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Carpal tunnel syndrome associated with chronic bursitis: A case report

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Abstract

This current report presents a rare case of carpal tunnel syndrome with chronic bursitis that was treated successfully by open surgery. A 53-year-old female patient that had begun to experience swelling, pain and limited flexion activity of the left wrist 1 year previously presented because of a deterioration in her condition and numbness of the thumb, index finger and middle finger in the previous 2 months without any treatment. The diagnosis of bursitis should be based on clinical symptoms and signs, combined with colour ultrasonography, magnetic resonance imaging, arthroscopy and arthrography. Bursitis should be differentiated from arthritis, tendonitis, fracture and neoplasm, but complete exclusion depends on the postoperative pathological results. In this current case, the histopathological findings were consistent with bursitis without malignancy. After surgery, the patient was instructed to perform rehabilitation exercises for the wrist joint. These exercises included passive activity 3 days after surgery and active activity 1 week after surgery. There was also regular follow-up every 3 months. The patient recovered well and reported that the pain and numbness that she described preoperatively had been resolved.

Keywords

Carpal tunnel syndrome, chronic bursitis, surgical excision

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Introduction

Bursitis mainly occurs in the olecranon, prepatellar, superficial infrapatellar and subcutaneous calcaneal bursitis, but rarely involves the wrist.[1] Carpal tunnel syndrome (CTS) is the most common peripheral nerve entrapment syndrome.[2] CTS can result

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from increased content or reduced volume of the carpal tunnel, which compresses the median nerve. It has been reported that CTS is commonly associated with injury, inflammation, pregnancy, diabetes mellitus, gout stones, distal radius fractures and cysts.[3] This current report presents a rare case of CTS with chronic bursitis that was treated using open surgery.

Case report

A 53-year-old female patient that had experienced swelling, pain and limited flexion activity of the left wrist for 1 year previously was referred to the Department of Orthopaedics, Taizhou People's Hospital, Taizhou, Jiangsu Province, China in May 2020 because of a deterioration in her condition and numbness of the thumb, index finger and middle finger in the previous 2 months without any treatment. The thenar muscle of the affected hand was slightly atrophied. The Tinel's sign and Phalen's test were both positive at the wrist. The static two-point discrimination sense and mononuclear sense of the distal phalanges of the left index finger were 7 mm and 0.4 g, respectively; and the parameters of the middle finger were 8 mm and 0.6 g, respectively. The smooth glide and grip strength of the left hand were worse than the right hand. The left wrist could be extended, but the metacarpophalangeal joint of the left index finger, middle finger, ring finger, little finger and the left wrist flexion activity were significantly limited. The range of motion of the left wrist was as follows: 60° palmar flexion, 50° dorsal extension, 20° radial deviation, 30° ulnar deviation, 45° pronation and 50° supination. The patient had no history of smoking and alcohol abuse. There were no family members with any history of related diseases. Laboratory indicators were negative, including rheumatoid factor and tuberculin tests. Erythrocyte sedimentation rate and C-reactive protein were higher than the normal range (Table 1). Magnetic resonance imaging (MRI) showed chronic bursitis with effusion and degenerative changes in the left wrist (Figure 1).

According to the patient's requirements and symptoms, surgical intervention was attempted by two orthopaedic attending surgeons, both of whom have over 3 years of surgical experience. The surgeons performed an S-shaped incision on the metacarpal surface of the wrist. The bursa abnormalities were wrapped around the median nerve and flexor tendon, while the aponeurosis and epineurium were eroded. The lesion was completely removed and the transverse carpal ligament was incised to release the flexor tendons, median nerve and its returning branches. Negative pressure drainage was removed 3 days after surgery. The stitches were removed 14 days after surgery and the wound dressings were changed regularly during this period. The wound healed without infection. After surgery, the patient complied with the surgeon's advice to start rehabilitation exercise to reduce adhesion of the tendon and nerve tissues. Postoperative rehabilitation exercises included passive activity 3 days after surgery and active activity 1 week after surgery (Figure 2).

