

Case Series

Modified thread technique, 2 threads 7 days in cases of wrist ganglions: a case series

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ABSTRACT

Ganglion cysts are soft tissue swellings occurring most commonly in the hand or wrist, they are usually asymptomatic. The 70% cases of ganglion are observed on the dorsal side of wrist. Ganglion cysts arise from mesenchymal cells at the synovial capsular junction as a result of the continuous micro-injury. Ganglion cysts have a recurrence rate of approximately 15% to 20%. Gang et al introduced the technique of treating ganglion by passing a silk thread to induce chronic inflammation leading to obliteration of the cyst. Three cases with wrist swelling without tenderness. On examination swelling is firm consistency, slightly mobile, not adherent to underlying or overlying structures, without local rise of temperature. Ultrasonography has confirmed the diagnosis of ganglion cyst. Modified thread technique has been planned. Patient has been followed on day 3, 5, 21, 90th day. Patient has no suture site complications, with no recurrence on 3 month follow up. The cyst was stabilised and a sterile silk/linen thread on a cutting needle was passed through the cyst and taken out from the opposite side from 3 O'clock to 9 O'clock position. Second thread was passed perpendicular to first one from 12 O'clock to 6 O'clock position. The contents of ganglion were expressed out by firm pressure. Thread was removed on the seventh day irrespective of presence or absence of yellowish discharge. Patients were followed up on the fifth day after thread removal. Patients were then followed at monthly intervals for first three months. Non-surgical techniques used are aspiration, sclerotherapy, steroid injection, hyaluronidase injection, immobilization and thread technique. These have high recurrence rates. Surgical excision has lower recurrence rates, but they have a high complication rate. The thread technique is being considered as a newer option since it has recurrence rates comparable to surgical excision and complication rates comparable to nonsurgical techniques.

Keywords: Thread technique, Wrist ganglion, Surgical excision, Ganglion management

INTRODUCTION

Ganglion cysts are soft tissue swellings occurring most commonly in the hand or wrist. Apart from swelling, most cysts are asymptomatic. It occurs most commonly on the dorsal side of the wrist (70%), followed by volar side (20%) of wrist and tendon sheath of fingers. The remaining 10% of ganglion cysts can arise from multiple areas of the body including the volar retinaculum of the wrist, distal interphalangeal joint, ankle joint, and foot.¹ It has been shown that 58% of cysts will resolve spontaneously over time.² Although they can form at any age, they are most

commonly found in women between the ages of 20 to 50. Women are three times more likely to develop a ganglion cyst than men.¹ Numerous theories have been presented in the past regarding the etiology of ganglion cysts with no present consensus. One theory introduced by Eller in 1746 is that ganglion cysts are the result of the herniation of synovial tissue from joints. Another theory postulated by Carp and Stout in 1926, which forms the basis of most modern belief, suggests that ganglion cysts result from mucinous degeneration of connective tissue secondary to chronic damage. Currently, most authors agree that ganglion cysts arise from mesenchymal cells at the

synovial capsular junction as a result of the continuous micro-injury.^{1,3} When examined under electron microscopy, their walls contain sheets of collagen fibres arranged in multidirectional layers with intermittent flattened cells resembling fibroblasts. The thick mucinous material present in the majority of ganglion cysts is highly viscous, which is attributed to a high concentration of hyaluronic acid and mucopolysaccharides.¹ Treatment can be either conservative or through surgical excision. This review concluded that nonsurgical treatment is largely ineffective in treating ganglion cysts. Other modes of therapy described include crushing Barnes et al rupture with a heavy book Grabb and Smith local injection of sclerosing agents (Mackie et al) firm strapping, irradiation (Lyle) and aspiration with or without injection of steroid (Holm and Pandey).⁹ All these methods of treatment are associated with a high rate of recurrence.⁴ Surgery is indicated for patients with continuing symptoms who have failed conservative management. Surgical excision is usually performed as an outpatient procedure. The most common complication of surgical excision is a recurrence, and volar wrist ganglion cysts have a higher recurrence rate than dorsal wrist ganglion cysts. Ganglion cysts have a recurrence rate of approximately 15% to 20%.⁵ Gang et al introduced the technique of treating ganglion by passing a silk thread to induce chronic inflammation leading to obliteration of the cyst. They reported a cure rate of ninety five percent, which was comparable to the results obtained with surgical excision.⁶

CASE SERIES

Case 1

A 17-year-old female with a dorsal wrist swelling without tenderness. On examination swelling is firm consistency, slightly mobile, not adherent to underlying or overlying structures, without local rise of temperature, measuring 3×2×2 cm. Ultrasonography has confirmed the diagnosis of ganglion cyst. Modified thread technique has been planned. Patient has been followed on day 3, 7, 21, 60, 90th day. Patient has no suture site complications, with no recurrence on 3 month follow up.

