

# A rare occurrence of ganglion cysts on the posterolateral aspect of the elbow without neurological manifestations: a case series and review of the literature

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## Abstract

### Background

The occurrence of ganglion cysts around the elbow is rare, and the occurrence of these lesions without any symptoms of compression to the nearby structures is even rarer. Most published cases of elbow ganglions have reported patients with symptoms relating to compression of the radial nerve, or branches thereof secondary to anteriorly located cysts. We present two cases of ganglions occurring on the posterolateral aspect of the elbow with no pressure symptoms to the radial nerve.

### Case series

The first case is a 33-year-old male, with a seven-month history of a spontaneous, slow-growing mass on the posterolateral aspect of his left elbow. The second case is a 38-year-old female, with a 12-month history of a spontaneous mass on the posterolateral aspect of her left elbow. In both cases, the reason for presentation was the unsightly elbow with an enlarging mass. The lesions were painless and both patients were neurologically intact with no restriction on range of motion of the joint. Both patients underwent excision of the mass for aesthetic reasons.

### Discussion

Patients with elbow ganglions usually have cysts located anterior to the radiocapitellar joint and almost invariably present with an associated motor, or less commonly, a sensory deficit of the radial nerve. Various treatment modalities have been reported; however, the vast majority undergo open surgical excision due to their association with progressive neurological symptoms. This usually leads to resolution of symptoms, and recurrence is rare.

### Conclusion

The clinical presentation of the two patients reported in this case series seems to be far less frequent than patients presenting with a neuropathy of the radial nerve due to an anteriorly located elbow ganglion. It cannot, however, be excluded that there is an underreporting of asymptomatic elbow ganglions. According to our review of the English literature, this is only the third report of an asymptomatic elbow ganglion in the lateral compartment of the elbow.

**Level of evidence:** Level 5

**Keywords:** elbow, ganglion, cyst

## Introduction

Ganglion cysts are benign lesions commonly found around the wrist and hand, with the dorsum of the wrist being the commonest location.<sup>1,2</sup> The occurrence of these cystic lesions around the elbow is rare, and when they do occur, they often present with symptoms related to the pressure they exert on the nearby structures.<sup>2</sup>

In most published cases of elbow ganglions, the cyst is located anterior to the radiocapitellar joint and patients usually present with motor and/or sensory fallout in the distribution of the radial nerve and its branches, depending on the level of compression.<sup>2,3</sup> These cystic lesions may also present with pain and restriction of joint movement.<sup>2</sup>

The occurrence of ganglion cysts around the elbow with no pressure symptoms to the nearby structures is a rarity. Herein, we

present two cases of such cystic lesions occurring spontaneously on the posterolateral aspect of the elbow with no pressure symptoms to the radial nerve. In both cases, the reason for presentation was the unsightly elbow with an enlarging mass.

## Case 1

A 33-year-old male, unemployed, right hand dominant, presented to our unit with a seven-month history of an asymptomatic, slow-growing mass on the posterolateral aspect of his left elbow. He reported no specific antecedent traumatic event and the reason for his presentation was the cosmetically unappealing mass. He had no pain and there was no associated weakness or numbness in the limb. The patient had no medical comorbidities and requested removal of the mass for aesthetic reasons.



**Figure 1.** Preoperative clinical pictures demonstrating the bi-lobed mass on the posterolateral aspect of the left elbow

On clinical examination, he had a bi-lobed mass on the posterolateral aspect of his left elbow, with each lobe measuring 1.5 cm × 1.5 cm (*Figure 1*). The mass was non-tender and firm to palpation with limited mobility and non-adherent to the overlying skin. The mass transilluminated on application of a light source. The elbow range of motion was unaffected compared to the contralateral side. The pulses distally were normal, as was the neurological examination. X-rays showed a soft tissue swelling in the area of the mass over the radiocapitellar joint, with a normal osseous anatomy (*Figure 2*).

The patient was taken to theatre for an excisional biopsy under general anaesthesia. The limb was elevated and a tourniquet applied for a clear field of dissection. A Kocher approach was utilised to expose the mass. A septated cystic mass measuring 1.0 cm × 2.0 cm was found protruding through the common extensor–supinator muscle fascia. The stalk of the lesion was followed down to its origin on the lateral aspect of the radiocapitellar joint.