Part of the specimen was removed for bacterial culture during the operation and the results were negative. Postoperative histopathology showed an uneven thickness of the bursa wall, myxoid fluid, hyperplasia of synovial cells, dilatation and hyperaemia of interstitial blood vessels, infiltration of lymphocytes and plasma cells (Figure 3). Histopathological findings were consistent with bursitis without malignancy.

Postoperative follow-up was conducted every 3 months. The patient expressed her gratitude that the pain and numbness that she described preoperatively had been resolved. The patient's symptoms had improved significantly (Figure 4).

Table 1. Demographic, clinical and diagnostic data of a 53-year-old female patient admitted because of symptoms of swelling, pain and limited flexion activity of the left wrist and numbness of the thumb, index finger and middle finger.

		Reference range
Demographic and clinical data		
Age, years	53	–
Sex	Female	–
Nationality	China	–
Family history	None	–
Smoking	None	–
Alcohol abuse	None	–
Physical examination		
Duration of onset	14 months	–
Pathological location	Left wrist	–
Symptoms	Swelling, pain, limited flexion activity, numbness	–
S2PD		
Index finger	7 mm	2–4 mm
Middle finger	8 mm	2–4 mm
Mononuclear sense		
Index finger	0.4 g	0.008–0.07 g
Middle finger	0.6 g	0.008–0.07 g
Range of motion of wrist		
Palmar flexion	60°	50–60°
Dorsal extension	50°	35–60°
Radial deviation	20°	25–30°
Ulnar deviation	30°	30–40°
Pronation	45°	80–90°
Supination	50°	80–90°
Operative method	Open excision	
Postoperative complications	None	
Laboratory examination		
White blood cell count, $\times 10^9$ /l	4.19	3.5–9.5
Red blood cell count, $\times 10^{12}$/l	4.75	4.3–5.8
Platelet count, $\times 10^9$/l	259	125–350
RF, IU/ml	10.6	0–16
CRP, mg/l	12.3	0–5
ESR, mm/h	31	0–15
PPD	Negative	–
ABO blood type	B	–
Rh blood type	Positive	–

S2PD, static two-point discrimination sense; RF, rheumatoid factor; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; PPD, tuberculin purified protein derivative.

The flexion and extension of the wrist joint and metacarpophalangeal joints of the left hand were slightly limited without bowstring deformity 6 months after the operation. The smooth glide and grip strength of the left side were similar to right side. Meanwhile, there was no clinical or radiological evidence of recurrence.

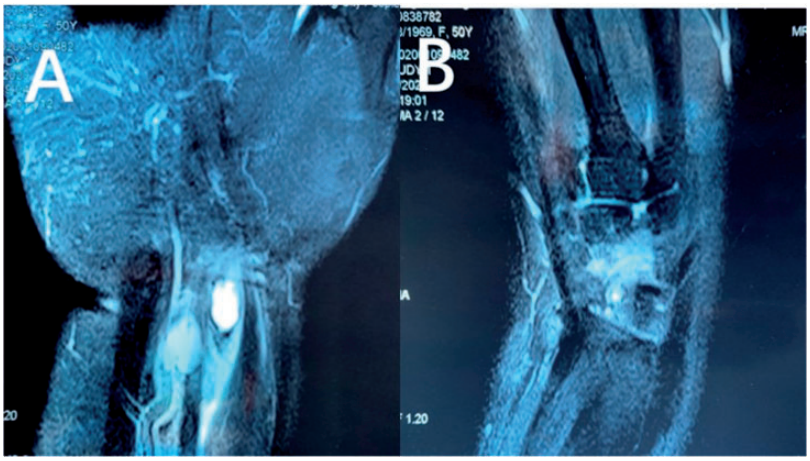

Figure 1. Magnetic resonance images of a 53-year-old female patient that had experienced swelling, pain and limited flexion activity of the left wrist for 1 year previously. She presented because of a deterioration in her condition and numbness of the thumb, index finger and middle finger in the previous 2 months without any treatment. The images show chronic bursitis with effusion and degenerative changes in the left wrist: (a) intraarticular synovial thickening with multiple patchy and cystic hypersignal foci in the T2 lipid compression sequence and (b) thickening of the synovial membrane in the coronal position of the T2 lipid compression sequence, patchy hypersignal shadow and an unclear boundary.

