

Rapid Recovery from Crossed Aphasia in a Dextral

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A case of crossed aphasia in a right-handed woman resulting from a right-hemisphere stroke is reported. Rapid recovery occurred between an initial evaluation performed at one month poststroke and a follow-up evaluation performed at 2 months post. The cerebral organization and the relationship between language and other cognitive abilities in crossed aphasics are discussed. Additionally, the unitary and transient models of crossed aphasia are examined.

The occurrence of aphasia in right-handed patients after right-hemisphere damage is rare and has been estimated at between .4% to slightly less than 2% (Zangwill, 1979). Less than one hundred cases have been reported in the literature and have included descriptions of Broca's, conduction, global, Wernicke's, and transcortical aphasias (Castro-Caldas & Confraria, 1984). Even so, some researchers have suggested that dextral crossed aphasia is a unitary phenomenon that always exhibits the same pattern of agrammatism, mutism, and relatively spared receptive language (Brown & Hecaen, 1976).

A number of researchers have claimed that writing skills are superior to verbal output in crossed aphasics (Brown & Wilson, 1973; Carr, Jacobson, & Boller, 1981). Likewise, the absence of limb apraxia has been reported in most cases (Brown & Hecaen, 1976; Brown & Wilson, 1973; Haaland & Miranda, 1982).

The role that the left hemisphere plays in assuming visuospatial functions in crossed aphasic patients has been a topic of controversy, with some researchers reporting severe visuospatial deficits coexisting with language impairment (Carr et. al., 1981; Haaland & Miranda, 1982; Kapur & Dunkley,

1984) and others reporting visuospatial preservation. The latter researchers have theorized that a reciprocal crossover of visuospatial skills and language occurs between hemispheres (Brown & Wilson, 1973; Larrabee, Kane, & Rodgers, 1982). I am reporting a case of crossed aphasia in a right-hander that will provide some further evidence with respect to these issues.

CASE REPORT

Patient R. M., a 75-year-old woman with a high school education, suffered a right-hemisphere cerebrovascular accident in November, 1984. Upon admission to the hospital, she was aphasic and had difficulty moving her left extremities. She subsequently developed a profound left hemiparesis. Computerized tomography (Figure 1) showed an area of decreased density distributed through the white matter of the right hemisphere at the level of the lateral ventricle and above. This was interpreted as representing an early CVA in evolution.

