

Efficacy of Cupping Therapy Compared to Acupuncture in Patients with Periarthritis of Shoulder - A Comparative Study

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Abstract

Background: Periarthritis Shoulder (PAS) is a major musculoskeletal disability characterized by insidious onset, progressive pain and loss of active and passive mobility in the glenohumeral joint. The incidence of PAS is between 3%-5% in the general population and as high as 20% among individuals with diabetes. According to Traditional Chinese Medicine, Cupping therapy and Acupuncture plays major role in treating PAS. Cupping therapy is the ancient technique of healing which restores the balance between Yin-Yang by strengthening the body resistance, ejecting the pathogenic factors, and promoting blood circulation to alleviate the pain. The aim of the study is to compare the Effectiveness of Cupping Therapy on Local points SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*) and Acupuncture at specific point St.38 (*Tiaokou*) on PAS.

Methods: Sixty subjects were randomly assigned into Cupping therapy group (CTG, n=30) and Acupuncture group (AG, n=30). Both groups were assessed at baseline and at the end of 4 sessions for Visual Analogue Scale (VAS), Shoulder Pain and Its Disability Index (SPADI) and the range of motion (ROM). Intervention was given weekly once for four weeks. In CTG, Sterile fiber glass cups are placed over the Acupuncture points like SI.15 (*Jianzhongshu*), GB.21 (*Chienching*) and SI.9 (*Chiencheng*) for 20 min. For AG, Sterile needle was placed for 20 min on St. 38 (*Tiaokou*).

Results: Both Cupping therapy and Acupuncture groups, shows improvements within the group in VAS, total SPADI score and ROM. But Cupping therapy shows significant changes in both statistically and clinically in VAS score ($p<0.001$), pain index ($p<0.003$), disability index ($p<0.002$), total SPADI score ($p<0.001$), shoulder flexion ($p<0.005$), abduction ($p<0.05$) and external rotation ($p<0.05$).

Conclusion: Cupping Therapy and Acupuncture may have similar effect in management of shoulder pain and its restriction which was measured through VAS, SPADI and range of motion—flexion, abduction and external rotation. However Cupping Therapy showed higher therapeutic benefits on patients with PAS.

Keywords: Periarthritis of shoulder • Cupping therapy • Acupuncture • Shoulder pain • Range of motion

Introduction

PAS commonly refers to a collection of pain symptoms in shoulders, plus motor function limitation, due to soft tissue abnormalities surrounding the affected shoulder [1]. Epidemiological investigation has revealed that the incidence of PAS is about 2% to 5% in the general adult population and 10% to 20% in diabetics worldwide. The PAS is prevailing in people of the age 40 to 60 years, and thus they were called “the forty’s shoulder [2].” Risk factors for frozen shoulder include accidents, lung disease, tonic seizures, diabetes mellitus, stroke, connective tissue diseases, heart disease, and thyroid disease [3]. Symptoms may start gradually and resolve within 2 or 3 years. Frozen shoulder can be described as either primary (idiopathic) if the etiology is unknown, or secondary, when it can be attributed to another cause [4].

Now a day, there are many intervention options are accessible for PAS,

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which are anti-inflammatories, intra-articular corticosteroid injections, capsular distension injections, bupivacaine suprascapular nerve blocks, manipulation under anesthesia, arthroscopic release and repair. Most of patients may also choose complimentary therapies like physiotherapy, exercise therapy, electrotherapy, acupuncture, hydrotherapy for the management of pain and to progress ROM of affected joint [5].

Acupuncture, one of the most popular non-pharmaceutical therapies, has been widely used to treat diseases by regulating the functions of qi (vital energy) and blood of the organs through puncturing certain acupoints of meridians in the body with needles, to strengthen the resistance of the body against diseases [6]. Cupping Therapy also belongs to TCM non-pharmaceutical therapy, which has been used for long time [7]. Cupping causes suction on selected acupoints which produce hyperemia or hemostasis that result in a therapeutic effect [8]. There are different types of cupping including Dry cupping, retained cupping, flash cupping, moving cupping, wet cupping, medicinal cupping, and needling cupping [9]. Similar to acupuncture, cupping therapy is based on energy channels (meridians) and acupoints [10].

Both acupuncture and cupping therapy are commonly used in treating many pain-related conditions. Though the mechanism of acupuncture and cupping therapy may be different, both, therapies employ the meridian and acupoints to activate blood stasis and regulate the flow of qi to relieve pain. Cupping therapy has more advantages than acupuncture, such as a non-invasive therapy with relatively shorter treatment duration and potential less treatment cost. Thus, the main aim of the study is to compare the effectiveness of cupping and Acupuncture on PAS.

