharyngeal space [5]. When bacteremia develops, secondary complications such as arthritis, meningitis, and endocarditis may occur [1]. Endocarditis occurs when the bacteria enters the bloodstream and colonize in a defective layer of the heart or heart valve. Endocarditis often happens in the people with a history of cardiac valvular diseases or congenital heart defects. Certain heart conditions associated with endocarditis include a history of heart valve surgery, mitral valve prolapse with valvular leakage, hereditary heart disease and defective heart valves due to rheumatic fever [3].

The patient reported here did not reveal any of the risk mentioned above factors according to history, HIV-Ab test

and the abdomen and pelvis CT scan. In our case, the reason for bacterial colonization can be attributed to the septal hematoma, which caused by the blow to the nose and lack of adequate treatment resulting in necrosis of nasal septum followed by the *S. pneumoniae* colonization. The invasive pneumococcal infection, if untreated, can rapidly affect the heart valves [1]; in this patient, endocarditis occurred a month after nose trauma. For patients without the common risk factors for pneumococcal endocarditis, the causes could be tricuspid valve diseases or valvular heart abnormalities. In a study conducted on 197 adult patients with pneumococcal endocarditis, 74.4% of the cases showed involvement in the aortic area, and 31.4% a disturbance in mitral valve [4] that reflects the tendency of pneumococcal endocarditis to involve the left side of the heart. In our case, since the patient has mitral valve prolapse, vegetation was seen in the anterior leaflet of the valve.

Although endocarditis caused by *S. pneumoniae* occurs rarely, it can cause serious complications such as cerebrovascular accidents, the need for heart surgery and even death [1]. Diagnosis of pneumococcal infection before the development of severe complications, especially in patients with valvular heart problems are critical. Because of the Pneumococcal tendency to destruct the heart valves and cause acute heart failure, the risk of valve abscess in the involved area and also the risk of endocarditis in patients who have these risk factors should be considered. Penicillin is still effective against pneumococcal infections, however, like meningitis, the empirical treatment recommended for pneumococcal endocarditis is a combination of ceftriaxone and vancomycin. The use of pneumococcal vaccine in susceptible individuals with risk factors to prevent severe pneumococcal infections should be considered.

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## CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest associated with this manuscript.

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