



Review Article

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An Overview on Evaluation of Wrist Ganglion Cysts Diagnostic and Management Approach

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ABSTRACT

The most common soft tissue bulge in the hand and wrist is a ganglion cyst. Any age group can develop ganglion cysts, although they are seen more frequently in those in their 20s to 40s. Aside from enlargement, most ganglion cysts are painless. The majority of patients sought guidance and therapy because they felt self-conscious about their ganglion's appearance or were frightened that it was a cancerous growth. The management options of ganglion cyst range from reassurance and nonsurgical therapies to surgical removal. To review and evaluate the management options that were presented in the published literature. PubMed database was used for articles selection, and the following keys were used in the mesh ((“ganglion cyst”[Mesh]) AND (“management”[Mesh]) OR (“surgery”[Mesh])). Nonsurgical treatments are associated with a relatively high failure rate and about half of the ganglions in general resolved spontaneously. Therefore, a conservative approach to ganglions is frequently considered useless but the complications, on the other hand, were found to be modest. Nevertheless, surgical excision is currently widely regarded as the most successful treatment method and is considered the gold standard approach.

Key words: *Wrist ganglion cysts, Management, Infection, Evaluation*

INTRODUCTION

The most common soft tissue bulge in the hand and wrist is a ganglion cyst [1]. The dorsal side of the wrist (70%) and the volar side (20%) of the wrist most usually been affected, as well as the tendon sheath of the fingers. Any age group can develop ganglion cysts, although they are seen more frequently in those in their 20s to 40s. In at least 10% of patients, there is a positive history of trauma, and the trauma is believed to be the contributing factor, while the etiology is unknown. Males have a prevalence of 25 per 100,000, while females have a prevalence of 43 per 100,000. Individuals with wrist pain have a 19% prevalence, while asymptomatic individuals have a 51% prevalence [2].

Aside from enlargement, most ganglion cysts are painless. The majority of patients sought guidance and therapy because they felt self-conscious about their ganglion's appearance or were frightened that it was a cancerous growth [3]. Reassurance, nonsurgical therapies such as aspiration, steroid injections or hyaluronidase, and surgical

removal are all possible options [1]. In this article, we aim to review the management options that were presented in the published literature.

MATERIALS AND METHODS

PubMed database was used for articles collection, and the following keys were utilized in the mesh ((“ganglion cyst”[Mesh]) AND (“management”[Mesh]) OR (“surgery”[Mesh])).

In regards to the incorporation criteria, the articles were collected based on the incorporation of one of the following topics: ganglion cysts, management options. Elimination criteria were all other articles, which did not have one of these topics as their essential endpoint.

Around 46 publications were chosen as the most clinically relevant out of 603 articles indexed in the last decade, and their full texts were evaluated. A total of 20 of the 46 were included after a thorough examination. Additional research and publications were found using reference lists from the recognized and linked studies. Expert consensus recommendations and commentary were added where relevant to help practicing physicians assess cirrhosis most simply and practically possible.

RESULTS AND DISCUSSION

Benign soft tissue tumors are ganglia that most typically affect the wrist but can affect any joint [4]. The dorsal portion of the wrist is home to 60% to 70% of ganglion cysts, which connect with the joint through a pedicle. This pedicle normally arises from a variety of locations along the dorsal portion of the wrist capsule, including the scapholunate ligament [5, 6]. On the volar side of the wrist, 13%-20% of ganglia can be discovered, metacarpotrapezial joint, in that order of prevalence or evolving through a pedicle from the radio scaphoid/scapholunate interlude, scaphotrapezial joint [7]. The ganglia that arise from a flexor tendon sheath in the hand makeup around 10% of all ganglia. Other joints, as well as intraosseous and intra-tendinous ganglia, have a substantially lower prevalence [8].

