



Ganglion cyst treatment using the ganglion suture technique

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KEYWORDS:

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treatment

Ganglion cysts, benign soft-tissue tumors that can occur at any joint, are the most common masses occurring in the hand and comprise 50%-70% of all hand soft-tissue tumors. Despite the high frequency of occurrence, ganglion cyst etiology remains uncertain and perhaps even more elusive is the most appropriate treatment. With 53% of wrist ganglion cysts spontaneously resolving and a nearly equal rate of recurrence after treatment, any invasive management should reliably warrant benefits outweighing presenting complaints. A minimally invasive treatment obtaining a 95% cure rate using 2/0 silk suture was first described in 1988 by Gang and Makhlof. Although surgical excision remains the accepted gold standard of symptomatic ganglion cysts treatment, we present a series of 7 cases of ganglion cysts treated using a suture technique. Six of the cases involve the dorsal wrist and 1 case involved a rare dorsal foot location. These patients were treated in a community family medicine residency setting. We achieved a 71% cure rate over an average follow-up time of 1 year with a range of 6-24 months. The positive outcomes achieved add to the present body of knowledge on using a suture technique. With a fast learning curve for this technique and the low risk of complications relative to other invasive techniques, we offer that the suture technique should be considered a first line of treatment for symptomatic ganglion cysts.

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Introduction

Ganglion cysts, benign soft-tissue tumors that can occur at any joint,¹ are the most common masses occurring in the hand²⁻⁴ and comprise 50%-70% of all soft-tissue hand tumors.⁵ Sixty percent of ganglion cysts occur on the dorsal aspect of the hand and the remaining 40% are volar.⁶ The incidence is greatest in females⁷ and 70% occur between the second and fifth decade of life.⁸ Despite the high frequency of occurrence, ganglion cyst etiology remains uncertain.¹ Examination of the cysts using electron microscopy reveals that they are composed of loosely oriented collagen sheets

stacked on top of one another with fibroblasts and mesenchymal cells interspersed.¹ As no synovial lining exists in these structures, the term ganglion cyst is actually a misnomer; it is more correctly called a pseudocyst.^{9,10} The clear cystic fluid within the pseudocyst is composed mainly of hyaluronic acid, glucosamine, globulins, and albumin and is much different than the synovial fluid found within joints.¹ Although the origin of the pseudocyst remains debatable amongst the medical community, the majority accept the theory that small droplets of mucin coalesce to form the main pseudocyst, which is connected to an adjacent joint via a torturous one-way valve duct.^{8,11} Current treatment techniques include reassurance, simple aspiration,¹² aspiration with corticosteroid plus or minus hyaluronidase,^{13,14} injection of sclerosing agent,¹⁵ needle puncture,^{13,14} suture technique,¹⁶⁻¹⁹ tenotome percutaneous incision,²⁰ surgical excision,^{8,13} and arthroscopic excision.²¹ Although surgical

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excision remains the accepted gold standard for treatment of symptomatic cysts¹, postoperative discomfort is reported in an average of 21% of cases²², in addition to other complications such as keloid formation, infection, neuroma, scarring, as well as the risks that are associated with general or local anesthesia.¹⁹ Although 53% of ganglion cysts resolve spontaneously²³, there is a high rate of recurrence with those that are treated. The recurrence rate ranges from 6% with specialized arthroscopic resection to 60% for aspiration¹⁸ (Table 2).

We employed a minimally invasive treatment reported to have a 95% cure rate using 2/0 silk suture.¹⁷ In spite of this reported treatment success, the suture technique has been vastly overlooked in the literature. It has been published only 3 times since its initial reporting and never in the US literature. The current study presents a series of 7 cases of ganglion cysts treated using the suture technique. Six of the cases involved the dorsal wrist and 1 case involved the dorsal foot. Patients were offered several options including observation, aspiration only, suture technique, or surgical referral. Patients were treated in a community family medicine residency setting. Our success was measured as no recurrence at 6-24 months.