Case 2

A 20-year-old female with a dorsal wrist swelling without tenderness. On examination swelling is firm consistency, slightly mobile, not adherent to underlying or overlying structures, without local rise of temperature, measuring 1×1×1 cm. Ultrasonography has confirmed the diagnosis of ganglion cyst. Modified thread technique has been planned. Patient has been followed on day 3, 7, 21, 60, 90th day. Patient has no suture site complications, with no recurrence on 3 month follow up.

Case 3

A 14-year-old female with a volar wrist swelling without tenderness. On examination swelling is firm consistency,

slightly mobile, not adherent to underlying or overlying structures, without local rise of temperature, measuring 0.5×0.5×0.5 cm. Ultrasonography has confirmed the diagnosis of ganglion cyst. Modified thread technique has been planned. Patient has been followed on day 3, 7, 21, 60, 90th day. Patient has no suture site complications, with no recurrence on 3 month follow up.

Operative technique

The patients were operated in the operation theatre to keep sterility as a prime concern (Figure 1). After cleaning the wrist with povidone iodine and isopropyl alcohol, the wrist was flexed/extended to make the ganglion prominent. The cyst was stabilised and a sterile silk/linen thread on a cutting needle was passed through the cyst and taken out from the opposite side from 3 O'clock to 9 O'clock position. The thread gets a glistening appearance as it comes out because of the mucin content, which confirms its passage through the cyst. Second thread was passed perpendicular to first one from 12 O'clock to 6 O'clock position (Figure 2). The contents of ganglion were expressed out by firm pressure (Figure 3). After completely emptying the cyst of its contents a sterile gauze piece was placed over the ganglion and the threads were tied over it by making a single loop, care should be taken not to tie both threads to each other so it can be easy while removing. Care was taken to avoid puckering of the skin. A pressure bandage was applied. Patients were strictly instructed not to take any antibiotics or anti-inflammatory medication till the next follow up visit. Patients were allowed to take only oral paracetamol tablets in case of persistent pain. The patients were asked to follow up after three days. During follow up visit, the gauze piece was removed, gentle pressure was given over the ganglion site and entry point of the thread into the ganglion was inspected for appearance of yellowish discharge. The thread was removed if there was visible discharge at the entry site. Swab was taken from the discharge and sent for microbial culture. The remaining contents of the cyst if any were expressed out and sterile dressing was reapplied. If no discharge was seen, patient was again followed up after four days for wound inspection. Thread was removed on the seventh day irrespective of presence or absence of yellowish discharge.

Patients were prescribed oral antibiotics for a period of five days after thread removal. All patients were allowed to do their routine work. Patients were followed up on the fifth day after thread removal and the entry points were inspected for any signs of infection. Patients were then followed at monthly intervals for first three months (Figure 4) and for final follow-up at six months. Though we operated second case (Figure 5) in an recovery room set up which is having weekly fumigation protocol we found comparable result at the end of 3 weeks in terms of chances of infection (Figure 6), other postoperative measures were kept constant. In another case black silk thread (Figure 7) has been used which has comparable results on short and long term follow up.



Figure 1: Case 1, pre-clinical image.



Figure 4: Case 1, 21 day follow up.



Figure 2: Case 1, intra-operative image.



Figure 5: Case 2, pre-treatment image.



Figure 3: Case 1, intra operative image.



Figure 6: Case 2, 21 day follow up.