The work has been reported in line with the CARE guidelines.[4]

Discussion

The bursa is a closed sac filled with synovial fluid that acts as cushioning to allow smooth gliding and reduce friction between structures such as tendons, bone or skin.[5] These bursae are located between apophysis and overlying skin, a few of which are connected to the joint.[6] Bursitis mainly occurs in the olecranon, prepatellar, superficial infrapatellar and subcutaneous calcaneal bursitis, but rarely involves the wrist.[1] Bursitis is usually caused by trauma, inflammation and infection.[6] It is more common in men than women, especially in patients that undertake heavy physical labour and athletes.[7–9] This current patient had been engaged in manual work for a long time, which might account for the development of bursitis. Bursitis is characterized by swelling and pain that may limit joint movement.[10] In the clinic, most patients have a long disease course and are prone to misdiagnosis and missed diagnosis due to the low incidence of this disease in the wrist. The diagnosis of bursitis should be based on clinical symptoms and signs, combined with colour ultrasound, MRI, arthroscopy and arthrography. Bursitis should be differentiated from arthritis, tendonitis, fracture and neoplasm, but complete exclusion depends on postoperative pathological findings. Most patients with chronic bursitis are treated with conservative management including ice, elevation of the affected limb, compression dressing, restricted movement, analgesics and corticosteroid injections.[8,11–13] Surgery will be performed in patients with persistent or recurring bursitis or significant growth of a bursa that affects function. The aim of surgery is to remove the lesion and reduce the possibility of recurrence. Surgical methods include open or endoscopic bursectomy. Possible complications

