Research Square

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The Treatment of Wrist Ganglion Cyst by the Chinese Acupotomy and Crisscross Thread

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Research article

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Abstract

Background: The current treatments of wrist ganglion have considerable recurrence rate, we developed a new treatment for ganglion cysts in our clinical practice, which combined acupotomy with crisscross thread method, so we now to compare the clinical effectiveness of Chinese acupotomy and crisscross thread with aspiration followed by injection of steroid and open excision for ganglion cysts treatment.

Methods: Recruited patients with wrist ganglion were divided into three groups according to the treatments. Among them, 27 patients who were treated by a new combined treatment of Chinese acupotomy and crisscross thread method in group A, 30 patients who were treated by aspiration followed by steroid injection in group B, and 28 patients who were treated by open excision in group C. The data of age, gender, weight, size of ganglion cysts, visual analogue scale (VAS) , cost were recorded and compared by One-way analysis of variance, followed by an LSD (Least Significant Difference)test. The recurrence rates were recorded were analysed by chi-square test.

Results: At the first day and one week after treatment, VAS score of group A was similar to group B with no statistic difference. VAS score of group C was higher than group A and B with statistic difference. Six months later, there was no statistic difference among the three groups about VAS. The recurrence rate was 3.7% in group A and 36.7% in group B and 10.7% in group C. No patient infected in three groups. The cost of group A was more than group B with no statistic difference. The cost of group A was much less than group C with statistic difference.

Conclusions: The combination of Chinese acupotomy and crisscross thread method was a simple, economical and effective procedure for wrist ganglion cysts.

Background

Ganglion cysts are benign soft tissue masses most commonly encountered in the hand and wrist[1], among which 60%-70% occurred in the dorsal aspect of wrist, communicating with the joint via a pedicle[2]. Ganglion cysts usually originate from scapholunate ligament[3], but several studies have demonstrated that ganglion cysts can arise from a number of other sites over the dorsal wrist capsule[4]. The symptoms of ganglion cysts include pain in the wrist, palpation of the mass, decreased range of motion and decreased grip strength, paraesthesia[5, 6] .

The treatment of ganglion cysts often begins with non-surgical management due to the limited morbidity and high potential for spontaneous resolution[7]. As the main non-surgical treatment, aspiration has been shown as an effective method. However, most studies report that its success rate is only 36–51%[8]. To improve the success rate of simple aspirations, numerous adjunctive measures have been developed, including injection of steroid, sclerosant or hyaluronidase after aspiration, and aspiration with multiple punctures[6]. However, lack of success, high recurrence rate and potential side effects have led to general abandonment of these approaches [6, 9]. Using blunt force to disrupt the capsule is another treatment of ganglion cysts[1], while its recurrence rate is up to 44.7%[1]. Although surgical excision is the golden

standard treatment for ganglion cysts, including open or arthroscopic surgical excision, its surgical trauma, postoperative complications (including unsightly scar) and high cost are the main reasons for patients to refuse surgery[6]. In addition, the recurrence rate of surgical excision varies from 3.8–42%[2, 10]. So surgeons still attempt to find a new treatment for ganglion cysts, with the advantages, including high success rate, low recurrence rate, low cost, safe and less surgery trauma.

Recently, we have developed a new treatment of traditional Chinese medicine for ganglion cysts, which combines Chinese acupotomy (Fig. 1) and the cross-thread method. This retrospective study is performed to compare the effectiveness and safety of the new combined treatment with that of aspiration with injection of steroid and open excision.

Methods

General material

From June 2015 to June 2018, patients in our hospital with ganglion cysts in dorsal aspect of wrist (Fig. 2)were included. The exclusion criteria were: (1) immunocompromised status (T2DM, HIV, etc.); (2) local skin lesions (eczema/tinea, etc.); (3) age ≤ 18 years or age ≥ 80 years; (4) other wrist diseases (osteoarthritis, rheumatoid arthritis, etc.). This study was approved by the Ethic Committee of Tongde Hospital of Zhejiang Province. Written informed consent and research authorization were obtained from all patients. The recruited patients in this study were divided into three groups according to the treatments: Group A: combined acupotomy with cross-thread method. Group B: aspiration with injection of steroid. Group C: open excision.

Treatment procedures

All treatments were performed by a senior surgeon.Patients in Groups A and B were received treatment in Outpatient Department, patients in Group C were in Inpatient Department.

