ISSN 2706-6819 Vol.3, Issue 3: 28-34, DOI: 10.25236/IJFM.2021.030306

Acupotomology Combined with Intra-articular Injection of Sodium Hyaluronate in the Treatment of Capulohumeral Periarthritis: A Systematic Review and Meta-analysis

Yingying Shao[1], Chen Tang[1], Bin Chen[2], Xudong Jiang[3*]

[1]School of Science, Guangxi University of Science and Technology, Liuzhou 545006, Guangxi, China
[2]Liuzhou Workers' Hospital, Liuzhou 545005, Guangxi, China
[3]School of Medicine, Guangxi University of Science and Technology, Liuzhou 545005, Guangxi, China
xudong@gxust.edu.cn
[*]Corresponding author

Abstract: *To systematically evaluate the safety and effectiveness of acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis. All RCTs of acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis since the establishment of databases (CNKI, VIP, PubMed, Web of Science, etc.) were searched by computer. 13 RCTs studies were included. Meta-analysis was performed with Revman 5.4 software, Egger and Begg tests were performed with R software. The clinical effective rate (OR=6.4, %CI [3.7,11.08], P<0.00001), VAS pain score(MD=-1.05, %CI [-1.16,-0.94], P<0.00001) and Constant- Murley shoulder function score(MD=13.42,% CI [9.3,17.54], P<0.00001) improvement in the trial group were superior to the control group, and the above results showed significant statistical differences;. The existing clinical studies have shown that acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis is an effective and safe method, which can improve the clinical effectiveness, relieve the pain of the patient's shoulder and improve the function of the shoulder.*

Keywords: *Scapulohumeral periarthritis, Treatment, Acupotomy, Intra-articular sodium hyaluronate, Meta-analysis*

Scapulohumeral Periarthritis (SP), also known as periarthritis of shoulder, frozen shoulder and Adhesive capsulitis of shoulder [1]0, is a department of orthopedics disease occurring in the middle and old age of 50 years old. It shows that the soft tissue around shoulder joint has large area of aseptic inflammation. Common scapulohumeral periarthritis includes biceps tendinitis, rotator cuff injury, rupture of supraspinatus tendon, etc. These disease limit the patient's arm abduction, external rotation and extension, leading to muscle adhesion and atrophy around the shoulder joint, thus affecting the normal life of the patient and his family [2].

Researchers have conducted a large number of studies and proposed many treatment methods [3-5], but there is often a lack of reliable studies to prove the feasibility of the methods. Acupotomy therapy and intraarticular injection of sodium hyaluronate are two common methods to treat scapulohumeral periarthritis [6,7],and the research on clinical treatment and systematic evaluation is also increasing. However, there is a lack of systematic evaluation literature on the safety and efficacy of acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis. Therefore, this paper aims to evaluate the safety and effectiveness of acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis through meta-analysis, and provide empirical analysis for clinical practice.

1. Data and Methods

1.1. Retrieval Strategy

Computer information retrieval databases: Wanfang Data, CNKI, VIP, CBM, Cochrance Library and PubMed Web of Science, and the retrieval time will be from establishment to April 21, 2021. First,

ISSN 2706-6819 Vol.3, Issue 3: 28-34, DOI: 10.25236/IJFM.2021.030306

search with subject words or free words alone, and then search with both. RCTs of acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis. The following coreterms were included: "needle-knife therapy", "needle knife", "needle scalpel", "hyaluronic acid", "HA", "Sodium hyaluronate", "periarthritis of shoulder", "frozen shoulder" and "scapulohumeral periarthritis".

1.2. Selection Criteria

(1) Inclusion criteria

The research type is all published RCTs of needle knife combined with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis are in Chinese or English only.The research object is in line with the diagnostic criteria prescribed issued by SATCM, and were diagnosed as scapulohumeral periarthritis through treatment symptoms, diagnostic characteristics, X-ray and other imaging data or laboratory examination. Treatment group using needle knife therapy in combination with hyaluronic acid intra-articular injection; The control group was treated with needle-knife therapy or sodium hyaluronate or conventional therapy.

(2) Exclusion criteria

Non RCTs; Full text cannot be obtained and data results cannot be extracted effectively; Repeated publication; Animal experiments, theories or reviews; The intervention measures of the treatment group were inconsistent with the research topic of this paper.