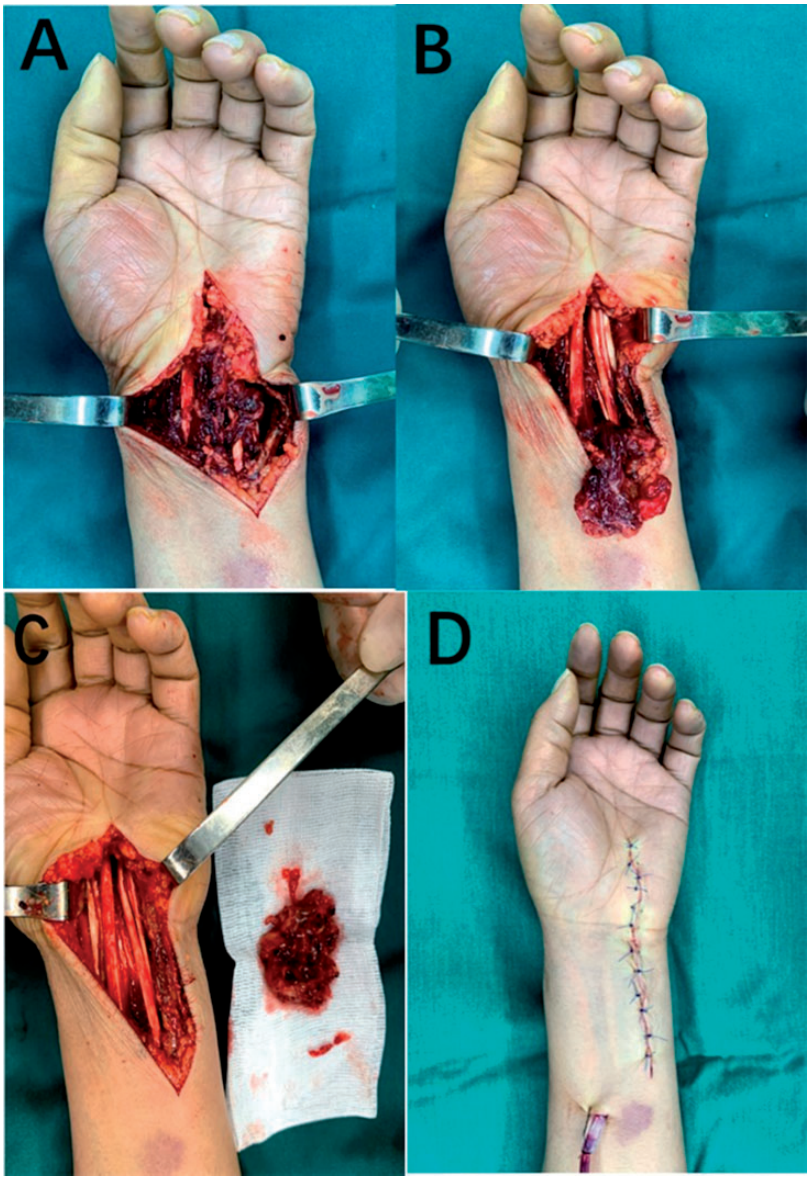

Figure 2. Surgical procedures undertake on a 53-year-old female patient admitted because of symptoms of swelling, pain and limited flexion activity of the left wrist and numbness of the thumb, index finger and middle finger: (a) an S-shaped incision on the metacarpal surface of the wrist (b) these bursa abnormalities were wrapped around the median nerve and flexor tendon, while the aponeurosis and epineurium were eroded; (c) the lesion was completely removed and the transverse carpal ligament was incised to release the flexor tendons, median nerve and its returning branches and (d) the wound was closed and a negative pressure drainage tube was placed. The colour version of this figure is available at: http://imr.sagepub.com.

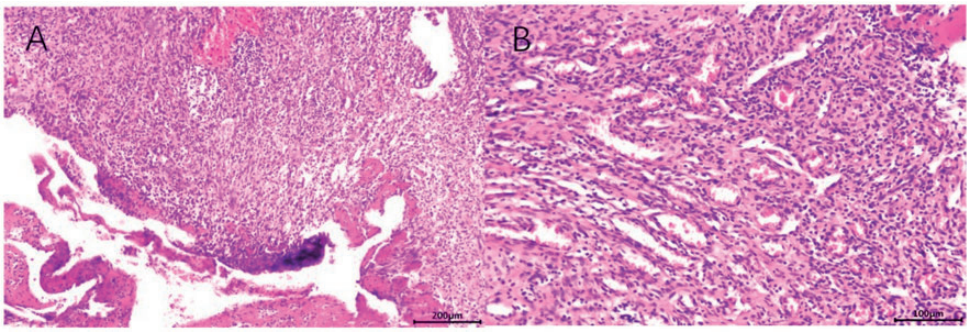

Figure 3. Representative postoperative histopathological photomicrographs show an uneven thickness of the bursa wall, myxoid fluid, hyperplasia of synovial cells, dilatation and hyperaemia of interstitial blood vessels, infiltration of lymphocytes and plasma cells. Haematoxylin and eosin; scale bar 200 μm (a) and scale bar 100 μm (b). The colour version of this figure is available at: http://imr.sagepub.com.