Materials and Methods

Subjects

This was a comparative clinical trial. A total sixty subjects of both gender with age ranging between 40-65 years were participated in the study. The subjects were randomly recruited from the Government Yoga and Naturopathy medical college and hospital, Arumbakkam, Chennai. A total of 78 subjects were assessed for eligibility for the study from the above-mentioned hospital. Out of them 60 subjects were screened after fulfilling inclusion criteria through a routine medical check-up and those are satisfying the diagnostic criteria for PAS were recruited for the study. An informed written consent was obtained from the subjects (Table 1).

Ethical considerations

Ethical clearance was sought from the Institutional Ethics Committee prior to the start of the study and the approval for the same was granted. Subjects who fulfilled inclusion criteria were described about the purpose of the study and their rights as research subjects. Informed consent form was administered in both English and regional language Tamil. Sufficient time was given to each patient to go through the information sheet and their queries were answered. Their right to withdraw anytime from the study and the need for willingness to participate voluntarily in the study was explained. All the subjects expressed their willingness to participate in the study by giving a signed informed consent.

Screening of the subjects

Inclusion criteria:

1. Shoulder pain for at least 1 month and less than 12-month duration.
2. Appreciable restriction of both active and passive motions with abduction and flexion not exceeding 90° and external rotation not exceeding 30°.
3. Pain at night, with inability to lie on the affected side.
4. Age between 40 years and 65 years.
5. Both genders.
6. Receiving no treatment in the last 4 weeks.
7. Providing written informed consent. Agree to co-operate for the study and to follow instructions of doctors.

Exclusion criteria:

Participants will be excluded if they have:

1. History of major shoulder injury or surgery.
2. Clinical or radiological evidence of other pathologies that could possibly account for the symptoms.
3. Patients with cervical radiculopathy, paresis or other neurological changes in the upper limb on the involved side.
4. Presence of underlying fracture associated inflammatory arthritis, known renal or hepatic disease, hematopoietic disorder and malignancy. Any psychological disorder likely to interfere with the course or assessment of the intervention process.
5. Painful arc between 40° and 120° abductions indicative of rotator cuff disease
6. Uncontrolled diagnosed neurological diseases, immunodeficiency, bleeding disorders and allergies.
7. Uncontrolled medical conditions which are unfit for acupuncture and cupping.
8. Acute infections, using anticoagulants, severe cardiac issues, under pacemaker and Hemophilia and similar conditions.

9. Women in lactation, pregnant women, or with plans to get pregnant in the coming half year.
10. Patients taking drugs such as NSAIDs or other pain killers.
11. Patients undergoing other clinical trials.

Randomization

The subjects were randomly assigned to either Cupping Therapy or Acupuncture group. Randomization was done using the online random number generating tool at the website – www.random.org. Each random number was carefully concealed by the principle investigator, not permitted to unfold until eligible patients were included in this trial with written informed consent. After a patient was enrolled in the trial, the researcher requested patient to open one of the concealed envelopes to further assign to either Cupping Therapy or Acupuncture group. Patients were not blind to the intervention. This study was conducted in the Out patient Department of Govt. Yoga and Naturopathy Medical college and Hospital, Arumbakkam, Chennai. After screening for eligibility sixty subjects were recruited for the study and are randomly assigned to two groups i.e., Cupping Therapy Group (CTG), n=30 and Acupuncture Group (AG), n=30. The subjects in CTG received Dry Cupping therapy on SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*) acupuncture points, whereas the subjects in AG received Acupuncture at St.38 (*Tiaokou*) Acupuncture point.

Trial profile

The trial profile illustrates the study plan, flow of patients across data points, statistical analysis of data and result (Figure 1).

Intervention cupping therapy group

The subjects in this group received dry CT at three Acupuncture points SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*). The description of these acupuncture points were given in the (Table 2). The medium sized Fiber glass cups with a diameter of 4 cm and volume of 260 ml (Cosmos International Supplies Co., Ltd. Taiwan) were used.

