

CASE REPORT

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# Focal finger palsy and wrist pain due to cortical infarction: a case report

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## Abstract

**Background** Hand knob infarction induced focal weakness of contralateral hand or distal arm, only accounts for less than 1% of all ischemic strokes. To date, there is no case with pain during sleep as the onset symptoms being reported. The atypical symptoms of hand knob infarction might increase the risk of delaying treatment especially in the hyperacute phase of stroke.

**Case presentation** A 70-year-old man awoke from sleep due to sudden pain of his right medial wrist and presented to the emergency department with difficulty extending his right index and middle fingers within the time window of intravenous thrombolysis. But the intravenous thrombolysis was not given based on the NIHSS score (0) and atypical symptoms. MRI showed multiple DWI hyperintense lesions, including partial left hand knob area and left posterior central gyrus. CTA showed a severe focal stenosis of proximal left internal carotid artery.

**Conclusions** The hand knob infarction might onset with unusual pain and should be carefully inspected in patients combined with acute onset of focal hand paresis.

**Keywords** Hand knob area, Stroke, Wrist pain, Focal hand paresis

## Background

The cortical “hand knob area” is located in the precentral gyrus in the shape of an inverted omega in the vast majority of cases, seldomly presented as a horizontal epsilon in the axial plane [1]. Infarction of this area can induce the focal weakness of contralateral hand or distal arm, occasionally combined with sensory deficits if the postcentral gyrus in the parietal lobe is also involved [2]. This rare type of acute stroke only accounts for less than 1% of all ischemic strokes, which is frequently at risk of being misdiagnosed as peripheral neuropathy. To our knowledge, there is no previous case presented with pain symptoms. We report a case whose primary symptom is wrist pain

during sleep followed by focal fingers paresis missing the intravenous thrombolysis in emergency department.

## Case presentation

A 70-year-old man awoke from sleep due to sudden pain of his right medial wrist at 21:30, meanwhile he felt difficulty in extending his right index and middle fingers. Two hours later he presented to the emergency department of our hospital since the symptoms persist. On admission, he also complained weakness of his right hand. He had past history of hypertension. Neurological examination showed paresis of extension of right index and middle fingers, and decreased gripping strength of right hand. There was no paraesthesia and the right finger-to-nose test could be done well with ring finger. The other neurological exam was unremarkable. The National Institutes of Health Stroke Scale (NIHSS) score was 0. After the assessment of stroke team, intravenous thrombolysis was not given based on the atypical symptoms and NIHSS score. Because of the acute onset of symptoms, besides the neurotrophic treatment, the

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antiplatelet and statin (atorvastatin) therapy were also administrated while we were scheduling the brain MRI (Siemens, Sonata, Siemens, Germany). The brain MRI showed multiple DWI hyperintense lesions (Fig. 1A), including partial left-hand knob area (black solid arrow) and its descending declining fibers (white solid arrow). CTA (Siemens, SOMATOM Definition FLASH, Siemens, Germany) showed a focal stenosis (>75%) of proximal left internal carotid artery (white dashed arrow) with a lateral calcified plaque (black dashed arrow) (Fig. 1B). Dual antiplatelet therapy was scheduled for 90 days since the patient refused further endovascular treatment. The symptoms was almost relived at 90 days follow-up.

### Conclusions

The rare infarction of cortical “hand knob area” only accounts for less than 1% of all ischemic strokes, which is frequently at risk of being misdiagnosed as peripheral neuropathy. The onset symptom of wrist pain during reported in our patient was different from previous studies and might increase the risk of misdiagnosis.

As for the etiology, although large arterial atherosclerosis (LAA) has been reported as one of the mainly etiologies since objective stenosis of carotid or intracranial arteries detected by angiography [3]. However, based on the brain MRI image of our patient, the arterial to arterial embolization caused by ruptured carotid plaque should be more exact etiology for our patient. Similarly, recent

studies indicated that the hand knob infarction should more typically induced by embolism, including athero-embolism, cardioembolism as well as cancer-associated thromboembolism [4, 5].

Our case presented with a sudden onset of pain during sleeping, which might increase the risk of confusing the case with peripheral neuropathy since nocturnal pain of medial wrist was one of the most commonly reported symptoms in carpal tunnel syndrome. The coexisting infarction of inferior part of left posterior central gyrus might be the source of the pain symptom (white dashed arrow in Fig. 1A).

Therefore, we suggested that the hand knob infarction should be carefully inspected in patients with acute onset of focal hand paresis, even though there might be other uncommon symptoms such as wrist pain during sleep.

