

## Intratendinous Ganglion of the Extensor Pollicis Longus: Case Report and Literature Review

Yuji Tomori<sup>1</sup>, Norio Motoda<sup>2</sup>, Mitsuhiko Nanno<sup>3</sup> and Tokifumi Majima<sup>3</sup>

<sup>1</sup>Department of Orthopaedic Surgery, Nippon Medical School Musashikosugi Hospital, Kanagawa, Japan

<sup>2</sup>Department of Diagnostic Pathology, Nippon Medical School Musashikosugi Hospital, Kanagawa, Japan

<sup>3</sup>Department of Orthopaedic Surgery, Nippon Medical School Hospital, Tokyo, Japan

Ganglion cysts are common benign lesions in the hand and wrist. However, intratendinous ganglion cysts are uncommon. We present a case of intratendinous ganglion cyst in the extensor pollicis longus (EPL) tendon of the right hand of a 73-year-old woman. The subcutaneous mass moved in concert with the EPL tendon in her right thumb. Magnetic resonance imaging showed a space-occupying lesion in the EPL tendon. Biochemical and hemato-immunological examinations ruled out diabetes, rheumatoid arthritis, and other connective tissue diseases. She reported motion pain during thumb extension, for which she desired surgery. An intratendinous cyst was identified intraoperatively within the tendon substance of the EPL, in which a part of the cyst was herniated into a slit in the tendon substance, just distal to the extensor retinaculum, without notable proliferative synovial tissue. The EPL tendon was opened longitudinally, and a cystic lesion was enucleated. Pathological examination showed that the cyst wall consisted of fibrous tissue with degeneration and no epithelial lining. Postoperative recovery was uneventful. Six months after surgery, the patient had no residual pain and no cyst recurrence. The rarity of intratendinous ganglion cysts makes diagnosis and treatment challenging. Because intratendinous ganglion cysts and associated synovitis frequently weaken the structure of affected tendons, prompt diagnosis and surgical excision are necessary. (*J Nippon Med Sch* 2021; 88: 500–505)

**Key words:** hand, extensor tendon, extensor pollicis longus, intratendinous ganglion

### Introduction

Ganglion cysts are the most common benign soft-tissue tumors of the hand and wrist<sup>1,2</sup>. The dorsal side of the wrist, which originates from the scapholunate ligament, and the volar side of the wrist, which originates from the scaphotrapezial and radiocarpal joint, are common lesion sites. Furthermore, palmar digital ganglia and volar retinacular cysts arise from the flexor tendon sheath. However, intratendinous ganglion cysts are less common<sup>1,2</sup>. Here, we present a case of an intratendinous ganglion cyst in the extensor pollicis longus (EPL) of the right hand and review English-language reports of such lesions of the hand and wrist.

### Case Presentation

A 73-year-old woman was referred to our hospital for evaluation of right wrist pain and a dorsal mass that she had noticed 6 months previously. The subcutaneous mass moved in concert with the EPL tendon of her right thumb (**Fig. 1A and B**). A radiograph showed no abnormality around the hump, including osteoarthritic changes of the carpometacarpal joint. Magnetic resonance imaging (MRI) using T2-weighted fast spin-echo and T1-weighted sequences showed a space-occupying lesion measuring approximately 5 × 5 × 7 mm in the EPL tendon (**Fig. 1C and D**). Biochemical and hemato-immunological examinations ruled out diabetes, rheumatoid arthritis, and other connective tissue diseases. The patient reported motion pain during thumb extension

Correspondence to Yuji Tomori, MD, PhD, Department of Orthopaedic Surgery, Nippon Medical School Musashikosugi Hospital, 1-396 Kosugi-cho, Nakahara-ku, Kawasaki, Kanagawa 211-8533, Japan

