

The Purport of Steroid Treatment in the Weakness Phase of Parsonage-Turner Syndrome

Gun Woo Lee, M.D., and Young Ho Kwon, M.D., Ph.D.

Department of Orthopedic Surgery, Kosin University Gospel Hospital, Kosin University College of Medicine, Busan, Korea

This article presents six cases of Parsonage-Turner syndrome with corticosteroid therapy in the muscle weakness phase. Three cases did not receive injected steroids after the onset of muscle weakness, and were classified as Group 1. The other three cases received injected steroid from just after muscle weakness onset, and were classified as Group 2. This article has a small study group of six cases, but is the first case study about the efficacy of steroids in the muscle weakness phase, showing a better treatment result when steroids were injected during the muscle weakness period. We report these findings, together with a review of the literature.

Key words: Parsonage-Turner syndrome, corticosteroid

Parsonage-Turner syndrome (PTS) can be a problem for both patients and physicians. PTS patients typically present with sudden onset of arm pain followed by muscle atrophy of the shoulder girdle and arm, which induces upper extremity weakness.¹⁾ Treatment of PTS is usually supportive and involves a combination of analgesics, immobilization and physical therapy, but some degree of sequelae is reported in about 10% of patients.^{2,3)} Steroid injection is reported to show better treatment results than others. In previous studies, early corticosteroid therapy might have positively influenced the acute pain phase in some patients; however, the use of steroids is controversial in the muscle weakness phase.

This article presents cases of PTS with steroid therapy in the muscle weakness phase. This study has a small study group of six cases, but is the first one on the effects of steroids after the onset of muscle weakness, showing better treatment results when steroids were injected during the weakness phase of PTS.

CASE REPORT

Group 1 had three cases. The mean age was 48 years old, ranging

from 36 to 61. Case 1 had a mild fever history, and case 2 had a trauma history of sudden crepitus following severe burning pain at the shoulder and arm during work. All visited other medical institutions and were prescribed medication but had little pain relief, with pain continuing again after a mean of 23 days (range 17-27) from the onset of symptoms. The medical records of the other medical institutions did not report numbness at the time of pain onset. Patients were transferred to our hospital with a chief complaint of muscle weakness of the upper extremities at about one month from the onset of pain. On physical examination, muscle power weakness was about Medical Research Council (MRC) grade 3. All range of motion from the shoulder joint to finger joints was checked and a mild degree of muscle atrophy was observed at the deltoid, biceps, and triceps muscles. Range of motion was normal, and a spurling test of the neck was negative. Paresthesia of the upper limbs was not checked. Specific findings were not checked by magnetic resonance imaging, except for mild disc herniation of cervical level 4/5, 5/6. Electromyogram (EMG) found lesions at the area of the brachial plexus or cervical plexus. Based on the clinical course and the EMG findings, conservative treatment such as physical therapy including muscle-straightening exercises, were performed with a diagnosis of PTS. Recovery parameters were set by muscle strength, timing of recovery, and Rankin score. For recovery parameters, recovery of muscle strength was defined by strength of more than 80% power compared to the normal side. Improvement of muscle power was

Received January 9, 2012 **Revised** February 9, 2012

Accepted March 27, 2012

Correspondence to: Young Ho Kwon, M.D., Ph.D.

Department of Orthopedic Surgery, Kosin University Gospel Hospital, 262, Gamcheon-ro, Seo-gu, Busan 602-702, Korea

TEL: +82-51-990-6467 **FAX:** +82-51-243-0181 **E-mail:** handkwon@hotmail.com

observed after 8 months (MRC grade 4), and patients were able to work normally after 12 months (grade 5) (Table 3). Summarized data for Group 1 are in Table 1.