### Abbreviations

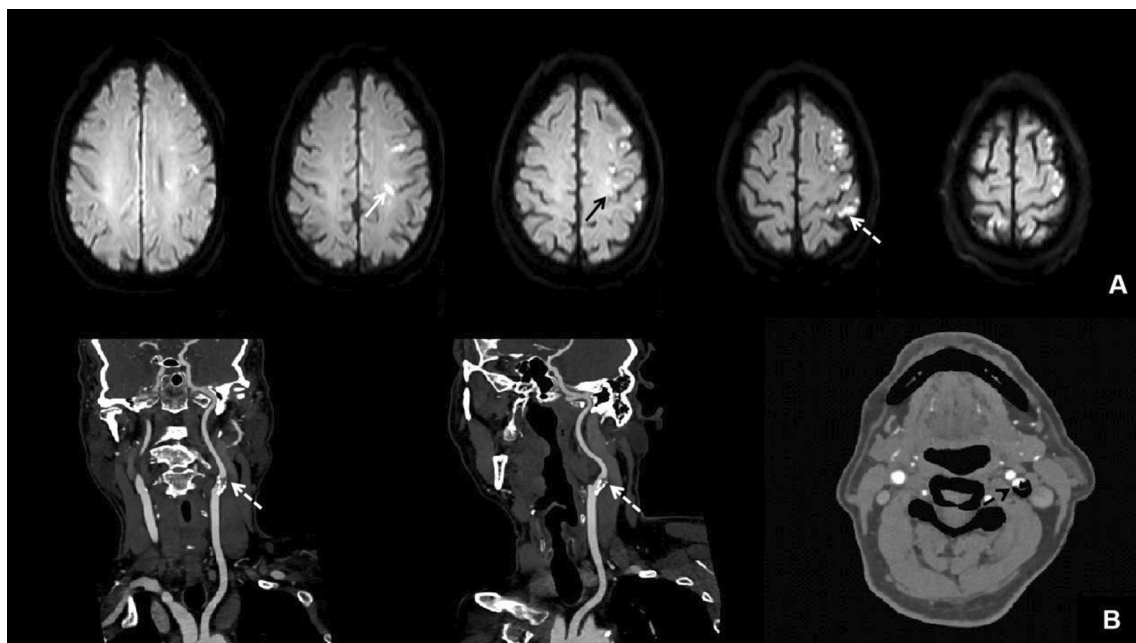
NIHSS	National Institutes of Health Stroke Scale
DWI	Diffusion Weighted Imaging
CTA	Computed Tomography Angiogram
LAA	Large arterial atherosclerosis
MRI	Magnetic Resonance Imaging

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Not applicable.

### Author contributions

SYH interpreted the patient data and was a major contributor in writing the manuscript. YW interpreted the angiogram of the patient. LJR reviewed and edited the manuscript. All authors read and approved the manuscript.



**Fig. 1** **A** Diffusion-weighted magnetic resonance imaging showing multiple acute infarctions involving partial left-hand knob area (black solid arrow) and its descending declining fibers (white solid arrow). **B** CT angiogram (CTA) showed a focal stenosis (>75%) of proximal left internal carotid artery (white dashed arrow) with a lateral calcified plaque (black dashed arrow)

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### Availability of data and materials

The anonymous image materials were available from the corresponding author on reasonable request. The figures were original and downloaded from the imaging system of Shenzhen Second People's Hospital with permission.

### Declarations

#### Ethics approval and consent to participate

According to national regulations no ethical vote was needed because this is an anonymous case description. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

#### Consent for publication

The consent to publish was obtained from our patient.

#### Competing interests

The authors declare that they have no competing interests.

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### References

1. Yousry TA, Schmid UD, Alkadhi H, et al. Localization of the motor hand area to a knob on the precentral gyrus. A new landmark. *Brain*. 1997;120(Pt 1):141–57.
2. Chen P, Hsu H, Wang P. Isolated hand weakness in cortical infarctions. *J Formos Med Assoc*. 2006;105(10):861–5.
3. Orosz P, Szócs I, Rudas G, et al. Cortical hand knob stroke: report of 25 cases. *J Stroke Cerebrovasc Dis*. 2018;27(7):1949–55.
4. Tomoda Y, Tanaka M, Tanaka K. Hand knob stroke from cancer-associated thromboembolism. *CMAJ*. 2019;191(42):E1164.
5. Davies ML, Harrison M. "Cortical Hand" in the emergency department: two case reports. *J Emerg Med*. 2022;62(2):e13–5.

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