Clinical features

Wrist ganglions are generally 1–2 cm cystic formations that feel like a dense elastic cystic structure anchored in position by their connection to the underlying joint capsule or tendon sheath. There is no erythema or hotness associated with the cyst, and it easily transilluminates. The clinical presentation is typically sufficient for diagnosis, and X-ray examination is rarely required (unless in the case of "occult wrist ganglion," for which an MRI is needed). Aching in the wrist that may radiate up the patient's arm, discomfort with movement or probing of the mass, restricted range of motion, and diminished grip strength are some of the possible symptoms. Volar ganglia may also cause paresthesias from compression of the ulnar or median nerves or their branches [8, 9]. The etiology of pain is uncertain. However, it is thought that compression of the terminal branches of the posterior interosseous nerve causes pain in the dorsal ganglia [10]. When it comes to the frequency of pain, there is considerable disagreement. According to certain studies, the most common presenting symptom is a painless mass, and less than one-third of patients experience pain, which is always low in intensity [3, 11]. Other studies, on the other hand, indicated that the majority of patients have pain [4, 7].

Management options

Reassurance

Most ganglion patients have no symptoms other than swelling, but some may have pain, weakness, or paresthesia [1]. In Barnes *et al.* study, only 19.5% showed symptoms other than a mass [12]. According to Westbrook *et al.*, the majority of patients decided to seek consultation because of the visual appearance of their cyst or because they were concerned that it was a cancer-related growth, while only 26% sought help because of discomfort and 8% due to an unusual feeling or limited hand function [3]. Many people may decide against treatment if they were informed of the condition's benign nature. In terms of Mean Visual Analogue Pain Scores, even painful ganglions elicit less pain than other prevalent orthopedic disorders like carpal tunnel syndrome and osteoarthritis [13]. Untreated ganglions had a spontaneous resolution rate of 40–58%. Thus, reassurance might be the option when the patients do not want any intervention [14, 15].

Aspiration

One of the simplest techniques to manage ganglion cysts is to just aspirate. It does, however, have a high recurrence rate. More than half of ganglions treated with aspiration alone will recur [14]. To improve effectiveness, a variety of strategies have been tested. By repeating aspiration up to three times, Zubowicz and Ishii found a 15% recurrence rate. They found, however, that individuals who required repeated aspiration had a lower success rate [16]. Multiple ganglion wall punctures have not been found to improve the outcome of simple ganglion aspiration [1].

Immobilization after aspiration had shown varied outcomes. Richman *et al.* found that 3 weeks of immobilization following suction and repeated puncture resulted in a much better success rate for dorsal carpal ganglion, whereas the results for palmar ganglion were unclear [17]. Korman *et al.*, on the other hand, found that immobilization did not increase the efficacy over perforation and aspiration alone and that it had the potential for discomfort, costly consequences, and rigidity [18].

Corticosteroids injections

Based on the original assumption that chronic inflammation may play a role in the etiology of ganglion, Becker recommended an 87% resolution rate and the use of steroid injection in treating ganglion. Following research revealed a mixed success degree. Varley *et al.* conduct comparing objective a randomized controlled trial (RCT) with and without steroid injection, concluding that extra steroid injection is of little benefit and that subcutaneous fat degeneration and skin depigmentation are possible side effects [1, 19].

Sclerotherapy

The use of sclerotherapy to treat ganglions has also been suggested. To lower the recurrence rate, damage the intimal lining to the sclerosant is injected into the ganglion sac and produce fibrosis. The preliminary research revealed a high success rate of 78–100%. Histological examinations by Mackie *et al.*, on the other hand, showed that the ganglion had no intimal lining and recorded a failure rate of up to 94%. Sclerosant might cross the ganglion to the joint and tendon, causing an injury because the ganglion and the synovial joint are connected [20]. The usage of sclerotherapy has decreased since these findings were published. A new approach has been developed to induce ganglion sclerosis without causing joint injury. Gumus in his paper presented the application of electrocauterization to induce ganglion sclerosis, and his findings were promising. This method has not been widely studied and/or adopted [1, 21].