Materials and methods

Seven cases of ganglion cysts were treated using the suture technique over a period of 5 years from 2007 to 2012 in the family medicine office at Spartanburg Family Medicine Residency Program, Spartanburg, South Carolina. Three patients were female and 4 were male. Six of the cases were located on the dorsal wrist and 1 on the dorsal foot. The average age was 43.1 years, with a range from 15 years to 60 years of age. The average diameter of the cyst, measured in 2 directions perpendicular to one another, was 3.0 cm with a range of 0.5-8.0 cm. It should be noted that 1 patient’s cyst diameter was unidentified. Successful treatment was classified as no recurrence at the 6-month or later follow-up (Table 1).

Materials

1. Absorbent drape/pad
2. Skin marker
3. Sterile and nonsterile gloves

Table 1 Clinical profile and results

Age	Sex	Location	Size	Success
56	M	Posterior wrist	N/A	No
51	F	Posterior wrist	1 cm	Yes
47	F	Dorsal foot	8 cm	Yes
60	M	Posterior wrist	2.5 cm	Partial
15	M	Posterior wrist	2.5 cm	Yes
55	F	Posterior wrist	0.5 cm	Yes
18	M	Posterior wrist	3 cm	Yes

Table 2 Comparison of various methods

Treatment method	Recurrence rate (%)
Surgical + Non-surgical	40
Surgical	34
Aspiration + steroid injection	60
Arthroscopic resection	6
Suture technique	5

4. 5 cc of 1% lidocaine with epinephrine and a 25-gauge needle
5. Alcohol wipes
6. Betadine or chlorhexidine topical solution
7. Suture tray
8. 2 packs of 2/0 silk suture with large curved needles
9. 4 × 4 in. gauze pads
10. Antibiotic ointment
11. Surgical tape or large band aid

Procedure

Consent

1. Obtain written consent for the procedure from the patient or legal guardian. The risks and complications, benefits, and alternatives reviewed are:
 - a. Risks and complications—the common ones include infection, damage to other tissues, and bleeding (all minimal). The possibility of a burning sensation from the silk sutures and the chance for recurrence (total or partial) are also mentioned.
 - b. Benefits—It is explained that this is a simple procedure that can be performed first and with a high degree of success with other treatment modalities available if needed.
 - c. Alternatives—watchful waiting, aspiration, and surgery.

Anesthesia

1. Have the patient lie comfortably on the examining table with the affected extremity exposed and lying on an absorbent pad (Figure 1).
2. Mark the outline of the ganglion cyst with a skin marker.
3. Cleanse the skin overlying the cyst with an alcohol pad.
4. Inject lidocaine in the 12, 3, 6, and 9-o’clock positions (see Figure 2).

The suture technique

1. Pass a 2/0 silk suture on a curved needle through the cyst and out the opposite side and then reverse the suture along the line parallel to the original tracks (this doubles the exposure to the silk suture). Leakage of a clear thick fluid confirms that the swelling is indeed a ganglion cyst and the suture was placed correctly.



Figure 1 Ganglion cyst on dorsum on hand.

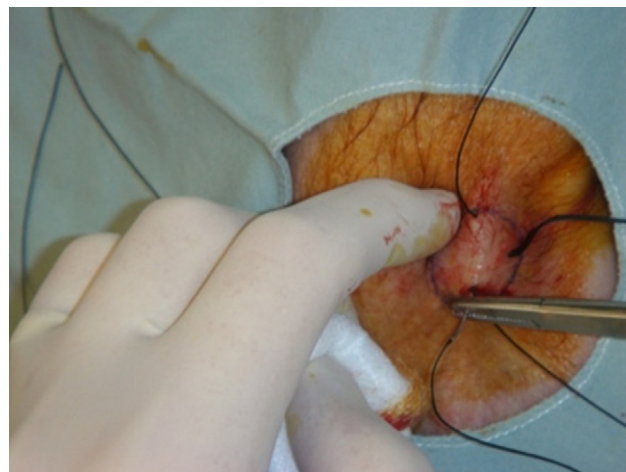


Figure 3 Sutures being placed perpendicular through the cyst.