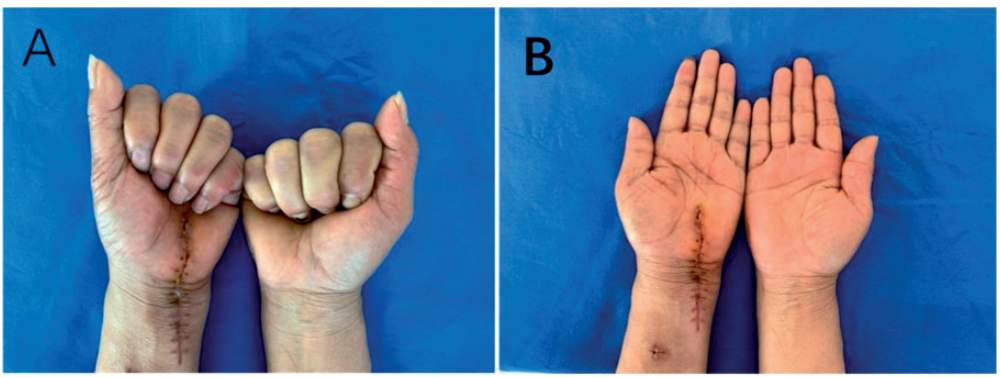

Figure 4. Photographs of the hands of a 53-year-old female patient admitted because of symptoms of swelling, pain and limited flexion activity of the left wrist and numbness of the thumb, index finger and middle finger at 3 months after surgery: (a) good flexion activity in the left hand compared with the right hand and (b) good extension activity in the left hand compared with the right hand.

of open surgery include wound infection, delayed healing, lymphatic fistula and allergic reactions to adjacent skin and tissues.[14–17] The complication rate of endoscopic surgery is lower than that of open surgery.[8,9]

Carpal tunnel syndrome is the most common peripheral nerve entrapment syndrome.[2] CTS affects approximately 0.4% of the population and is three times as common in women than in men.[18] The carpal tunnel is a U-shaped bone fibre canal composed of the carpal bone and the transverse carpal ligament, which contains nine digital flexor tendons and median nerves.[19] CTS can result from increased content or reduced volume of the carpal tunnel, which compresses the median nerve. It has been reported that CTS is commonly associated with inflammation, pregnancy, diabetes mellitus, gout stones, distal radius fractures and cysts.[3] Common symptoms of CTS include paresthesia and/or numbness in the median innervation area (thumb, index finger, middle finger and radial half of ring finger) and even thenar muscle atrophy.[20]

CTS usually starts with numbness in the fingers at night. The two most common provocative tests used to examine CTS are Tinel's sign and Phalen's test.[21] Clinical diagnosis still requires the combination of signs and other methods such as nerve conduction velocity, MRI and ultrasonography.[22–24]

It has been confirmed that the increased expression of prostaglandin and vascular endothelial growth factor in pathological tissues is related to the pathogenesis of CTS.[25] This increases fibroblast density, the size of the collagen fibres, vascular proliferation and type III collagen, which leads to the formation of contractile scar tissue around the median nerve and tendons, resulting in CTS and tendon adhesions.[3] The bursitis mass of the wrist and hand produces severe compression on the tendon, median nerve and other tissues, which can spread along the tendon, carpal tunnel and even reach the proximal finger, affecting limb activities.[3] During the operation on the current case, the pathological bursa was completely removed to relieve the compression and prevent more serious damage caused by median nerve entrapment.[3]

In conclusion, this current report described a rare case of CTS with chronic bursitis. The review of the patient may be useful for clinical diagnosis and treatment and future research on the pathogenesis of this rare condition.

Declaration of conflicting interest

The authors declare that there are no conflicts of interest.