1.3. Data Collection

The existing literature retrieved was read and chose by two research workers separately. After excluding the literatures that obviously did not meet the inclusion criteria, the remaining literatures were read in full text and the data were extracted independently, Both parties can discuss or discuss with a third researcher to determine the final result.

1.4. Statistical Analysis

The literature was systematically evaluated by the meta-analysis software RevMan5.4 provided by the Cochrance Collabation. Odds ratia (OR) and mean difference (MD) were used as the combined effect size for the meta-analysis of enumulation and measurement data, respectively, and calculate 95% confidence interval(CI). Potential heterogeneity was assessed by P-values and I^2. When $P > 0.05$ and $I^2 \leq 50\%$, the homogeneity between the studies was good, and meta -analysis used the fixed effects model; When $P \leq 0.05$ and $I^2 > 50\%$, indicating that heterogeneity exists between studies, and select the random effects model. If more than 10 studies were included, Egger test and Begg test were used to observe whether there was potential publication bias.

2. Result

2.1. Literature Search Results

A total of 272 research literatures were retrieved,including Wanfang Data(133), CNKI (69), CBM (43), Cochrane Library (0), PubMed (1), Web of Science (0),VIP (26) and other ways (0). 67 duplicate documents were removed, 205 were obtained after preliminary screening, and 149 were removed after reading titles and abstracts, leaving 56 articles remaining. After reading the full text by 2 researchers according to the inclusion and exclusion criteria, 43 articles were further removed, and 13 literatures were included in this study [9-21].

2.2. Essential Features and Jadad Scores of Literature

A total of 1051 patients, the treatment group 546 cases, control group 505 cases. Basic characteristics and Jadad scale scores [8] are displayed in Table 1.

ISSN 2706-6819 Vol.3, Issue 3: 28-34, DOI: 10.25236/IJFM.2021.030306

Table 1: Essential features and Jadad scores

Inclusion studies	Number of subjects		Outcome measures	Score
	Treatment group	Control group		
Zhang Song2017	53	53	Effective rate	1
Wei Chunli2018	47	47	VAS, Constant-murley shoulder function score, Effective rate	2
Tian Zhonggu2015	50	50	VAS, Effective rate	1
Li chenggang2013	30	15	VAS, Constant-murley shoulder function score	3
An Qi2015	32	32	Effective rate	1
Guan Yijian2016	50	50	VAS, Constant-murley shoulder function score, Effective rate	2
Huang Shujie2017	40	40	VAS, Constant-murley shoulder function score	1
Li Li2018	18	18	VAS, Constant-murley shoulder function score, Effective rate	2
Liu Jianjun2018	30	30	VAS, Effective rate	1
Jia Xiaoxiang 2018	16	16	Effective rate	1
Xu Chuanggui2010	40	40	Effective rate	2
Shen Jun2010	110	84	Effective rate	1
HuangMingjiang2009	30	30	VAS	1

2.3. Risk Assessment of Bias in the Literature

Using the risk assessment of bias method recommended by Cochrane Collaboration, and evaluating the bias risk of 13 RCTs included in the study, as shown in Figure 1.