When the mass was ruptured, it contained the typical clear, thick gelatinous fluid of a ganglion cyst (*Figure 3*). The mass was

carefully separated from the surrounding soft tissue and removed from the base of its stalk in its entirety. At the six-week follow-up, the patient had full elbow range of movement and was neurologically intact with no recurrence of the lesion.

## Case 2

A 38-year-old housewife, right hand dominant, presented to us with a 12-month history of a spontaneous mass on the posterolateral aspect of her left elbow. There was no history of trauma or any exacerbating factors. The patient complained of minimal discomfort and requested excision of the mass for cosmetic reasons. There was no associated weakness or numbness in the limb. The discomfort was localised and did not radiate down the arm. The patient was otherwise healthy with no medical comorbidities.

Clinical examination revealed a small mass on the posterolateral aspect of the left elbow (*Figure 4*). The mass was firm and non-tender to palpation. It felt fixed to the underlying structures but not to the overlying skin. On application of a light source, the mass transilluminated. The range of motion of the elbow was unaffected compared to the contralateral side. Her neurological examination was normal, as were the distal pulses. The X-rays of the affected elbow were normal.

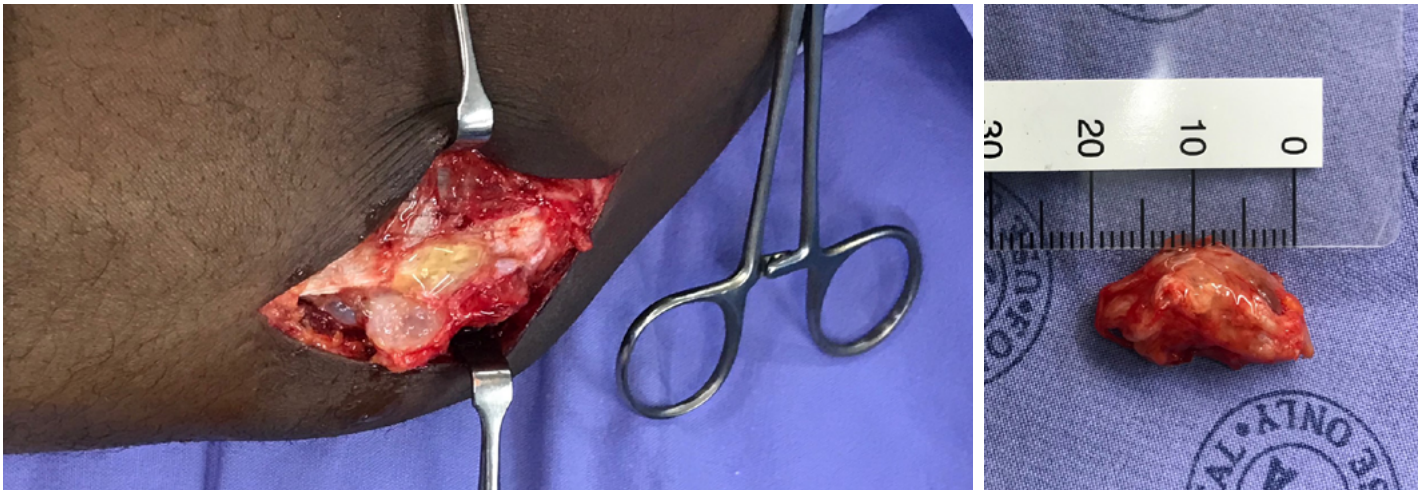
The patient was taken to theatre for an excisional biopsy. Under general anaesthesia, the limb was elevated and a tourniquet applied for a clear field of dissection. A Kocher approach was used, and revealed a cystic mass measuring 1.2 cm × 2.5 cm. The mass had a stalk originating from the radiocapitellar joint. It was carefully separated from the surrounding soft tissue and removed from the base of its stalk. When the mass was ruptured post removal, it contained the typical clear, thick gelatinous fluid of a ganglion cyst. At the six-week follow-up the patient had full elbow range of movement and was neurologically intact with no recurrence of the lesion.