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References

1. Aaron DL, Patel A, Kayiaros S, et al. Four common types of bursitis: diagnosis and management. *J Am Acad Orthop Surg* 2011; 19: 359–367.
2. Olney RK. Carpal tunnel syndrome: complex issues with a "simple" condition. *Neurology* 2001; 56: 1431–1432.
3. Zamborsky R, Kokavec M, Simko L, et al. Carpal Tunnel Syndrome: Symptoms, Causes and Treatment Options. Literature Reviev. *Ortop Traumatol Rehabil* 2017; 19: 1–8.
4. Gagnier JJ, Kienle G, Altman DG, et al. The CARE guidelines: consensus-based clinical case reporting guideline development. *Headache* 2013; 53: 1541–1547.
5. Hudson K and Delasobera BE. Bursae. In: Komzsik L, Birrer RB, O'Connor FG and Kane SF (eds). *Musculoskeletal and Sports Medicine For The Primary Care Practitioner*. 4th ed. Boca Raton, FL: CRC Press, Taylor & Francis Group, 2016, pp.111–116.
6. Khodaee M. Common Superficial Bursitis. *Am Fam Physician* 2017; 95: 224–231.
7. Baumbach SF, Lobo CM, Badyine I, et al. Prepatellar and olecranon bursitis: literature review and development of a treatment algorithm. *Arch Orthop Trauma Surg* 2014; 134: 359–370.
8. Chard MD and Walker-Bone K. The elbow. In: Hochberg MC, Silman AJ, Smolen JS, Weinblatt ME and Weisman MH (eds). *Rheumatology*. 6th ed. Philadelphia, PA: Mosby, 2014, pp.611–617.
9. Morrey BE. Bursitis. In: Morrey BF and Sanchez-Sotelo J (eds). *The elbow and its disorders*. 4th ed. Philadelphia, PA: Saunders/Elsevier, 2009, pp.1164–1173.
10. Bursitis of the Elbow, Knee, and Heel. *Am Fam Physician* 2017; 95. PMID: 28290637.
11. Laupland KB and Davies HD. Calgary Home Parenteral Therapy Program Study Group. Olecranon septic bursitis managed in an ambulatory setting. *Clin Invest Med* 2001; 24: 171–178.
12. McAfee JH and Smith DL. Olecranon and prepatellar bursitis. Diagnosis and treatment. *West J Med* 1988; 149: 607–610.

13. Reilly D and Kamineni S. Olecranon bursitis. *J Shoulder Elbow Surg* 2016; 25: 158–167.
14. Degreef I and De Smet L. Complications following resection of the olecranon bursa. *Acta Orthop Belg* 2006; 72: 400–403.
15. Kerr DR and Carpenter CW. Arthroscopic resection of olecranon and prepatellar bursae. *Arthroscopy* 1990; 6: 86–88.
16. Ogilvie-Harris DJ and Gilbart M. Endoscopic bursal resection: the olecranon bursa and prepatellar bursa. *Arthroscopy* 2000; 16: 249–253.
17. Stewart NJ, Manzanares JB and Morrey BF. Surgical treatment of aseptic olecranon bursitis. *J Shoulder Elbow Surg* 1997; 6: 49–54.
18. Atroshi I, Gummesson C, Johnsson R, et al. Prevalence of carpal tunnel syndrome in a general population. *JAMA* 1999; 282: 153–158.
19. Dorwart BB. Carpal tunnel syndrome: a review. *Semin Arthritis Rheum* 1984; 14: 134–140.
20. Wang L. Guiding Treatment for Carpal Tunnel Syndrome. *Phys Med Rehabil Clin N Am* 2018; 29: 751–760.
21. Ibrahim I, Khan WS, Goddard N, et al. Carpal tunnel syndrome: a review of the recent literature. *Open Orthop J* 2012; 6: 69–76.
22. de Krom MC, Knipschild PG, Kester AD, et al. Efficacy of provocative tests for diagnosis of carpal tunnel syndrome. *Lancet* 1990; 335: 393–395.
23. Mesgarzadeh M, Triolo J and Schneck CD. Carpal tunnel syndrome. MR imaging diagnosis. *Magn Reson Imaging Clin N Am* 1995; 3: 249–264.
24. Keleş I, Karagülle Kendi AT, Aydin G, et al. Diagnostic precision of ultrasonography in patients with carpal tunnel syndrome. *Am J Phys Med Rehabil* 2005; 84: 443–450.
25. Hirata H, Nagakura T, Tsujii M, et al. The relationship of VEGF and PGE2 expression to extracellular matrix remodelling of the tenosynovium in the carpal tunnel syndrome. *J Pathol* 2004; 204: 605–612.