

Open Surgical Excision of Dorsal Wrist Ganglia: Puncturing the Dome Reduces Surgery Time

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Background: The following study is retrospective and compared the operative time and complications using two techniques of surgical resection of primary dorsal wrist ganglia in adults.

Methods: Surgery was performed by the senior author (M.M.A.) through a transverse skin incision. The dome of the ganglion is dissected in both techniques. In the first technique (group A patients, n = 20 patients), dissection is continued to the base of the ganglion to reach the stalk near the scapho-lunate ligament. The stalk is transected and cauterized near the ligament. This surgical technique has been practiced by the senior author for 25 years. Over the last 5 years, the author has modified the technique (group B patients, n = 20 patients) by puncturing the dome of the ganglion following dome dissection. About two-thirds of the content of the ganglion is removed, and a mosquito is then used to close the puncture site. Dissection of the base of the ganglion to the stalk becomes easier and quicker, and the stalk is transected and cauterized near the scapho-lunate ligament.

Results: There was one recurrence in each group. Other complications were not seen in either group. The mean operative time (SD) was 30.75 (SD = 2.98) minutes for group A; and 20.75 (SD = 2.25) minutes for group B. An independent-samples *t* test was used to compare the operative time of both groups, which showed the difference was statistically significant ($P < 0.001$).

Conclusions: Our study showed that intentionally puncturing the dome of the ganglion makes the dissection of the base quicker, without increasing the risk of complications. (*Plast Reconstr Surg Glob Open* 2024; 12:e5868; doi: [10.1097/GOX.0000000000005868](https://doi.org/10.1097/GOX.0000000000005868); Published online 5 June 2024.)

INTRODUCTION

Ganglia are the most encountered masses in the hand, and are usually seen on the dorsal aspect of the wrist. Many techniques have been described to treat dorsal wrist ganglia, including aspiration, arthroscopic resection, and open resection. Open surgical resection remains the gold standard method of management of dorsal wrist ganglia. Most studies focused on comparing recurrences and other complications following management.^{1,2} Our literature

review did not reveal any study comparing time of surgery with various techniques of open surgical resection of dorsal wrist ganglion. We present a simple technique aiming to make open resection easier and quicker.

METHODS

The study was retrospective and compared the operative time and complications using two techniques of surgical resection of primary (ie, not recurrent) dorsal wrist ganglia in adults. Surgery was performed by the senior author (M.M.A.) through a transverse skin incision. Blunt dissection was done, preserving the sensory nerves to reach the dome of the ganglion. The dome was dissected in both techniques. In the first technique (group A patients), dissection was continued to the base of the ganglion to reach the stalk near the scapho-lunate ligament. The stalk was transected and cauterized near the ligament. This surgical technique has been practiced by the senior author for 25 years. Over the last 5 years, the author has modified the technique (group B patients) by intentional puncturing of the dome of the ganglion following dome dissection. About two-thirds of the content of the ganglion was removed.

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A mosquito was then used to obliterate the puncture site. Dissection of the base of the ganglion to the stalk became easier and quicker, and the stalk was transected and cauterized near the scapho-lunate ligament. [Figure 1](#) shows an illustration of the second technique.

Inclusion/Exclusion Criteria and Data Collection

Initially (before exclusion), we included all patients who underwent surgery between 2016 and 2021. Exclusion criteria were surgery performed by a trainee, recurrent ganglia, patients younger than 18 years of age, cases with follow-up less than 18 months after surgery, and inadequate data. After exclusion, there were 40 patients: group A patients ($n = 20$) underwent surgery between 2016 and 2018 (operated on using the standard technique), and group B patients ($n = 20$) underwent surgery between 2019 and 2021 (operated on using the new technique). The indications for surgery were pain, cosmetic, or both.

Demographic data, operative time (time from skin incision to skin closure), patient satisfaction, and complications were recorded for both groups. Operative time was retrieved from nursing notes, which recorded time of surgery from skin incision to skin closure. This recording is routinely done in both government and private hospitals. Patients were asked about their satisfaction with pain relief and the scar at final follow-up. Patient satisfaction with pain relief does not mean complete relief of pain because they were informed preoperatively that there might be mild residual pain with heavy activities. Patients were asked to respond as *satisfied*, *somewhat satisfied*, or *not satisfied*.

