

# Acupotomy for Ganglion Cysts: A Case Report

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**Abstract:** Ganglion cysts of the wrist are highly prevalent, but a single treatment option is associated with high time and financial costs for the patient. We report a case of a novel treatment option that is simple and efficacious, with a low recurrence rate. Case presentation: A middle-aged woman complained of a cyst on the back of her right wrist, with occasional pain, soreness and swelling on pressure, and limited wrist movement. The patient was clinically diagnosed as "ganglion cyst", and we gave her a acupotomy treatment. After the treatment, the cyst on the back of the wrist disappeared, with no limitation of movement, and there was no recurrence of the cyst 3 months after the treatment. Thus, as a new therapeutic option, acupotomy shows outstanding advantages in the treatment of ganglion cysts. Compared with the traditional surgical options, it is convenient, fast, simple, no scar after surgery, saves the patient's time and economic costs, and avoids the patient's fear of surgery. However, this is only an isolated case, and there is a lack of large sample data to explore its potential mechanism of action.

**Keywords:** acupotomy; ganglion cyst; wrist; case report

## 1. Introduction

Ganglion cysts are common soft tissue tumors around the hand and wrist, the most common ganglion cysts in the hand is the dorsal wrist ganglion cyst, accounting for 60-70% of ganglion cysts in the hand, and it is noteworthy that the incidence is higher in women compared to men [1]. The clinical symptoms are mainly a round mass about 1-2 cm in diameter at the dorsal wrist with clear borders, which has average mobility. When the wrist is dorsiflexed/extended, the mass protrudes significantly. Ganglion cysts are associated with osteoarthritic joints, degenerative joints that produce articular capsular herniation, the connection between the cyst and the distal interphalangeal joints can be clearly visualized by injecting methylene blue injections, and 48% of patients with ganglion cysts have osteoarthritic joint disease [2]. There are several possible development processes mainly as below. First of all, Joint stress (acute or chronic) may lead to rupture of the joint capsule, resulting in leakage of synovial fluid into the periarticular tissues. Subsequently, the reaction between this fluid and the local tissue leads to the production of a gelatinous cystic fluid and the formation of a capsule wall. Alternatively, joint stress may lead to cyst formation from mucus-like degeneration of adjacent extra-articular connective tissue. Finally, some have suggested that joint stress may stimulate mucin secretion by mesenchymal cells in the surrounding tissues. The final common pathway for all of these theories is the merging of small pools of mucus to form master cysts. The production of peripheral pseudopodia is induced by an unknown mechanism, although it may be caused by compression of the surrounding tissues [3].

Clinical manifestations are sufficient for diagnosis, If you want to clearly check it out, ultrasonography is the examination of choice for ganglion cysts as it can show the cyst's boundaries, size, morphology, depth, relationship with surrounding tissues and blood flow distribution. MRI examination can be used for differential diagnosis, as ganglion cysts show a slightly isosinusoidal signal in T1WI, or a slightly low or high signal, mainly due to the fact that the mucinous fluid inside the cyst contains proteins. Macrophages of the tenosynovial sheath (GCTTS) are often identified with tenosynovial cysts, which are soft-tissue masses within the ganglions of the small joints of the hands and feet, and tend to be round and oval in shape. Unlike tendon cysts, GCTTS presents with double low signal at T1WI and T2WI. In addition, ganglion cysts should be differentiated from synovial hemangiomas, which are benign vascular lesions originating from the peri-synovial area and are less common. It presents intermediate signal in T1WI and high signal in T2WI, based on which the two can be clearly differentiated [4].

Current treatment including conservative treatment, drug injection therapy, and surgical treatment [5].