E-mail: s4064@nms.ac.jp

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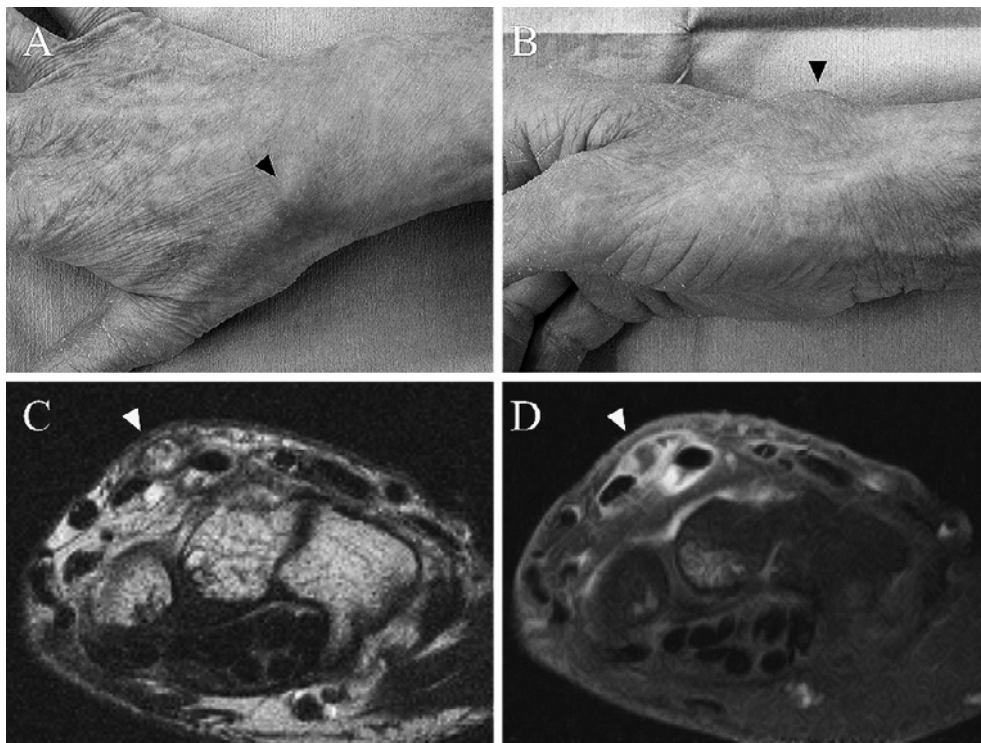


Fig. 1 Preoperative photographs (A, B) and magnetic resonance image (MRI) (C, D). A mass (black arrowheads) that moved in concert with the movement of the extensor pollicis longus (EPL) tendon was observed (A, B). MRI showed a space-occupying lesion (white arrowheads) in the EPL on T2-weighted and enhanced T1-weighted images.

and desired surgery. Informed consent for surgery was obtained from the patient, who also gave written permission for us to use her anonymized images in this publication.

An intratendinous cyst was identified intraoperatively within the EPL tendon substance, in which a part of the cyst was herniated into a slit of the tendon substance, just distal to the extensor retinaculum (Fig. 2A and B). The cyst had no connection to the wrist joint. No noteworthy synovitis was observed in the surrounding tissue (Fig. 2C). The EPL tendon was opened longitudinally, and a cystic lesion filled with a translucent gelatinous material was enucleated (Fig. 2D). Repair of the split EPL tendon was performed using 4-0 polypropylene non-absorbable sutures.

The results of cultures to determine the presence of bacteria, acid-fast bacilli, and fungi were negative. Pathological examination of the excised lesions showed no evidence of a specific bursitis such as rheumatoid arthritis. The cyst wall consisted of fibrous tissue with degeneration and no epithelial lining. These pathological findings were consistent with a ganglion cyst. Postoperative recovery was uneventful. Six months after surgery, the patient had no residual pain and no cyst recurrence.

### Discussion

Intratendinous ganglion cyst of the hand is uncommon. Only 22 cases of ganglion cyst around the tendon of the hands and wrists have been reported in 11 case reports in the English literature (Table 1 and 2)<sup>3-13</sup>. These cysts originated from 20 extensors and two flexors. Intratendinous ganglion cysts in extensor tendons are usually small and present aesthetic concerns. In contrast, intratendinous ganglion cysts in flexor tendons are difficult to recognize until they grow large enough to be noticed. The difficulty of identifying intratendinous ganglion cysts in the flexor tendon might explain why only a few cases have been reported.

