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Olgu Sunumu / Case Report

Severe Respiratory Failure in the Coexistence of Polymyositis and Hypothyroidism: A Case Report

Şiddetli Solunum Yetmezliğine Neden Olan Polimiyozit ve Hipotiroidi Birlikteliği: Olgu Sunumu

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ABSTRACT

Polymyositis is a systemic, inflammatory muscle disease. Respiratory insufficiency as a result of respiratory muscle involvement could also be observed. Here we report a fortyone-year-old man who attended to the hospital with the complaints of shortness of breath and chest pain that have suddenly started. Physical examination has revealed proximal muscle weakness. Serum creatinine phosphokinase level has increased, ANA was positive and the electromyographic examination has revealed myopathic changes. Deltoid muscle biopsy was in accordance with polymyositis. Methyl-prednisolone 1 gram iv pulse therapy was given during the first 5 days. He was started with 25 mg/week parenteral methotrexate. Laboratory tests suggested hypothyroidism and levothyroxine replacement therapy was started. The clinical findings have improved concomitant with the reduction in the muscle enzymes and thyroid stimulant hormone levels into the normal ranges. He was discharged with the recommendation of the NIMV device application during night-time. The clinical symptoms are more severe in the presence of alveolar hypoventilation due to polymyositis and coincidantal hypothyroidism.

Key Words: Alveolar hypoventilation, non invasive mechanical ventilation, hypothyroidism, polymyositis.

ÖZET

Polimyozit sistemik inflamatuar bir kas hastalığıdır. Solunum kas tutulumuna bağlı solunum yetmezliği görülebilen bir klinik tablodur. Burada 41 yaşında hastanemize ani başlayan nefes darlığı ve göğüs ağrısı şikayetleriyle başvuran bir hasta sunulmuştur. Muayenesinde proksimal kas güçsüzlüğü saptandı. Kreatin fosfokinaz yüksekliği, ANA pozitifliği ve elektromyografik incelemesinde myopatik değişiklikler bulundu. Deltoid kas biyopsisi sonucu polimyozit ile uyumlu bulundu. Hastaya 5 gün 1 gram iv pulse metil prednizolon tedavisi uygulandı. Aynı zamanda 25 mg/hafta parenteral metotreksat tedavisi uygulandı. Laboratuar testinde hipotiroidi de tespit edilmesi üzerine levotiroksin replasmanı tedaviye eklendi. Takipte klinik bulgular ile birlikte kas enzimleri ve tiroid stimülan hormon düzeyleri düzelen hasta gece NIMV kullanımı önerisi ile taburcu edildi. Polimyozite hipotiroidinin eşlik ettiği tabloda klinik semptomlar daha ciddi izlenmektedir.

Anahtar Kelimeler: Alveolar hipoventilasyon, invaziv olmayan mekanik ventilasyon, hipotiroidi, polimyozit

INTRODUCTION

Polymyositis (PM) is a systemic, inflammatory muscle disease[1]. It's prevalance in the general population is approximately 1:100.000 and is two-fold more frequent in women then men. Principally it leads to muscle weakness as a result of proximal group muscle involvement. Difficult swallowing as a result of pharenx muscle involvement or to a lesser extent, respiratory insufficiency as a result of

respiratory muscle involvement could also be seen. Among the rare findings, heart and eosophagus could also be involved. Fever, weight loss, Raynaud's phenomenon and non-erosive inflammatory olygoarthritis are among the rare clinical aspects of the disease. Although the pulmonary involvement is rare, it is an important reason of mortality and morbidity. PM could involve the lung in three ways: (1) Interstitial lung disease: seen in 10 % of all the cases, (2) Hypoventilation as a result of respiratory muscle involvement, and (3) Aspiration pneumonitis[2,3].

Hypothyroidism is pronounced as the functional loss of the thyroid gland. Hashimoto thyroiditis is one of the autoimmune reasons of hypothyroidism. The functional rates of a plenty of organs and tissues are slowed down as a result of insufficient synthesis/release of the thyroid hormones. Muscle disease related to hypothroidism has a broad spectrum ranging from asymptomatic CPK elevation to severe myopathy. Neuromuscular symptoms like proximal muscle weakness, fatigue, muscle cramps and myalgia were reported in 30-80 % of the patients[4,5]. Particularly, the weakness in the shoulder and pelvic muscles along with the muscle enzyme elevations in a patient could be challenging for diagnose as these findings could be easily confused with polymyositis. However, the EMG test results and muscle biopsy findings are important for the differantial diagnosis of hypothyroidism and polymyositis[6].