Ganglion cysts are associated with ligament injuries caused by joint overactivity. Conservative treatment refers to avoiding fatiguing activities of the joint where the cyst is located and moderate bracing to reduce the load on the joint. However, ganglion cysts take a long time to heal on their own, usually 2-3 months. Usually, while restricting the patient's joint activities, acupuncture or heavy pressure will be used to rupture the cyst, but this method does not destroy the structure of the cyst itself, such as the cyst wall, cystic fluid, and cystic stipe. Therefore, the possibility of recurrence is very high. However, for patients with milder symptoms, conservative treatment is more popular among them. Drug injection therapy refers to the injection of drugs into the cyst after suctioning the cyst fluid. The commonly chosen drugs are trimethoprim and hormones, which has anti-inflammatory and anti-allergic effects [6]. It can reduce the exudation and release of inflammatory substances. The first thing to be done before injecting the drug is aspiration, where the cystic fluid of the ganglion cyst is withdrawn through a successful needle puncture. Zubowicz [7,8] reported three aspirations with an 85% success rate, but failure of the maneuver is a common occurrence, which suggests that the chances of success of the aspirations vary widely. After studying a large body of literature it was found that repeated suction had only a 30-50% success rate. There is a limit to the success rate of aspiration of ganglion cysts in the flexor tendons of the hand, whereas the success rate is lower in the palmar aspect of the wrist, considering that because of anatomical structures, such as the radial artery and the median nerve palmar cutaneous nerve running through this area, perhaps the success rate will increase under ultrasound guidance, but the economic cost and patient tolerance is another issue that needs to be addressed. After successful aspiration of the cystic fluid, local injections of anti-inflammatory and anti-allergic medications are administered to prevent reformation of the ganglion cyst [3]. Tang et al. achieved a cure rate of 70% in patients with ganglion cysts using tretinoin injections [9]. However, the shortcomings of drug injection therapy are also prominent, and one study showed that the recurrence rate of corticosteroid injection for ganglion cysts was 73% [10]. The underlying reason for this is that drug injection therapy does not address the actual problem of the cyst. In addition, the cases of aseptic necrosis of tendon caused by drug injection have gradually increased in recent years, mainly because hormones will delay and inhibit the production of collagen tissue by inhibiting the proliferation of local tendon capillaries and fibroblasts, which will then lead to the reduction of tendon elasticity and the weakening of tensile strength, thus triggering tendon rupture [11]. Surgical treatment is more common, Wang R et al. [12] used surgical excision to treat ganglion cysts of the wrist, with a recurrence rate of 12%, and concluded that surgical excision, although an invasive operation, is a thorough treatment that can effectively reduce the recurrence rate. Zheng Guoqiang [13] improved the ganglion cyst excision: complete excision of the cyst and its tip, suture and close the synovial membrane attached to the cyst, and at the same time repair the weak ligaments, and postoperative use of plaster casts to immobilize the joints, and achieved better results. Jiang Ze [14] used surgical methods to treat ganglion cysts and concluded that surgical methods were effective and highly curative. MANGUKIYA et al. [15] concluded that injection therapy was prone to complications and that surgical release was the gold standard for the treatment of recalcitrant ganglion cysts, and that the use of a longitudinal incision was favorable for the identification of the fascial compartment and the complete release of peritendinous adhesions. But due to a variety of factors such as the complexity of the anatomical location of the cyst (encasement of nerves and blood vessels), the experience of the attending surgeon, and postoperative care, a review of the literature actually shows a high rate of recurrence, especially for dorsal carpal tenosynovial cysts [3], with a significant portion of the population needing reoperation, loss of postoperative work time, and psychological and financial stress on the patient [16]. Surgical treatment options also have problems that are difficult to ignore, such as a number of complications, including infections, neuromas, unsightly scars and keloids, and the possibility of stiffness, loss of grip strength, and reduced range of motion after surgery. These are all issues that need to be taken into consideration when the patient and doctor decide on a treatment plan together.

For the treatment of ganglion cysts, some doctors believe that conservative treatment is needed first, and if conservative treatment is ineffective, then drug injection or surgical treatment is chosen. For patients who are clearly diagnosed with ganglion cysts, most scholars believe that surgical treatment is needed at an early stage regardless of the presence or absence of clinical symptoms to prevent the lesion from continuing to develop, which may lead to more complications [17]. However, in fact, the number of patients who choose surgical treatment because of ganglion cysts is not very high. In addition, in a study [18], it was found that 38% of patients expressed cosmetic concerns, 28% were concerned about malignancy, and only 26% visited the clinic because of pain. Therefore, even if patients visit the clinic based on altered body function and pain considerations, they prefer non-surgical treatments [19]. Postoperative complications and recovery time are not the only reasons for them to refuse surgical treatment, rather it is the attitude of the patients towards the disease of tendon ganglion cysts that makes the best treatment option change, aesthetics has been suggested in the literature as a common reason for patients to seek medical assistance, and we have found this to be the case in our clinic, so from the

medical point of view surgery is the best option for the treatment of this disease, with a low recurrence rate in comparison to other treatment. The recurrence rate is lower than other treatment options, but from the patient's point of view, there are inevitably ugly scars after surgery, as well as the necessary recovery time. However, from the patient's point of view, the inevitable presence of ugly scars after surgical procedures and the necessary recovery time make patients look forward to the emergence of a new treatment option that does not leave scars, is convenient, and shows fast results.