For the patients in group A: after the area of ganglion cysts was cleaned with tincture of iodine solution and a localized anesthesia was performed with 0.5% lidocaine. A 1/0 mersilk on a needle (Ethicon) was passed in one direction through the skin and the substance of the ganglion cysts were taken out through the skin on the other side. Another 1/0 mersilk on a needle was passed in the same way, perpendicular to the first thread. Both threads were cut off from the needle, leaving the silk thread in a crisscross manner (Fig. 3). A Chinese acupotomy (Fig. 1, Jiangsu Huayou Medical Devices Co., Ltd. China) was inserted directly into the ganglion cysts in multiple direction to puncture the wall (Fig. 4). Adequate pressure and massage on the ganglion cyst continued until the ganglion cyst disappeared. A sterile cotton ball was placed over the ganglion cysts and was fixed by the two threads (Fig. 5). After ten days, the cotton ball and threads were removed (Fig. 6a and b).

For the patients in group B, the localized clean and anesthesia were the same with group A. The ganglion cyst was aspirated with a 18G (Becton Dickinson S.A.) hypodermic needle and a 5 ml syringe. The

aspiration was facilitated by milking the ganglion contents towards the needle. After the fluid was completely aspirated, 1 ml 20 mg/ml triamcinolone acetonide (Zhejiang Xianju Pharmaceutical Co., Ltd. China) was injected into the ganglion cysts. A sterile gauze dressing was applied with a firm bandage for ten days.

For the patients in group C, the localized clean was the same with group A. The operation was performed under brachial plexus block anesthesia. A tourniquet was applied and inflated during surgery. A transverse skin incision was made over the ganglion cyst. The ganglion cyst was isolated by meticulous dissection, without disrupting the ganglion cyst. The ganglion cyst and its capsular attachments were tangentially excised to avoid damage to the dorsal ligaments. After the incision was closed, a sterile gauze dressing was applied with a firm bandage for ten days.

Outcome measurement

Patient demographics data (age, gender, weight, size of ganglion cysts) were recorded. Pain level was assessed using a visual analogue scale (VAS, 0 means no pain while 10 means most severe pain imaginable) and assessments were performed pre-operatively, and at 1 day, 1 week, 6 months after the operation. Recurrence was defined as reappearance of cyst at the same site being visualized by ultrasound. The secondary outcomes include cost and infection. Wound culture positive was categorized as infection.

Statistical analysis

The data of age, gender, weight, size of ganglion cysts, VAS and cost were compared among three groups by One-way analysis of variance, followed by an LSD (Least Significant Difference)test. The recurrence rates were analysed by chi-square test, and continuous correction chi-square values were selected. Statistical significance was defined as $P < 0.05$.

Results

From June 2015 to June 2018, 89 patients with ganglion cysts in dorsal aspect of wrist were divided into three groups and received treatment in our hospital. Among these patients, 4 were lost in follow-up. There were 27 patients in Group A included in the final study and analysis, and 30 in Group B and 28 in Group C. No differences in demographic data among the three groups were found (Table 1).

Table 1
Baseline characteristics of patients in the three groups

	Group A	Group B	Group C	P
N	27	30	28	-
Age (years)	44.2 ± 13.2	43.7 ± 11.6	44.8 ± 11.2	0.946
Gender (M/F)	11/16	13/17	12/16	0.979
Weight (kg)	64.1 ± 10.57	66.3 ± 9.29	64.1 ± 9.56	0.587
Cyst Size (cm)	2.05 ± 0.89	1.9 ± 0.83	2.18 ± 1.1	0.631
VAS	2.27 ± 1.4	2.46 ± 1.8	2.71 ± 1.2	0.737

On the first day after treatments, VAS score in Group C was higher than Groups A and B (P2 < 0.001; P3 < 0.001, respectively), there was statistic difference, but there was no statistic difference between Groups A and B regarding VAS score (P1 = 0.849). One week after treatment, VAS score in Group C was higher than that of Groups A and B (P2 < 0.001; P3 < 0.001, respectively), there was statistic difference. But there was no statistic difference between Group A and Group B regarding VAS score (P1 = 0.621). Six months after treatment, there was no statistic difference among the three groups in VAS score.