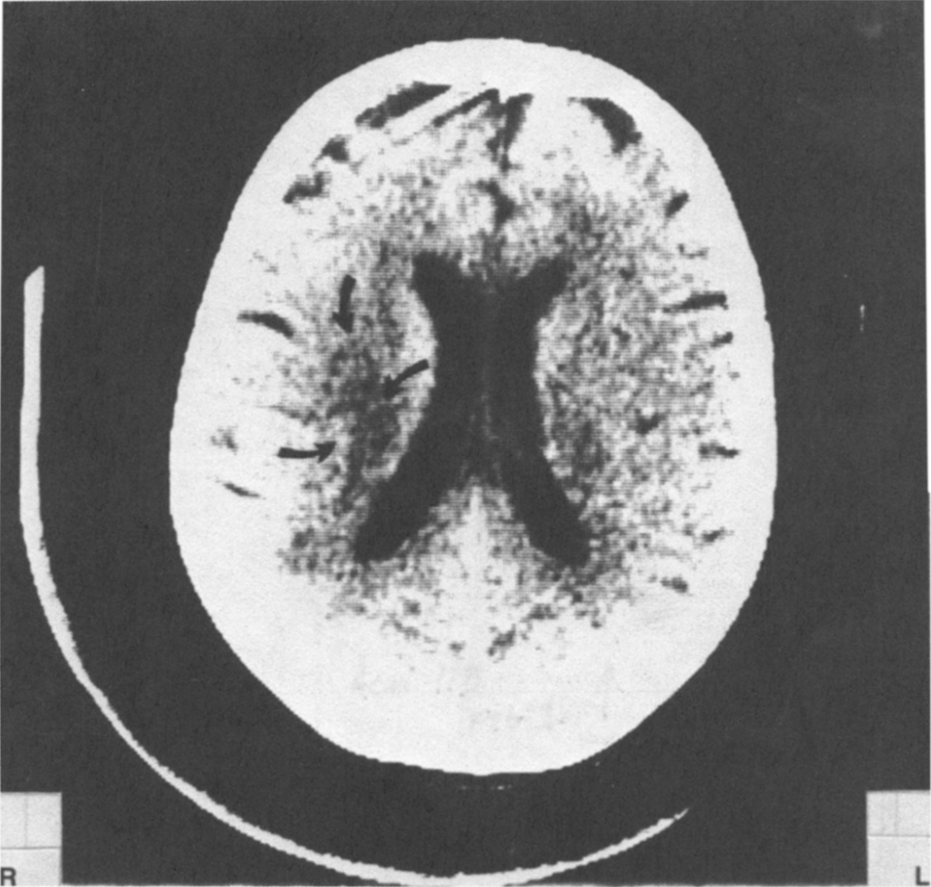
Handedness

Hand preference was assessed with the Edinburgh Handedness Inventory (Oldfield, 1971). The patient was unable to respond reliably upon examination; therefore it was administered to her husband and her older brother. They reported a right-hand preference for 16 of 20 activities including writing, drawing, various sports activities, and using tools and utensils. They reported no preference for three activities and a left-hand preference for throwing. Additionally, her older brother reported no family history of left-handedness and that the patient had begun writing with her right hand as a child, with no attempts having been made to switch her from left to right in early grammar school.

Tests

Initial and follow-up neuropsychology and speech assessments were performed at one and 2 months post stroke. Language was assessed with the Boston Diagnostic Aphasia Examination (Goodglass & Kaplan, 1983). Visuospatial skills were assessed with the memory (Administration A) and copy (Administration C) forms of the Benton Visual Retention Test (Benton, 1974) and the Benton Facial Recognition Test (Benton, Hamsher, Varnay, & Spreen, 1983). Limb praxis for the right hand was assessed using real objects upon both command and imitation of the examiner. Additionally, the patient was asked to pantomime a number of purposeful activities. The Line Bisection Test (Lezak, 1983) and other informal neuropsychological assessment procedures were also administered.

FIGURE 1. CT scan demonstrating area of decreased density in the right hemisphere at the level of the lateral ventricles.



Test Results One Month Post

Upon initial examination, the patient received an aphasia severity rating of 1 on the BDAE, indicating severe overall impairment of communicative abilities (Figure 2). She had great difficulty following commands and could not give reliable yes-no or pointing responses, indicating severely impaired auditory comprehension. She was dysarthric, her longest phrase length was four words, and her controlled word fluency was severely impaired. Her prosody of speech was constricted. Confrontation naming, and number, letter, and word reading were all impaired. She made numerous neologistic, verbal, and literal paraphasic errors. However, repetition was relatively well

SUBTEST SUMMARY PROFILE

NAME: **R.M.**

DATE OF EXAM: 12-3-84 ———
1-15-85 - - - - -

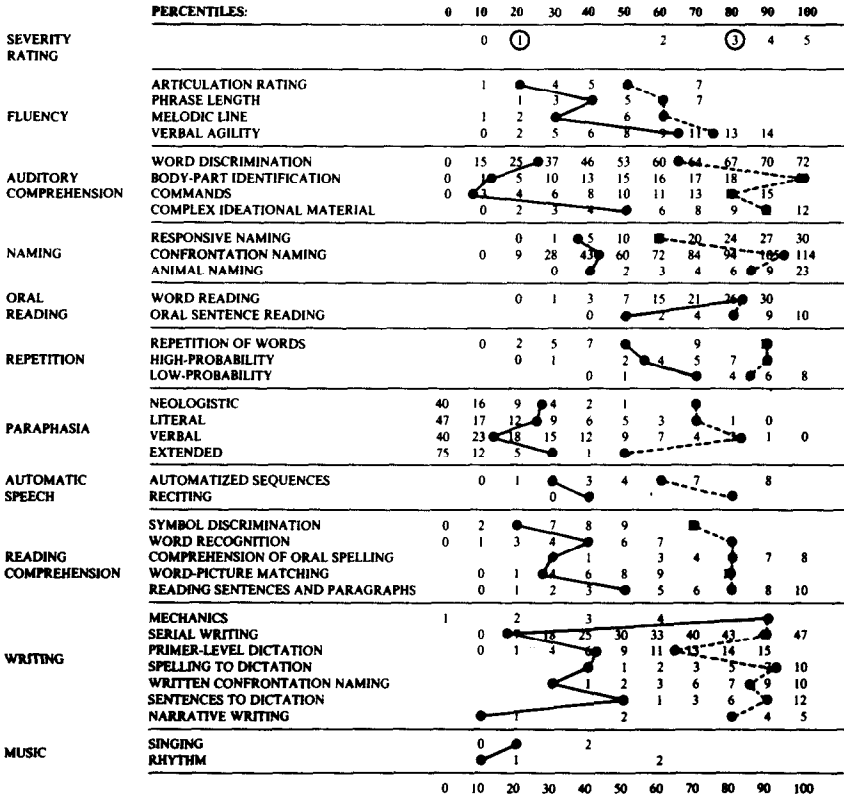


FIGURE 2. Subtest summary profile of Boston Diagnostic Aphasia Examination, administered 1 and 2 months poststroke.

preserved (albeit, with some literal paraphasias). In fact, she frequently echoed the examiner's questions and commands, while displaying no comprehension of what she had heard or said. Reading aloud and reading comprehension were also impaired. With respect to writing, Figure 3 illustrates that her letter formation and fluency of writing were intact. However, she made gross spelling errors, word substitutions, and neologistic paraphasias in both her copy, as shown in Figure 3, and her spontaneous writing.