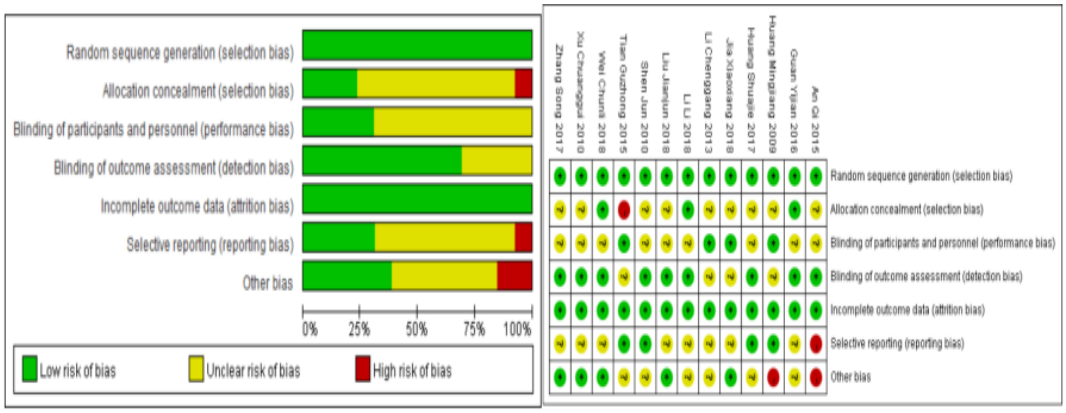

Figure 1: Bias risk percentile chart and summary chart

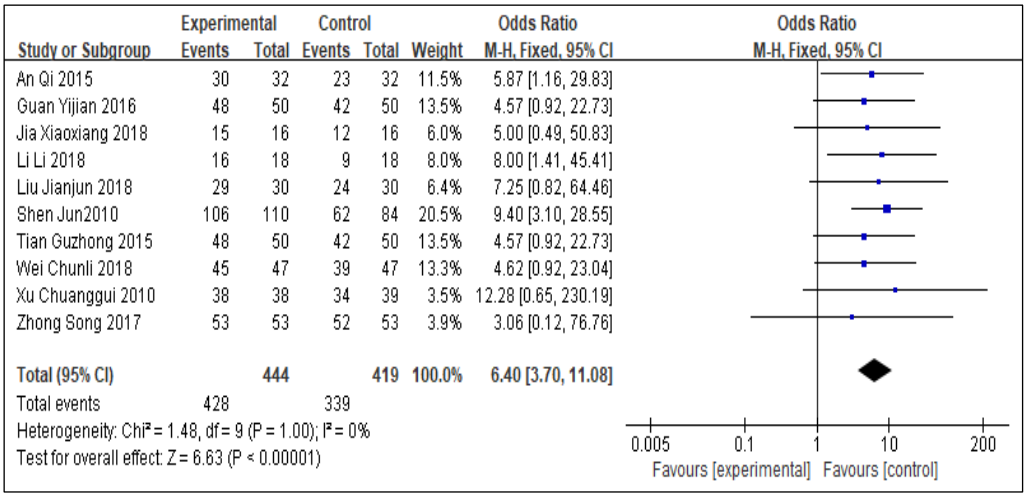

Figure 2: Meta-analysis of efficiency

ISSN 2706-6819 Vol.3, Issue 3: 28-34, DOI: 10.25236/IJFM.2021.030306

2.4. Results of Meta-analysis

(1) Clinical effective rate

10 studies used the clinical effective rate as the outcome index, with a total of 863 patients, treatment group of 185, the matched group of 170. The heterogeneity test indicated that heterogeneity in the literature does not exist (P=0.99,$I^2 = 0\%$), so So it should choose a fixed effect model. OR was combined effect size(OR=6.4,%CI[3.7,11.08],P < 0.00001), and the difference was significant meaning, indicating that experimental clinical effectiveness was superior to the matched group, as shown in Figure 2.

(2) VAS score

8 studies used visual analogue scale(VAS) score indicate the degree of peripheral shoulder pain in patients. The score was directly proportional to the pain degree, with a full score of 10. A total of 575 patients, treatment group of 185, the matched group of 170. The results showed that there was heterogeneity in the 8 included literatures (P=0.0002,$I^2 = 76\%$), and the random effect model was used. Compared with the matched group, the VAS score of the experimental group decreased more significantly(MD=-0.99,% CI [-1.23,-0.76],P<0.00001).

Because of the heterogeneity of literature, sensitivity analysis was used. Heterogeneity (P=0.26, $I^2 = 22\%$) was significantly reduced afterthe elimination of a three-week study, indicating that this study was the main source of heterogeneity, The remaining 7 studies were meta-analyzed by fixed effect model. Combined effect size was MD=-1.05(% CI[-1.16,-0.94], P<0.00001), and the difference was significant meaning, indicating that the trail group was superior to the matched group in relieving pain due to scapulohumeral periarthritis, as shown in Figure 3. Excluding other studies one by one, the heterogeneity results did not change significantly.