Six months after the treatments, one case in Group A, eleven in Group B and three in Group C had recurrence. The recurrence rate in Group A (3.7%,1/27)was lower than Group B (36.7%,11/30) and Group C(10.7%,3/28). But, there was no statistic difference between Group A and Group C regarding recurrence rate (P2 = 0.630). No patient had infection in the three groups. Regarding cost, the cost of Group A was higher than that of Group B with no statistic difference. Compared with Group C, the cost of Group A was lower, there was statistic difference between two groups. Compared with group C, the cost of group B was lower, there was statistic difference between the two groups(Table 2).

Table 2
VAS, recurrence, infection and cost of the three groups

	Group A	Group B	Group C	P1	P2	P3
VAS(1D)	1.28 ± 0.81	1.32 ± 0.74	2.39. ± 1.11	0.849	< 0.001	< 0.001
VAS(1W)	0.48 ± 0.41	0.41 ± 0.39	1.71 ± 0.85	0.621	< 0.001	< 0.001
VAS(6M)	0.09 ± 0.16	0.05 ± 0.10	0.10 ± 0.17	0.286	0.782	0.175
Recurrence	1/27	11/30	3/28	0.006	0.630	0.045
Infection	0/27	0/30	0/28	-	-	-
Cost (¥)	476.89 ± 40.43	322.39 ± 60.90	3061.11 ± 474.72	0.038	< 0.001	< 0.001

Note: P1 means compared group A and B, P2 means compared group A and C. P3means compared group B and C.

Discussion

Acupotomology originated from traditional Chinese medicine, and gradually absorb modern anatomical theories. It is easily accepted by the patients because it has the advantages of simple operation, no condition limitation, minimal invasive, small damage to the body tissue, rare in inducing infection, low adverse reaction and quick recovery. In clinical practice, acupotomology is usually used for the treatment of chronic soft tissue injury and also suitable for traumatic bursitis, tenosynovitis, and muscle fasciitis. In our hospital, we have cured ganglion cysts with the acupotomy therapy. Our study demonstrates that patients who received the new combined treatment of acupotomy and crisscross thread had pain level similar to the patients who received treatment of aspiration followed by steroid injection, and had less pain than the people who experienced open excision.

There are various treatments being tried out for permanent cure of ganglion cysts, and all these treatments have different recurrence rates. The recurrence rate of blunt force is 44.7%[1], while aspiration 15%-69%[11]. Moreover, a number of techniques have been developed to close the potential space of the empty cysts and to prevent recurrence, including aspiration with multiple punctures of the wall and aspiration with injection of steroid or hyaluronidase. However, the recurrent rate of aspiration with steroid is 14%-83%, aspiration with multiple puncture 49%-78%[6], aspiration with sclerotherapy varying between 10%-35%[12]. The recurrence rate is 36.7% in our research of aspiration with steroid group, it is similar to previous reports. Surgical excision remains the golden standard for treatment of ganglion cysts and it is the choice when conservative treatment fails. In most previous studies, the recurrence rate of surgical excision varies from 3.8–42%[2, 10]. One meta-analysis[13]found that open excision had a mean recurrence of 21%, reduced by 76% in recurrence compared with aspiration. The above meta-analysis reported the recurrence of arthroscopic excision was 6% across all studies[13]. Chung[14] found their recurrence of arthroscopic excision was 10%. In our study, the recurrent rate of the open excision was 10.71%, which was consistent with previous studies. But surgical excision is usually accompanied by

many complications, including unsightly scar, infection, keloid, radial artery injury and neurapraxia, decreased range of motion, postoperative stiffness, grip weakness[3]. One meta-analysis[13] reported the complication incidence of open excision was 14%, while arthroscopic excision was 4%. In our view, some complications could be avoided by the combined treatment. As a kind of closed lysis between surgery and non-surgery, the acupotomy therapy is a minimally invasive method. It has no incision and its surgical trauma is minor. In our hospital, there was no patient had infection or other complications in any group.