Group 2 had three cases with a mean age of 47 years old, ranging from 39 to 51. Patients were engaged in an occupation that used the arms frequently, and none had a specific trauma or disease history. Two patients had visited other medical institutions with a chief complaint of burning pain of the upper extremity and pharmacological treatment was given for pain control although this gave no pain relief. The patients visited our hospital within 14 days of pain onset. In one case, the patient visited our hospital just after pain onset because of pain in the left upper extremity and shoulder. At the time of the visit, no sign of motor or sensory weakness of the affected upper extremities was observed. On physical examination at admission, the range of motion of the upper limbs was normal, and tenderness and tinel sign were positive at the supraclavicular brachial

plexus, but muscle atrophy was not found. Muscle power, sensation, and tendon reflex were all normal. A spurling test of the neck was negative, and various tests for shoulder lesions such as rotator cuff tear were all negative. Simple X-ray of the neck and shoulder joint showed no abnormal findings. After 5 weeks from onset, pain was relieved but weakness of muscle power at left upper limb appeared, with grade 3 for elbow flexion. EMG performed at that time found a lesion at the area of the left brachial plexus. Based on the clinical course and EMG findings, the patient was diagnosed with PTS. A dose regimen of steroids followed, with a two week course of oral prednisolone, 60 mg daily in the first week, and tapering to the dosage by 10 mg per day with a 5 mg as the last step. Oral prednisolone was accompanied with physical therapy within 7 days of the onset of muscle weakness (one case just after onset, two cases within 5 days of onset). No side effects of steroid treatment were observed. Recovery parameters were as for Group 1. After 8 months, muscle

Table 1. Summarized Data on 3 Patients of Group 1

Case number	Age/sex	Preceding Hx.	1st clinical feature (VAS)/time to pain relief	F/U (mo)	MRI finding	EMG finding	Involved muscle/MRC grade	Treatment (except steroid)	Steroid treatment	Recovery time of muscle strength (mo)*	Complications
1	36/M	Fever	Painful right arm (8)/35 days	49	(-)	BP	DM, BB, IS, SS/grade 3	NSAIDs+PT	(-)	11	(-)
2	47/F	Trauma	Painful right arm (10)/22 days	63	(-)	BP	SS, IS, BB, B/grade 3	NSAIDs+PT	(-)	12	Mild weakness
3	61/F	Unknown	Painful right shoulder (8)/27 days	19	(-)	CP	Serratus, trapezius/grade 3	NSAIDs+PT	(-)	12	(-)

*Time for recovery of 80% strength during working, in comparing with normal side. Hx., history; VAS, visual analogue scale; F/U, follow-up; MRI, magnetic resonance imaging; EMG, electromyogram; MRC, Medical Research Council; M, male; F, female; BP, brachial plexus; CP, cervical plexus; DM, deltoid muscle; BB, biceps brachis; IS, infraspinatus; SS, supraspinatus; B, brachialis; NSAID, non-steroidal anti-inflammatory drug; PT, physical therapy.

Table 2. Summarized Data on 3 Patients of Group 2

Case number	Age/sex	Preceding Hx.	1st clinical feature (VAS)/time to pain relief	F/U (mo)	MRI finding	EMG finding	Involved muscle/MRC grade	Treatment (except steroid)	Steroid treatment	Recovery time of muscle strength (mo)*	Complications
4	39/F	Unknown	Painful right arm (8)/23 days	49	(-)	BP	IS, SS/grade 3	NSAIDs+PT	(+)	6	(-)
5	50/F	Infection	Painful left arm (8)/21 days	63	N.C.	BP	SS, IS, BB, B/grade 3	NSAIDs+PT	(+)	8	(-)
6	51/M	Unknown	Painful Bilat. arm (9)/38 days	19	(-)	CP	Serratus, trapezius/grade 3	NSAIDs+PT	(+)	8	(-)

*Time for recovery of 80% strength during working, in comparing with normal side. Hx., history; VAS, visual analogue scale; F/U, follow-up; MRI, magnetic resonance imaging; EMG, electromyogram; MRC, Medical Research Council; F, female; M, male; Bilat, bilateral; N.C., not checked; BP, brachial plexus; CP, cervical plexus; IS, infraspinatus; SS, supraspinatus; BB, biceps brachis; B, brachialis; NSAID, non-steroidal anti-inflammatory drug; PT, physical therapy.