Therefore, it is necessary to find a safe and effective complementary alternative therapy. Acupotomy has the advantage of simplicity and few side effects; however, there is limited evidence to support Acupotomy for ganglion cysts. Here, we describe a case in which a patient with a ganglion cyst appears to have been successfully treated with Acupotomy and had its recurrence effectively controlled.

## 2. Cases

On March 29, 2018, a 47-year-old female patient was diagnosed with a dorsal wrist ganglion cysts. The patient's main symptom was a 1 cm\*1 cm bulging mass on the back of the right wrist, semicircular in shape with clear borders, moveable by pushing, occasionally painful, noticeable when the wrist was flexed, and soreness and swelling by pressure, which limited the patient's dorsal extension movement of the wrist and seriously affected her normal life. The patient had received various conservative treatments in the past, but her symptoms were not relieved, so she sought Acupotomy treatment at our clinic in 2022 because she was afraid of surgery.

## 3. Acupotomy Treatment

The patient was seated with the affected limb abducted and wrist extended, the skin was routinely disinfected at the localization site, and 2 ml of triamcinolone acetate + 3 ml of lidocaine + 1 ml of methylcobalamin + 4 ml of 0.9% sodium chloride injection was used for local infiltration anesthesia with a 10 ml syringe. The cyst was stabbed into the central part of the cyst vertically at 90° with a disposable Acupotomy (0.5\*50mm Bond), the blade line and the direction of the tendons of the extended finger and wrist were the same, the Acupotomy penetrated the skin to reach the cyst wall, and there was a feeling of falling when the cyst wall was pierced, and the Acupotomy continued to enter slowly, and when there was a feeling of obstruction under the knife, it indicated that the ganglion cyst had been touched, and 2 to 3 cuts were made horizontally and vertically within 0.5 cm, or 2 to 3 cuts were made in the left and right oblique directions to destroy the cyst. Then the Acupotomy was lifted slightly, and the cyst wall was punctured around the cyst, the Acupotomy was withdrawn, then the cyst was squeezed around the treatment point with the thumb, and the transparent gelatinous mucus in the cyst was squeezed out, wiped with sterile gauze, covered with another piece of sterile gauze, and bandaged. The cyst was fixed with a bandage and pressure bandage. Finally, the outpatient physician performed local manual massage as a sign of the end of the treatment. The bandage was removed after 3 days. During this period, the wound was kept dry and excessive use of the wrist was avoided.

## 4. Clinical Results



Figure 1: Photographs taken before (A) and at the end of treatment (B)

After outpatient treatment, the cyst in the patient's wrist disappeared. 3 months later, the patient was followed up by telephone, and the cyst in the patient's wrist did not recur and he was living and exercising normally. The disease was considered to be treated and controlled. In Figure 1, photographs taken before (A) and at the end of treatment (B) are shown respectively. Figure 2 records the treatment process.



*Figure 2: Records the treatment process*

## 5. Discussion

The Acupotomy is a needle that resembles acupuncture on the outside but has a narrow blade at its tip, which can perform the dual functions of needling and knife cutting. It is a new type of Chinese medical device formed on the basis of modern Western surgical therapy and traditional acupuncture therapy in Chinese medicine. Acupotomy is widely used in the treatment of lumbar disc herniation [20], cervical spondylosis [21], frozen shoulder [22], and knee osteoarthritis [23]. Acupotomy is based on the ancient nine needles in the “lang needle” and “feng needle” development. The ancient text "Ling Shu" said "the micro-needle will pass the meridians, regulate qi and blood". Prof. Zhu Hanzhang believes that Acupotomy treatment can improve the function of the circulatory system, reach the operation of local organs by stimulating the endings of nerve tissues, accelerate lymphatic circulation, improve metabolism, and also dilate the small blood vessels, thus promoting the nutrient supply to the locally diseased tissues, and helping the organism to recover [24]. It has been shown that acupotomy has an anti-inflammatory effect by inhibiting the expression of inflammatory cytokines such as IL-1 $\beta$ , IL-6 and TNF- $\alpha$  [25]. Acupotomy through loosens, cuts and peels inflammatory, adhesive and degenerated tissues so that stagnation of qi and blood can be flow smoothly to relieve pain and dispel disease. Acupotomy has the effect of dredging fluid retention and promoting fluid reflux, and can promote local microcirculation [26]. The key to acupotomy treatment of ganglion cyst is to adequately disrupt the wall of the cyst, make multidirection cuts in the wall, and prevent the reaccumulation of the contents. Secondly, the Acupotomy can separate the stem and the capsule at the base from the surrounding normal tendons and ligaments, thus reducing the symptoms of swelling, pain and numbness, and with pressure bandaging and local pressure, the fragments of the cyst wall and normal tissues can be bonded together to prevent the cyst from forming again.

