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CASE REPORT

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Physician's Dilemma – Ischemic Infarct
Hand Knob Gyrus vs Peripheral Nerve Palsy

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A hand knob stroke, also known as a cortical hand stroke is a rare type of stroke that affects the "hand knob" area of the motor cortex (Figures 1 & 2), responsible for fine hand movements [1,2].

The hand knob gyrus is delimited by an omega shaped sulcus. The precentral gyrus runs on the lateral surface of the frontal lobe, anterior to the central sulcus (Figure 3). The primary motor cortex lies in the precentral gyrus and controls voluntary motion. The corticospinal tract, corticobulbar tract and corticorubrospinal tract originate within the precentral gyrus. The hand knob gyrus is located on the precentral gyrus [1,2].

Symptoms often include sudden weakness or numbness of the contralateral hand, difficulty with fine motor skills like pincer grasp, and potentially pain or sensory symptoms (Figures 4–8). These symptoms can be easily mistaken for peripheral neuropathy, leading to delayed diagnosis and treatment [3–5].

KEY SYMPTOMS

1. **Sudden weakness and/or numbness.** This is the most common symptom affecting the hand and potentially the distal upper limb on the side opposite to the stroke.
2. **Difficulty with fine motor skills.** This includes tasks requiring precision and dexterity, such as buttoning clothes, cutting vegetables, using utensils, or writing.
3. **Pain or sensory changes.** Some may experience unusual pain, especially wrist pain, sensory deficits like transient numbness and sensory blunting in the affected hand.
4. **Possible speech problems.** While not always present, transient dysarthrias can occur.
5. **Mimicking peripheral nerve issues.** Symptoms can mimic conditions like ulnar or radial nerve palsies, "Posterior interosseous nerve compression", leading to misdiagnosis [3,5].

IMPORTANT CONSIDERATIONS

Mis-diagnosis: Hand knob strokes mistaken for peripheral nerve injuries → inappropriate treatment [5,6].

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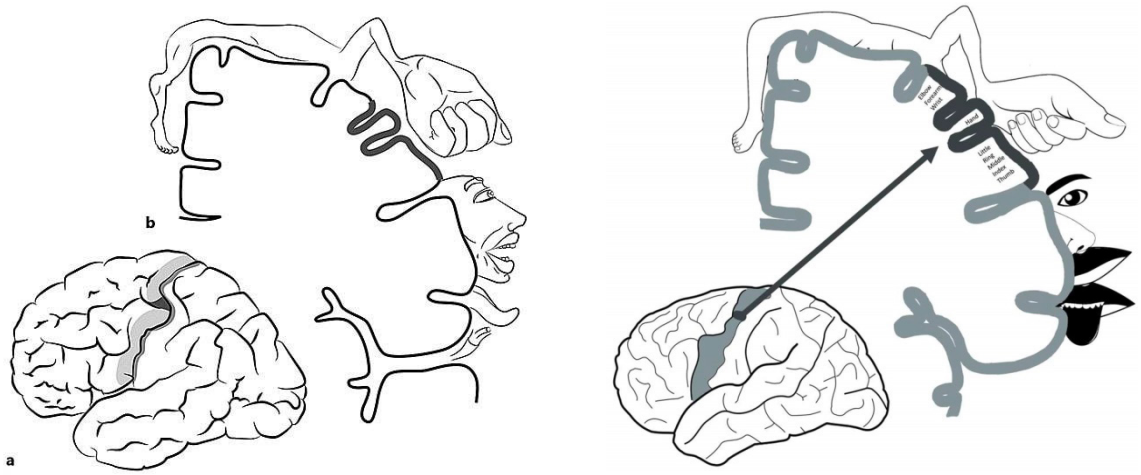

Figure 1. Cortical representation of hand motor function – Anatomical localization [7].