CASE REPORT

Forty one-year-old man with a smoking history of 25 packs-year was attended to the hospital with the complaints of shortness of breath and chest pain that have suddenly started. The complaint of dispnea was worsening particularly during night time, and subsequently the effort capacity was deteriorating and for these reasons he was unable to do his self care. He had a 15 kgs weight loss in 2 months. He never had any cough, sputum or hemoptysis. He was hospitalized with the hypoxemic and hypercapnic respiratory failure. He had difficulty in climbing the stairs, standing up from sitting and combing the hair. No additional data was gathered from his family's medical history. In physical examination, the fever: 37°C, pulse rate: 88/min (rhytmic), and the blood pressure was 110/75 mmHg. In pulmonary system examination, the respiratory rate was 22/min, and rapid and shallow respiratory pattern was positive. The anteroporterior width of the chest wall was found to be enlarged and bilateral widespread expiratory rhonchus was present in auscultation. The muscle strength examination results were: Of the upper extremity proximal part: 3/5 bilaterally; lower extremity proximal part: 3/5 bilaterally. Decrease in the respiratory muscle movements was also observed. Other organ system examinations revealed normal findings. No fever was observed during the follow-up.Lung radiography was normal. Respiratory function tests revealed severe restrictive pattern (FEV1/FVC:93, FEV1: 25 % (0,92L), FVC: 22 % (0,99L)). Increased residual volume (RV) was found. The patient could not complete the diffusion test. Empysema was present in high resolution and dynamic thorax computerized tomography (CT). No finding was present that suggests pulmonary embolism. The results of arterial blood gases which was sampled in normal room air were as follows: pH:7,37mmHg, PO2:73,5mmHg, PC02:54mmHg, HC03:30,7 and SO2:94,3 %. The alveolo-arterial oxigen gradient was normal. After gathering and evaluating all these data, alveolar hypoventilation was diagnosed and the patient was suspected to have a muscle disease. Laboratory test; Creatinine phosphokinase; 831U/L (<170), Aspartate transaminase; 62 U/L (<31), Alanine transaminase; 39 U/L (<31), Thyroid stimulating hormone; 46 mIU/mL (0,35-4,2), Free T_4; 0,62 ng/dl (0,89-1,8), Anti-microsomal antibody;1092 U/mL (0-50), Anti-thyroglobulin antibody;1309 U/Ml (<115) were found. Other laboratory test all were normal. ANA was positive by immunofluoresceine. Anticardiolipins and anti-

extractable nuclear antigen antibodies were all negative including anti-Jo1. Hepatitis B, C and HIV test were all negative. The electrocardiographic and echocardiographic examinations were normal. Electromyographic examination revealed myopathic involvement together with denervation findings of the proximal group muscles. During the follow-up, decompensated respiratory acidosis and hypoxemia has worsened and the general health of the patient has impaired, he was transported to the ICU. The NIMV therapy had begun. Because of the muscle weakness, ANA positivity and abnormal EMG findings, polymyositis was suspected and therefore biopsy was taken from the deltoid muscle. Muscle biopsy examination revealed variation in fibre size, with hypertrophy and atrophy of fibres, increased internal nuclei, scattered necrotic, degererating and regenerating fibres (Figure-1). Marked lymphocytic infiltration was not seen by the immunohistochemical evaluation. There were positive staining in the sarcolemmal and internal part of fibres with HLA-1 (Figure-2). Membrane-attack-complex (MAC), C5b-9 was negative. The combination of histology, histochemistry and immünohistochemical findings were consistent with inflammatory myopathy; polymyositis was diagnosed. Methyl-prednisolone (MP) 1 gr iv pulse therapy was given during 5 days and then the dose was tapered to 100 mg/day. He was moved to the Rheumatology department, followed up with NIMV and was started with 25 mg/week parenteral methotrexate. No adverse effect was observed. The additional laboratory tests suggested hypothyroidism (high TSH and low free $T_{4,}$ positive thyroid autoantibodies) were present. Thyroiditis was found in ultrasonographic examination of the thyroid gland, so the patient was also diagnosed as Hashimoto thyroiditis and levothyroxin 25 mcg was started. The dose was incresed to 75 mcg/day by adding 25 mcg per week. His need to respiratory support has reduced and was advised to apply the device only at night-time. No malignancy was found during the follow up. Metilprednisolone dosage was tapered to 64 mg. Pulmonary disease departmet has recommended home-type BIPAP-ST device. The setup of the device was arranged according to the arterial blood gases of the patient. As his general health was improved, the muscle enzymes and the TSH levels were returned to normal ranges, the arterial blood gases were stable and the patient was discharged.