Table 3. Subjective Recovery Rates and Residual Symptoms per Duration of F/U

Case number	F/U duration	Full recovery (normal side: 100%)	Able to work	Modified Rankin score (%)						
				0	1	2	3	4	5	
1	6 mo	30%	(-)				■	■	■	
	1 yr	60%	(-)			■	■	■	■	
	2 yr	90%	(+)		■	■	■	■	■	
2	6 mo	20%	(-)					■	■	■
	1 yr	50%	(-)			■	■	■	■	
	2 yr	60%	(-)		■	■	■	■	■	
3	6 mo	30%	(-)					■	■	
	1 yr	70%	(-)		■	■	■	■	■	
	2 yr	Nearly 100%	(+)	■	■	■	■	■	■	
4	6 mo	50%	(-)			■	■	■	■	
	1 yr	80%	(+)		■	■	■	■	■	
	2 yr	Nearly 100%	(+)	■	■	■	■	■	■	
5	6 mo	60%	(?)*				■	■	■	
	1 yr	80%	(+)		■	■	■	■	■	
	2 yr	90%	(+)	■	■	■	■	■	■	
6	6 mo	50%	(-)					■	■	
	1 yr	70%	(+)		■	■	■	■	■	
	2 yr	90%	(+)	■	■	■	■	■	■	

*Patient said that "I can work", although muscle power was 60% of normal side. F/U, follow-up.

strength was restored (MRC grade 5) and the patient was able to return to his work (Table 3). The summarized data of Group 2 is described in Table 2.

DISCUSSION

PTS was first reported by Freinberg in 1897, but the disease name was not established until Personage and Turner described a series of 136 clinical cases in 1948. Other terms used to describe this disease entity include neuralgic amyotrophy, brachial plexus neuritis, idiopathic brachial plexopathy, acute brachial radiculitis.^{1,3} However, the general term Parsonage–Turner syndrome is most commonly used. The etiology of this condition remains unclear, but an immune attack on the brachial plexus or its branches within the limb triggered by various preceding events, such as infection, vaccination, pregnancy and parturition, surgery, radiation, intravenous heroin use, or treatment with interferon, has been suggested as a cause, although pathological evidence is scant. Trauma is not a certain risk factor, but is recognized as a contributing factor after Mulvey et al² reported that mild trauma could induce symptoms of neuritis.³ One case in group 1 was associated with trauma, and the others were related

to mild infection. Symptoms of PTS vary widely, but the typical clinical course starts with acute, severe, aching, unilateral shoulder and proximal arm pain lasting from days to a few weeks. When the pain abates, painless shoulder girdle and arm weakness develops, more prominent in the upper plexus muscles including deltoid, supra or infraspinatus, biceps. Forearm and hand muscles are less frequently involved.^{4–6} For numbness, different viewpoints exist; Tsairis et al⁷ reported 67% of cases with numbness, while Misamore and Lehman⁵ reported that no cases with numbness.

Treatment is usually supportive and involves a combination of analgesics, immobilization and physical therapy.^{1,3,5,6} Recently, steroid injection was reported to give better treatment results, however, these reports were based on limited resources such as a few case reports so controversy remains about the effects of the treatment.^{6,8} Non-randomized studies provide some evidence to support shortening the time of intense pain and hastening motor nerve recovery when the corticosteroids are administered during the acute phase of the condition.⁹ Anecdotal evidence suggests that their use leads to a more rapid resolution of the painful phase of the illness, in particular when used early in its course, although they do not seem to influence the ultimate prognosis. Non-controlled clinical observations

suggest that very early treatment with corticosteroids in some cases results in prompt pain resolution, with no or minimal weakness.¹⁰ In this study, patients of group 1 returned to work after 6 months from the onset of pain, and worked normally after 12 months. However, in group 2, muscle strength was restored after 8 months from the onset of the pain, with return to normal work within 12 months ($p=0.001$) (Table 3). However, statistical comparisons of steroid-treated patients with the untreated group showed no differences in baseline variables such as age, sex, preceding history and the occurrence of atrophy, or weakness symptoms during the attack.