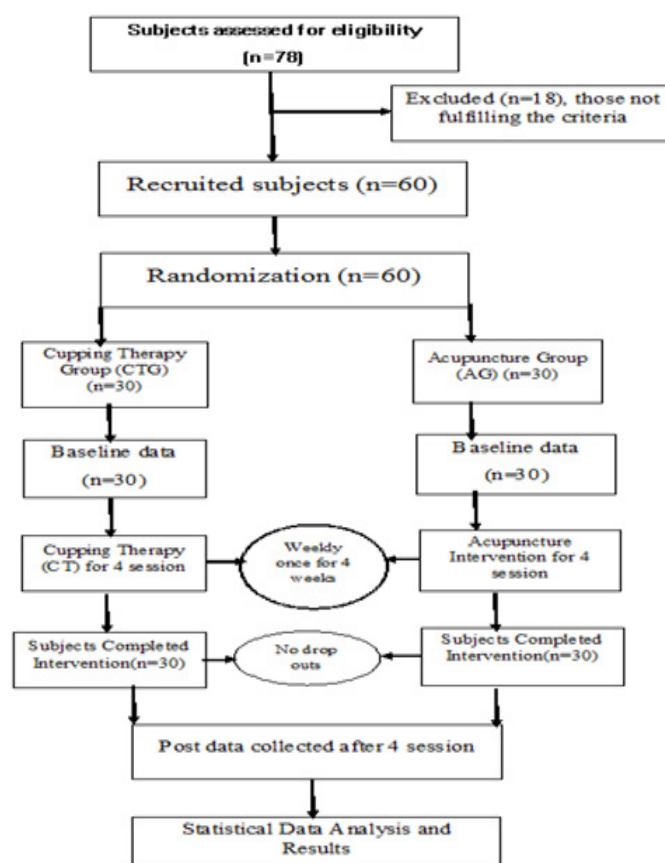


Figure 1. The trial profile.

Participants were asked to sit comfortably in a chair with both feet flat on the floor and expose their shoulder and neck region. The cupping procedure is as follows.

- i. The Acupuncture point location is well sterilized with an alcohol swab.
- ii. Sterile fiber glass cups are placed over the Acupuncture points [SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*)].
- iii. The negative pressure inside the cups was created with the help of suction pump.
- iv. The cups were then removed after 20 minutes.
- v. This intervention was given once in a week for 4 weeks (4 sessions).

Acupuncture Group (AG)

A total of 30 subjects of AG received needling at the point St. 38., Tiaokou (Table 2). The needle was inserted at 1 to 1.5 t-sun perpendicularly. We used 0.5 t-sun sterile acupuncture needles and no needles were reused. Used needle were destroyed through electric needle destroyer. Traditionally this point was specific acupuncture point for PAS or frozen shoulder.

Assessments

The baseline and post-intervention assessments consisted of:

Primary outcome variables

Visual Analogue Scale (VAS) for pain: It was used to evaluate subject's overall pain intensity on a scale of 0-10, where 0 indicates no pain and 10 indicates highest pain. Subjects were suggested to mark on the scale to indicate their pain intensity. Using a ruler, the score is determined by measuring the distance (mm) on the 10-cm line between the "no pain" anchor and the patient's mark, providing arrange of scores from 0 –100. The higher score indicates greater pain intensity [11] (Table 3).

Shoulder Pain and its Disability Index (SPADI): The Shoulder Pain and

Disability Index SPADI are formulated to measure present shoulder pain and disability in an outpatient setting. It is a self-administered questionnaire that consists of 13 items that assess two domains; pain (pain symptoms, 5 items) and disability (physical function, 8 items). The items of both domains were scored on a Visual Analog Scale (VAS) ranging from 0 to 10, where 0=no pain/no difficulty and 10=worst pain imaginable/so difficult required help. Domain scores was equally weighted, then added for a total percentage score ranging from 0 to 10, where 0=best and 10=worst. subjects were assessed twice in this study [12]. Questionnaire was administered to the patient at the baseline after inclusion for the study and after completion of 4 sessions.

Secondary outcome variables

Range of Motion: Ranges of Motion (ROM) measurements are essential for the evaluation and diagnosis of PAS. ROM is usually measured by using goniometer. The term goniometry is derived from two Greek words, gonia meaning angle and metron, meaning measure. Thus, a goniometer is an instrument used to measure angles. Goniometers are produced in a variety of sizes and shapes and are usually constructed of either plastic or metal. We have used metal goniometer for this study. Within the field of physical therapy, goniometry is used to measure the total amount of available motion at a specific joint. Goniometry can be used to measure both active and passive range of motion. The patient was positioned on examination (Table 4) for the testing. We explained about the examination of their affected shoulder joint. Active range of motion (ROM) of flexion, abduction and external rotation was assessed at neutral position [13].

Data extraction and analysis

The data was collected as primary outcomes and secondary outcome variables. The assessments were done on the before intervention starts (baseline data) and after completion of 4 session (post data). The data was organized in Microsoft Excel Sheets. (Version 2013). For continuous data, the descriptive statistics were reported as mean (standard deviation). The Shapiro–Wilk test was used to test the hypothesis of normal distribution. Based on the normality

Table 1. Describes the demographic details of the subjects.