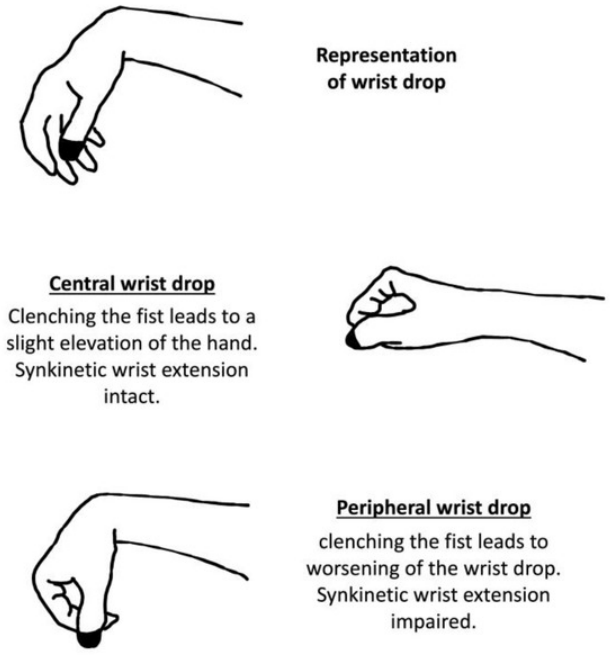

Figure 2. Representation of wrist drop [7].

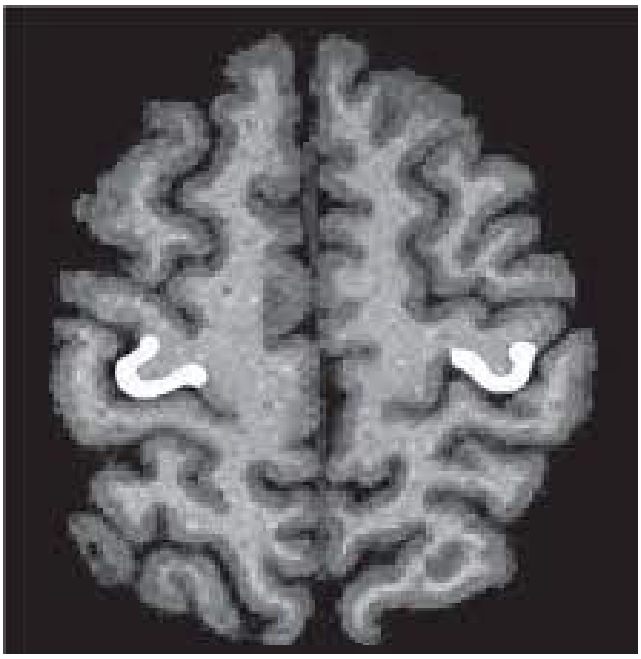

Figure 4. Sigmoid hook sign.

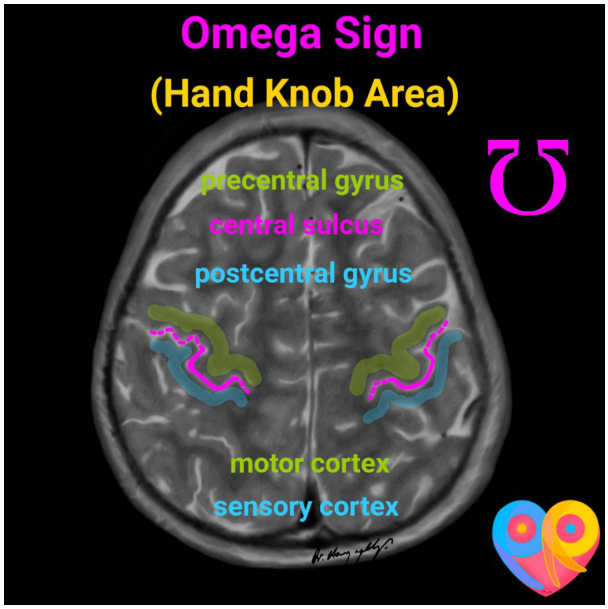

Figure 3. Omega sign [8].

