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Case Report

Cupping Therapy Combined with Rehabilitation for the Treatment of Radial Palsy: a Case Report

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ABSTRACT

This case report demonstrates the beneficial effects of cupping therapy (CT) in a 35-year-old man who is diagnosed with a fracture of the radial shaft due to a motorcycle accident. One year after the treatment started, pseudoarthrosis developed in the radius and an autogenous iliac bone graft was performed. However, extension dysfunction in the wrist became evident. After another 6 months of physical therapy and rehabilitation, no improvements were observed. Therefore, CT and adjunctive electrostimulation were performed, after 30 days of treatment, marked recovery of muscle function and full wrist extension were observed, as determined by electromyography and a grade 5/5 on the Medical Research Council power of wrist extension scale. The results in this case study suggest that CT in conjunction with adjunctive electrostimulation, may accelerate functional recovery from postoperative radial palsy, and provide a useful alternative treatment in this situation.

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Introduction

Cupping therapy (CT) is a traditional and supplementary practice that has been used for hundreds of years. Wet and dry cupping are the most commonly used methods for implementing CT. The basis of dry CT is to increase blood flow in subcutaneous tissue by generating a negative pressure on the skin [1]. CT is used in various diseases with different etiologies, such as migraine, chronic back pain, metabolic syndrome, hypertension, carpal tunnel syndrome, and fibromyalgia [2, 3].

Fractures of the radius and the humerus are common in high-energy traumas, like traffic accidents [4]. Although radial nerve injury may occur with radial fractures and surgeries, it is more commonly observed with contusion and compression, and it generally resolves with physical therapy and rehabilitation (PTR). If recovery is not achieved, surgical exploration is performed [5]. In such cases, supplementary methods may be used as an alternative or adjunctive therapy to PTR. In this case report, we present the effect of CT in a patient with postoperative radial palsy, who had not achieved recovery after 6 months of PTR.

Case Report

A 35-year-old man was brought to the emergency department with a fracture of the radial shaft incurred in a motorcycle accident. A fixation plate was applied to the radius by the orthopedic department. At the end of the first year of treatment, pseudoarthrosis developed in the radius, and an autogenous iliac bone graft was applied. After the iliac bone graft to the radius, the function of wrist extension function was lost (grade 1/5 on the Medical Research Council power of wrist extension scale). Anti-inflammatory and vitamin B12 treatments were started in

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the acute phase for edema. At the end of the acute phase, the patient underwent physical therapy for the left radial posterior interosseous nerve (RPIN) palsy. A PTR program of 30 sessions (three sessions per week) was initiated, which included transcutaneous electrical nerve stimulation (TENS) (20 minutes, frequency 100 Hertz, current rate 100 μs), galvanic stimulation (5 × 1 ms pulses at 300 Hz), range of motion exercises, and isometric strength and relaxation exercises. Although 90 sessions of physical therapy were completed, RPIN amplitude stimulation could not be perceived, this represented severe axonal injury (Table 1). The absence of a beneficial response on radial palsy following this treatment indicated that nerve compression, damage, or laceration during surgery might be the cause of this condition.

The patient was referred to the Department of Orthopedics for tendon transfer due to the failure of the current treatments, he was then admitted to our clinic for alternative treatment instead of undergoing surgery. After assessment of the nerve palsy, CT was considered as a suitable therapy for the patient.

Dry CT was applied over the RPIN daily for 15-20 minutes (Fig. 1). After 20 days of dry CT, there was minimal wrist mobility on extension, therefore adjunctive electro stimulation therapy was performed. When dry CT was combined with TENS using the electric stimulation protocol (20 minutes, 5 × 1 ms pulses at 300 Hz) for 30 days, normal muscle contraction was observed (grade 5/5 on the Medical Research Council power of wrist extension scale), and the nerve and muscle function results were recorded by electromyogram (EMG) and recovery was observed especially in interosseous dorsalis of the left radial nerve (Table 1). No adverse events were observed with the combined therapy. These results suggest that the effects of increasing blood flow and creating negative pressure using CT, together with electrostimulation, speed up recovery of the radial nerve.

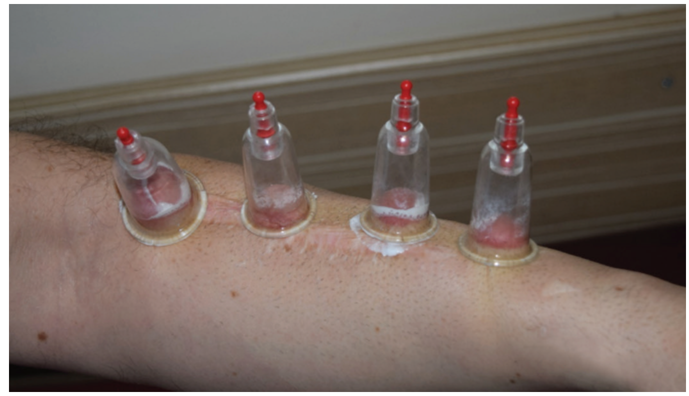

Fig. 1. Applying cupping therapy along the radial nerve trace.