Although the site of intratendinous ganglion cyst formation may be similar to that of typical ganglion cysts, the former are easy to distinguish by physical examination because they move in concert with the tendon. The differential diagnosis includes granulation due to trauma, inflammatory or infectious tenosynovitis, and neoplasm<sup>3-6</sup>. A history of injury near the lesion suggests granulation due to trauma. Biochemical and pathological examinations can rule out inflammatory tenosynovitis due to diabetes, rheumatoid arthritis, gout, or other con-

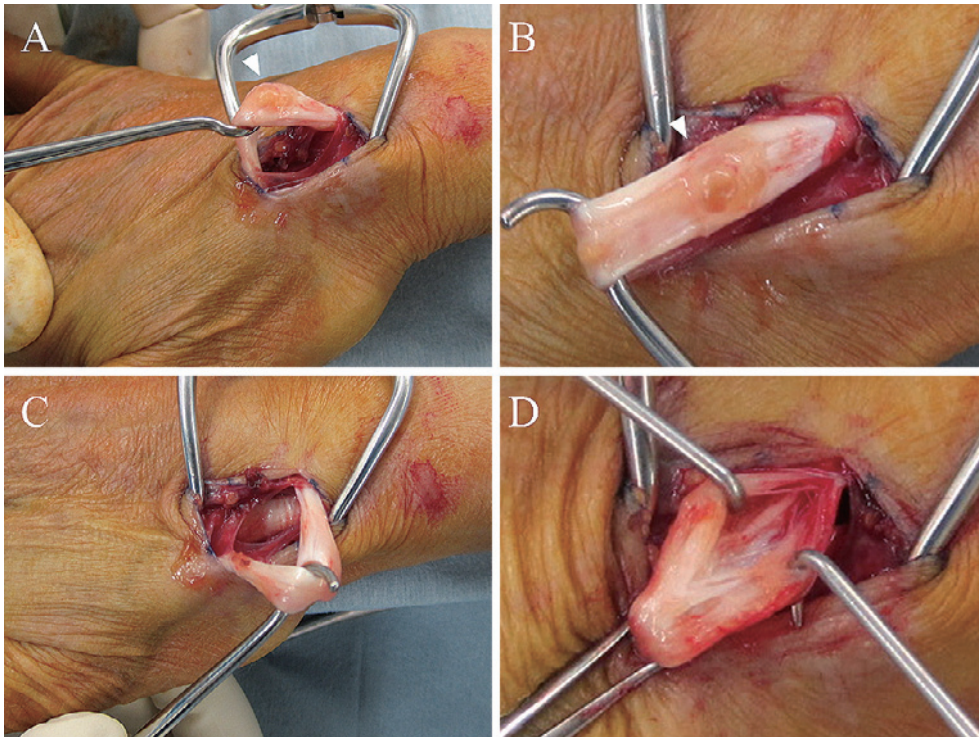


Fig. 2 Perioperative photographs of the extensor pollicis longus (EPL) tendon (A-D). An intratendinous ganglion cyst was identified within the EPL tendon substance, in which a part of the cyst (white arrowheads) was herniated into a slit of the tendon substance (A, B). The cyst had no connection to the wrist joint. Consequently, no notable synovitis was observed in surrounding tissue (C). The EPL tendon was opened longitudinally, and a cystic lesion filled with translucent gelatinous material was found within the EPL tendon. The cystic lesion was enucleated (D).

nective tissue diseases. Neoplasms, including giant cell tumor of the tendon sheath and angioleiomyomas, are diagnosed with imaging modalities or pathological examination.

Imaging modalities, including MRI and ultrasonography, are helpful for diagnosing ganglion cysts; however, diagnosis of intratendinous ganglion cysts is difficult because most lesions are small<sup>3-13</sup>. Radiographs provide meaningful information only if there is clinical suspicion of an underlying bony abnormality, including osteoarthritis or bone spur. Thus, definitive diagnosis of intratendinous ganglion cyst may not ultimately be possible preoperatively<sup>5</sup>. In our case, biochemical and hematological findings ruled out diabetes, rheumatoid arthritis, and other connective tissue diseases, and surgical and pathological findings yielded a definite diagnosis of the lesion.