## Discussion

The clinical diagnosis of a soft tissue swelling around the elbow joint can at times be challenging. Common pathologies include bursitis, gouty tophi, rheumatoid nodules and lipomas. Because the diagnosis of an elbow ganglion is rare, the majority of cases reported in the literature are confirmed preoperatively



**Figure 2.** Preoperative AP and lateral X-rays of the left elbow showing a soft tissue shadow over the area of the mass with normal osseous anatomy



**Figure 3.** Clinical pictures of the mass intraoperatively: the left picture shows the typical thick gelatinous fluid of a ganglion cyst originating from the mass; the right picture shows the mass post excision

by CT, MRI and/or ultrasonography.<sup>2-14</sup> The vast majority of these cases reported on, unlike our two cases, were of patients presenting with anteriorly located ganglions and symptomatic compression of various regions of the radial nerve. Ganglions around the wrist occur commonly, and have characteristic features on physical examination. Wrist ganglions are frequently diagnosed clinically and excised without additional imaging. Few cases of elbow ganglions being excised without requiring additional further imaging aside from X-rays have been reported.<sup>6,15-17</sup>

The clinical presentation and examination findings of patients with elbow ganglions varies among the cases reported. The majority of these cases present with weakness or numbness in the distribution of the radial nerve or posterior interosseous nerve.<sup>3-6,8-11,13-18</sup> Many cases present with an indiscrete elbow swelling with or without pain or neurology.<sup>4,5,8-10</sup> Some cases present only with neurological symptoms and no identifiable swelling or mass and are subsequently found to be ganglions on advanced imaging studies or on surgical exploration.<sup>5,6,10,11,14-16</sup> Only Ogino et al. in



**Figure 4.** Preoperative clinical pictures demonstrating a mass on the posterolateral aspect of the left elbow

1991 reported on a case series in which two of six patients had clinical examination findings clearly suggesting a ganglion.<sup>5</sup> Both our cases had clinical features typical of any ganglion.

There have been very few cases that have been reported in patients with a confirmed ganglion arising from the elbow joint without any neurological fallout. In 2000, Feldman reported a 47-year-old female who had a nine-month history of a painless anterior elbow mass. Diagnosis of a ganglion was made on MRI and the patient opted for conservative management but returned two and a half years later for arthroscopic excision. At no point did she experience any neurological fallout.<sup>7</sup>

In 2014, Erol et al. presented a case of a 62-year-old female who presented with pain in her elbow that radiated down the dorsoradial aspect of her forearm. Although this suggests compression of the superficial radial nerve, the authors reported no motor fallout and no altered sensation in the distribution of the superficial radial nerve. Initially diagnosed as radial tunnel syndrome, the patient was treated conservatively but after four weeks with no resolution, returned and was diagnosed with a ganglion anterior to the radiocapitellar joint on MRI. The cyst was decompressed by ultrasound-guided aspiration and her symptoms resolved.<sup>12</sup>

In 2014 Vaishya et al. reported on a 45-year-old female who presented with a tender mass on the anterolateral aspect of her elbow but with no evidence of a compressive neuropathy. MRI revealed a ganglion anterior to and communicating with the radiocapitellar joint, and this was confirmed after open excision of the mass which was sent for histological examination.<sup>2</sup>

In 2019, Gnany et al. presented a 60-year-old male patient with a painful mass on the anteromedial aspect of his left elbow and arm. MRI revealed a multi-lobed mass which was in close proximity to the ulnar nerve; however, the patient had no features of a compressive neuropathy. The mass was excised, and histopathological examination confirmed the diagnosis of a ganglion cyst.<sup>19</sup> In this case, the ganglion originated from the medial compartment of the elbow, unlike our two cases and the rest of the cases referenced in this article which originated from the lateral compartment. Both of our cases had no pain, no motor fallout and normal sensation, with no pain radiating in the distribution of the superficial radial nerve. In contrast to the above cases, both of our cases had cysts on the posterolateral aspect of the elbow.