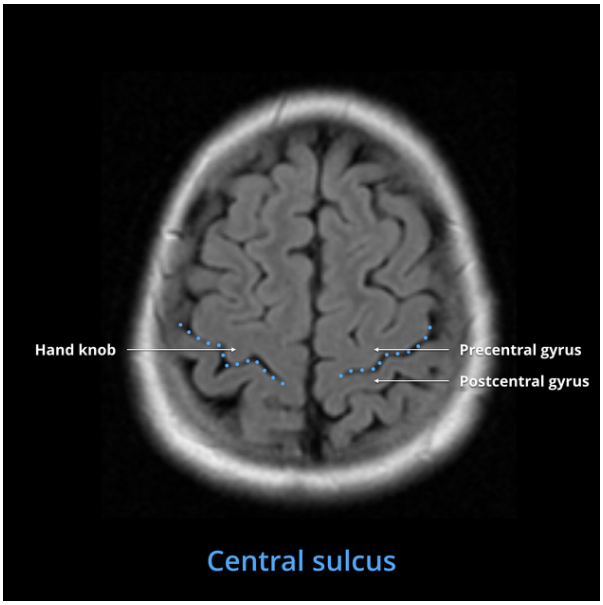

Figure 5. Radiological representation of the hand knob area [9].

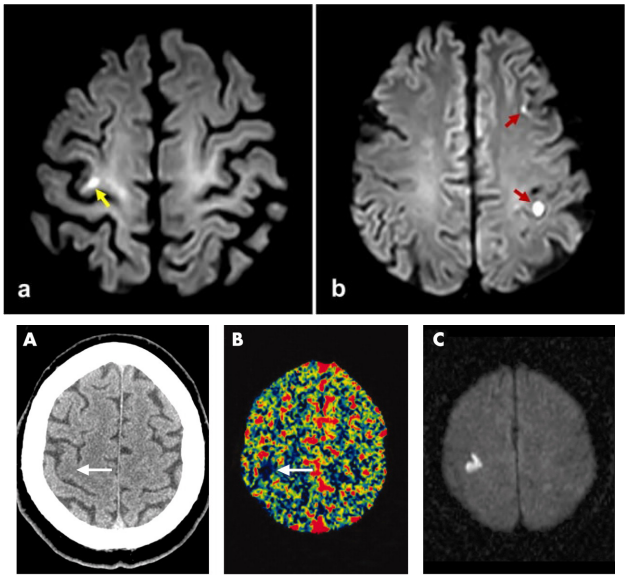

Figure 6. Cortical infarct [10,11].

Figure 7. Hand drop sign [11].

Good prognosis: With appropriate treatment, → good recovery.
Diagnosis: Imaging CT or MRI Brain.

Treatment: Antiplatelet therapy, Statins, other lifestyle modifications, smoking cessation.

CASE REPORT

A 72-year-old lady came with the history of sudden weakness of grip in the left hand. Was well in the morning, and activities of daily living were normal. At 8 am she was cutting onions and experienced a sudden onset weakness of the left hand and was unable to grip the onions. No preceding headache, giddiness, diplopia, slurred speech or limb weakness.

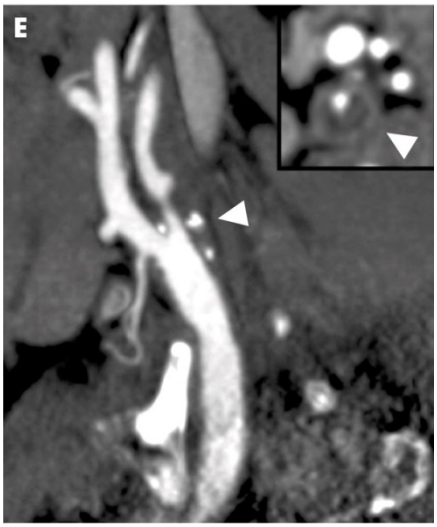

Figure 8. Large Artery Atherosclerosis (LAA) [11].

Old case of hypertension, CAD – 5–7 yrs on regular drugs and follow-up. (Anti-hypertensives and antiplatelets)

On Examination:

- Blood pressure 160/80 in right and left upper limb
- All pulses felt, carotids equally felt – no bruit
- Cardiovascular system – Ejection systolic murmur in the aortic area, no S3, regular rhythm.
- Respiratory system – normal
- Central nervous system – Higher mental functions are normal, and speech is normal
- Cranial nerves – normal
- Motor-Left hand weakness beyond wrist:
  - Extension of wrist & fingers – 2/5
  - Flexion of wrist and fingers – 1–2/5
  - Sensory blunting – touch, vibration beyond the wrist
- Motor system – rest were normal
- Deep tendon reflexes present, Plantar reflexes were flexor
- Gait was normal

