Brachial Plexus Injury after Massage: A Case Report

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บาดเจ็บที่ร่างแหประสาทของแขนภายหลังการนวด: รายงานผู้ป่วย

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ABSTRACT

A 35-year-old woman developed suddenly weakness of upper limb after a session of massage. A diagnosis of brachial plexus injury (BPI) was suspected. This is an uncommon cause of BPI. An electrodiagnostic study, rehabilitation and outcome at 6 months after injury of this case are discussed. Other 2 cases of BPI after massage with variety of severity and prognosis are also discussed..

Keywords: brachial plexus, brachial plexus injury, massage, complication

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บทคัดย่อ

ผู้ป่วยหญิงอายุ 35 ปี มีอาการอ่อนแรงแขนทันทีจากการนวด ซึ่งเป็นสาเหตุของบาดเจ็บที่ร่างแหประสาทของแขนที่พบไม่บ่อย ในบทความกล่าวถึงผลการตรวจไฟฟ้าวินิจฉัย การฟื้นฟูสมรรถภาพและผลการฟื้นฟูเมื่อครบ 6 เดือนภายหลังการบาดเจ็บ ผู้นิพนธ์ได้วิจารณ์กรณีศึกษาดังกล่าวร่วมกับกรณีศึกษาของผู้ป่วยที่ได้รับบาดเจ็บที่ร่างแหประสาทของแขนภายหลังรักษาด้วยการนวดอีก 2 ราย ซึ่งมีความรุนแรงและผลการรักษาแตกต่างกัน.

คำสำคัญ: ร่างแหประสาทของแขน, บาดเจ็บที่ร่างแหประสาทของแขน, การนวด, ภาวะแทรกซ้อน

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Introduction

Brachial plexopathy represents 14% of upper limb neurological lesions.[1] Major cause is closed trauma particularly vehicle accidents. Other causes are obstetric paralysis, thoracic outlet syndrome, neuralgic amyotrophy, neoplastic plexopathy, postanesthesia paralysis, rucksack paralysis, and burners/stingers.[2] Uncommon causes are anterior shoulder dislocation,[3,4] shoulder manipulation[5] and manual carotid compression for treatment of spontaneous carotid-cavernous sinus fistula.[6] Previous studies reported median[7] and posterior interosseous[8] nerve injury after massage. To an author's knowledge, only one study was reported brachial plexus injury (BPI) as a complication of massage.[9] The author reports an uncommon case of BPI after massage. An electrodiagnostic study, rehabilitation and outcome at 6 months after onset are discussed.

Case report

Clinical findings

A 35-year-old woman had a fall injury. Her right shoulder hit on the floor. She had a shoulder pain and difficult to rotate her neck to the right side. Two days later, she went to a massage shop for pain treatment. During massage, a masseur squeezed at supraclavicular fossa. She immediately felt a severe shooting pain along her right arm and forearm. Masseur told her that pain was normally occurred during massage. Then he squeezed that area again. After that, she could not either elevate shoulder or flex elbow. She waited for several days but no recovery was found.

One week later, she went to the medical school hospital. General practitioner prescribed Mecobalamin (500 mcg) 1 tablet three times a day, an arm sling and consult a physiatrist for electrodiagnosis and rehabilitation. On the initial assessment, manual muscle testing revealed right deltoid graded 0/5, biceps brachii graded 1/5, pronator teres graded 5/5, triceps brachii graded 5/5 and flexor digitorum sublimis graded 5/5. Hyperesthesia was found at the lateral side of the right arm, forearm and the first web space of the right hand. A provisional diagnosis was the right BPI. Electrodiagnostic study was performed 2 weeks later (3 weeks after onset).

Electrodiagnostic study

Nerve conduction study and needle electromyography (EMG) were performed. The diagnosis was an incomplete right

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Table 1. Electrodiagnostic findings of the patient

Needle EMG study	Fibrillation potentials	Positive sharp waves	Motor unit action potential (MUAP)
R deltoid	+	+ + +	No MUAP
R Biceps brachii	+	+ + +	Isolate
R Extensor carpi radialis	None	None	Reduced
R Infraspinatus	+	+ +	Isolate
R Rhomboid major	None	None	Discrete
Sensory nerve conduction study			
R median nerve			
R ulnar nerve	normal latency, amplitude and velocity		
R radial nerve	normal latency, amplitude and velocity		
	mild prolonged distal latency and slowed velocity, normal amplitudes		
R lateral antebrachial cutaneous nerve	normal distal latency and velocity, decreased amplitude		
L radial nerve	normal latency, amplitude and velocity		
L lateral antebrachial cutaneous nerve	normal latency, amplitude and velocity		

EMG, electromyography; R, right; L, left

Table 2. Physical examination of the right upper limb of the patient

Time since onset	1st visit	Wk 4	Wk 8	Wk 16	Wk 24
Infraspinatus	1	1	2	4	4
Supraspinatus	0	0	1	2	3
Deltoid	0	0	0	2	3
Biceps brachii	1	1	2	3	4
Triceps brachii	5	5	5	5	5
Pronator teres	5	5	5	5	5
Flexor carpi ulnaris	5	5	5	5	5
Extensor carpi radialis	4	5	5	5	5
Flexor digitorum sublimis	5	5	5	5	5
Flexor digitorum profundus	5	5	5	5	5
Abductor pollicis bravis	5	5	5	5	5
Adductor digiti minimi	5	5	5	5	5
Sensation at lateral side of arm, forearm and the 1st web space	Hyper -esthesia	Hyper -esthesia	Hyper -esthesia	Hypo -esthesia	Normal

Wk, Week

BPI (axonal loss) at the upper trunk level with retrograde degeneration to nerve to rhomboid major muscle. Table 1 summarizes the electrodiagnostic findings of this patient.