Several other thread techniques was also reported. Rathod[15] introduced the transfixation technique, by which two sterile silk sutures were passed through the cyst at right angles to each other, the content of the cyst were aspirated using a syringe needle, and the threads was tied over the cyst over a sterile gauze firmly. They reported the failure rate was 5%. Mohan[16]described the same thread technique without aspiration of the cyst content, their recurrent rate was 5.56%. Zangana[17]reported another thread technique–when the ganglion content was aspirated, one silk thread was passed through the ganglion horizontally and tied to a silk ring, and the patients were advised to rotate the silk ring and apply gentle digital pressure on the ganglion interval every day. They found the recurrence rate was 4% finally. Compared with previously reported thread techniques, the novel feature of our technique was coalesced with acupotomy, which originated from traditional Chinese medicine. In our study, the recurrent rate of the new combined treatment was 3.7%, which was a little lower than other thread technique. This may be because the lining of the cysts wall was damaged by the multiple punctures of the acupotomy, and a low grade chronic inflammation was caused by the silk thread between cysts walls. What's more, adequate pressure produced by the cotton ball was conducive to closing the potential space of the empty cyst.

There is few report about the cost of the ganglion cysts treatment. One rearch[18]from Stanford University of America showed that the average total cost of an open excision was $1,821± $1,127 ,while an arthroscopic excision was $3,668 ± $872, Surgical costs from arthroscopic ganglion excision are significantly higher than open excision. In our hospital, open excision cost was only ¥3061.11 ± 474.72, which was much less than that in America. The new combined treatment cost about ¥ 476.89 ± 40.43, and aspiration with steroid group was ¥ 322.39 ± 60.90. Groups A and B spent much less than Group C so that the financial burden of patients was reduced greatly.

Conclusions

According to our treatment experience and the existing research analysis, the combination of Chinese acupotomy and crisscross thread method was a simple, economical and effective procedure for wrist ganglion cysts.

The limition of this study was that the number of patients was too small, and more time was needed to observe the long term effects. However, it is worthwhile to explore the value of traditional Chinese medicine and combine modern medical knowledge to treat diseases.

Abbreviations

VAS
Visual analogue scale;
T2DM
Type 2 diabetes mellitus;
HIV
Human immunodeficiency virus

Declarations

Acknowledgements

Not applicable.

Authors' contributions

Study conception and design: DL, SZ. Data collection: BX, YL. Data analysis: DL, SZ, BX, YL. Manuscript preparation: SZ, BX and YL. All authors read and approved the final manuscript.

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Availability of data and materials

All data generated or analyzed during this study are included in this

manuscript.

Ethics approval and consent to participate

Ethics approval and consent to participate in present study was approved by the Ethic Committee of Tongde Hospital of Zhejiang Province. Written informed consent and research authorization were obtained from all patients.

Consent for publication

We obtained a written informed consent from the patients for publishing the de-identified images.

Competing interests

The authors have no competing interests to declare.

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Figures



Figure 1

one Chinese acupotomy needle.