2. Repeat the procedure at a 90° angle to the first suture. This results in 2 double sutures dissecting the cyst perpendicular to one another (see [Figure 3](#) and [Illustration 1](#)).
3. Remove the needles from the suture.
4. Pull the sutures back and forth to facilitate contact with the cyst, remove the cyst's mucin material and to aid in the inflammatory reaction within the cyst itself.
5. Apply firm pressure and massage the cyst to expel the contents.
6. Place a folded 4 × 4- or 2 × 2-inch gauze atop the cyst. (see [Figure 4](#)).
7. Tie the sutures across the gauze like a package (see [Figure 5](#)).
8. Antibiotic ointment can be placed at the suture sites.
9. Place a sterile gauze dressing over the skin.
10. Total time for the procedure is estimated at 10-15 minutes.

Postoperative care

1. The site is to be kept clean and dressed for 3-5 days.
2. The sutures can be removed in 3-5 days.



Figure 2 Anesthetizing the cyst.

ICD-9 and CPT codes

Ganglion cyst, unspecified 727.43

Ganglion cyst, wrist 727.41

Aspiration of ganglion cyst 20612

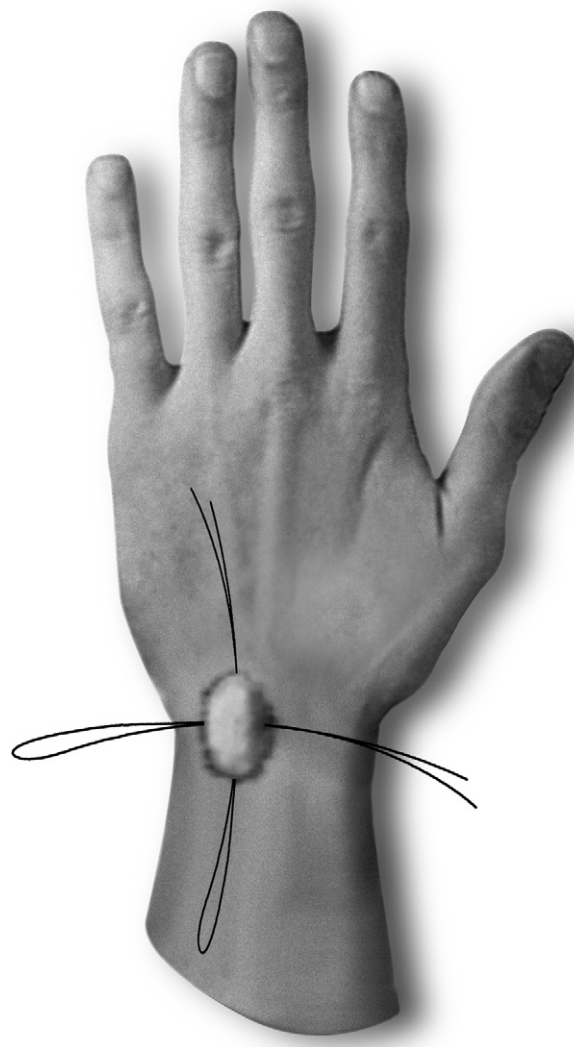


Illustration 1 Perpendicular location of sutures through the cyst

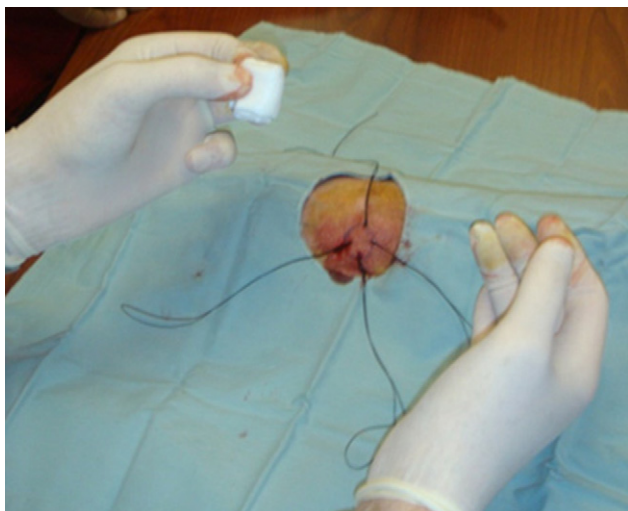


Figure 4 Suture placement and ready for compression gauze.