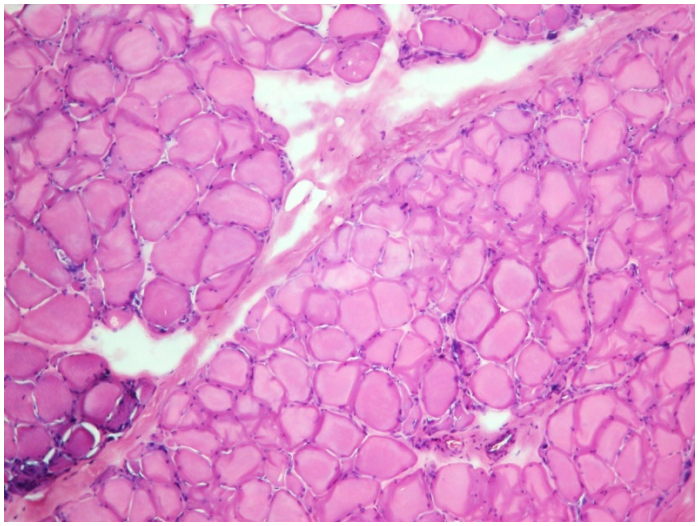

Figure-1. (H&E X 100). Deltoid muscle byopsi has revealed hypertrophy and atrophy of fibres, increased internal nuclei, scattered necrotic, degererating and regenerating fibres. A rare lymphocytic infiltration was also present.

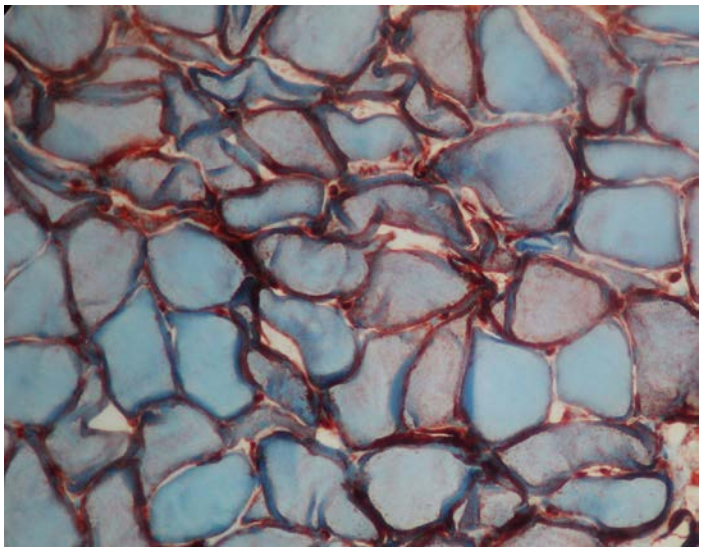

Figure-2. (X 200). Positive staining sarcolemmal and internal part of fibres with HLA-1

DISCUSSION

Polymyositis is a rare disorder with an unknown aetiology. Bohan and Peter have reported classification criteria for idiopathic inflammatory myopathy: symmetrical proximal muscle weakness, typical rash for dermatomyositis, muscle enzyme elevations in the serum, myopathic alterations in EMG and characteristic muscle biopsy findings[7]. Most important clinical finding is symmetrical, progressing muscle weakness. Myalgia and tenderness of the muscles are only seen in 25–50 % of the cases. In advencing periods of the disease without appropriate therapy or resistancy to the drugs, muscle atrofy could also be present. Aspiration pneumonia and/or bacterial pneumonia could occur as a result of involvement of the muscles of farenx and distal 1/3 part of the eosophagus muscles[8,9]. Cardiac involvement could be seen as myocarditis or arrythmia however the disease could rarely lead to severe myocarditis and eventually progresses to congestive heart failure[10]. In our case, no cardiac involvement was present. Not as frequent as it is in dermatomyositis but malignancy could also accompany polymyositis. For this reason, at the time of diagnose and during the following years, malignant diseases should be suspected and scanned for detailly[11,12].

