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Bilateral Parsonage-Turner Syndrome after Intensive Exercise in a Young Woman

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Abstract: **Parsonage-Turner syndrome, also known as brachial plexus neuritis or idiopathic amyotrophy, is a common undiagnosed inflammatory neuropathy, which is characterized by acute onset of shoulder pain, followed by weakness of the shoulder or upper limb, and occasionally, sensory disturbances. The present report discusses a rare case of Parsonage-Turner syndrome caused by intensive exercise.**

Study design: A 29-year-old woman presented to our clinic with 1 month history of bilateral shoulder pain and weakness after heavy intensive exercise. The patient was followed up for 3 months after treatment, and again 1 year after treatment.

Materials and methods: Laboratory analysis was performed to obtain complete blood count, erythrocyte sedimentation rate, and C-reactive protein levels. Radiography of the shoulder and neck were performed. Brachial plexus magnetic resonance imaging (MRI) was also performed. Physiotherapy was performed to relieve the pain.

Results: Brachial plexus MRI showed edema throughout the brachial plexus, with an elevated T2-weighted signal in the supraspinatus, infraspinatus, and teres minor muscles. All other test results were normal. A diagnosis of Parsonage-Turner syndrome was suspected based on symptom characteristics: acute pain followed by progressive weakness of the shoulder. Following physiotherapy, the pain gradually improved.

Conclusion: Several factors are associated with the development of Parsonage-Turner Syndrome, such as sudden intensive exercise, as in this case. Adequate physiotherapy leads to improvement of pain, with excellent prognosis for Parsonage-Turner Syndrome.

Keywords: **brachial neuritis, idiopathic neuralgic amyotrophy, bilateral physiotherapy.**

1. INTRODUCTION

Parsonage-Turner syndrome, also known as brachial plexus neuritis or idiopathic neuralgic amyotrophy, is a common undiagnosed inflammatory neuropathic condition, with an incidence of 1 per 1000 cases per year [1]. The syndrome is characterized by acute neuropathic pain in the upper extremities, with a loss of sensation, and is occasionally associated with scapular winging.

The etiology is unknown, but is generally thought to be related to inflammation [4]. Several risk factors are associated with the development of Parsonage-Turner syndrome, such as infection, stressful exercise, and trauma [5,6]. One very rare form of Parsonage-Turner syndrome is hereditary in nature, being autosomal dominant, and has been linked to a mutation in the *SEPT9* gene on chromosome 17q [7].

Men are more likely to develop the syndrome than women, with the male-to-female ratio ranging from 9:1 to 11.5:1. Moreover, the symptoms are more commonly unilateral [8,9]. Since the presentation of this syndrome, which includes neuropathic pain and a loss of sensation in the upper limbs, is similar to that of many diseases, there is a need to rule out other causes of these symptoms, such as cervical brachialgia, muscles strain, and thoracic outlet syndrome [13].

2. CASE PRESENTATION

A 29-year-old woman presented with a 1-month history of bilateral shoulder pain and upper arm weakness, two days after intensive and stressful exercise, including push-press of heavy weight of approximately 70 kg. The pain included a

burning sensation over her shoulders that radiated down to her arms and fingertips. She did not experience any neck pain. The patient reported bilateral shoulder weakness 1 week after the pain had begun, particularly during abduction and external rotation. She did not have any history of trauma or medical illness.

Upon examination, bilateral winging of the scapulae was observed, which was more prominent on the right side. The patient could actively abduct her right shoulder up to 45° and her left shoulder up to 60°, with full passive abduction bilaterally. Her shoulder abduction strength was 3/5, and there was diminished sensation over the lateral aspect of her shoulders bilaterally. Bilateral triceps, biceps, and brachioradialis reflexes were normal. Radial pulses were palpable bilaterally. All other examination findings were normal. Laboratory analysis of her complete blood count, erythrocyte sedimentation rate, and C-reactive protein levels were normal. Radiography of her shoulder and neck did not reveal any abnormalities. Brachial plexus magnetic resonance imaging (MRI) showed edema throughout the brachial plexus, with an elevated T2-weighted signal in the supraspinatus, infraspinatus, and teres minor muscles. Electromyography (EMG), performed 3 weeks after reporting weakness of bilateral shoulders, revealed fibrillation potential and positive waves of the supraspinatus and serratus anterior muscles on the right side and of the supraspinatus muscle on the left side. Lumbar puncture was not performed for this patient.

The patient was diagnosed with bilateral Parsonage-Turner syndrome (bilateral plexus neuritis), and treated with non-steroidal anti-inflammatory drugs and intensive physiotherapy to strengthen her periscapular muscles. After 3 months of follow-up, there was no pain, and the patient exhibited improved muscle strength and range of motion. At the 1-year follow-up, strength and function of the muscles fully recovered, with no residual pain or deficit.

3. DISCUSSION

Parsonage-Turner syndrome is commonly unilateral, and affects men more than women [1,13]. However, the patient in this report was a woman, and presented with bilateral symptoms after heavy stressful exercise, which is extremely rare. The pathophysiology of Parsonage-Turner syndrome is unknown, but thought to be related to inflammation. Additionally, there are several risk factors that can lead to the development of the condition, including intensive exercise, as described in this case. Indeed, Weikers et al. described that 8 out of the 12 cases they observed were caused by stressful exercise [10].

Shoulder pain and weakness can be associated with a wide variety of diseases. Parsonage-Turner syndrome is a common undiagnosed inflammatory neuropathy; hence, an accurate diagnosis requires X-ray, MRI, and EMG, with both X-ray and MRI of the spinal cord being needed to exclude the possibility of other diseases that could manifest with the same presentation. However, in this patient, the pain started two days after intensive exercise, followed by weakness of bilateral shoulders, which is characteristic of Parsonage-Turner syndrome. This suspicion was confirmed by MRI of the brachial plexus, which revealed edema and an elevated T2 signal intensity, as well as by EMG, which indicated wide denervation, including fibrillation and positive waves of the relevant muscles [12,14]. Parsonage-Turner syndrome is self-limiting, and has an excellent prognosis in 36% of the patients within 1 year, 75% of the patients within 2 years, and 89% of the patients within 3 years [11,18–20]. In this case, the pain subsided after 3 months, but weakness of bilateral shoulders persisted; the patient was treated using physiotherapy, include exercises to increase the range of motion and strength training of the periscapular muscles. After 1 year of physiotherapy, the patient fully recovered her shoulder strength and range of motion.

4. CONCLUSION

Sudden intensive exercise is a causative factor of Parsonage-Turner syndrome. Many differential diagnoses exist for shoulder pain and weakness. Therefore, an accurate diagnosis of Parsonage-Turner syndrome requires a detailed history and physical examination, including X-ray, MRI, and EMG. Parsonage-Turner syndrome has an excellent prognosis following physiotherapy treatment.

Learning points:

1. Sudden intensive exercise may cause Parsonage-Turner syndrome.

2. An accurate diagnosis requires X-ray and magnetic resonance imaging examination.

3. Adequate physiotherapy leads to excellent prognosis.

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