Impression: Peripheral neuropathy – ? Entrapment

Investigations:

- Haematology and biochemistry parameters – normal
- Except elevated total cholesterol and LDL cholesterol
- ECG – SR – no fibrillation, T wave changes in inferior leads

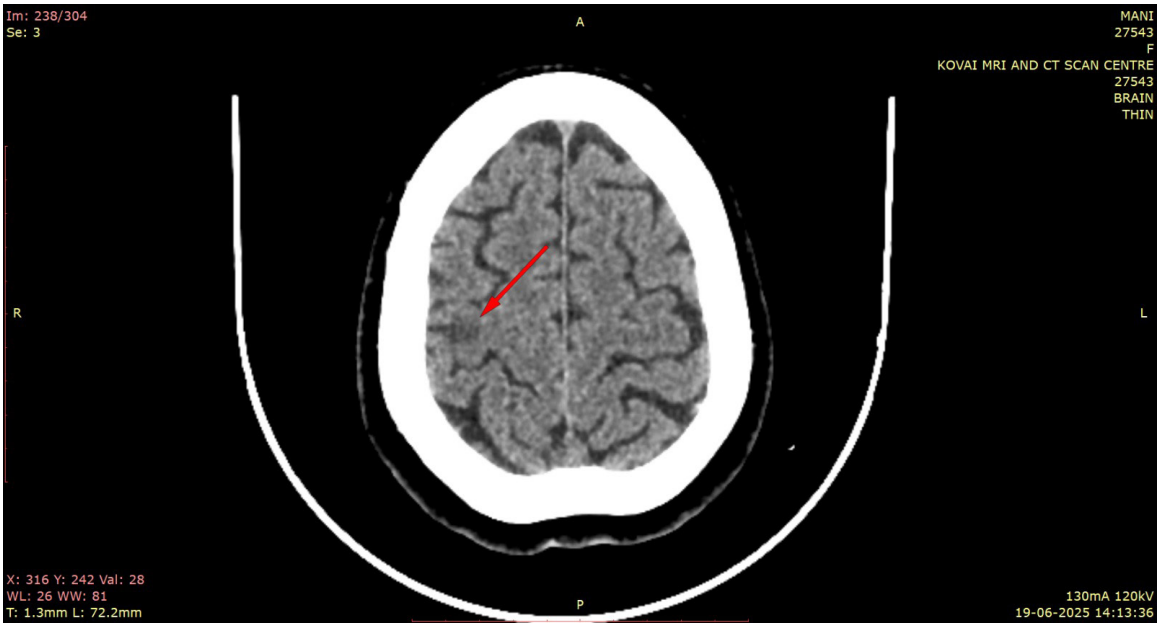

Figure 9. CT brain of the patient showing acute infarct in the frontal lobe.

Treatment:

- Treated with Injection dexamethasone and continued regular drugs

CT Brain – Showed acute infarct in right high frontal lobe (pre-central motor cortex) (Figure 9). No haemorrhage.

ECHO – Basal inferior hypokinesia, no clots
EF – 60%.

Added heparin and dual antiplatelets – considering the diagnosis of minor stroke.

She had a brief episode of slurred speech the following day, with recovery. Progressively improved over 72 hours and full recovery was seen by 7 days. Further evaluation – MRI / Doppler were not done due to financial constraints.

Final Diagnosis: Cortical hand knob stroke

DISCUSSION

Cortical hand knob stroke is a rare but clinically significant type of stroke that occurs at the hand knob region within the precentral gyrus, a motor control area responsible for hand movements [4,6]. Although uncommon, it accounts for less than 1% of ischemic strokes and more often the right-hand knob [1,2].

Anatomically, the hand knob is a knob-like projection of the precentral gyrus that corresponds to the middle genu of the central sulcus. Consistently described as an omega-shaped structure in axial brain images. The small cortical stroke leads to weakness limited to specific finger groups – pseudo-peripheral palsy [5].

This case illustrates the diagnostic challenges, as it can be misinterpreted as peripheral neuropathy and thereby delayed treatment. It highlights the principle "time is brain."

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