With respect to praxis, the patient was unable to pantomime purposeful activities upon command, but this could have been influenced by her severely impaired comprehension. She could not demonstrate the use of any of six real objects but, rather, attempted to use them inappropriately. For example, she used the fork to comb her hair and waved the screwdriver around in the air. Additionally, she was able to imitate the examiner's use of only three of the six objects.

She had severe neglect of left hemispace. On the Line Bisection Test, she accurately bisected the lines both in right hemispace and directly in front of her, but she missed the line entirely when in left hemispace, making her mark beyond the right end of the line.

Visuospatial skills were also severely compromised. On the immediate recall administration of the Benton Visual Retention Test, she accurately reproduced none of 10 items and made over 25 scorable errors (see Figure 4). On the copy administration, she accurately reproduced one of 10 and again made over 25 errors. Figure 4 demonstrates the spatial distortions, left neglect (she missed the left peripheral figure on both attempts), and inap-

THE QUICK BROWN FOX JUMPS OVER THE LAZY DOG.

The lazy dog jumps over the quick brown fox.

Copywriting sample obtained one month post-stroke. Note preserved fluency of writing and paragraphic jargon.

The quick brown fox jumps over the lazy dog.

Copy writing two months post-stroke.

FIGURE 3.

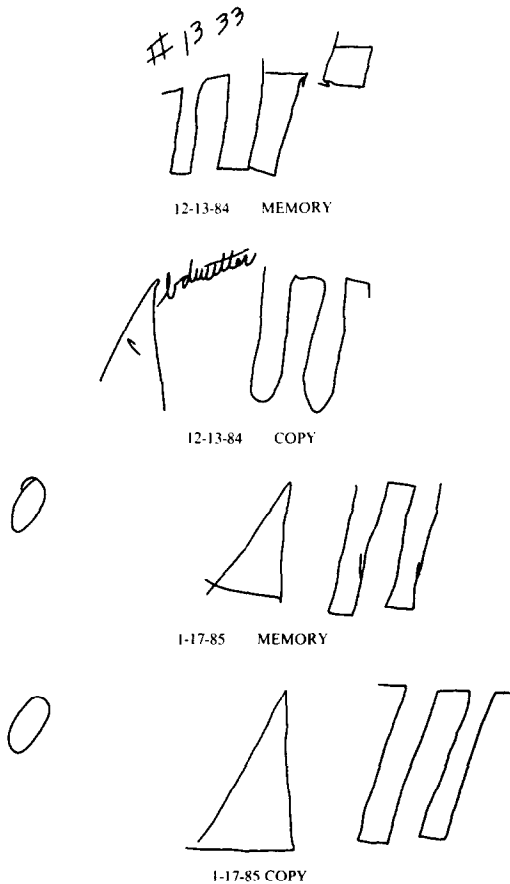


FIGURE 4. Samples of memory and copy administrations of the Benton Visual Retention Test. Note constructional difficulties, neglect of left peripheral figure, and paragraphic jargon. The 1-17-85 copy is correct.

appropriate aphasic writing present in most of her designs. On the Facial Recognition Test, she correctly matched only one face on six trials.

Test Results Two Months Post

Upon reexamination, the patient obtained an aphasia-severity rating of 3 on the BDAE, demonstrating significant recovery of her overall ability to communicate (Figure 2). She was able to follow complex, multistep commands and give reliable yes-no responses. She was fairly accurate in her

pointing responses and 100% accurate in body-part identification, indicating improvement in auditory comprehension from severely impaired to mildly impaired. Her speech continued to be labored and dysarthric. However, prosody of speech, controlled word fluency, and phrase length were all improved. Confrontation naming was significantly improved to a mildly impaired level, and responsive naming was improved to a moderately impaired level. She was able to read numbers, letters, and words aloud accurately. She no longer used neologisms or extended paraphasias, and verbal and literal paraphasic errors were greatly reduced in frequency. Repetition remained fairly well preserved, with fewer literal paraphasias, and she no longer echoed the examiner. Word-picture matching and sentence and paragraph completion were significantly improved, reflecting gains in reading comprehension. Figure 3 demonstrates that her writing was also improved. Her letter formation and speed of writing remained intact, and she was greatly improved in the language content of her copy, spontaneous writing, and writing to dictation.

