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Treatment of ganglion cysts on the wrist: Why and how?

Why is surgical treatment chosen for ganglion cysts?

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Abstract
Aim: Our study aimed at comparing the results of surgical treatment and additional cortisone application to ganglion cysts aspiration formed on the wrist, and to evaluate the reasons that lead patients to treatment.
Material and Methods: Patients who applied to our clinic between 2012 and 2019 were diagnosed with ganglion cysts were divided into two groups. Group A consisted of 91 patients who underwent surgical excision, and Group B consisted of 33 patients who underwent cyst aspiration with 1 ml of betamethasone administration. A total of 124 patients were evaluated regarding the cyst side, age, gender, complications after treatment modalities, preoperative and postoperative pain, and function scores.
Discussion: Pain was the leading complaint in 63 (50.8%) patients in our study. Considering the current literature, the most common complaint among symptomatic patients is pain. Also, the cyst size of the group that chose surgical treatment was larger than in the group that underwent aspiration with injection.
Results: In our study, it was observed that wrist ganglion cysts were more common in women than in men, they were more common on the dorsal side than on the volar side, and the first reason for choosing surgical treatment was cosmetic concerns and suspicion of the tumoral lesion after pain occurrence. The incidence of recurrence was 11.5 times higher in the patient group treated with aspiration and betamethasone injection compared to the patient group treated with surgical treatment.

Keywords
Cyst, Ganglion, Wrist, Aspiration

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Introduction

Ganglion cysts are synovial cysts filled with gelatinous mucoid material, of unknown etiology, believed to be formed due to mucinous degeneration of the connective tissue as a result of repetitive microtraumas [1]. Ganglion cysts are the most common benign soft-tissue tumors of the hand and wrist [2]. Among the treatment options, the best known and most frequently applied method is open surgical excision. In addition, observation/reassurance, aspiration alone, aspiration with steroid, hyaluronidase, or ethanol injection and arthroscopic surgical excision are the other treatment options [3]. Although most ganglion cysts are asymptomatic, some of the patients present with complaints such as localized pain, tenderness, cosmetic dissatisfaction, and tumor suspicion. In addition, although rarely, clinical entities such as ulnar neuropathy, central canal stenosis, cubital tunnel syndrome, trigger thumb can be seen due to the compression of the cyst on the surrounding tissues [4-7].

Material and Methods

The patients who were diagnosed with ganglion cysts at our clinic between 2012 and 2019 were examined retrospectively. The diagnosis was performed by clinical examination and magnetic resonance imaging (MRI) technique (Figure 1). Cyst sizes were measured in cm2 using MRI images. Patients with ganglion cysts 1 cm in diameter or larger were treated with two different methods: open surgical excision and aspiration with betamethasone injection (Figure 2). Open surgical excision was performed in 91 (73.4%) patients, and aspiration with betamethasone injections was performed in 33 (26.6%) patients. Surgery involved excision of the ganglion traced back to the carpal joints, along with its stalk, under local anesthesia and tourniquet control. Both senior and junior orthopedists and hand surgeons performed the surgeries. All patients were followed up for 22 months regarding pain and functional scores, complications, and recurrence assessment.

Ethical Approval

The study was approved by the Ethics Committee of University of Necmettin Erbakan Faculty of Medicine (protocol no 2021/3551).

Statistical Analysis

The data obtained from the research were transferred to the SPSS (Statistical Package for Social Sciences) v.18.0 package program for statistical analysis.

deviation and median (minimum, maximum) were used to summarize numerical data, and numbers and percentages were used to summarize categorical data.

The compliance of numerical variables to the normal distribution was analyzed with the Kolmogorov-Smirnov test. The relationship between the categorical data was analyzed with the Chi-square (x2) test.

Since it was determined that the patients' q DASH, VAS, and MAYO scores were not normally distributed, comparisons made for two separate times as preoperative and postoperative were compared with the Wilcoxon paired-sample test. The model, which was created with the parameters that could affect recurrence, was analyzed using regression analysis.

A p-value of <0.05 was considered statistically significant.

Results

Among the patients, 76.6% (n=95) were females and 23.4% (n=29) were males. The mean age of the patients was 32.94 ± 14.11 years (min:11, max:72).

Ganglion cysts were located on the right wrist in 51.6% of the patients and on the left wrist in 48.4%, while anatomically they were located dorsally in 75.8% and on the volar side in 24.2% of the patients. While the surgery was performed in 75.5% of patients with dorsal location, n steroid injection was performed in 24.5% of them; surgery was performed in 66.7% of the patients with volar location, and steroid injection was performed in 33.7% of them.