Baseline parameters	Acupuncture Group (N = 30)	Cupping Therapy Group (N=30)
	Mean ± SD	
Age	55 ± 7.31	55 ± 8.38
SBP	126 ± 7.12	124 ± 7.37
DBP	76.87 ± 7.40	78 ± 6.13
PR	82.20 ± 7.56	81 ± 9.25
HT	161.23 ± 8	160 ± 10.13
WT	71.33 ± 12.82	70 ± 14.89
BMI	2.75 ± 6.47	2.74 ± 5.86

Table 2. Description of acupuncture points.

Acupuncture Point	Location
SI.15 (<i>Jianzhongshu</i>)	2 t-sun lateral to the lower border of spinous process of the seventh thoracic vertebra.
GB.21 (<i>Chienching</i>)	Highest point of the shoulder joint. Surface marking was between the 7 th intervertebral disc and acromion.
SI.9 (<i>Chiencheng</i>)	1 t-sun above the lower margin of the posterior axillary fold; arm should be kept in full adduction.
St.38 (<i>Tiaokou</i>)	A point one finger breadth lateral to the inferior (distal) end of the tibial tuberosity is ST -36 (<i>Zusanli</i>). 5 t-sun below ST-36 and one finger breadth lateral to the anterior border of the tibia is St.38

Table 3. Results of primary outcome variables.

Variables	Cupping Therapy Group (N=30)			Acupuncture Group (N=30)		
	Pre	Post	P Value	Pre	Post	P-value
Pain Index (%)	83.6 ± 9.3	46.6 ± 1.4	<0.003	83.9 ± 5.6	66.4 ± 7	<0.001
Disability Index (%)	83.7 ± 9.1	46.4 ± 1.4	<0.002	84.2 ± 9.5	67.9 ± 6.3	<0.003
Total SPADI	83.7 ± 8.4	46.5 ± 1.2	<0.001	77.1 ± 4.2	67.3 ± 5.8	<0.001
VA	8.1 ± 1.1	3 ± 0.9	<0.001	7.7 ± 1.1	4.2 ± 1.4	<0.001

% - Percentage, SD – Standard deviation, p – Probability

Table 4. Results of secondary outcome variables.

Variables	Cupping Therapy Group (N=30)			Acupuncture Group (N=30)		
	Mean ± SD		P value	Mean ±SD		P value
	Pre	Post		Pre	post	
Shoulder flexion	73.7 ± 10.6	122.3 ± 5.3	<0.001	82.6 ± 9.9	101.9 ± 10.8	<0.006
Shoulder Abduction	78 ± 9.3	124.3 ± 4.9	<0.001	84.8 ± 7.1	105.1 ± 9.4	<0.007
External rotation	24.2 ± 3.4	41.4 ± 3.1	<0.05	25.4 ± 2.4	33.6 ± 4.5	0

Table 5. Comparison of variables after the treatments in between the cupping and acupuncture groups.

Variables	Group	N	Mean Rank	P-value
Post_SPI	CTG	30	18.6	0
	AG	30	42.4	
Post_SDI	CTG	30	17	0
	AG	30	44	
Post Total SPADI	CTG	30	16.6	0
	AG	30	44.5	
Post_VAS	CTG	30	23.1	0.001
	AG	30	37.9	
Post_FLX	CTG	30	44.1	0
	AG	30	16.9	
Post_ADB	CTG	30	44.6	0
	AG	30	16.4	
Post_ER	CTG	30	43.8	0
	AG	30	17.2	

test, the nonparametric Mann–Whitney test was used to assess the change difference between intervention and control groups. Students paired T test was used for within group analysis. All the tests were two-sided at P=0.05 level of significance. All statistical analysis was done using SPSS software version 17.0 (Table 5).

Discussion

According to TCM, The pathogenesis of PAS is local cold, invasion of exogenous pathogens, long-term strain or discord between Qi and blood, those results in poor nourishment of tendons and muscles. The treatment of frozen shoulder is to disperse the excess Wind, Cold and Dampness and to remove the obstruction in the affected meridians and their collaterals, spreading the qi and Blood [14]. Though there are several methods in TCM, CT is widely used in treating pain and musculoskeletal disorders.

In this study we have used CT on Local points SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*) and Acupuncture at specific point St.38 (*Tiaokou*) as an intervention. VAS, SPADI questionnaire and ROM – flexion, abduction and external rotation are the variables used to measure the pain, disability and restriction of shoulder joint.

