CASE REPORT

Initially unrecognised lunate dislocation as a cause of carpal tunnel syndrome

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georg.mattiassich@gmx.at**SUMMARY**

A patient was admitted reporting tingling pain and numbness in the right hand. Neurological examination—including nerve conduction studies—diagnosed carpal tunnel syndrome. Operative carpal tunnel release was performed without complications. Four months postoperatively the otherwise healthy patient presented again due to persistent complaints, although preoperative symptoms had improved. On this occasion, the patient reported loss of strength accompanied by rigidity in the wrist. Clinical examination showed some swelling adjacent to the operation wound. A postoperative ganglion cyst was suspected and a conservative treatment option—splinting the wrist—was chosen. Four weeks later the patient presented again with further swelling and increasing rigidity of the wrist. Surgical intervention was planned. Preoperative plain radiographs of the wrist revealed chronic palmar dislocation of the lunate to be the cause of the symptoms in our patient. Radiological signs of scapholunate advanced collapse arthritis (SLAC wrist) were also observed.

Additional imaging such as x-ray, ultrasound, CT or even MRI examination is facultative and can be helpful in preoperative planning.

Therapy of mild CTS can consist of local or systemic cortisone therapy supported by splinting. If symptoms cannot be resolved by conservative means, operative treatment with release of the carpal tunnel is the therapy of choice.

CASE PRESENTATION

A patient was referred to our clinic, with loss of strength in the right hand, periodically mainly nocturnal emerging pain and numbness in the median-innervated fingers. Trauma anamnesis was negative and onset of symptoms had been a few months previously. The patient showed no risk factors for CTS such as rheumatoid arthritis or gravidity. Positive Phalen's and Tinel's signs were evident. Passive and active fist closure was possible but strength was reduced in the right hand compared with the left (muscle strength grade 3).

Neurological and EMG investigations showed typical signs of severe CTS, with reduced sensitivity and strength in the right thumb, index finger and middle finger as well as highly reduced nerve conduction in the median nerve. Additional imaging was not performed as the symptoms were conclusive and previous trauma was denied. Operative decompression of the median nerve through open carpal tunnel release was indicated and performed 3 days after the patient was referred at our department. The operation and the postoperative progress were unremarkable and the patient was discharged the day after the operation.

Owing to persistent complaints the patient presented 4 months postoperatively, although preoperative symptoms complained of had showed improvement. Nocturnal pain improved but loss of muscle strength increased and rigidity was reported. Furthermore, palmar swelling adjacent to the operation wound was noted by the patient and was suspected as a postoperative ganglion cyst. Clinical investigation showed positive Phalen's and Tinel's signs. Conservative treatment attempt was recommended, which consisted of splinting the wrist.

OUTCOME AND FOLLOW-UP

The patient presented again 4 weeks later with further swelling and increasing loss of range of motion of the wrist. Surgical excision of the suspicious cyst and revision of open carpal tunnel release was planned. Plain radiographs (figure 1A, B) of the right hand were taken preoperatively and

BACKGROUND

Carpal tunnel syndrome (CTS) is the most frequently encountered nerve entrapment syndrome with a prevalence varying between 5% and 16%.^{1–8} Middle-aged women are more often affected than men.⁹

The carpal tunnel is a narrow space confined by anatomical borders of carpal bones and the transverse carpal ligament. The exact pathogenesis of CTS is not clear. Most likely causes are compression, microvascular insufficiency, use of vibration hand tools, synovitis due to rheumatoid arthritis and gravidity with swelling of the soft tissue.^{10–12} However, in many cases CTS is of idiopathic genesis.

Diagnosis is based on patient history with frequently encountered nocturnal burning pain associated with tingling and numbness in the distribution of the median nerve. Patients are often awoken by pain in the middle of the night.

Clinical examination reveals a loss of sensitivity in the median-innervated fingers and loss of motor function in the thenar muscles.

Electrophysical examinations such as nerve conduction studies or electromyographic (EMG) findings can support diagnosis but are not pathognomonic, although electrophysical examinations are considered to be of great value in CTS diagnosis and postoperative documentation of operational success.

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Figure 1 Figure 1 (A and B) Plain radiographs (anterior/posterior and lateral view) showing chronic, palmar dislocation of the lunate with progressive (A and B) radiological signs of scapholunate advanced collapse arthritis (SLAC wrist).

revealed chronic, palmar dislocation of the lunate with radiological signs of scapholunate advanced collapse arthritis (SLAC wrist). MRI scans later confirmed the lunate's dislocation into the carpal tunnel adjacent to the flexor tendons (figure 2).

DISCUSSION

Dislocation of the lunate bone is a result of a high-energy trauma.¹³ Combined injuries involving other carpal bones in the forearm are frequently seen by trauma surgeons.^{14 15}

In our case, the patient's history presented no trauma suitable for lunate dislocation to the wrist. However, it is possible that the patient simply did not remember having suffered trauma which had occurred to the affected hand in the past.

Figure 2 T1-weighted MRI scans showing the lunate bone dislocated palmar into the carpal tunnel adjacent to the flexor tendons.

Only a few studies report on CTS caused by lunate dislocation. Chen¹⁶ reported 10 patients suffering from median nerve neuropathy associated with chronic anterior dislocation of the lunate bone. All of these cases had a history of previous trauma. Type and severity of the injuries varied. Deformity and dysfunction of the wrist due to high-energy trauma was not noted in all cases.

Oka *et al*¹⁷ also presented a case involving dislocation of the lunate based on rheumatoid arthritis causing CTS.

Diagnosis of CTS should be based on clinical and neurological investigations, such as nerve conduction studies or EMG.

Plain radiographs—wrist and carpal tunnel views—are considered to be of limited value, as fractures or dislocations of the wrist are a rare cause of CTS. Plain radiographs cannot visualise the content of the carpal tunnel itself, which consists of soft tissue. Using high-resolution sonography, tendons and the median nerve can be displayed. Functional testing is another advantage of ultrasound studies. According to Kele and Verheggen¹⁸, high-resolution sonography is almost comparable (sensitivity of 89.1%, specificity 98%) to electrophysiological examinations although results have high interobserver variability.

CT scans are of limited use and are only indicated in cases where there are mechanical causes of CTS. MRI scans can visualise the median nerve as well as the flexor tendons. Aberrant muscles, rare soft tissue tumours and ganglion cysts are detected by MRI scans.¹⁹

However, according to Assmus *et al*¹⁹ preoperative imaging alone is considered of limited value compared with clinical investigation and electrophysiological methods of clinical diagnosis. Imaging is thus assumed to be dispensable in initial diagnosis in a patient without comorbidities.

Since in our case preoperative imaging would in fact have changed the initially prescribed therapy, we recommend the use of preoperative imaging, favouring standard x-rays of the hand or ultrasonography. Both methods are cheap, easily accessible and patient-friendly.

Learning points

- ▶ Although carpal tunnel syndrome (CTS) is the most frequently encountered nerve entrapment syndrome and of idiopathic origin, causative reasons should not be overlooked.
- ▶ Imaging should be performed in addition to clinical and electrophysiological examination, especially if operative intervention is planned. Standard radiographs of the hand are mandatory in order to exclude bony pathologies.
- ▶ Ultrasonography can also be useful in detecting mechanical problems as a cause of CTS.

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