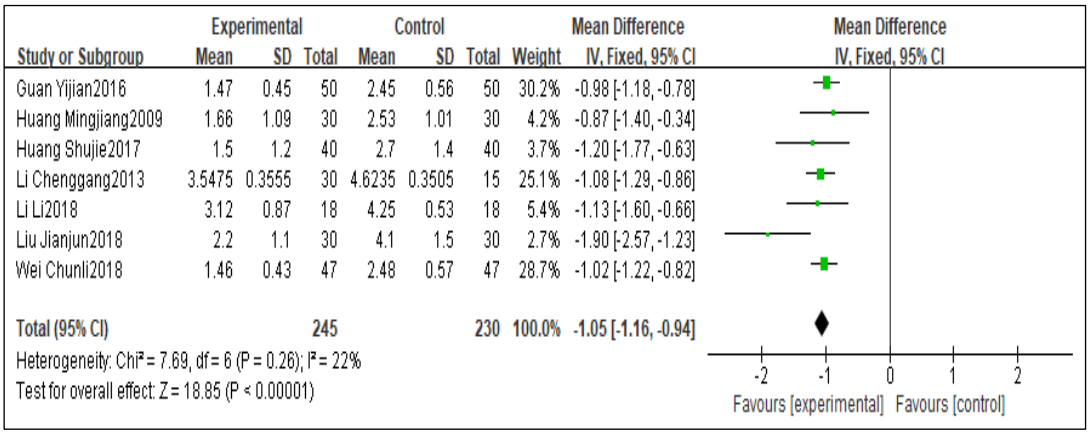

Figure 3: Meta-analysis of VAS score after excluding one study

(3) Constant-murley shoulder function score

5 studies provided data on Constant-murley shoulder function score of patients, treatment group of 185, the matched group of 170. The meta-analysis results showed that there was high heterogeneity (P<0.00001, $I^2 = 90\%$), so random effect model was used. MD was combined effect size (MD=13.42, %CI [9.3, 17.54], P < 0.00001), and the result is significant meaning, which showed that the treatment method of the trail group was superior to the matched group in improving shoulder joint function, as shown in Figure 4.

Due to the heterogeneity in the 5 included literatures, subgroup analysis was performed to identify the source of heterogeneity, and the sample size was found to be the source of heterogeneity. Group A indicated that the sample size was less than 50, and 2 studies were included. The consequences indicated that there was no heterogeneity (P=0.5, $I^2 = 0\%$). The difference was statistically significant (MD=18.26, %CI [16.61, 19.9], P < 0.00001); Group B indicated that the sample size was higher than 50, and three studies were included. The results showed that there was no heterogeneity (P=0.59, $I^2 = 0\%$), the difference was statistically significant (MD=10.25, %CI [8.35, 12.16], P < 0.00001). Constant-murley shoulder function scores of the two groups were superior to the control group, as shown in Figure 5. According to the inter group heterogeneity in subgroup analysis (P < 0.00001, $I^2 = 97.4\%$), the size of sample is the reason for the heterogeneity.