Hyaluronidase

Aspiration may not be complete if the content of the ganglion is too sturdy to be drawn. Some suggested using hyaluronidase, an enzyme that depolymerizes the hyaluronic acid found in ganglion material. After a 6-month follow-up period, it is expected to have a 95% cure rate. Despite Paul and Sochart determined that utilizing hyaluronidase in a mixture with steroids resulted in a substantially higher decision rate than the usage of steroids alone, only 49% of their patients treated with hyaluronidase and steroid had a complete decision, as compared to 20% of those treated with steroid alone [11]. Nevertheless, Akkerhuis *et al.* found a 77 % recurrence rate after using hyaluronidase to treat ganglion [22]. As a result, the success rate has been inconsistent, and hyaluronidase might trigger an allergic response [1].

Thread technique

The thread approach was introduced by Gang et Makhoul, wherein two sutures were inserted into the ganglion at right angles to each other and secured in a loop. The massage was used to evacuate the contents of the ganglion at regular intervals. They reported a 4.8% recurrence rate. However, 11% of the patients had positive culture swabs [23]. A comparable approach was disclosed in another study and the total resolution rate was only 50%. Therefore, with such a high failure rate and about half of the ganglions in general resolved spontaneously, nonsurgical treatment of ganglions was frequently useless. The complications, on the other hand, were found to be modest. Some individuals experienced no concerns at all, while others mentioned minor issues like temporary pain and edema. As a result, if patients do not desire surgery, nonsurgical therapy might be considered an alternative for symptomatic alleviation. Lowering the panic of the patients and their itch for advanced therapy is another advantage of conservative therapy is that aspiration of ganglion contents confirms a benign diagnosis [1].

Surgical approach

Angelides and Wallace in 1976 developed procedures for eliminating the entire ganglion to lower the recurrence rate, together with the cyst, its attachments to the scapholunate ligament, and the affected portion of the joint

capsule. Surgical excision is currently widely regarded as the most successful approach and is considered the gold standard approach [5]. Before Angelides' study, 40% of postoperative repetition rates were as high, a figure that was only surpassed by conservative treatment. Angelides and Wallace's study indicates that the repetition rate can be as low as one percent. Recurrence rates have decreased dramatically with the introduction of surgical procedures that entail removal of the complete ganglion bundle, a cuff of the surrounding joint capsule, and incorporating cyst, pedicle. Only two RCTs compared the recurrence rate of conservative vs surgical intervention. Aspiration, steroid injection, immobilization, and hyaluronidase use were compared to surgery in the literature and it has been found that surgery resulted in the lowest recurrence rate [22].

Dissection of Improper in convoluted duct system found at the joint capsule is not thoroughly expunged which is often blamed for increased reported rates of recurrence. Volar wrist ganglia have a different complication risk and recurrence rate than dorsal wrist ganglia. Volar ganglion recurrence can be as high as 42% an average of 30% since the source is more unpredictable and accessibility is more difficult owing to surrounding neurovascular tissues. Although favorable outcomes from various authors, surgery is not without risk, with low complications. Wound infection, hypertrophic scar (keloid) formation, neuroma development, median nerve, and radial artery injury were among the surgical removal consequences, with a complication incidence of 0–56%. Surgery had a greater complication rate (20%) than aspiration (5%) or reassurance in Dias et Buch's cohort analysis [14]. After dorsal wrist ganglion removal, scapholunate instability has been documented. Some speculated that peri-scaphoid ligamentous damage was the source of the ganglion rather than a surgical complication [24, 25].

Kivett *et al.* used physical examination and imaging to analyze 61 post-ganglionectomy patients and found that surgical removal did not destabilize the wrist [26]. Surgery may not have a positive outcome. Postoperative stiffness, grip weakness, and reduced range of motion are also possible. Stiffness can occur in up to 25% of the patients, who will need up to 8 weeks of occupational therapy to restore full functionality. After surgery, 1.2% exhibited a 0–10 degree loss of volar flexion, according to Angelides *et al.*, although this had little functional significance.