The reasons leading patients to treatment were as follows: 50.8% were due to severe pain, 24.2% were due to cosmetic reasons, 12.9% were due to suspected malignancy, and 12.1% were due to environmental effects (Table 1). The mean preoperative cyst size in the surgical group was 1.74±1.37 (min:1, max:12) cm2. The mean cyst size of the patient group who underwent aspiration with betamethasone injection was 1.16±0.23 cm2 (min:1, max:1.80).

Recurrence was observed in 15.3% (n=19) of all the patients. While the recurrence rate was 5.5% (n=5) in the surgical excision group, it was 42.4% (n=14) for the patients who had aspiration with betamethasone injection. Patients who underwent surgery had a significantly lower recurrence rate than patients who received aspiration with betamethasone injection. (x2=25.45, p<0.001).

Age, gender, side, location, preoperative cyst size, and the type of treatment, which were thought to affect recurrence, were

Table 1. Descriptive characteristics of patients

		n	%
Gender	Female	95	76.6
	Male	29	23.4
Age	32,94±14,11 (min:11, max:72)		
Side	Right	64	51.6
	Left	60	48.4
Location	Dorsal	94	75.8
	Volar	30	24.2
Reasons for choosing treatment	Pain	63	50.8
	Cosmetic reasons	30	24.2
	Suspicion of malignancy	16	12.9
	Environmental effects	15	12.1

Table 2. Comparison of some parameters in the surgical group and aspiration group

	Open surgical excision	Aspiration with betamethasone injection
Preoperative cyst size	1,74±1,37 cm^2 (min:1, max:12)	1,16±0,23 cm^2 (min:1, max:1,80)
Preoperative q DASH	24,73±9,29 (min:11, max:56)	20,85±7,60 (min:11, max:43)
Postoperative q DASH	18,32±5,44 (min:12, max:45)	18,06±5,77 (min:11, max:39)
Preoperative MAYO	81,37±4,48 (min:70, max:89)	84,50±4,33 (min:74, max:90)
Postoperative MAYO	87,56±5,46 (min:69, max:98)	87,44±5,18 (min:74, max:93)
Preoperative VAS	3,12±1,82 (min:1, max:7)	2,39±1,36 (min:1, max:5)
Postoperative VAS	1,68±1,16 (min:1, max:11)	1,61±1,05 (min:1, max:6)
Recurrence	5 (5.5%)	14 (42.4%)
Complication	8 (6.5%)	-

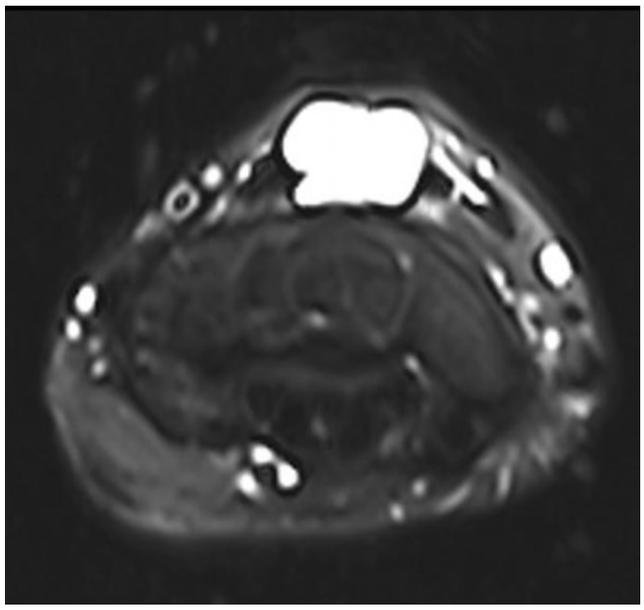


Figure 1. Dorsal ganglion cysts on wrist MRI image



Figure 2. Open surgical excision of the volar wrist ganglion cyst

examined with regression analysis, and only the treatment type was found to affect the recurrence.

There was no statistically significant relationship between the recurrence rate and gender, side, and anatomical location. (x2=0.84, p=0.35; x2=0.35, p=0.55; x2=1.95, p=0.66).

Postoperative complications were seen in 8 (6.5%) patients, all of whom were in the surgical intervention group (Table 2). Four patients had keloid development, two had adhesions, and two had radial artery damage. Triamcinolone treatment was applied to four patients who developed keloids. Two patients with adhesions underwent tenolysis, and radial artery damage was repaired intraoperatively.

Detailed information and measurements of the surgical excision group and aspiration with the betamethasone injection group are given in Table 2.