Open surgery can completely remove the cyst, but it is difficult to operate, easy to damage the tendons and nerves, and if the pressure of the cystic fluid is high, the cystic wall will rupture. Besides postoperative scar is obvious, postoperative recovery needs to be fixed for 1 week [25]. In recent years, arthroscopic tenosynovial cyst excision has gradually increased, this treatment method has small incision, less pain, but postoperative swelling is obvious, easy to damage the nerve, some patients have no improvement in mobility or grip strength [27]. Compared with surgical treatment, Acupotomy can effectively destroy the cyst wall, squeeze out the cyst fluid, eliminate the mass, release the adhesions of the tissue around the cyst, and cooperate with functional massage, which can effectively relieve the symptoms. This treatment method have the advantages of less trauma, less postoperative pain, no scar, fast recovery of activity and function, and simple operation. From the economic perspective, the treatment cost is much lower than surgical treatment.

Therefore, compared with open surgery, it is characterized by two features: first, the incision is small, without removing any tissues or organs of the body and without sutures; second, it is a non-direct vision surgery. First of all, the tool used for the acupotomy is the needle knife. The needle knife blade is only 1 ~ 3 mm, so the needle knife into the skin and all levels of anatomical structures, to the lesion site to complete the knife operation, pull out the needle knife left behind by the wound is very small, do not need stitches, it can be healed on their own. Secondly, the needle knife does not remove any human tissue or organ, which is very different from the nature of Western medicine surgery, the needle knife is through the cut lesions of adhesions, scarring, adjusting the biomechanical balance of the human body to achieve the purpose of treatment of disease. Finally, due to the needle knife incision is very small, the needle knife in the human body operation process is not carried out under the direct vision of the naked eye, but rather under the conditions of non-direct vision operation. The basis of non-direct vision surgery is the theory of needle knife medicine and the anatomical system of bowstring mechanics. Knowledge of the anatomical structure of the human body, familiarity with the projection of important nerves and blood vessels, and strict adherence to a step-by-step approach to the needle knife are important safeguards for the safety of the needle knife.

Finally, the massage technique after the end of the acupotomy is very important, in addition to the cyst wall fragments and normal tissue adhesion easy to prevent recurrence, massage technique has the effect of slippery joints, rectify the misalignment, activate blood circulation and remove blood stasis, ganglion cysts are often accompanied by inflammation of the joints, the anatomical structure of the different degrees of impact, massage technique can be the joints, ligaments adjusted to a normal state to promote the local blood circulation, to help the recovery of the disease. In addition, functional exercises after patients go home should also be emphasized. People who need to use computers and mice for a long time should pay particular attention to this, and they should take a break of 5-10 minutes every hour to do soft or gentle exercises. For example, rotating the wrist for about 2 minutes can relax the wrist muscles, restore blood circulation, and eliminate the bent wrist posture. After exertion with a hot water bag on the affected area for hot compresses, massage, so that the local blood usually, circulation accelerated.

## 6. Summary

Currently, there are various treatment methods for ganglion cysts, clinicians are seeking new treatment options, but have not yet found a treatment that can fully meet all the requirements, and there is still no one fully satisfactory treatment model. Suction is a convenient and simple treatment option, but the recurrence rate remains high. The updated post-suction medication injection has anti-inflammatory and anti-oedema effects, and does tend to damage the nerves, while not affecting the high recurrence rate. Surgery is the golden solution to treat ganglion cysts, it can completely remove the cyst wall and cyst tip, if the postoperative recovery is good, avoiding postoperative fatigue and other arthritis again triggered by the ganglion cysts recurrence of the situation, the patient can no longer need to worry about ganglion cysts of this disease. However, the invasive nature of surgical treatment has deterred most patients, who are looking forward to newer treatment options that are less invasive, more effective, and have a lower recurrence rate. However, surgical therapy is still the first choice for anatomically malpositioned ganglion cysts. In this case, we report a common ganglion cyst with simple etiology and common structure, for this type of ganglion cyst, we propose a new treatment option, the mini-needle knife. It was accepted by the patient with its own unique advantages. Our observations suggest that Acupotomy may be therapeutically effective in ganglion cysts to control recurrence and may be an alternative therapy for this condition, however this is a single, uncontrolled case from which no firm conclusions can be drawn. A sufficiently large sample size is needed to verify the effectiveness of acupuncture and to explore its potential mechanisms of action.

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