ISSN 2706-6819 Vol.3, Issue 3: 28-34, DOI: 10.25236/IJFM.2021.030306

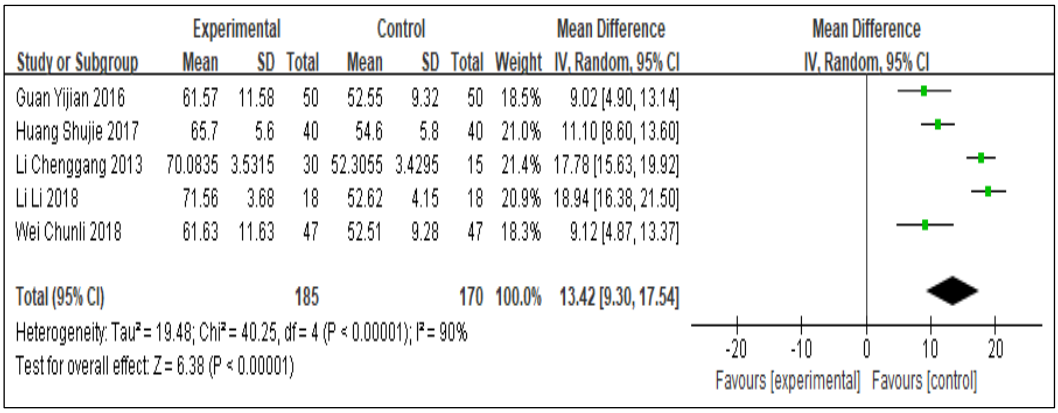

Figure 4: Meta-analysis of Constant-murley shoulder function score

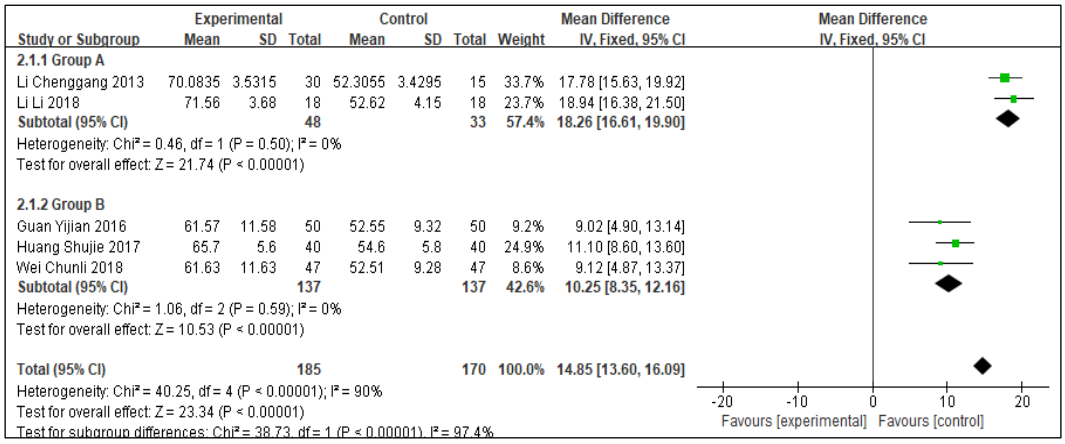

Figure 5: Subgroup analysis of Constant-murley shoulder function score

2.5. Safety Evaluation

3 studies showed no adverse reactions, and the remaining studies did not propose whether adverse reactions occurred. Therefore, to a certain extent, acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis is safe.

2.6. Publication Bias

For the clinical effective rate of acupotomology united with hyaluronic acid injection in diagnosis and treatment of periarthritis scapulohumeral (10 studies). R software was used to carry out Egger test and Begg test. And the test results were P=0.8569 and P=0.7048, respectively, with P values greater than 0.1, indicating that there was no publication bias in the included literatures.

3. Discussion

3.1. Efficacy Analysis of this Study

As a chronic soft tissue injury disease, there are many methods for the treatment of scapulohumeral periarthritis [22], including oral non-inflammatory drugs, intra-articular injection of corticosteroids, physical therapy, etc, but the optimal treatment method is still controversial [23].

Although oral non steroidal anti-inflammatory and analgesic drugs can temporarily relieve the pain around the shoulder joint of patients, long-term use will lead to nausea, abdominal pain and other adverse reactions, and in severe cases, gastric ulcer, liver and kidney function damage and other symptoms [24], and the curative effect is lower than other treatment methods. Intra articular injection of corticosteroids [24] can significantly improve shoulder pain in a short time. Therefore, because of its cartilage toxicity, Large dose injection (total dose > 100mg) or long-term injection (>6 times) will lead to serious cartilage damage and cartilage loss. Physical therapy is one of the common ways to treat

ISSN 2706-6819 Vol.3, Issue 3: 28-34, DOI: 10.25236/IJFM.2021.030306

scapulohumeral periarthritis [25], but its intensity, treatment timing and curative effect are still controversial. For refractory scapulohumeral periarthritis, manual release under anesthesia and arthroscopic release of articular capsule are two effective treatment methods, but there are certain surgical risks.

Hyaluronic acid intra articular injection to supplement synovial fluid is a preferred method for clinicians in the treatment of scapulohumeral periarthritis [26]. It can regulate vascular permeability, lubricate joints, reduce articular cartilage wear, and form a protective film on the surface of soft bone to promote wound healing, but this method lasts for a short time. Acupotomy is a kind of closed release between operation and non operation, combines the basic theory of traditional Chinese medicine with the surgical anatomy of Western medicine. In recent years, many researchers have devoted themselves to the clinical trial of treating scapulohumeral periarthritis with the combination of the two, and achieved good results.

