Functional integrity of the structural unaffected left hemisphere in crossed aphasia

We would like to comment on the article by Cappa *et al*¹ in which a PET study on crossed aphasia was reported. The authors state: "Neither CT scanning nor MRI can exclude the presence of a left hemispheric functional impairment. Functional imaging methods, such as single photon emission computed tomography (SPECT) and positron emission tomography (PET), have been used in a handful of cases to assess regional cerebral blood flow and metabolism in patients with crossed aphasia." In their two patients, PET scan has shown a functional depression of both hemispheres in the acute stage. Their report is particularly interesting as they suggest that, in the acute stage of a crossed aphasia, only PET can provide information on the functional state of the structurally unaffected left hemisphere; one of the conclusions is that such a functional impairment of the left hemisphere may play an important role in the development of language disturbances in crossed aphasia, thus suggesting a bihemispheric representation of language in these patients.

We have some remarks about the authors' results: (1) as reported by the authors themselves, the first patient was unfortunately not age matched with the control group and was 79 years old; it has been recently shown that cerebral oxidative metabolism decreases with aging.² (2) In the first patient, hypometabolism in the left hemisphere was mild compared with the marked crossed cerebellar diaschisis. (3) In the second patient, the bilateral improvement of metabolism on the second PET examination did not really help to distinguish the crucial site responsible for language disturbances.

Regarding the assessment of the functional condition of the left hemisphere, our two cases of crossed aphasia previously reported showed abnormalities in standard EEG and quantified EEG (QEEG) that presented a good relationship with CT and MRI findings, suggesting a functional integrity of the left hemisphere.^{3,4} Aphasia is usually related to cortical-subcortical lesions and, in these cases, EEG and QEEG have a good sensitivity and specificity in detecting abnormalities in the affected hemisphere,⁵⁻⁸ as well as in more widespread diseases.⁹ We thus consider our finding of a functional integrity of the left hemisphere assessed by EEG and QEEG to be correct.

We believe the discrepancy between our findings and those of Cappa *et al*¹ is due to the extreme complexity in the physiopathology of crossed aphasia and to the uncertain knowledge, as yet, about brain lateralisation of language in these patients.

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Cappa *et al* reply:

Drs Bandini and Primavera point to a discrepancy between our findings of reduced glucose metabolism in the left hemisphere of two patients with crossed aphasia, and their own results of normal EEG activity in the unaffected hemisphere of right handed patients with language disturbances and right hemispheric pathology.

As a general comment, we think that a direct comparison of EEG findings with measurements of local metabolism and blood flow is probably unwarranted, given the differences between the methods. It is noteworthy that, in a recent review devoted to transcerebral diaschisis, Andrews¹ concluded that the data on contralateral electrical activity in the acute period after a unilateral lesion were "inconclusive", while blood flow and metabolism showed a consistent decrease, followed by gradual return to baseline.

Considering Bandini and Primavera's specific remarks: (1) Case 1 was not age matched with the control group. We consider it to be unlikely that this age difference played a crucial role in the comparison. Although oxygen consumption decreases slightly with normal aging,² several studies have confirmed the lack of a significant decline in absolute values of glucose consumption (see, for example, ref 3). In any case, it must be underlined that the reductions in our patient were in the 30-50% range in comparison with control values. (2) A direct quantitative comparison between crossed cerebellar and transcerebral diaschisis is of limited interest, given the present uncertainty about the mechanisms underlying these phenomena.⁴ Both findings are well documented in the medical literature on PET.^{5,6} (3) The increase of metabolism is needed bilateral, as clearly indicated by the lack of interaction in analysis of variance. This finding is in agreement with the participation of the contralateral hemisphere in the early phase of recovery, both in patients with "standard" aphasia and in patients with atypical language dominance. Our specific hypothesis, that the latter patients may be more liable to remote effects of focal lesions, remains open to further investigation.

In conclusion, we think that the differences between our report and Bandini and Primavera's findings are mainly due to the

different methods. The subject of crossed aphasia, as well as of other instances of atypical cerebral dominance, is far from being completely understood, and remains a crucial research area for the understanding of the neural correlates of cognitive functions.

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Brain's Disease of the Nervous System/ 10th Edition. Edited by JOHN WALTON. (Pp 801, Price: £95.00) 1993. Oxford University Press. ISBN 019-261969-1.

When the first edition of Brain's, "Diseases of the Nervous System" was published in 1933, its initial reception did not suggest a long life expectation; and yet now a review of the tenth edition is invited, some 60 years later!

The book was first reviewed in "Brain", and although the piece was unsigned, the somewhat acerbic style is still recognisable. Several of the points made in the review can be considered in assessing the later and this, the latest, edition.

"The crux of the medical writer's problem today is not what he is to include but what he should omit . . . it is a defect of some modern textbooks that their authors have never formulated their problem in these terms and have left it obscure as to whom they wish to reach."

Lord Walton maintains, in his preface,