

# Relationship between anesthesia method and recurrence rate after surgical treatment of ganglion cysts

 Sukru Demir<sup>1</sup>,  Muhammet Kazez<sup>1</sup>,  Resit Sevimli<sup>2</sup>,  Sefa Key<sup>3</sup>,  Murat Gurger<sup>1</sup>,  Gokhan Once<sup>4</sup>

<sup>1</sup>Clinic of Orthopedic and Traumatology, Firat University Research Hospital, Elazig, Turkey

<sup>2</sup>Department of Orthopaedics and Traumatology, Faculty of Medicine, Inonu University, Malatya, Turkey

<sup>3</sup>Clinic of Orthopedic and Traumatology, Bingol State Hospital, Bitlis, Turkey

<sup>4</sup>Clinic of Orthopedic and Traumatology, Bitlis State Hospital, Bitlis, Turkey

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## Abstract

**Aim:** Recurrence is frequently reported in patients operated on with the diagnosis of ganglion cyst. In this study, it was aimed to investigate the relationship between relapse and anesthesia method in patients who underwent total surgical excision.

**Material and Methods:** 133 patients who were operated with a preliminary diagnosis of ganglion cyst in the orthopedics and traumatology Clinic between 2015-2019 were included in the study. The demographic features of the patients, the location of the cyst and the anesthesia method applied were evaluated retrospectively.

**Results:** Of the 120 patients operated on, 76 (63.3%) were female and 44 (36.7%) were male. General anesthesia was performed in 44 (37%), sedation anesthesia in six (5%), regional anesthesia in 42 (35%), and local anesthesia in 28 (23%). During routine follow-up, 19 (15.8%) patients showed recurrence on average 6-12 months after the operation. When anesthesia method of patients who developed recurrence after surgery was examined, it was found that local anesthesia was performed in 13 (46.4%) of 19 patients.

**Conclusion:** It has been determined that ganglion cysts are more likely to recur with local anesthesia during surgery than other anesthesia methods. The result obtained suggests that local anesthesia causes surgical failure due to the limited working field of the surgeon, the patients feel pain when deeper tissues are reached and the lack of adequate exposure.

**Keywords:** Anesthesia method; ganglion cyst; recurrence

## INTRODUCTION

Although ganglion cysts are most commonly seen in the upper extremity but it can also be seen throughout the body originating from tendon sheaths or joint capsules. They are gel-like, viscous, yellowish-colored fluid containing cystic lesions. Their shape can be round, oval, lobulated or irregularly contoured. Ganglia constitute 50-70% of all hand masses (1-3). Although the wrist dorsal is the most common site of involvement, it is also commonly seen on the volar aspect of the wrist. Women are more commonly affected than men. It is most frequently observed in the 2nd and 3rd decade of life (4). The etiology has not been clarified yet. However, a history of job related acute or chronic trauma or excessive use of the extremity can often be considered (5-7). Magnetic resonance imaging gives almost a clear idea in definitive diagnosis, especially according to the signal characteristics of soft tissue tumors. In T2-weighted and gradient-echo examinations, collections characterized by lobular, multiseptal, hyperintense signal increase covering the entire lesion are specific to the ganglion cyst (8).

In the differential diagnosis of ganglion cysts, lipoma, fibroma, osteoma, sarcoma, tuberculosis, rheumatoid tenosynovitis and aneurysm should be considered (6). There are a wide variety of methods used in management. Conservative treatments such as splint and nonsteroidal anti-inflammatory therapy, aspiration of cyst contents, corticostreoid injection into the cyst, and the total excision are frequently applied methods (9). Recurrence rate after surgical excision reported by the literatures was variable with the range of 0–31.2% (13,15,16). Recurrences after total excision can be attributed to inadequate excision of the cyst (6,10,11). In terms of recurrence rates, the best results were achieved with total excision of the ganglion. In this study, the relationship of recurrence rates of patients underwent surgery with total excision along with the selected anesthesia method was investigated.