RESULTS

There were 14 women and six men in group A; and there were 13 women and seven men in group B. The mean age (range) was 28 years (18–39 years) for group A and 27 years (18–38 years) for group B. The mean (range) of follow-up was 23 (18–28) months for group A and 24

Takeaways

Question: Can intentionally puncturing the dome of the dorsal wrist ganglion reduce surgery time?

Findings: In a retrospective comparative study, the mean operative time (SD) was 30.75 (2.98) minutes for group A patients ($N = 20$ patients with no puncture), and 20.75 (2.25) minutes for group B patients ($N = 20$ patients with puncture). An independent samples *t* test was used to compare the operative time of both groups, which showed the difference was statistically significant ($P < 0.001$).

Meaning: In open surgical excision of dorsal wrist ganglia, puncturing the dome reduces surgery time.

(18–30) months in group B. A summary of the demographic data is shown in [Table 1](#). There was one recurrence in each group. Except for recurrent cases, all patients were satisfied with the outcome at final follow-up. Other complications such as bleeding, infection, injury to the sensory nerves, and complex regional pain syndrome were not encountered in either group. The mean operative time (SD) was 30.75 (SD = 2.98) minutes for group A; and 20.75 (SD = 2.25) minutes for group B. An independent-samples *t* test was used to compare the operative time of both groups, and showed the difference was statistically significant ($P < 0.001$).

DISCUSSION

This is a retrospective study. For inclusion/exclusion criteria, one main concern was taken into consideration. It is well known that the experience of the surgeon affects the postsurgical recurrence rate; and this has been shown by Zachariae and Vibe-Hansen.³ The surgeon who performed the surgery in our series has been in practice for over 30 years. The new technique was adopted in 2019. Hence, patients of group A were selected from the period just before 2019, and group B patients from the period

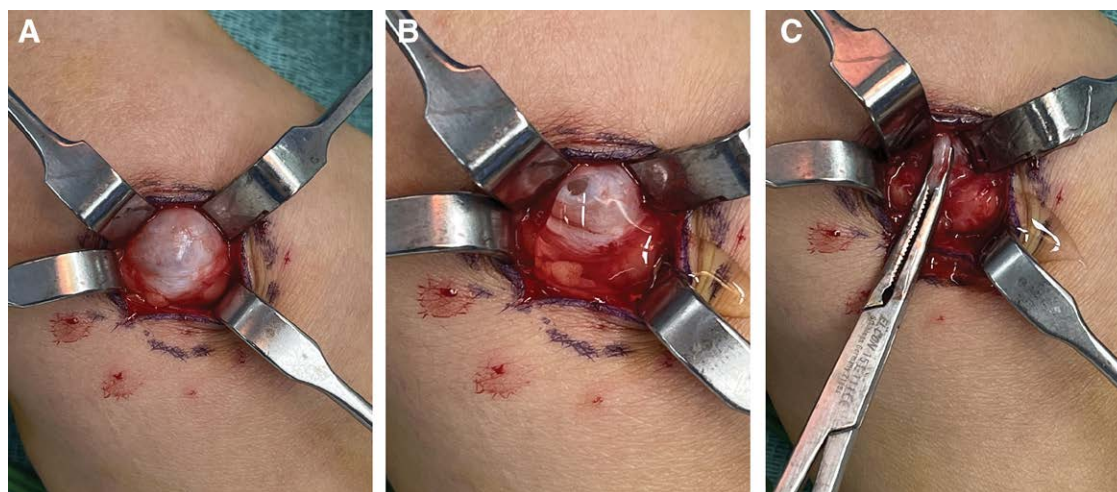


Fig. 1. Illustration of the second technique. A, Dissection of the dome is complete. B, Intentional puncturing at the center of dome. C, After partial evacuation of the content, a mosquito is used to obliterate the puncture site.

Table 1. Demographic Data of the Two Study Groups

Group	Group A (No Puncture)	Group B (Puncture)
No. cases	20	20
Sex	14 female, 6 male	13 female, 7 male
Mean age	28 (range 18–39)	27 (range 18–38)
Mean follow-up	23 mo (range 18–28 mo)	24 months (range 18–30 mo)

immediately following 2019. Furthermore, any case operated on (totally or partially) by a trainee (even if it was under the supervision of the senior author) was excluded. Hence, almost all included cases were done in private practice (without any trainees in the operating room). The nurse was the surgical assistant in private practice.