Results

We achieved a 71% success rate over an average follow-up of 1 year and a range of 6-24 months. None of the 7 patients had evidence of infection. None of the successfully treated patients reported having the formation of a scar, residual swelling, or any cosmetic changes to the area. Results of follow-up included 1 full recurrence and 1 partial recurrence. The patients were followed up with a routine office visit or phone call at 6 months to 2 years after treatment to assess for recurrence (Table 1).

Discussion

We report 7 cases of ganglion cyst treatment using a nearly pain-free and minimally invasive procedure known as the Ganglion Suture Technique. The inherent nature of a silk suture allows us to take advantage of its ability to mobilize fibroblasts. This eventually causes a low-grade inflammatory reaction in the cyst. It is theorized that the cyst wall

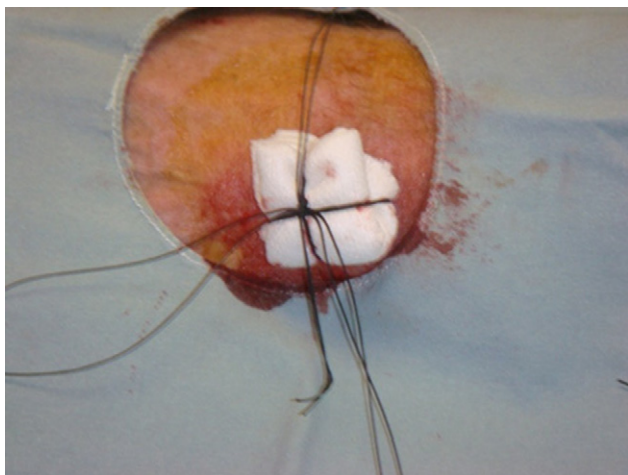


Figure 5 Compression gauze in place.

becomes adherent to itself and the one-way valve at the base of the cyst is essentially walled off from the synovial joint, diminishing its contact and potential source of additional mucin.^{7,8,11,16,19} Like the previous claims in the literature using the suture technique, we believe the learning curve is very fast, requiring very little training.

Ganglion cysts are the most common soft-tissue masses found in the wrist but are capable of occurring at any joint. Though this benign tumor causes little discomfort, a significant number of patients opt for treatment, even invasive treatments. Cosmetic purposes are the most common for patients to consider treatment, followed by being nervous about the etiology, mild pain with or without decreased range of motion, and loss of strength.¹ There is a multitude of treatments available for ganglion cysts, each with its own success rate and complications. Recently, a very high success rate has been reported using arthroscopic excision, with reproducible recurrence rates as low as 5%.²¹ This technique is costly and requires a high level of training to perform the procedure and is not a practical choice in the primary care office. In the light of the host of treatments available, there is a need to identify the most feasible first line of treatment in the primary care setting, while considering associated risks, benefits, and costs.

With a spontaneous regression rate of 53%,²³ the most conservative treatment should be considered first for symptomatic ganglion cysts. The Ganglion Suture Technique offers a minimally invasive procedure that should be considered as first-line treatment. Larger studies comparing this technique along-side other treatment options in a controlled environment may be beneficial in the future.

Conclusion

We achieved a 71% total success rate over an average follow-up of 1 year and a range of 6-24 months. The successful outcome achieved in 5 of 7 cases adds to the present body of knowledge using the suture technique and contains a rare case of a dorsal foot ganglion cyst. This minimally invasive suture technique has previously shown excellent results in other countries. We felt the technique and success rate warranted our attention. Using the suture technique adopted from Gang, the primary care physician is capable of providing a conservative initial approach to symptomatic ganglion cyst treatment.¹⁶⁻¹⁹

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March/April 2013 Answers

1. d 2. a 3. a 4. b 5. a 6. c 7. d 8. c 9. b 10. a