## MATERIAL and METHODS

Ethics committee approval was received from Inonu University Faculty of Medicine and informed consent was taken from all patients. The demographic characteristics, location of the cyst, the type of anesthesia applied, and

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**Corresponding Author:** Resit Sevimli, Department of Orthopaedics and Traumatology, Faculty of Medicine, Inonu University, Malatya, Turkey **E-mail:** resitsevimli@hotmail.com

the duration of follow-up of 133 patients, who underwent total excision with a preliminary diagnosis of ganglion cyst, were evaluated retrospectively in the orthopedics and traumatology clinic from 2015 to 2019. Seven patients could not be contacted and the pathology results of these patients were not compatible with the ganglion cyst, they were excluded from the study. The study continued with the remaining 120 patients. All patients received 1 g of cefazolin preoperatively. A tourniquet was applied and a skin incision was made over the lesion. Intraoperatively, the neurovascular structures were preserved and protected, the cyst was totally excised and sent to the pathology laboratory for histopathological examination. After the operation, elastic bandage was applied to all patients, an analgesic-anti-inflammatory drug was prescribed and the dressing method within the first 24 hours was explained. Antibiotic prophylaxis was not required after the operation. Sutures of the patients were removed on average 15 days.

### Statistical analysis

SPSS version 22.0 package program was used for statistical analysis. Values for categorical variables obtained in the study are given as frequency and percentage, and mean  $\pm$  SS for continuous variables. Chi Square test was used for comparisons between groups.  $p < 0.05$  values were considered statistically significant.

## RESULTS

Of the 120 patients included in the study, 76 (63%) were female and 44 (36.7%) were male. The average age was  $32.38 \pm 13$  in men and  $31.80 \pm 11$  in women.

Considering the reasons for application to outpatient clinic, 74 (61.7%) of the patients had pain and 31 (25.8%) had swelling. 15 (12.5%) patients applied with cosmetic complaint.

When examined in terms of settlement, it was determined that 109 (90.8%) of the lesions were on the wrist. Of these, 60 (50%) were on the dorsal aspect, 49% (40.8%) of them were located on the volar side. Other locations were the phalanx in three (2.5%), toe in three (2.5%), the knee anterior in two (1.7%), and the posterior of the knee in three (2.5%) patients. Neurovascular injury that required repair and wound infection did not occur in any of the patient who underwent total excision. The mean follow-up period of the patients was 24 (3-41) months.

Considering the previously applied treatments, 53 (44.2%) had not received any treatment before, 37 (30.8%) received conservative treatments, aspiration done in 25 (20.8%) and five (4.2%) patients had aspiration and corticosteroid injection.

When the anesthesia methods applied for surgical treatment were examined, 44 (36.7%) had general, 42 (35%) regional, 28 (23.3%) local, and six (5%) received sedation anesthesia.

In the routine follow-ups, relapse was not observed in 101 (84.2%) patients, while 19 (15.8%) patients had relapses

on average 6-12 months after the operation. Eight (42.1%) of the patients who developed recurrence were male and 11 (58.9%) were female. Considering the cyst localization of patients who developed recurrence, it was observed that the volar aspect of the wrist was the relapse site in 13 (68.4%) patients, the dorsum of the wrist in four (21%) patients, and the posterior of the knee was the relapse site in two (10.6%) patients (Table 1).

**Table 1. Frequency and Recurrence Rates According to the Localization of Ganglion Cysts**

	Localization n (%)	Recurrence n (%)
Wrist Dorsal	60 (50)	4 (21.0)
Wrist Volar	49 (40.8)	13 (68.4)
Knee Anterior	2 (1.7)	0.00
Knee Posterior	3 (2.5)	2 (10.6)
Phalanx	3 (2.5)	0.00
Toe	3 (2.5)	0.00
<b>Total</b>	<b>120 (100.0)</b>	<b>19 (100.0)</b>

When the anesthesia method of patients who developed recurrence after surgery was examined, it was observed that local anesthesia was applied in 13 (46.4%) of 19 patients, while 15 (53.6%) patients who underwent surgery with local anesthesia had no recurrence. Regarding patients who underwent surgery with general/ regional/ sedation anesthesia types, recurrence occurred in 6 (6.5%) patients and no recurrence was observed in 86 (93.5%) patients. The rate of recurrence in patients undergoing local anesthesia was statistically significant compared to those receiving general and regional anesthesia (Table 2) ( $p < 0.01$ ). Local anesthesia was performed in nine (69%) of 13 patients with wrist volar site recurrence, regional anesthesia in three (23%), and general anesthesia in one (8%) patient.