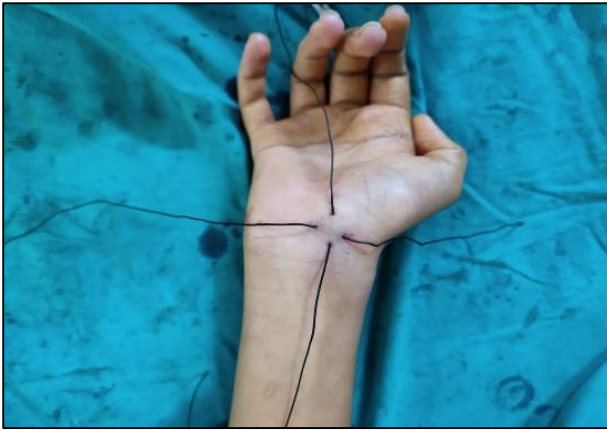


Figure 7: Case 3 intra operative picture.

DISCUSSION

Most wrist ganglions are asymptomatic and patients consult their treating doctors mostly for cosmetic reasons. A few present due to fear that the swelling may be a malignant growth and less than thirty percent patients may experience symptoms like aching in the wrist, pain with activity or palpation of the mass, decreased range of motion and decreased grip strength. Volar ganglion may also cause paraesthesia from compression of the ulnar or median nerves or their branches.⁴ Majority of patients with ganglion do not have symptoms besides swelling, while others may present with pain, weakness, or paraesthesia. The spontaneous resolution rate of untreated ganglion ranged 40-58%.^{7,8} Barnes et al reported in their review that only 19.5% had symptoms other than a mass.⁹ Many may not opt for any treatment if they are reassured of the benign nature of the disease. Conservative management though has high recurrence rate has been tried in form of aspiration, sclerotherapy, steroid injection, hyaluronidase injection, immobilization and thread technique. Success rate of aspiration decreases with successive attempts. Zubowicz and Ishii reported a recurrence rate of 15% by repeated aspiration up to three times.¹⁰ Trial of steroids was done to suppress inflammatory process. Becker observed a resolution rate of 87% with the use of steroid injection.¹¹ Sclerotherapy uses Sodium tetradecyl sulfate as a sclerosing agent. Sclerosant is injected into ganglion sac which leads to fibrosis of the intimal lining. Mackie et al however, confirmed ganglion had no effect on intimal lining and observed failure rates as high as 94%.¹² Hyaluronidase leads to depolymerisation of hyaluronic acid in the wall of ganglia. Akkerhuis et al however, reported a recurrence rate of 77%, for treatment of ganglion with hyaluronidase.¹³ Surgical excision is considered as the most effective technique, but is associated with occurrence of complication. It involves excising the whole ganglion including the cyst, its attachments, and the involved segment of joint capsule.¹⁴ Complications of surgical excision are wound infection, neuroma formation, hypertrophic scar, median nerve, and radial artery damage.¹⁵ Osterman and Raphael described a technique of arthroscopic excision. This technique was

attempted for dorsal wrist ganglia. The advantage of this technique is that there is minimal surgical scar.¹⁶ A prospective randomized study in 2008 showed that rates of recurrence with arthroscopic dorsal ganglion excision are comparable with and not superior to surgical excision.¹⁷ Gang and Makhoul introduce the thread technique. In this method, two sutures were passed through the ganglion at right angles to each other, and each was tied in a loop. All the contents of ganglion were expelled by massage at regular interval and ganglion thread removal at 3rd week. They reported a recurrence rate of 4.8%.¹⁸ In our study, the sutures are left in place for 7 days and antibiotics are started only once the sutures have been removed. Thread technique employs the principle of Wound healing, which has three overlapping phases. Namely inflammation, proliferation, and remodelling.¹⁹ The proliferation phase starts 3-10 days after injury. It is the transition phase between appearance of fibroblasts and disappearance of macrophages. The last step of the proliferation phase is the granulation tissue formation. Fibroblasts migrate to the wound site and proliferate within the wound. Then they begin to synthesize a provisional matrix containing collagen type III, glycosaminoglycans and fibronectin.

CONCLUSION

It has been observed that nearly half of the ganglion cases resolve spontaneously. Non-surgical treatment is considered ineffective due to high recurrence rates. On the other hand, Surgical excision has a lower recurrence rate than conservative treatment. However, it has higher rates of complication and longer recovery period. The thread technique is being considered as a newer option since it has recurrence rates comparable to surgical excision and complication rates comparable to nonsurgical techniques. Two threads for 7 days technique is simple yet effective procedure with high success and low recurrence rate with easy reproducible surgical procedure without any complication.

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