Several issues are relevant for discussion of our article. Firstly, there were several reasons that prompted the senior author to adopt a new technique after several years of successful use of the first technique. In the first technique, accidental rupture of the ganglion frequently occurs during posterior dissection (near the stalk), and in these cases, dissection of the stalk becomes much more difficult, and the author hypothesized that recurrence rate would be higher in such cases. Secondly, the second technique makes the dissection easier and makes the identification of the stalk easier especially in large ganglia. Kim and Lee⁴ reported on their technique of surgery. These authors completed the dissection of the ganglion without intentional puncture of the dome if the stalk was easily identified. Intentional puncturing of the dome was only done when the stalk was not easily identified.⁴ Finally, the senior author (M.M.A.) of the current communication hypothesized that the new technique would likely reduce the operative time, and this would be cost effective.

Our study showed that puncturing the dome of the ganglion to empty part of its contents is a simple modification that makes the dissection of the base and stalk easier and quicker, without increasing the risk of complications. Our literature review revealed one study that compared the operative time of open surgical resection of primary versus recurrent wrist ganglia. Time of surgery was shorter in primary cases, but the difference was not significant.⁵ No other study focused on operative time and, hence, we could not compare our results with other studies.

The whole current study is based on the difference in operative time between the two techniques. The recording of the operative time by different nursing staff in two different settings (private and government), which is furthermore retrieved retrospectively, is a significant limitation. However, most of our cases were done in private practice wherein operative time is accurately documented for billing purposes. Another limitation of our study is that patient satisfaction was not reported in an anonymous fashion.

There are three main approaches to the management of dorsal wrist ganglia: observation, aspiration, and surgical excision. Dias et al.⁶ studied the outcome of these three approaches in a series of 236 patients. Of the 55 cases observed, 58% resolved spontaneously. Aspiration was done in 78 cases with a recurrence rate of 58%. A total of 103 patients underwent surgical excision with a recurrence rate of 39%.

Table 2. Potential Factors That May Affect the Recurrence Rate following Surgical Excision of Dorsal Wrist Ganglia

Factors Affecting Recurrence	Comment
1- Experience of the surgeon	Probably the most important factor
2- Factors related to the ganglion itself	Large ganglia and ganglia with multiple stalks are expected to have a higher recurrence rate
3- Factors related to the operative technique	Lower recurrence is expected with intentional puncturing of the dome of the ganglion, and with complete excision down to the origin of the stalk from the joint
4- Postoperative wrist immobilization	Immobilization may lower the recurrence rate
5- Other factors	Some studies reported a higher recurrence rate in severely symptomatic patients, and when surgery was done under local anesthesia (compared with general anesthesia)

There are several factors that may increase the recurrence rate following open surgical excision of dorsal wrist ganglia. Recurrence rate varied greatly in the literature from 1%⁷ to around 40%.⁶ The recurrence rate in our study was 5% in both groups (one out of 20 cases). This recurrence rate was similar to the recurrence rate in several previous studies.^{1,2} Table 2 summarizes potential factors affecting recurrence following dorsal wrist ganglia excision. We believe that the experience of the surgeon is the most important factor, and this was demonstrated by Zachariae and Vibe-Hansen.³ In a series with high recurrence rate, most operations were performed by trainees.⁶ This may also explain the fact that the recurrence rate did not change in the current series using both techniques because the operator has been in practice for over three decades. Postoperative wrist immobilization is a controversial factor.^{8,9} Other studies reported a higher recurrence rate in patients with preoperative severe symptoms,⁶ and if surgery was done under local anesthesia (compared with general anesthesia).¹⁰

CONCLUSIONS

Our study showed that puncturing the dome of the ganglion to empty part of its contents is a simple modification that makes the dissection of the base and stalk easier and quicker, without increasing the risk of recurrence. The study has limitations such as being retrospective, the relatively small number of patients, and the lack of hand function analysis. However, the study is unique in comparing operative time and complications using two different surgical techniques with relatively strict inclusion criteria.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

ETHICAL APPROVAL

Ethical approval was obtained from Medical Consultants Polyclinic, Riyadh, Saudi Arabia.

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