**Table 2. The Relationship between Localization and Applied Anesthesia Method in Patients with Recurrence**

	Local anesthesia applied n (%)	General/ Regional Anesthesia Applied n (%)	Total	p
Wrist Dorsal	3 (%75)	1 (%25)	4	
Wrist Volar	9 (%69)	4 (%31)	13	
Knee Anterior	0	0	0	
Knee Posterior	1 (%50)	1 (%50)	2	
Phalanx	0	0	0	
Toe	0	0	0	
<b>Total</b>	<b>13</b>	<b>6</b>	<b>19</b>	<b>&lt;0.001</b>

General anesthesia was the anesthesia type in one (25%) of the four (18%) patients who developed recurrence in the dorsum of the wrist, and local anesthesia was the anesthesia method in the remaining three (75%) patients who underwent recurrence in the dorsal of the wrist.

Regional anesthesia was performed in one (50%) of two patients (9%) who developed recurrence in the posterior knee and local anesthesia was applied in the second patient who had recurrence. The frequency of incidence according to localization of ganglion cysts, recurrence rates, and the method of anesthesia application in patients who develop recurrence are summarized in Table 2.

## DISCUSSION

Clinically, ganglion cysts are the most common benign tumors in the upper extremity. The number of outpatient clinic applications during the day is quite high due to pain, swelling and cosmetic problems in the patients. In this study, the reasons for admission to the hospital of the patients with ganglion cyst were pain, swelling and cosmetic concerns. Mark et al. Listed 50 patients with ganglion cyst and the reasons that led them to seek medical help and advice was 38% appearance, 28% malignant tumor anxiety, 26% pain, and 8% concerns about unusual feeling and function (12). Although anamnesis and physical examination may be sufficient in the diagnosis of ganglion cyst, imaging methods such as magnetic resonance imaging and ultrasonography can be performed in cases of doubt (6). The recurrence rate is quite high in conservatively treated patients or with aspirating cyst contents. In a study conducted by Wright et al., the recurrence rate was found to be 80% in which cyst content was aspirated and corticosteroid was injected (13). In the study of Nelson et al., the rate of recurrence was found to be 6% in cysts operated under general anesthesia or axillary block. In the same study, they reported a recurrence rate of 16% with general anesthesia and tourniquet, and 35% after pressure or needle rupture following cortisone injection (14). Ganglia of the flexor tendon sheaths on the fingers are often treated with multiple hole puncture using 18 gauge needle under local anesthesia. The ganglia of the radial side of the volar wrist cannot be easily ruptured by pressure, and needle rupture is not recommended. Since the radial artery is frequently in close relationship with the ganglion, more careful surgical exposure is required in the masses of the volar side of the wrist.

In this study, the rate of recurrence in patients undergoing local anesthesia was higher than the rate of recurrence in patients with general and regional anesthesia. In our study recurrence rate of ganglion cysts after surgical excision was compatible with the literature. Although the type of anesthesia to be applied in patients included in the study is determined by considering the factors such as the risks of anesthesia, localization of the cyst, patient suitability, and patient preference; local anesthesia is often preferred in our patients. However, the limited working field that local anesthesia gives to the surgeon during the operation and the fact that patients feel pain when deeper tissues are reached suggest that surgical intervention under local anesthesia has a higher failure rate due to inadequate and restricted exposure.

## CONCLUSION

As a result, the possibility of relapse of ganglion cysts after surgical excision treatment exists despite careful surgery. In addition, the frequency of relapse may be related to the type of anesthesia selected.

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