While surgery improved pain in 79%, it exacerbated pain in 8% of patients, according to Clay et Clement. A weaker grip was reported by 17% of patients, with 2% showing a reduction in grip strength of more than 20% when compared to the opposite hand [5]. Dias compared the results of dorsal and palmar ganglions that were treated with surgery to those treated with reassurance and aspiration in two prospective cohorts. There was no significant difference between the three groups in terms of persistent symptoms and symptom alleviation [14, 15]. Despite this study likely showing an irrational excessive achievement rate with aspiration (85%) and predicting that all patients with repetition will choose for surgery, it has been expected that preliminary nonsurgical remedy of patients could save \$100,000 per 100 patients [16].

There is also the cost of lost workdays after surgery. This might be a substantial indirect cost. Individuals who underwent surgery had much longer durations of recovery, extraction palmar and dorsal wrist ganglion averaging 14.1 days and 10.9 days off work, and compared to 3.5 days and 3.2 days for palmar and dorsal wrist ganglion aspiration, respectively [14].

Arthroscopic excision

Osterman et Raphael disclosed arthroscopic removal of the dorsal wrist ganglia in 1995. Arthroscopic excision can reduce surgical scarring while also allowing for the examination of any intra-articular pathologic state in the midcarpal or radiocarpal joints. The widely held early findings on repetition rate appear to be more promising than open extraction. Nonetheless, a prospective RCT published in 2008 found that arthroscopic dorsal ganglion excision had recurrence rates that are equivalent to, but not superior to, open removal. To effectively identify the effectiveness of open versus arthroscopic methods, further long-term comparative studies are needed [1, 27].

CONCLUSION

Nonsurgical treatments are associated with a relatively high failure rate and about half of the ganglions in general resolved spontaneously. Therefore, a conservative approach to ganglions is frequently considered useless but the complications, on the other hand, were found to be modest. Nevertheless, surgical excision is currently widely regarded as the most successful treatment method and is considered the gold standard approach.