The vast majority of elbow ganglions reported in the literature have been associated with a neuropathy of the radial nerve and have been found anterior or anterolateral to the radiocapitellar joint in the region of the radial tunnel. Depending on the location of the ganglion and what part of the radial nerve the ganglion compresses, patients have presented with three different clinical scenarios.<sup>5,13</sup> Some have had mixed motor and sensory symptoms

**Table I:** Summary of the cases reviewed with demographic data, clinical presentation and mode of treatment used

Author	Year	Sex	Age (years)	Location of mass on elbow	Type of nerve palsy	Treatment
Bowen and Stone <sup>15</sup>	1966	M	57	Anterior	PIN	Open excision
Mass, et al. <sup>16</sup>	1982	F	41	Anterior	PIN	Open excision
Hermansdorfer, et al. <sup>17</sup>	1986	F	30	Anterolateral	SRN	Open excision
McCollam, et al. <sup>4</sup>	1988	2F 1M	16–52	2 anterior, 1 posterolateral	2 PIN 1 PIN + SRN	Open excision
Ogino, et al. <sup>5</sup>	1991	5F 1M	27–56	Anterior	3 PIN + SRN 2 PIN 1 SRN	Open excision
Steiger and Vögelin <sup>6</sup>	1998	1F 1M 1?	31–64	Anterior and anterolateral	PIN	Open excision
Feldman <sup>7</sup>	2000	F	47	Anterior	None	Arthroscopic excision
Matsubara, et al. <sup>18</sup>	2006	4M 3F	31–66	Anterior	6 PIN 1 PIN + SRN	Open excision
Yamazaki, et al. <sup>3</sup>	2007	8M 6F	40–65	Anterior and anterolateral	PIN	12 open excision 1 aspiration 1 conservative
Lifchez, et al. <sup>8</sup>	2008	2M	56 + 73	Anterior	1 SRN 1 PIN + SRN	1 open excision 1 patient died before open excision
McFarlane, et al. <sup>9</sup>	2008	F	45	Anterior	SRN	Open excision
Jou, et al. <sup>10</sup>	2009	2F	31 + 36	Anterior and anterolateral	1 PIN 1 SRN	Open excision
Lee, et al. <sup>11</sup>	2013	F	65	Anterior	PIN + SRN	Conservative (aspiration declined by patient)
Erol, et al. <sup>12</sup>	2014	F	62	Anterior	? Pain in SRN distribution but no altered sensation	Aspiration (ultrasound-guided)
Miralles, et al. <sup>13</sup>	2016	7F 1M	33–52	Anterior	SRN	Open excision
Vaishya, et al. <sup>2</sup>	2016	F	45	Anterior	None	Open excision
Seki <sup>14</sup>	2017	M	77	Anterior	PIN	Aspiration (ultrasound-guided)
Gnany, et al. <sup>19</sup>	2019	M	60	Medial	None	Open excision
Meier, et al.	2021	1M 1F	33 + 38	Posterolateral	None	Open excision

M: male; F: female; PIN: posterior interosseous nerve palsy; SRN: superficial branch of the radial nerve palsy

when the ganglion compressed the common radial nerve or both the posterior interosseous nerve and the superficial sensory branch.<sup>3,5,18</sup> Some have had purely motor symptoms if the ganglion compressed only the posterior interosseous nerve, while others have had purely sensory symptoms when the ganglion only compressed the superficial sensory branch of the nerve.<sup>3,5,13</sup> The most common clinical entity of the three is patients who present with isolated motor fallout due to compression of the posterior interosseous nerve from an anteriorly located elbow ganglion (*Table I*).

In 2007, Yamazaki et al. described two types of ganglions of the elbow according to their anatomic location in relation to the arcade of Frohse. Type A elbow ganglions are located proximal to the arcade of Frohse, while type B elbow ganglions are located distal to it. The authors described that type A ganglions displace the posterior interosseous nerve, the superficial sensory branch and the motor branch to the extensor carpi radialis longus muscle anteriorly. Because only the posterior interosseous nerve travels under the arcade, unlike the other two divisions, patients with type A elbow ganglions are more likely to present with purely motor symptoms.<sup>3</sup>

In contrast to this, Miralles et al. in 2016 described a case series of eight elbow ganglions in seven patients who presented with type A elbow ganglions who had purely sensory changes in the distribution of the superficial radial nerve, with no motor fallout.<sup>13</sup>

Both our cases display ganglions that originated posterolateral to the radiocapitellar joint. They did not protrude anteriorly toward the supinator where the radial tunnel is located. They therefore could not be classified according to the system proposed by Yamazaki et al.

We therefore propose a new classification system for elbow ganglions (*Table II*) modified from the original classification system by Yamazaki et al.