Preoperative q DASH scores of patients were significantly higher compared to postoperative q DASH scores (Z=-7.61; p<0.001), preoperative VAS scores were significantly higher compared to postoperative VAS scores (Z=-7.21; p<0.001). In addition, postoperative MAYO scores were higher compared to preoperative MAYO scores. (Z=-7.42; p<0.001).

Discussion

Ganglion cysts are the most common soft tissue tumors seen in the hand and wrist [8]. Although many treatment methods have been tried in their treatment from the past to the present, open surgical excision is the most common treatment method [3]. In accordance with the general literature, we performed open surgical excision in 91 (73.4%) of our 124 patients.

Pain was the leading complaint in 63 (50.8%) patients in our study. Considering the current literature, the most common complaint among symptomatic patients is pain [9]. On the contrary, in the study by Westbrook et al. with 50 patients, cosmetic problems were reported as the most common symptom [10]. Similarly, in the study by Tomlinson et al., cosmetic problems were reported as the most common reason for referral [11].

In our study, the most common reason for patients to choose surgical treatment was pain, while cosmetic problems and tumor suspicion were the second and third most common reasons for surgery. It is seen that the preoperative VAS scores of the patients who underwent surgery were higher than the VAS scores of the patients who underwent aspiration. Our study showed that the preoperative visual analog score of the patients who underwent open surgical excision was 3.12, while it decreased to 1.68 postoperatively. As a result of different clinical studies, it was observed that the VAS score regressed significantly after surgery [12,13]. Similarly, we observed a significant improvement in q DASH and MAYO scores after surgery. However, we observed an improvement in all these three scores in the aspiration and injection group, and after both treatment options, the pain decreased significantly in the patients, and there was an improvement in functional scales.

Also, the cyst size of the group that chose surgical treatment was larger than in the group that underwent aspiration with injection. It is also known that asymptomatic wrist ganglion cysts improve by 50% during follow-up [14]. Tumoral lesion anxiety has directed some patients to surgical treatment despite this information. In our study, 14 of 16 patients with suspected tumoral lesions chose surgical treatment, while only two patients preferred aspiration and injection treatment. Limitation of wrist movement, decreased grip strength, and cosmetic reasons determine the choice of surgery in the treatment [15].

When we consider the recurrence results, Nasab et al. reported recurrence rates in patients who underwent aspiration alone (62.5%), aspiration and cortisol injection (45%), aspiration and ethanol injection in ganglion cysts (36.5), respectively [16]. Limpaphayom et al. examined patients with a dorsal ganglion cyst and observed recurrence in two (18.2%) out of 11 patients who underwent surgery and in eight (61.5%) out of 13 patients who had cyst aspiration and methylprednisolone injection [17]. Paramhans et al. administered 2 ml of 10% triamcinolone injection in one group and surgical treatment for the other group for adult ganglion cysts. They reported that there were

14 recurrences (12.2%) among 114 surgeries and eight (8.4%) recurrences out of 105 patients who had aspirations and triamcinolone administration [18]. As a result of a systematic review and meta-analysis conducted in 2015, the recurrence rate was found as 21% on average in open surgical excision and 59% in aspiration [19]. Our findings were consistent with the literature. At the end of the 22-month follow-up period in patients who underwent aspiration and betamethasone, the recurrence rate was 11.5 times higher than in patients who underwent surgery. Different studies have tried to apply various chemicals into the cyst after aspiration. In particular, intracystic injection of steroids was performed, emphasizing the idea that ganglion cysts occur after an inflammatory process.

Contrary to what had been predicted, it was observed that there were few fibroblasts and mesenchymal cells in the wall of the ganglion cyst and that it did not contain inflammatory cells [14,20]. Based on this information, there is no medical reason to support the steroid injection with high anti-inflammatory properties into the cyst. Although aspirating the cyst and applying chemicals into the cyst cavity seems to be a simple procedure, complications such as neuropathy may occur due to the adjacency to the nerves. In addition, since cysts located in the volar part of the wrist are primarily associated with the ulnar and radial arteries, ischemia, an undesirable complication, may occur in the distal extremity. In our study, no complications occurred in the aspiration and injection groups.

Limitations

In our study, patients were followed up for an average of 22 months. It can be thought that complications and recurrence rates may change in a longer follow-up period.

Conclusion

In our study, we observed that the most common reason for choosing surgical treatment in wrist ganglion cyst was pain, and in addition to these complaints, cosmetic appearance and suspicion of a tumoral lesion were among the decision-making concerns in the choice of surgical treatment. We found that the recurrence rate was significantly lower in surgical treatment compared to aspiration and betamethasone application. The search for treatment for ganglion cysts continues. Our study will contribute to the literature by investigating the causes and consequences of the two most commonly applied treatment options.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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