

Background

Cortical Hand Strokes are small infarcts affecting the 'hand knob' of the motor homunculus in the cortex resulting in isolated distal arm/hand weakness. They are rare and can be easily misdiagnosed for peripheral lesions (*Peters et al, 2009*).

Case Presentation

A 59 year old male presented to the Emergency Department after noticing he had lost grip in his left hand whilst driving. There was no sensory deficit noted. A full neurological examination determined that this was not a peripheral lesion and in fact the most likely diagnosis was a stroke.

He was referred to the Stroke Team who advised that this was a Cortical Hand Stroke following the neuroimaging described below.

Results: Imaging

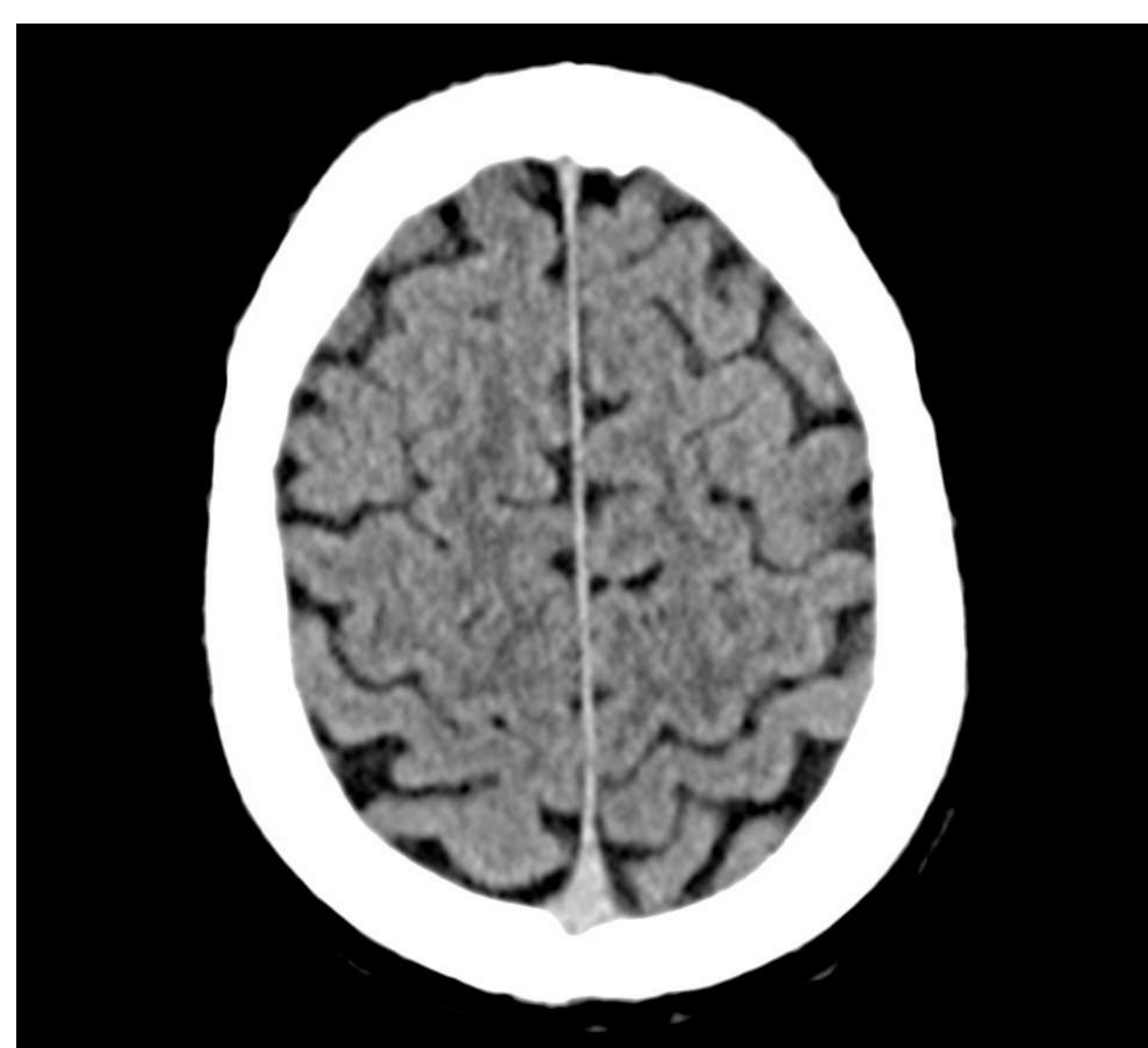


Figure 1:
Selected axial slice of the unenhanced CT head showing preserved grey-white matter differentiation, with no established acute large vessel territory infarction.

