SELF ASSESSMENT ANSWERS

A woman with language disturbance

Q1: What does the patient's computed tomogram show?

Her admission computed tomogram (see page 341) shows infarct in the right posterior parietal hemisphere suggestive of an infarct in the right middle cerebral artery (RMCA) territory.

Q2: What is her language dysfunction?

Her verbal output was decreased. Her comprehension was impaired and she was unable to name objects presented to her. She tended to repeat what was told to her. Because the repetition was intact and comprehension was completely impaired, the patient had transcortical aphasia of the mixed type.

Q3: How can her language dysfunction be explained on the basis of the computed tomogram?

Her left hemiparesis is because of the infarct in the (RMCA) territory. Language dysfunction can be explained on the basis of either ''crossed aphasia'' or it is possible that the patient has a second lesion in the left middle cerebral artery (LMCA) territory. She underwent single photon emission computed tomography (SPECT) (fig 1). It showed multiple perfusion defects in the right parietal, occipital, and temporal areas with the left hemisphere sparing. The patient had a completed stroke and hence if there was a lesion in the left MCA territory, the subsequent computed tomogram should have picked up the corresponding infarct. Her repeat computed tomogram a month later showed the old RMCA infarct only. The other areas of the brain were normal.

Q4: What would be recovery profile of this patient?

Her recovery profile is good. On her subsequent follow up her power was grade 5/5 in both upper limbs and lower limbs. She improved in her language. She was able to name two of the three objects. Auditory and written comprehension was good. She was able to sign her name.

Discussion

Aphasia is a disorder of language attributable to acquired lesion of the brain. The left hemisphere deals with the language functions in a normal right handed person. In a normal population handedness and footedness are relevant factors in producing speech disturbance. Crossed aphasia refers to language disturbance after a right hemispheric lesion in a right handed person. These cases are very interesting, as they are rare in clinical practice. Aphasia attributable to right hemispheric lesion in a right handed person is rare.[1] Incidence is 0.4% to 2%.[2] Language is one of the unique features of human beings. It is also one of the most clearly lateralised functions. The standard assumption is that there is an innate functional asymmetry in the brain, so that the left hemisphere is predisposed to deal with the language function. Some language function in the right hemisphere underlies the syndrome of crossed aphasia. Diachisis or functional depression of the anatomically normal left hemisphere is seen to occur in cases of crossed aphasia. Unilateral brain damage, handedness, speech laterality, and sodium amytal test, dichotic listening test, and other intelligent quotient (IQ) tests, determine lateralisation of function.

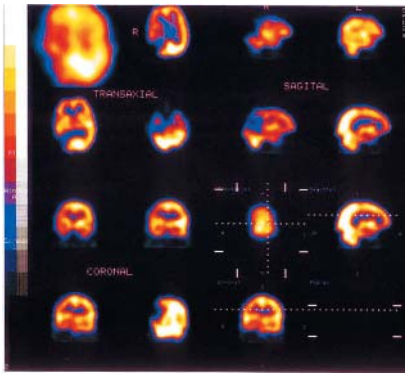

Figure 1 SPECT scan shows perfusion defects in the right parietal, occipital, and temporal area.

The neurobiological mechanism of crossed aphasia is unknown. The possible explanations for the underlying mechanisms are: (I) activation of a silent lesion in the left hemisphere by a sudden lesion in the right hemisphere, (2) ipsilateral control of the dominant hand, (3) dual representation of language functions, (4) arrest in the development of lateralisation of language function.[3] In most (90%) right handed people, language is overwhelmingly in the left hemisphere (95%). In left handed people language lateralisation to left hemisphere is less dominant (75%) with the remainder about equally divided between bilateral and right hemisphere localisation. Alexander *et al* classified crossed aphasia into two types ''mirror image aphasia'' and ''anomalous aphasia''.[4] Mirror image aphasia would be identical to the aphasia as it would result with a LMCA territory infarct. In the anomalous type, the aphasia cannot be explained on the basis of the similar lesion in the left hemisphere.

The recovery profile of crossed aphasia is good. This is probably attributed to the shift of function to the homologue areas of the opposite hemisphere. The risk factors in our patient were diabetes mellitus and dyslipidaemia. Persons with diabetes are two to three times more at risk for ischaemic stroke.[5] Dyslipidaemia is present in patients with uncontrolled diabetics. Poor glycaemic control and hypertriglyceridaemia increases the susceptibility to oxidation and acceleration of atherosclerosis. Poor glycaemic control increases triglyceride values. This patient had a crossed aphasia with minimal left hemiparesis and had substantial improvement in her language and weakness in three months. Disorders of neuronal migration or perinatal or early developmental trauma could affect the crossed lateralisation of language. In the absence of such insults, the aetiology of crossed aphasia is unknown. The advent of functional magnetic resonance imaging may provide better insight regarding the clinical manifestations of this rare disorder.

Final diagnosis

Crossed aphasia with left hemiparesis, right middle cerebral artery infarct, type 2 diabetes mellitus, dyslipidaemia.

References

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4 **Alexander MP**, Fischette MR, Fischer RS. Crossed aphasia can be mirror image or anomalous. *Brain* 1989;**112**:953–73.
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