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REFERENCES

1. Suen M, Fung B, Lung CP. Treatment of ganglion cysts. *Int Sch Res Notices*. 2013;2013:1-7. doi:10.1155/2013/940615
2. Lowden CM, Attiah M, Garvin G, Macdermid JC, Osman S, Faber KJ. The prevalence of wrist ganglia in an asymptomatic population: magnetic resonance evaluation. *J Hand Surg*. 2005;30(3):302-6. doi:10.1016/j.jhsb.2005.02.012
3. Westbrook AP, Stephen AB, Oni J, Davis TR. Ganglia: the patient's perception. *J Hand Surg: Br Eur Vol*. 2000;25(6):566-7. doi:10.1054/jhsb.2000.0504
4. Gude W, Morelli V. Ganglion cysts of the wrist: pathophysiology, clinical picture, and management. *Curr Rev Musculoskelet Med*. 2008;1(3-4):205-11. doi:10.1007/s12178-008-9033-4
5. Angelides AC, Wallace PF. The dorsal ganglion of the wrist: its pathogenesis, gross and microscopic anatomy, and surgical treatment. *J Hand Surg*. 1976;1(3):228-35. doi:10.1016/s0363-5023(76)80042-1
6. Clay NR, Clement DA. The treatment of dorsal wrist ganglia by radical excision. *J Hand Surg*. 1988;13(2):187-91. doi:10.1016/0266-7681(88)90135-0
7. Greendyke MS, Wilson M, Shepler CT. Anterior wrist ganglia from the scaphotrapezial joint. *J Hand Surg*. 1992;17(3):487-90. doi:10.1016/0363-5023(92)90358-v
8. Thornburg LE. Ganglions of the hand and wrist. *J Am Acad Orthop Surg*. 1999;7(4):231-8. doi:10.5435/00124635-199907000-00003
9. Nishikawa S, Toh S, Miura H, Arai K, Irie T. Arthroscopic diagnosis and treatment of dorsal wrist ganglion. *J Hand Surg: Br Eur Vol*. 2001;26(6):547-9. doi:10.1054/jhsb.2001.0620
10. Derbyshire RC. Observations on the treatment of ganglia with a report on hydrocortisone. *Am J Surg*. 1966;112(5):635-6. doi:10.1016/0002-9610(66)90094-8
11. Paul AS, Sochart DH. Improving the results of ganglion aspiration by the use of hyaluronidase. *J Hand Surg*. 1997;22(2):219-21. doi:10.1016/s0266-7681(97)80066-6
12. Barnes WE, Larsen RD, Posch JL. Review of ganglia of the hand and wrist with analysis of surgical treatment. *Plast Reconstr Surg*. 1964;34(6):570-8. doi:10.1097/00006534-196412000-00004
13. Tomlinson PJ, Field J. Morbidity of hand and wrist ganglia. *Hand Surg*. 2006;11(01n02):5-8. doi:10.1142/s0218810406003000
14. Dias J, Buch K. Palmar wrist ganglion: Does intervention improve outcome A prospective study of the natural history and patient-reported treatment outcomes. *J Hand Surg*. 2003;28(2):172-6. doi:10.1016/s0266-7681(02)00365-0
15. Dias JJ, Dhukaram V, Kumar P. The natural history of untreated dorsal wrist ganglia and patient reported outcome 6 years after intervention. *J Hand Surg*. 2007;32(5):502-8. doi:10.1016/j.jhse.2007.05.007
16. Zubowicz VN, Ishii CH. Management of ganglion cysts of the hand by simple aspiration. *J Hand Surg*. 1987;12(4):618-20. doi:10.1016/s0363-5023(87)80221-6
17. Richman JA, Gelberman RH, Engber WD, Salamon PB, Bean DJ. Ganglions of the wrist and digits: results of treatment by aspiration and cyst wall puncture. *J Hand Surg*. 1987;12(6):1041-3. doi:10.1016/s0363-5023(87)80108-9
18. Korman J, Pearl R, Hentz VR. Efficacy of immobilization following aspiration of carpal and digital ganglions. *J Hand Surg*. 1992;17(6):1097-9. doi:10.1016/s0363-5023(09)91073-5
19. Varley GW, Needoff M, Davis TR, Clay NR. Conservative management of wrist ganglia: aspiration versus steroid infiltration. *J Hand Surg*. 1997;22(5):636-7. doi:10.1016/s0266-7681(97)80363-4
20. Mackie IG, Howard CB, Wilkins P. The dangers of sclerotherapy in the treatment of ganglia. *J Hand Surg*. 1984;9(2):181-4. doi:10.1016/s0266-7681(84)80025-x
21. Gümüş N. A new sclerotherapy technique for the wrist ganglion: transcutaneous electrocauterization. *Ann Plast Surg*. 2009;63(1):42-4. doi:10.1097/sap.0b013e31818a664f
22. Akkerhuis MJ, Van Der Heijden M, Brink PR. Hyaluronidase versus surgical excision of ganglia: a prospective, randomized clinical trial. *J Hand Surg: Br Eur Vol*. 2002;27(3):256-8. doi:10.1054/jhsb.2002.0764

23. Gang RK, Makhlof S. Treatment of ganglia by a thread technique. *J Hand Surg: Br Eur Vol.* 1988;13(2):184-6. doi:10.1016/0266-7681(88)90134-9
24. Watson HK, Rogers WD, Ashmead IV D. Reevaluation of the cause of the wrist ganglion. *J Hand Surg.* 1989;14(5):812-7. doi:10.1016/s0363-5023(89)80080-2
25. Duncan KH, Lewis Jr RC. Scapholunate instability following ganglion cyst excision. A case report. *Clin Orthop Relat Res.* 1988;(228):250-3. doi:10.1097/00003086-198803000-00038
26. Kivett WF, Wood FM, Rauscher GE, Taschler NA. Does ganglionectomy destabilize the wrist over the long-term?. *Ann Plast Surg.* 1996;36(5):466-8. doi:10.1097/00000637-199605000-00005
27. Kang L, Akelman E, Weiss AP. Arthroscopic versus open dorsal ganglion excision: a prospective, randomized comparison of rates of recurrence and of residual pain. *J Hand Surg.* 2008;33(4):471-5. doi:10.1016/j.jhsa.2008.01.009