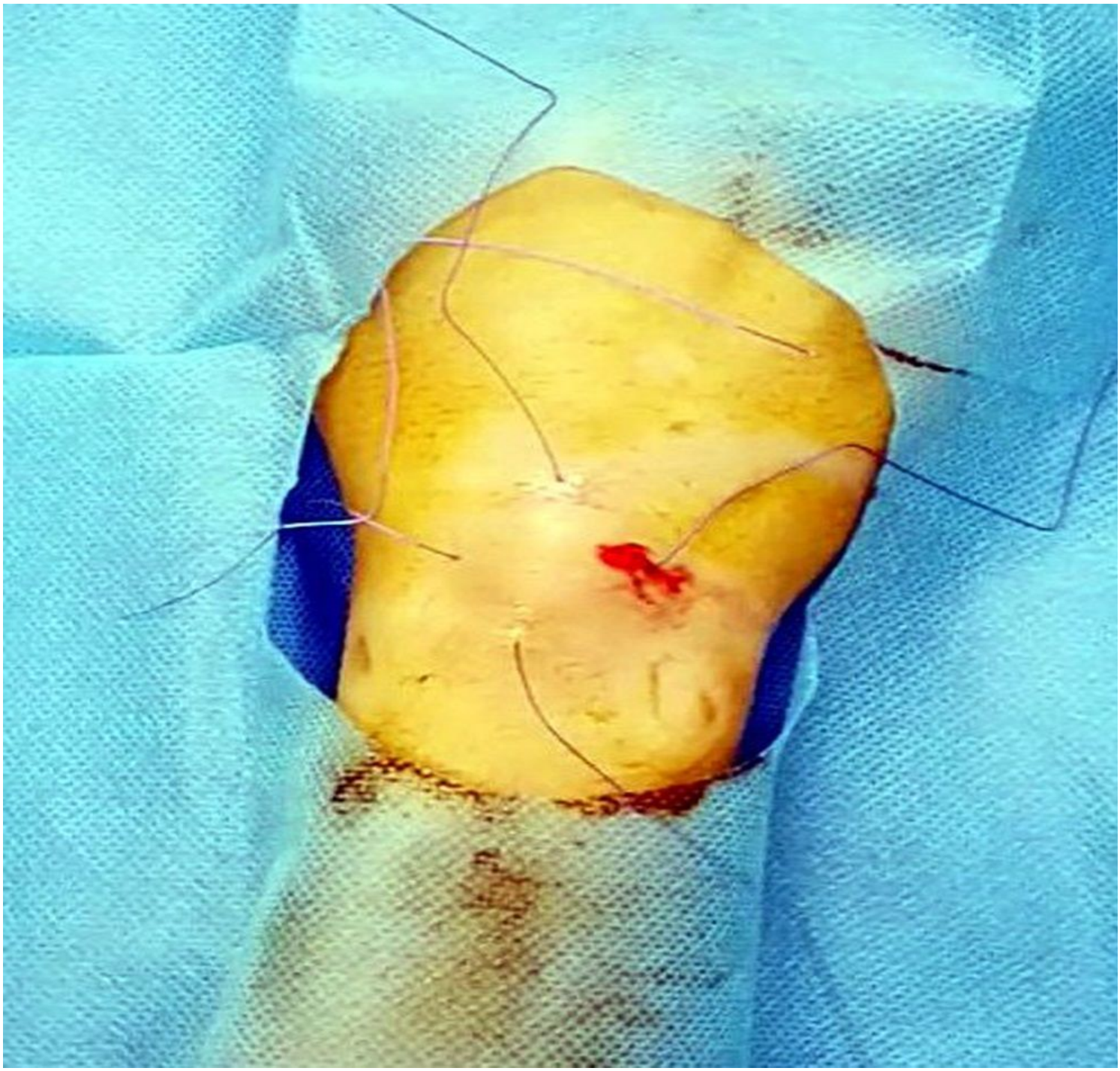


Figure 2

two silk threads passed in a criss-cross manner.

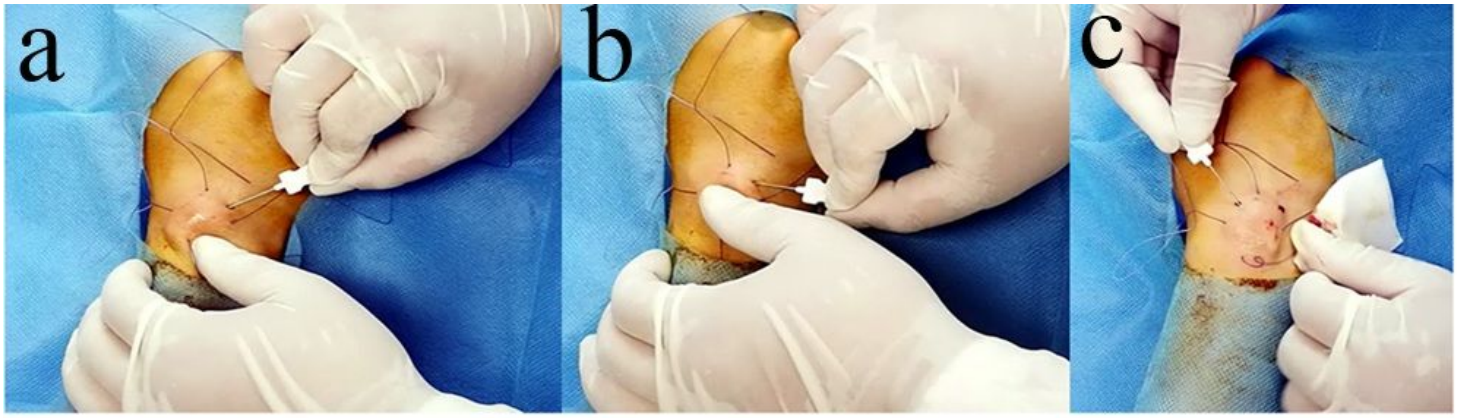


Figure 3

the ganglion cyst wall was destroyed with an acupotomy in multiple direction and the cyst content was expelled.



Figure 4

one sterile cotton ball was fixed by the two threads over the ganglion cysts .