The result of this study revealed that both CT and Acupuncture may alleviate the symptoms of Periarthritis of shoulder in pain and disability index and also in the range of motion of flexion, abduction and external rotation. However of Cupping therapy on SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*) shows significant result when compared to Acupuncture at St.38 (*Tiaokou*) for 4 sessions. There was no adverse effect noticed in this study during the 4 sessions on all subjects. There are no drop outs in the study. Subjects were compliance to the intervention. In the present study we noticed that CT was beneficial for the management of shoulder pain and disability than the Specific point Acupuncture. There were also significant changes observed within the both group.

According to Liang MZ et al., The functions of CT is promoting joints, activating blood circulation and removing blood stasis, relaxing meridians and dredging collaterals, strengthening the body's immune function [15]. Farhadi et al., states that the objective of the dry cupping in adhesive disorders is for diversion of vitiated matter, evacuation of matter, to alleviate pain, to resolve

inflammation and local calorific. Thus Cupping helps to disperse the congested wind and helps to restore the ROM [16].

The possible mechanism by which cupping helps in pain management is that cupping therapy play a potential role in increased blood flow to the skin and muscles and stimulates the peripheral nervous system by draining extra fluids and moving connective tissue. In addition, cupping has been claimed to modulate neuro-hormonal systems, stimulate the autonomic nervous system, and improve subcutaneous blood flow. This vasodilation increase metabolism and accelerate the elimination of waste and toxins from the body. This effect acts to improve physical function [17].

Jin et al., proved that Cupping dilates topical capillaries and increases dermal blood flow. The increase of blood flow can promote the discharge toxins and wastes, improves the local nutrition state, and finally boosts the metabolism [18]. CT on these prescribed local points SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*) relax the muscles, remove the obstruction, regulate qi and Blood and remove the pathogenic factors. According to TCM, cupping is a process of supporting the healthy aspect and eliminating the pathogenic factors. CT acts to dredge and unblock meridians and collaterals, promote qi flow and dissolve stagnation, expel wind and cold, disperse swelling and kill pain, and promote the elimination of toxins and pus. CT can also improve the microcirculation, promote metabolism, enhance body immunity, and mitigate pain [19].

Turk et al., used cupping for inflammation. CT eliminates stagnated Qi and Blood, and facilitate circulation, hence it can be considered to be effective in the local treatment of areas of inflammation. Hence it is applicable in our study [20]. AL- Rubaye et al., suggest that tense muscles are usually deprived of oxygen because tightness reduces the blood circulation to the area. Cupping increases blood flow to the cupped region (hyperemia); which produces warmth that relaxes muscles and reduces pain [21]. These positive effects of cupping are the result of a hemodynamic mechanism facilitating muscle function, as demonstrated by the reduction of deoxy-hemoglobin and elevated oxy-hemoglobin levels in muscle areas treated with cupping. Hence Cupping helps in improving ROM in Adhesive capsulitis [22]. Cupping involves a mechanism for removing oxidative stress, and produces therapeutic effects through diffuse noxious inhibitory control; this would contribute to the alleviation of pain [23].

There are different intervention in TCM for PAS, however we used Cup-

ping therapy on Local points [SI.15 (*Jianzhongshu*), GB.21 (*Chienching*), SI.9 (*Chiencheng*)] and Acupuncture on specific point [St.38 (*Tiaokou*)]. This study shows changes within groups, but when compared with each group CT is more efficient in reducing pain, Disability and improving ROM in PAS.

Strengths of the Study

1. This is the first study to compare the effect of Cupping and Acupuncture on PAS.
2. Cupping therapy showed immediate relief in pain management that developed hope in subjects for regular follow up.
3. There were no adverse events observed in subjects.

Limitations

1. The sample size was relatively smaller.
2. Diurnal variations might have influenced the results.
3. Room temperature was not maintained equally to all subjects during treatment.
4. Other physical activities and diet in home might acted as confounding factors for this study.

Directions for Future Research

1. This study should replicate with larger sample size.
2. A randomized controlled trial with multi arm study could be better for definite conclusion.
3. Strong methodology with follow-up is essential to support our result.
4. Objective variables like digital goniometer; bio-markers for the pain can be used.
5. Mechanism of CT should be evaluated in depth.

Conclusion

The present study shows that both CT and Acupuncture may have similar effect in management of shoulder pain and its restriction which was measured through VAS, SPADI and range of motion – flexion, abduction and external rotation. CT showed higher therapeutic benefits on patients with PAS, when compared to Acupuncture. Further research with a larger sample size, objective variables and randomized controlled trial is warranted to reveal accurate changes in this field.

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