Rehabilitation

The outpatient rehabilitation program consisted of range of motion exercises, strengthening exercises, electrical stimulation (ES) and biofeedback. The patient participate physical therapy once daily 5 days a week. She performed home-used ES once daily, 7 days a week. Sensory desensitization was performed by the occupational therapist at the lateral side of her arm, forearm and the first web space of the right hand. Modified activities of daily living (ADLs) were trained by an occupational therapist. Mecobalamin was continued. No other medications were prescribed.

Eight weeks after injury, physical examination revealed muscle power improvement. Six months after onset, all weaken muscles were at least grade 3. She had few difficulties to do ADLs. Sensation returned to normal. The patient was satisfied with the improvement. She regularly exercised by herself and had no further problems with ADLs. Table 2 summarizes motor and sensory examination of the patient.

Discussion

Massage usually relieves pain and muscle discomfort. However, complication of massage may occur. This case is a reminder that a masseur need to carefully treat areas over nerves, plexus and vessels. A proper massage training should include anatomy which will help avoid complication.

The author reports an uncommon case of BPI after massage. Differential diagnosis in a patient with weakness of the shoulder girdle and arm should include C5-6 radiculopathy, rotator cuff tear, spinal accessory neuropathy and neuralgic amyotrophy.[10] Recognition of this complication could remind practitioners to include this cause of injury in the differential diagnosis of brachial plexus lesions especially of the upper trunk portion. The possible mechanism of this compressive injury is associated with direct and vigorous pressure at the supraclavicular fossa. Beneath the fossa is a trunk portion of brachial plexus. Other mechanisms are vigorous traction or stretching the posterior triangle of the neck causing the upper trunk injury.

Physical examination cannot differentiate between severe conduction block and axonal loss because they reveal the same clinical findings in early period after injury. In my experience, other 2 cases of BPI after massage had different

severity and prognosis. The first case had an incomplete brachial plexus injury with axonal loss at the upper trunk level. Recovery was not known because of loss of follow up. The second case had a left hemiparesis after stroke. He went to a massage shop 2 months after discharge from a rehabilitation center. He developed greater weakness of the left shoulder flexion, abduction and adduction; and elbow flexion after massage. He also had increased numbness of his left arm and forearm. The provisional diagnosis was BPI. He was readmitted to the rehabilitation center. One week after admission, numbness was decreased and motor function was gradually improved. Two weeks later, he gained muscle strength and function of the left upper limb to the same level as before injury. An electrodiagnostic study was not performed and this case was diagnosed with neurapraxic BPI due to early recovery.

In the present case, a needle EMG showed signs of axonal loss of C5-6 more than C6-7 innervated muscles with abnormal findings in the right lateral antebrachial cutaneous (LAC) and radial nerves. Normal needle EMG of C7-T1 innervated muscles and normal sensory nerve conduction study of median and ulnar nerves were shown. Fifty percent decreased amplitude of the right LAC nerve was noted. Mild delayed distal latency with slowed velocity of the right radial nerve was seen. A significant abnormality of the LAC nerve was likely to be found more than radial nerve because 40% of sensory fibers of the radial nerve are derived from the C7 dorsal root ganglion.[10] Increased spontaneous activities with abnormal MUAPs were found in the right infraspinatus, deltoid and biceps brachii muscles. So the site of lesion is at the upper trunk. Discrete polyphasic potentials with no spontaneous activity were found in the right rhomboid major muscle. This indicated no denervation of the muscle. The above findings confirmed that the lesion was incomplete with axonopathy, same as in the previous case report of BPI after massage.[9]

In general, a rehabilitation program decreases complications due to disuse and enhances recovery. Range of motion exercise maintains joint mobility. An arm sling prevents traction injury of shoulder capsule and rotator cuff tendons before recovery of the shoulder girdle muscles. ES prevents muscle atrophy and assists in strengthening the muscles. Biofeedback facilitates motor relearning and improvement of muscle power. Sensory desensitization minimizes annoying abnormal sensation. Modified ADLs prevents overuse injury and facilitates usage of the remaining muscles. As the previous case report, the recovery of BPI after massage in that case was good at 12 months follow up.[9]

In conclusion, brachial plexus injury after massage is uncommon and its severity of injury varies from neurapraxia to axonal loss. Electrodiagnostic studies are necessary to determine severity of injury and prognosis for recovery. Rehabilitation with exercises, physical modalities and modified ADL training, is useful for this kind of injury. Finally, a well-trained masseur will help to avoid this complication.

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