Various treatment modalities have been reported for elbow ganglions. The majority of cases reported, unlike our two cases, were symptomatic. As a result, the vast majority of cases are treated by decompression or excision of the cyst. Lee et al. in 2013 reported a 65-year-old female with an ultrasound- and MRI-confirmed ganglion of the elbow and associated weakness of finger extension who deferred aspiration. The patient followed up three months later and had slight improvement of symptoms. This is the only report of a conservatively treated elbow ganglion that could be found in the literature.<sup>11</sup>

Two cases of elbow ganglions treated with ultrasound-guided aspiration have been reported. Erol et al.'s case reported in 2014 with ultrasound-guided aspiration of an elbow ganglion remained symptom free at nine-month follow-up.<sup>12</sup> In 2017, Seki reported a case of a 77-year-old male with an ultrasound-confirmed elbow ganglion and a posterior interosseous nerve palsy, who was treated with ultrasound-guided aspiration. The patient's symptoms

**Table II:** Proposed new classification system for elbow ganglions, modified from the original system proposed by Yamizaki, et al.<sup>3</sup>

Type	Site	Occurrence	Clinical presentation
Type 1 Subtypes A and B	Anterior/anterolateral <ul style="list-style-type: none"> <li>Type 1A = proximal to arcade of Frohse</li> <li>Type 1B = distal to arcade of Frohse</li> </ul>	Most common	May present with features of a radial nerve neuropathy (posterior interosseous nerve and/or superficial radial nerve)
Type 2	Posterolateral	Rare	Unlikely to present with any neurological manifestations
Type 3	Medial	Rare	May present with a neuropathy of the ulnar nerve if large enough

resolved and he remained symptom-free at the 17-month follow-up.<sup>14</sup>

Data is lacking with regard to long-term follow-up of patients with elbow ganglions treated with aspiration, but recurrence rates of ganglions treated elsewhere in the body have been shown to be over 50% when treated with aspiration.<sup>20</sup> Feldman's report of an arthroscopically excised elbow ganglion in 2000 is the only case that has been reported with this modality of treatment. The patient developed a transient neuropraxia of the superficial sensory branch of the radial nerve postoperatively, which resolved within one week and there was no evidence of recurrence at the 18-month follow-up.<sup>7</sup> The vast majority of cases reported have been treated with open surgical excision of the cyst, with symptom resolution and no recurrence.<sup>2-4,6,8-10,13,15-18</sup>

## Conclusion

Ganglions that occur around the elbow are infrequently encountered. Most cases reported on in the literature consist of case reports and small case series. They appear to occur more commonly in females and usually present between the third and sixth decades of life. The most common clinical scenario reported in the literature occurs secondary to an anterior elbow ganglion in the region of the radial tunnel. These patients usually present with lateral-sided elbow pain, commonly initially misdiagnosed as lateral epicondylitis, with or without associated neurological symptoms of the radial nerve. Most patients have motor weakness due to compression of the posterior interosseous nerve; less frequently, patients have sensory disturbances in the distribution of the superficial sensory branch of the radial nerve. Unlike our two patients, most cases are not easily diagnosed clinically and require further advanced imaging.

This case series presents two patients with asymptomatic posterolateral elbow ganglions who requested removal for aesthetic reasons. This clinical presentation seems to be far less frequent than patients presenting with a neuropathy of the radial nerve; however, it cannot be excluded that there is an underreporting of asymptomatic elbow ganglions in the literature. According to our review of the English literature this is only the third report of an asymptomatic elbow ganglion in the lateral compartment of the elbow.

## Ethics statement

The authors declare that this submission is in accordance with the principles laid down by the Responsible Research Publication Position Statements as developed at the 2nd World Conference on Research Integrity in Singapore, 2010. Prior to commencement of the study, ethical approval was obtained from the following ethical review board: University of the Witwatersrand Human Research Ethics Committee (Medical), reference number: M210285. All procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed written consent was obtained from all patients for being included in the study.

## Declaration

The authors declare authorship of this article and that they have followed sound scientific research practice. This research is original and does not transgress plagiarism policies.

## Author contributions


WM: study conceptualisation, data capture, first draft preparation, manuscript preparation, manuscript revision

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