Hashimoto thyroiditis is an autoimmune disease which is the most common reason of hypothyroidism. The disease is so-called as chronic lymphocytic thyroiditis or autoimmune thyroiditis and is seen mostly in middle age; however could also occur in every year of life. The prevalance of the disease is seen more than 2 %. The frequency is higher in women than in men. The neuromuscular symptoms are reported to be 30-80 % in different series. Hypothyroidism could be confused with polymyositis as causing proximal muscle weakness. There are case reports which are presented like polymyositis[4,6,13]. CPK elevation in hypothyroidism is generally asymptomatic. Even though 4-5 fold increase is observed, much more increases in the serum levels are also reported. Muscle weakness is generally in proximal muscles of shoulder, neck and pelvis. The EMG is normal in 50 % of the cases. The rest of the cases could have non specific findings. The muscle biopsy could be normal or reveal minimal abnormalities like focal necrosis and/or degeneration in the

muscle fibrils[14]. The myopathy of hypotyroidism most common histopathological findings of were type II fiber atrophy, type I fiber hypertrophy, central nuclei disposition, necrosis, increased percentage of type I fibers, and decreased percentage of type II fibers, inflammatory infiltrates and the presence of core-like structure. All these pathological findings were nonspesific and did not correlate well with the clinical severity of the myopathy. Myopathies due to hypothyroidism respond well to thyroid replacement therapy. Muscle biopsy and EMG are informative for the discrimination of hypotyroidism from polymyositis[5,6].

The pulmonary symptoms of hypothyroidism are also important which includes shallow breathing and also impairment of the ventilatory reply to hypercapnia and hypoxemia. In myxedema coma respiratory insufficiency is particularly a major problem of the patients. Hypotiroidism is also found to be related with pulmonary hypertension[15]. Autoimmune thyroid dysfunction is also related with the other autoimmune diseases. The probability of autoimmune thyroid disease and pulmonary hypertension is relatively high in systemic lupus erythematosus and Sjogren's syndrome. Raynaud's phenomenon (RP) could be present in both primary pulmonary hypertension and hypothroidism. RP in hypothyroidism could improve with thyroid hormone replacement therapy[16,17]. Although there are several hypothyroidism cases in the literature who are also reported to be diagnosed as polymyositis, hypothyroidism accompanying polymyositis with evident respiratory failure is rarely reported in a patient. Pulmonary hypertension was not present in our patient in the echocardiographic examination. As the patient was not diagnosed as myxedema coma (according to the clinical and laboratory findings), the alveolar hypoventilation and hypercapnia were not attributed to hypothyroidism.

Myastenia gravis, and muscular distrophies were excluded by history, physical examination, laboratory tests and muscle biopsy findings. History of any medication that is known to cause myopathy were absent. The muscle biopsy results of our case has approved the diagnosis of polymyositis. Necrosis in muscle fibrils, regeneration and degeneration is seen as a result of inflammation. HLA expression is useful for discriminating polymyositis from other inflammatory myositis and myopathies[18]. In our case the absence of marked lymphocyte infiltration could be attributed to the corticosteroid administiration two days prior to the biopsy. The typical skin lesions and diagnostic biopsy findings of dermatomyositis such as, cellular infiltrations in the perifascicular area, immune complex depositions around the vessels were all absent, besides, C5b-9 (MAC) was not detected and HLA expression was positive[19]. Inclusion body myositis and other connective tissue diseases were excluded by clinical, immunological and biopsy findings.

Polymyositis presenting with hypercapnic respiratory insufficiency is rarely reported in the literature. Alveolar hypoventilation is present in less than 5 % of patients and is the main reason of respiratory insufficiency in polymyositis patients[20,21]. Muscle weakness in polymyositis is severe and could involve both inpiratory and expiratory muscles. Respiratory function tests (RFT) are not only important for objective evaluation of shortness of breath but also for the severity of the disease and a tool for measuring the success of the treatment. In these patients, restrictive respiratory functions (which are characterized by: A normal FEV_1/FVC ratio, reduced FEV_1, FVC and total lung volume (TLV), increased residual volume (RV) and reduced carbonmonoxide diffusion capacity) could be found[22]. Intermittent non-invasive home mechanic ventilation administiration at night-time could enhance the respiratory muscle strength and improve the chronic hypoventilation occuring at day-time. Additionally,positive pressure ventilation administiration at night-time improves the

hypercapnia by enhancing the sensitivity of central chemoreceptors to carbon dioxide[23].

CONCLUSION

In summary, polymyositis is a rare inflammatory muscle disease. Respiratory muscle involvement is a rare finding in the disease. The clinical symptoms are more severe in the existency of alveolar hypoventilation due to polymyositis and coincidantal hypothyroidism. The respiratory insufficiency would be a life-threatening complication of polymyositis especially if hypothyroidism accompanies the disease. This should be kept in mind and every similar case should be screened with this point of view. Multidisciplinary approach is approved to be one of the most important clue for success of the management of a patient with respiratory failure. Non invasive mechanic ventilation support could significantly reduce morbidity and mortality together with the corticosteroid and immunosuppressant therapy.

Competing interests

None of the authors has any conflict of interest

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