Although the causes of intratendinous ganglion cysts are unclear, most cases occur around the extensor or flexor retinaculum. In our patient, the intratendinous ganglion cyst was located just distal to the extensor retinaculum<sup>3-13</sup>. Thus, chronic mechanical stimulation to the

tendon, including friction to the flexor or extensor retinaculum and irritation by a bone spur such as metacarpal bosses, may be the cause of intratendinous ganglion cysts<sup>5,10,13</sup>. Alternatively, on the basis of their observations of intraoperative findings, Seidman and Margles proposed that the pathomechanism of these lesions is characterized by synovial tissue invasion of tendon parenchymal tissue<sup>6</sup>. However, our case and some past cases exhibited no notable tenosynovitis, which indicates a different pathomechanism for ganglion cyst formation.

Treatment of intratendinous ganglion cysts of the hand is controversial. Enucleating the tendon to excise a ganglion cyst, followed by closure with a running suture, is adequate. Intratendinous ganglion cysts, however, are associated with increased risk of spontaneous tendon rupture<sup>3-13</sup>, perhaps because of the presence of degenerative tendinopathy and longitudinal tearing of the affected tendon<sup>8,9</sup>. Because intratendinous ganglion cysts weaken the tendon, the severely damaged tendon is difficult to preserve. Among the 22 tendons reported in the literature, five were resected. All the resected tendons, which included a flexor and four extensor tendons, were covered

Table 1 Previously reported intratendinous ganglion cysts of the hand and wrist in the English literature (1)

No. of case report	Author	Year	No. of lesions	Age (years)/sex	Side	Occupation	History of injury or cause of lesion	Symptoms at time of occurrence	Duration of wrist pain
1	Lucas GL <sup>13</sup>	1979	1	13/F	Rt	None	None	Hump of the wrist	1 year
2	Young SC & Freiberg A <sup>3</sup>	1985	1	51/M	Rt	Carpenter	Car accident	Hump of the wrist, dull pain	7 months
3	Rayan GM <sup>4</sup>	1989	1	48/F	*	*	None	Painless swelling, mass of the wrist	2 years
4	Chen WS et al. <sup>5</sup>	1992	1	42/F	Rt	Housewife	Carpometacarpal boss	Intermittent pain, hump of the wrist	10 years
			1	55/M	Lt	Farmer	Carpometacarpal boss	Dorsal mass of the wrist, soreness	3 years
5	Seidman GD & Margles SW <sup>6</sup>	1993	2	56/F	Rt	*	Carpometacarpal osteophyte, 1	Hump of the wrist, pain (mild tenderness, 5)	10 years
			1	59/F	Lt	*	First carpometacarpal arthritis, 1		10–12 years
			1	47/F	Lt	*			>1 year
			1	42/F	Rt	*			Several years
			1	57/F	Rt	*			9 months
			1	56/M	Rt	*			9 months
			2	66/M	Lt	*			2–3 months
6	Ikeda K & Tomita K <sup>7</sup>	2001	1	53/M	Lt	*	none	Hump of the wrist, inability to extend left hand completely	*
7	Chew EM <sup>8</sup>	2010	1	43/F	Lt	Waitress	None	Swelling, hump of the wrist	1 month
8	Satonaka H et al. <sup>9</sup>	2014	1	45/F	Rt	*	None	Motion pain, painful triggering	3 years
9	Chia DS et al. <sup>10</sup>	2015	1	73/F	Rt	*	None	Painless swelling	1 year
10	Lee HJ et al. <sup>11</sup>	2015	1	51/F	Lt	Housewife	None	Hump of the wrist, motion pain	*
			1	51/F	Rt	Housewife	None	Painful fusiform wrist mass, motion pain	1 month
11	Senda H et al. <sup>12</sup>	2017	1	58/*	Rt	*	None	Wrist mass, motion pain	30 years
			1	56/*	Rt	*	None	Wrist mass, motion pain	*
12	Present case	2020	1	73/F	Rt	Housewife	None	Hump of the wrist, motion pain	8 weeks

F, Female; M, Male; Lt, Left; Rt, Right  
Asterisks indicate missing data

with ganglia and severely damaged. If the function of the tendon is nonessential or can be compensated for by tendon transfer or tendon graft, the affected tendon can be resected<sup>5,9,12,13</sup>. However, reconstruction of the tendon is more challenging and functional outcomes are worse than those for primary ganglion cyst excision and tendon repair. Furthermore, the risk of ganglion cyst recurrence must be considered in the management of intratendinous lesions. Recurrence of an intratendinous ganglion cyst

was reported in only one patient<sup>6</sup>. When the tendon is fully occupied and covered with ganglia, complete enucleation of the ganglia is impossible, and the risk of recurrence is thus higher.

