in the 298 codon of NOS3 gene is a risk factor for Alzheimer's disease, neither through an independent effect nor through interaction with the existing APOE ε4 risk.

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CORRESPONDENCE

How well does the Oxfordshire Community Stroke Project classification predict the site and size of infarct of brain imaging?

Mead *et al* very justifiably draw our attention to the value of clinical assessment of patients with stroke. The cohort they describe is heterogeneous—that is, patients with acute stroke and non-acute patients attending an outpatients' clinic.¹ Clinical features of stroke syndrome seem to predict the anatomical site and size of the ischaemic lesion. We presented an abstract at the 7th European Stroke Conference² describing the correlation of CT features and clinical stroke syndromes on Oxfordshire Community Stroke Project classification in a study of 202 patients with acute stroke, the clinical examination being performed within 3 days of admission to the hospital and the CT performed at a mean duration of 3.5 (SD 2.6) days. Whereas there was a very good correlation between these two measurements ($p=0.01$), the group with lacunar infarcts had a heterogeneous presentation, only 20% of patients with a visible lacunar infarct on CT had a lacunar infarct syndrome on clinical examination, the rest having some form of cortical clinical feature—that is, dysphasia, neglect, or hemianopia in addition to motor, sensory, or sensorimotor deficit. Similarly a good proportion

of patients with large (12%) and small cortical infarcts (24%) had only a lacunar syndrome on clinical classification.

What are the clinical implications of these findings? Should the management and investigation of patients with acute stroke depend on clinical assessment or on CT findings? What about the prognostic relevance of the two findings for outcome? We reported that there was a higher mortality in patients with a visible lacunar infarct compared with the clinical lacunar syndrome; the difference, however, was not significant (29% *v* 11%, $p=0.09$). The likely explanation is that some of these patients had cortical clinical syndromes associated with higher mortality.

Two of our recent patients admitted with partial anterior circulation infarct syndromes had evidence of only lacunar infarcts on CT. Should these patients undergo carotid investigation and how about their long term prognosis? In the study by Mead *et al* only 54% of the subcortical infarcts had clinical lacunar syndromes.

The lacunar infarcts thus have a heterogeneous clinical presentation. Brain CT is therefore essential to determine the site and size of infarcts in all patients with acute stroke in whom further investigations are to be performed—that is, carotid scanning; the decision on whether or not to investigate carotid circulation should depend on the collective information obtained from CT and clinical examination. Similarly the prognosis of mortality, one of the concerns of patients presenting with acute stroke, should also be made on the information obtained on both these measures, the CT and clinical syndromes being complementary to each other.³ In the absence of a visible infarct on CT, the decision on management and prognosis depends on clinical assessment alone. The absence of a visible infarct is usually associated with a better outcome⁴ but may indicate the need for carotid scanning if there are clinical features of cortical involvement. Patients with lacunar infarcts with clinical cortical features do not do as well as patients with lacunar infarcts without cortical features. The explanation for cortical features in lacunar infarcts is not clear but may be due to a variation in circulation in these patients.

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The authors reply:

Sharma *et al* raise some interesting points concerning the relation between the clinical classification of stroke and the site and size of

infarcts on brain imaging.^{1 2} Firstly, they point out that patients with a lacunar infarct on brain imaging may present with cortical symptoms. One likely explanation for this apparent anomaly is that the lacunar infarct was old, and that the new cortical infarct responsible for cortical symptoms had not become visible on CT. Secondly, they raise the issue of whether the investigation and management of patients with acute ischaemic stroke should depend on clinical assessment or on CT findings. In acute ischaemic stroke, not all infarcts are visible on CT and, in these patients, clinical assessment must be relied on. However, if subsequent brain imaging demonstrates a new infarct in the "wrong" place, then the clinical classification could be modified according to CT. For example, if a patient presents with a pure motor stroke (clinically a lacunar syndrome) but has a recent cortical infarct on CT, then this patient is more likely to have carotid or cardiac disease than a patient with a pure motor stroke who has a lacunar infarct on CT.³ Thirdly, Sharma *et al* suggest that because lacunar infarcts present in a heterogeneous way, a CT is essential to determine the site and size of infarct. We would agree that a CT is essential in patients presenting with acute stroke, but the main and urgent reason is to distinguish haemorrhagic from ischaemic strokes. So many patients with a lacunar syndrome have either normal CT, or several candidate lesions, that it is certainly not possible to identify a relevant lesion in every case.

Fourthly, they suggest that the decision on whether or not to investigate the carotid circulation should depend on the collective information obtained from CT and the clinical examination. We suggest that patients should be investigated for carotid disease if they have experienced a recent (<6 months) carotid territory minor non-disabling ischaemic stroke or transient ischaemic attack and would be medically fit (and willing) to undergo surgery (they fulfil criteria of symptomatic carotid surgery trials). In centres where access to carotid Doppler imaging is limited, it is particularly important that imaging should be performed only in patients who fulfil these criteria. Of course, it is still unclear whether severe ipsilateral carotid disease in patients with lacunar stroke is causative or coincidental, and whether endarterectomy in patients with lacunar ischaemic events will confer as much benefit as it does for those with cortical events. Further analyses of individual patient data from the symptomatic carotid surgery trials will help resolve this dilemma.

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