3.2. Clinical Significance of this Study

This paper studied the safety and effectiveness of acupotomology united with hyaluronic acid injection in diagnosis and treatment of scapulohumeral periarthritis. A total of 13 RCTs and 1051 patients. After meta-analysis, the consequences showed that the differences statistically significant in clinical effective rate (OR=6.4, %CI [3.7,11.08], P<0.00001), VAS score (MD=-1.05, % CI [-1.16, -0.94], P<0.00001), Constant-murley shoulder function score (MD=13.42, % CI [9.3, 17.54], P<0.00001) in the treatment of scapulohumeral periarthritis, but the meta-analysis of Constant- murley shoulder function score showed heterogeneity. Subgroup analysis showed that sample size was the reason for heterogeneity. Egger test and Begg test showed no publication bias.

3.3. Limitations of this Study

(1) The number of included literatures is small, which leads to the small sample size of the main research; Among them, three studies described the specific random allocation method, and other literatures only mentioned the word "random", but don’t describe it specifically; Jadad scale score showed that the quality of literature is generally low, which reduced the demonstration strength of study to a certain extent.

(2) Scapulohumeral periarthritis is a chronic soft tissue injury disease. Some literatures lack longer follow-up information. The long-term safety and effectiveness need further follow-up.

(3) The injection dose of sodium hyaluronate in the literatures included in the study is not the same, which may be a factor affecting the results, but it still needs a large number of literatures to demonstrate.

3.4. Summary

To sum up, needle knife combined with hyaluronic acid injection can further improve the clinical efficiency of patients with scapulohumeral periarthritis, relieve shoulder pain, improve shoulder function, and has good safety to a certain extent, but there is no significant improvement in the recurrence rate of patients. Moreover, the quality of the included studies is not high as a whole, and more rigorous, standardized randomized controlled clinical trials are still needed to support this paper.

References

[1] Wang SY, Cai SL, et al. Clinical Research Progress of External Treatment of Scapulohumeral Periarthritis in Recent Ten Years [J]. Guangming Journal of Chinese Medicine. 2020, 35 (09): 1435-1437.

[2] Zuckerman JD, Rokito A. Frozen Shoulder: A Consensus Definition [J]. J Shoulder Elbow Surg. 2011, 20: 322-5.

[3] Hand G, Athanasou N A, Matthews T, et al. The Pathology of Frozen Shoulder [J]. The Journal of Bone and Joint Surgery. British volume, 2007, 89-B(7): 928-932.

[4] Liu CQ, Zhang Na, Guo Xin, et al. Discussion on the Treatment of Scapulohumeral Periarthritis from the Perspective of "Pivot Fracture" [J]. Chinese Acupuncture and Moxibustion. 2015, 35(12): 1214.

[5] Franz A, Klose M, Beitzel K. Conservative Treatment of Frozen Shoulder. Unfallchirurg 2019, 122:

ISSN 2706-6819 Vol.3, Issue 3: 28-34, DOI: 10.25236/IJFM.2021.030306

934-40.
[6] Pereira H, Sousa DA, Cunha A, et al. Hyaluronic Acid [J]. Adv Exp Med Biol. 2018.
[7] Li F, Jiang TX. Needle-knife Therapy Combined with Moxa Stick Pressure Moxibustion for Cervical Vertigo: A Randomized Controlled Trial [J]. Chinese Acupuncture and Moxibustion. 2018, 38(9): 936-939.
[8] Schulz KF, Chalmers I, Hayes RJ, et al. Empirical Evidence of Bias. Dimensions of Methodological Quality Associated with Estimates of Treatment Effects in Controlled Trials [J]. Jama, 1995, 273(5): 408-12.
[9] Zhang S, Zhang H, et al. Clinical Observation of Sodium Hyaluronate Combined with Acupotomy in the Treatment of Frozen Periarthritis of Shoulder [A]. The 4th China Information Conference on Traditional Chinese Medicine Proceedings [C]. China Information Association For Traditional Chinese Medicine and Pharmacy: China Information Association of Traditional Chinese Medicine. 2017: 4.
[10] Wei CL Zhang LD, et al. Effect of Intraluminal Injection of Sodium Hyaluronate on Pain Symptoms and Limb Function Recovery of Patients with Scapulohumeral Periarthritis [J]. Journal of community medicine. 2018, 16 (04): 53-54.
[11] Tian ZG, Wang F, et al. Clinical Efficacy Analysis of Intra-Articular Injection of Sodium Hyaluronate Combined with Acupotomology Massage in the Treatment of Scapulo Humeral Periarthritis [J]. World latest medical information digest. 2015, 15 (63): 42-43.
[12] Li CG, Zhou L, et al. Clinical Efficacy of Intra-Articular Injection of Sodium Hyaluronate and Small Needle Knife in the Treatment of Scapulohumeral Periarthritis [J]. Chinese Journal of Traditional Medical Traumatology and Orthopedics.2013, 21(06): 19-20+24.
[13] AnQ. Clinical Observation of Hydroacupotomy Combined with Sodium Hyaluronate in the Treatment of Biceps Tendinitis [D]. Heilongjiang University of Traditional Chinese Medicine. 2015.
[14] Guan YJ, Cheng CH, Liang YM. Clinical Effect of Water Needle-Scalpel Combined with Intra-Articular Injection of Sodium Hyaluronate on Scapulohumeral Periarthritis [J]. The Journal of Traditional Chinese Orthopedics and Traumatology. 2016, 28(11): 13-16.
[15] Huang SJ. Clinical study of hydroacupotomology combined with sodium hyaluronate injection in treatment of scapulohumeral periarthritis [J]. Journal of North Pharmacy. 2017, 14(09): 109-110.
[16] Li L, Wang R, Cao Qihui. Clinical Study of Small Needle Knife Combined with Intra-Articular Injection of Sodium Hyaluronate in the Treatment of Scapulohumeral Periarthritis [J]. Modern Medicine and Health Research.2018, 2(07): 69.
[17] Liu JJ. Observation on the Curative Effect of Small Needle Knife Combined with Intra-Articular Sodium Hyaluronate Injection in the Treatment of Scapulohumeral Periarthritis [J]. Public Medical Forum Magazine. 2018, 22(11): 1533-1534.
[18] Jia XX, Liu RX, et al. Clinical Observation on the Treatment of Frozen Shoulder with New Comprehensive Sequential Therapy [J]. Guiding Journal of Traditional Chinese Medicine and Pharmacy. 2018, 24(09): 82-83.
[19] Xu CG, Gao JD. Clinical Observation on 40 Cases of Frozen Shoulder Treated with Needle Knife Combined With Sodium Hyaluronate [J]. Chinese Community Doctors.2010, 12(04): 86.
[20] Shen J. Efficacy Analysis of Acupotomology and Intra-Articular Injection in the Treatment of Scapulohumeral Periarthritis [J]. China Medical Herald.2010, 7(05): 83+86.
[21] Huang MJ, Huang ZJ. Clinical Observation on Comprehensive Treatment of Scapulohumeral Periarthritis [J]. Journal of Practical Traditional Chinese Medicine. 2009, 25(04): 234.
[22] Gao SZ, Yang J. Acupuncture and Moxibustion Therapy [M]. Beijing: China Press of Traditional Chinesse Medicine. 2012: 34.
[23] Keilani M, Stummvoll G, Kainberger F, et al. Intensive Ultrasound Treatment in Acute Calcificperiarthritis of the Wrist:a Case Report [J].Wien Klin Wochenschr, 2015, 127(15-16): 649-651.
[24] Dehghan A, Pishgooei N, Salami MA, et al. Comparison between NSAID and Intra-Articular Corticosteroid Injection in Frozen Shoulder of Diabetic Patients; A Randomized Clinical Trial [J]. Exp Clin Endocrinol Diabetes. 2013; 121(2): 75-79.
[25] Chan HBY, Pua PY, How CH. Physical Therapy in the Management of Frozen Shoulder [J]. Singapore Medical Journal. 2017 Dec; 58(12): 685-689.
[26] Peyron J G . Preliminary Clinical Assessment of Na-Hyaluronate Injection into Human Arthritic Joints [J]. Pathologie Biologie, 1974, 22(8): 731-736.