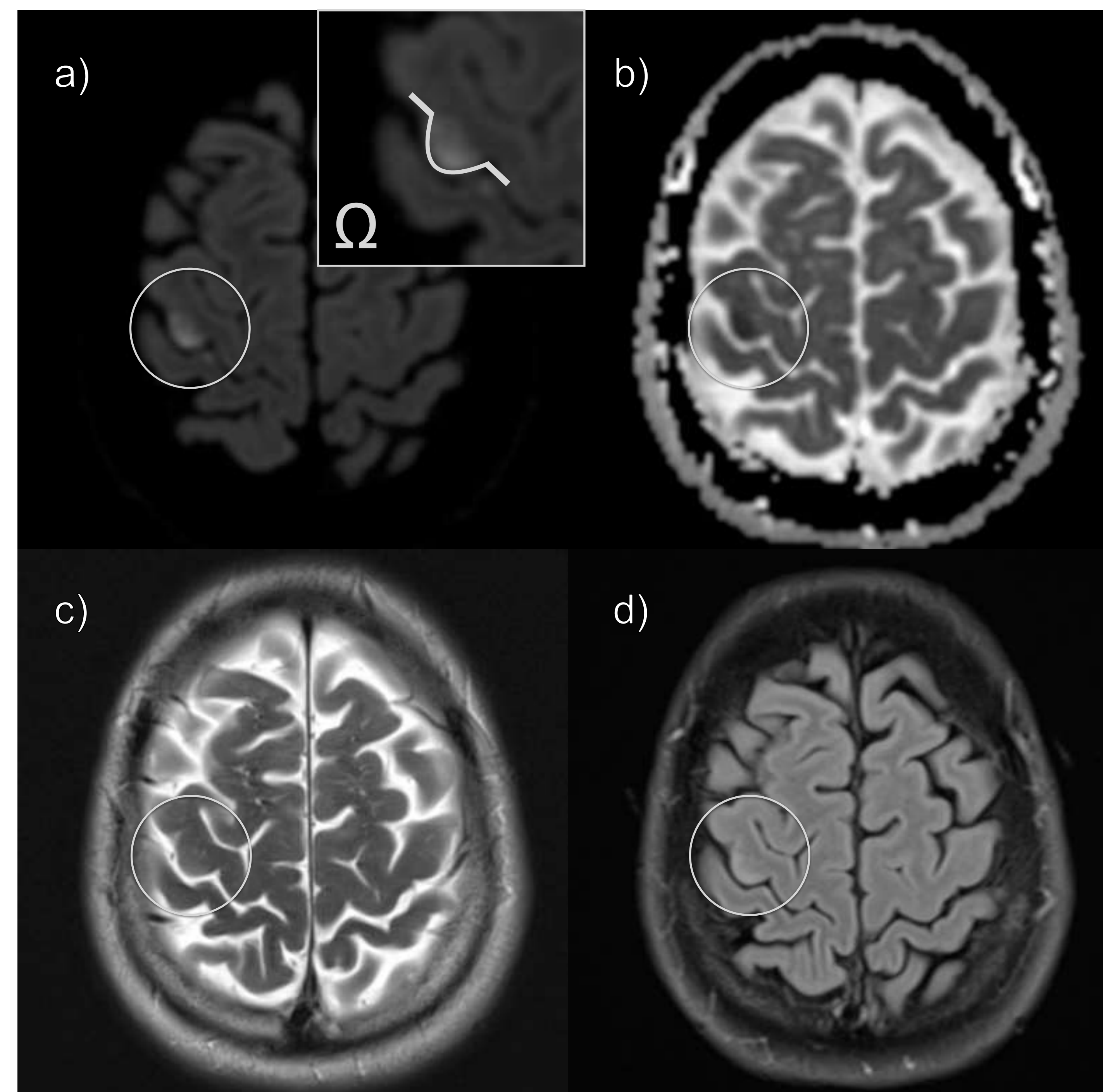


Figure 2 - MRI head showing:
 (a) Diffusion Weighted Imaging with high signal at the right motor cortex, affecting the 'hand knob' or inverted omega (inlaid image).
 (b) showing corresponding low signal on the apparent diffusion coefficient map which confirms acute diffusion restriction in keeping with infarction.
 (c) and (d) show minimally increased T2 and FLAIR signal, respectively, in keeping with subtle oedema on fluid sensitive sequences which was not demonstrated on CT.

Given the examination findings suggested a central lesion a non-contrast CT head was performed initially to look for any evidence of stroke, bleed or overt mass lesion (see figure 1). This modality was chosen as it is fast and there is easy access to CT from the ED.

The CT was unremarkable and showed no evidence of established infarction. However, given CT has low sensitivity until oedema develops, an MRI was then performed on the advice of the stroke team. This would allow identification of any infarction that is too early to manifest on CT (*Allen et al, 2012*). This demonstrated a small focal cortical stroke affecting the area of the right motor cortex corresponding to the left hand (see figure 2).

Discussion

These strokes are rare but are an important differential for wrist drop. They are often first strokes and embolic in nature therefore correct diagnosis is imperative in order to initiate secondary prevention. Thorough neurological examination can help to clinically differentiate central from peripheral lesions in the Emergency Department, in particular: the involved muscle groups, spasticity and synkinetic wrist function. Despite its incidence of around 1% of ischaemic strokes (*Peters et al, 2009*), Cortical Hand Strokes remain relatively unknown in Primary Care and the Emergency Department.

We hope presenting this case improves awareness of Cortical Hand Stroke and subsequently improves patient outcomes due to reduced misdiagnosis.

References:

- Allen, L.M., Hasso, A.N., Handwerker, J., & Farid, H., "Sequence-specific MR Imaging Findings That Are Useful in Dating Ischaemic Stroke". *RadioGraphics* (2012). 32:5 pp1285-1297.
- Peters N, Müller-Schunk S, Freilinger T, Düring M, Pfefferkorn T, Dichgans M. Ischemic stroke of the cortical "hand knob" area: stroke mechanisms and prognosis. *J Neurol*. 2009 Jul; 256(7):1146-51.