Although ganglion cysts are usually asymptomatic, prompt diagnosis and surgical enucleation can reduce the risk that the ganglion cyst will continue to grow or recur and lead to rupture of the affected tendon. The most important concern is detecting the intratendinous ganglion.



Table 2 Previously reported cases of intratendinous ganglion of the hand and wrist in the English literature (2)

No. of case report	Site of lesion formation	Tumor size	Adjacent lesion	Surgical procedure	Follow-up duration	Postoperative complications	Reconstruction surgery	Recurrence
1	EDBM	*	None	Resection	None	None	-	None
2	EPB	*	None	Enucleation	*	None	-	None
3	EPL	40 mm fusiform nodular	None	Enucleation	12 years	None	-	None
4	EDC (III)	10×3×3 mm	Carpometacarpal boss	Enucleation	6 months	None	-	None
	Bifurcation of EDC (II, III)	15×15×10 mm	Carpometacarpal boss	Enucleation	3 years	None	-	None
5	EDC (II), EDC (III)	*	Synovitis	EDC (II); resection, EDC (III); enucleation	12 years, 9 months	None	EDC (II); EIP side-to-side suture	None
	EDC (IV)	*	Synovitis	Enucleation	3 months	None	-	None
	EDC (III)	*	Synovitis	Enucleation	1 year, 10.5 months	None	-	Yes
	APL	*	None	Enucleation	2 years, 7.5 months	None	-	None
	ECD (III)	*	Synovitis	Enucleation	8 years, 4 months	None	-	None
	EDC (II)	*	Synovitis	Enucleation	9 years, 9 months	None	-	None
	EDC×2	*	None	Enucleation	8 years, 1.5 months	None	-	None
6	EDC (IV)	*	None	Enucleation	2.5 years	None	-	None
7	EPB	20×20 mm	EPL; synovial cyst	Enucleation	*	None	-	None
8	EPL	14×8×7 mm	Stenosing tenosynovitis	Resection	3 months	None	EIP tendon transfer	None
9	FDP (V)	15×10 mm	None	Enucleation	1 year	None	-	None
10	EDC (III)	12.6×5.5×13.2 mm	No synovitis	Enucleation	2 years	None	-	None
	EPL	22×2.9×6.2 mm	No synovitis	Enucleation	2 months	None	-	None
11	EDC (III)	10×20×30 mm	Synovitis	Resection of 2/3 tendon	6 months	Subcutaneous tendon rupture	Bridge graft	None
	FDS (IV)	7×7×20 mm	None	Blocked excision with tendon	6 months	None	-	None
12	EPL	5×5×7 mm	Mild synovitis	Enucleation	6 months	None	-	None

APL, abductor pollicis longus; EDBM, extensor digitorum brevis manus; EDC, extensor digitorum communis; EIP, extensor indicis proprius; EPB, extensor pollicis brevis; EPL, extensor pollicis longus  
Asterisks indicate missing data.

Intratendinous ganglion of the flexor tendon is difficult to detect, and some lesions in the flexor tendon might result in spontaneous closed flexor tendon rupture<sup>14</sup> before being diagnosed as intratendinous ganglion in flexor tendon. In any case, prompt diagnosis and surgical excision of intratendinous ganglion cysts are important.

### Conclusion

Intratendinous ganglion cyst of the hand is uncommon, and definitive diagnosis is challenging because of the rarity of these lesions. Because intratendinous ganglion cysts and associated synovitis frequently weaken the structure of the affected tendons, prompt diagnosis and surgical excision are required.

**Conflict of Interest:** The authors declare no conflicts of interest. The authors are responsible for the content and writing of this article.

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