Table 1. Electromyogram Results of the Patient's Wrist Function Before and After Cupping Therapy.

MOTOR NERVE	Latency D (ms)		2 Amp D (Mv)	
	Before	After	Before	After
Left medianus Wrist - APB	2.4	3.2	12.1	10.9
Left ulnaris Wrist - ADM	1.71	2.7	7.5	11.1
Right radialis Below elbow	2.6	2.6	7.0	9.1
Left radialis Below elbow	-	1.8	-	7.6
SENSORY NERVE	**Latency D (ms)**		**12 Amp D (Mv)**	
	Before	After	Before	After
Left medianus Digit III - wrist	2.2 -1.5	3.2 -1.1	30	34
Left ulnaris Digit V - wrist	1.88 -2.3	2.7 -2.0	18	22
Right radialis IOD I – forearm	2.2 -	2.4 -0.6	25	30
MUSCLE (innervation)	**Fibrillations**		**Positive Sharp Waves**	
	Before	After	Before	After
Left extensor indicis (Radialis, C7 C8)	8/10	9/10	9/10	10/10
Left IOD I (Ulnaris ramus profundus, C8 T1)	0/10	8/10	0/10	8/10
Left extensor digitorum communis (Radialis, C7 C8)	7/10	8/10	9/10	10/10

ADM, abductor digiti minimi; APB, abductor pollicis brevis; IOD I, interosseous dorsalis 1; ms, milliseconds; mV, microvolt; D, dispersion.

Discussion

Forearm fractures occur for multiple reasons; direct trauma being the most common cause. In high-energy traumas like traffic accidents, open fractures and soft tissue damage occur together. According to the fracture type, various treatment methods can be applied to radial shaft fractures. Surgical treatments of open humeral shaft fractures are preferable due to better control of fracture fragments, reduced time to union, and increased functional recovery; however, for closed humeral shaft fractures with radial palsy, recovery can be achieved using noninvasive therapeutic methods [6]. Indications for external fixation of the forearm are restricted to open fractures, in which soft tissue loss is high and bone loss exists. Internal fixation with open reduction and a single plate placement with 4 screws is preferable to achieve additional functional recovery. If fragmentation accounts for more than 50%, grafting is recommended [7]. Nerve damage occurs rarely after radial shaft fractures. The radial nerve can be damaged primarily (due to trauma), or through secondary (iatrogenic) damage following surgical investigation [8] as was observed in the present case.

Following nerve damage, reinnervation potential is usually observed by EMG within 6-8 weeks. Detection of reinnervation potential within 6-8 weeks supports a diagnosis of axonotmesis. However, if reinnervation potential is not detected, then the nerve damage is classified as neurotmesis and requires surgical exploration [8]. The decision on whether nerve damage requires surgery is controversial [9]. In this case, the first EMG was performed at 7 months after surgery, and severe axonal injury in the left RPIN was detected.

After nerve damage occurs, muscle atrophy begins and progresses daily. For this reason, starting rehabilitation early is very important. Brown et al have shown that for every 6 days of denervation, a 1% loss of function occurs [10]. Pain and edema also cause function loss in the acute phase [11]. In this case, anti-inflammatory medication and physical therapy were utilized in the acute phase to relieve pain and remove edema. In addition to the treatment methods for prevention of muscle atrophy, therapeutic interventions were performed for the repair of nerve damage.

CT was applied to the patient after failure of routine treatment of nerve injury. When minimal mobility of the wrist on extension was observed on the 20th day of CT, adjunctive electrostimulation therapy was initiated. After performing the combination of electrostimulation and CT for 30 days, complete muscle strength was restored.

In this case, the physician who applied CT was also the patient. Recovery of wrist extension mobility was observed with the use of CT, after a lack of response to PTR. One of the possible therapeutic mechanisms in this case may have been the reduction of nerve compression that developed intraoperatively by physical negative pressure generated by the CT. Another mechanism may be the acceleration of recovery, due to increased blood flow developed by the CT [12]. The results observed in this case study indicate that alternative and supplementary medical methods such as CT may be considered in addition to conventional treatments. This is the first reported case study describing the benefits of CT for radial palsy. Prospective studies are required to examine the beneficial effects of CT for radial palsy in a clinical setting, and to further understand the effects of CT.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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