No study has reported on the efficacy of steroid treatment in the muscle weakness phase. Although this report lacks a large number of cases and a follow-up period, it is meaningful as the first study on the efficacy of steroid injection in the muscle weakness phase of PTS. We propose that even in this phase, steroid injection is possible to improve recovery time and enable rapid return to daily life.

REFERENCES

1. Aymond JK, Goldner JL, Hardaker WT Jr. Neuralgic amyotrophy. *Orthop Rev.* 1989;18:1275-9.
2. Mulvey DA, Aquilina RJ, Elliott MW, Moxham J, Green M. Diaphragmatic dysfunction in neuralgic amyotrophy: an electrophysiologic evaluation of 16 patients presenting with dyspnea. *Am Rev Respir Dis.* 1993;147:66-71.
3. Personage MJ, Turner JW. Neuralgic amyotrophy; the shoulder-girdle syndrome. *Lancet.* 1948;1:973-8.
4. James JL, Miles DW. Neuralgic amyotrophy: a clinical and electromyographic study. *Br Med J.* 1966;2:1042-3.
5. Misamore GW, Lehman DE. Parsonage-Turner syndrome (acute brachial neuritis). *J Bone Joint Surg Am.* 1996;78:1405-8.
6. Geertzen JH, Groothoff JW, Nicolai JP, Rietman JS. Brachial plexus neuropathy. A long-term outcome study. *J Hand Surg Br.* 2000;25:461-4.
7. Tsairis P, Dyck PJ, Mulder DW. Natural history of brachial plexus neuropathy. Report on 99 patients. *Arch Neurol.* 1972;27:109-17.
8. Miled B, Askri A, Sadfi A, et al. Parsonage-Turner syndrome (acute brachial neuritis). A rare cause of scapular pain. *Tunis Med.* 2010;88:451-2.
9. van Alfen N, van Engelen BG. The clinical spectrum of neuralgic amyotrophy in 246 cases. *Brain.* 2006;129:438-50.
10. Kelkar P, Parry GJ. Brachial plexus disorders. In: Noseworthy JH, ed. *Neurological therapeutics: principles and practice.* London: Martin Dunitz Publishers; 2003.

파르소니지-터너 증후군에서 근력 약화시기에 스테로이드 투여의 의미

이근우 · 권영호

고신대학교 의과대학 고신대학교복음병원 정형외과학교실

파르소니지-터너 증후군(Parsonage-Turner syndrome)은 견갑부 및 상완의 동통 및 근력 약화를 야기하는 매우 드문 질환으로, 예후는 대부분 양호한 것으로 알려져 있으나 약 5-10%에서 영구적인 근력 약화를 야기할 수 있다. 근력 약화가 발생되기 전에 스테로이드를 투여하는 것이 도움이 된다고 보고되고 있으나, 근력 약화 이후에 스테로이드 투여의 효용성에 대한 문헌은 아직 보고된 적이 없었다. 저자들은 6예의 적은 증례수이기는 하나, 근력 약화기 이후에 스테로이드를 투여하여 만족스러운 치료 결과를 얻어, 문헌 고찰과 함께 보고하고자 한다.

색인단어: 파르소니지-터너 증후군, 스테로이드

접수일 2012년 1월 9일 수정일 2012년 2월 9일 게재확정일 2012년 3월 27일

교신저자 권영호

부산시 서구 김천로 262, 고신대학교복음병원 정형외과

TEL 051-990-6467, FAX 051-243-0181, E-mail handkwon@hotmail.com