Language comprehension improved to the point where she was able to be given the pantomime portion of the praxis exam. She was able to correctly pantomime five of eight activities. However, on two activities she used her body part as the object, and, on a third activity, when asked to demonstrate the use of a key, she rubbed her fingers together. She correctly demonstrated the use of five of six real objects, with her only error that of making stirring motions with a screwdriver.

Her neglect of left hemispace was improved, and, on the Line Bisection Test, her mark was only right shifted in left hemispace by about three cm.

Improvements in visuospatial skills mirrored improvements in language. On the immediate-recall administration of the Benton Visual Retention Test, she correctly reproduced 4 of 10 designs and made nine scorable errors. On the copy administration, she accurately copied 9 of 10 designs and made only one scorable error. Figure 4 illustrates her improved performance. She omitted details in the main figure on the memory administration and was accurate in her copy. It also illustrates her improved attention to left hemispace, the left peripheral figures being accurately reproduced on both memory and copy. Finally, on the Facial Recognition Test, she correctly matched four faces on six trials.

DISCUSSION

This case provides further evidence against the unitary model of crossed dextral aphasia. The patient's severe deficits in auditory comprehension and verbal expression, her echolalia, and the relative sparing of repetition in her initial examination were consistent with a transcortical mixed aphasia. Castro-Caldas and Confraria (1984) identified four transcortical aphasics in

their review of 39 reported cases of crossed aphasia. They reported numerous other cases of different aphasia syndromes in this population, indicating that the unitary model is not accurate and that these individuals can exhibit many of the same profiles found in left-hemisphere language-dominant aphasics.

Most reported cases of crossed aphasia have been found to have good recovery rates (Carr et. al., 1981). The present case fits this pattern, with her overall aphasia rating improving from severe at one month post to mild-to-moderate at 2 months post. The pattern of fast recovery has led researchers to hypothesize that these individuals really have bilateral representation of language and that crossed aphasia is a transient state that exists before the left hemisphere can assume complete control (Brown & Hecaen, 1976). However, a number of authors have described a 1-2-month period of early rapid recovery, with relatively chronic language deficits persisting afterward (April & Tse, 1977; Ettlinger, Jackson, & Zangwill, 1955; Lozano & Clark, 1976; Wechsler, 1976). Unfortunately, this case could not be followed beyond her second evaluation, and, therefore, a definitive statement on the eventual extent of her recovery could not be obtained. Speech and language therapy did report that she had reached a plateau, and she was discharged subsequent to her second evaluation.

The present case differs from most other reported cases in that writing skills were not superior to verbal skills. Although the mechanics of writing, including letter formation and writing speed, were generally spared, the content reflected severely disturbed language. Her numerous neologisms and gross spelling errors suggested writing rather similar to that of a left-hemisphere-dominant Wernicke's aphasic. Both Wernicke's aphasics and crossed aphasics usually share the characteristic of relatively intact motor areas controlling the dominant hand. Furthermore, in this case, language comprehension was severely impaired, as in a typical Wernicke's. Her writing therefore reflected the disturbed language and preserved motor control seen in most Wernicke's. It can be postulated that the linguistically correct writing reported in many other crossed aphasics was found in individuals whose predominant impairments were in oral expression, with cortical areas responsible for language comprehension being relatively preserved.

This case also differs from the majority of past reported cases in that dominant-limb praxis was severely disturbed. During both her initial and her follow-up exams, the patient exhibited ample evidence of both ideomotor and ideational limb apraxia. Based on past reported cases of preserved praxis in crossed aphasics, Haaland and Miranda (1982) have suggested that the hemisphere controlling the preferred hand, regardless of language dominance, is also most often dominant for control of praxis functions. The present case would apparently provide an exception to this, with praxis seemingly being regulated by the language-dominant hemisphere, rather than the one controlling the preferred hand.

There are conflicting theories regarding the hemispheric control of visuospatial functions in right-hemisphere language-dominant individuals. Although many crossed aphasia studies have reported visuospatial deficits, others have reported relative preservation of these skills, suggesting a reciprocal crossover of language and visuospatial function between hemispheres. The impaired performance in the present case on both constructional and nonconstructional visuospatial tasks suggested the kind of visuospatial deficits typically found in right-hemisphere-damaged individuals. In fact, other deficits usually seen in right-brain-damaged people were also seen in the present case, including profound neglect of left hemispace. As her language improved, there were concomitant improvements in both her visuospatial abilities and her attention to left hemispace. Thus, at least in the present case, there appeared to be no reciprocal crossover of cognitive abilities.

In conclusion, this case conforms to some of the patterns found in past reported cases, including a rapid recovery, the presence of an aphasia syndrome frequently seen in left-hemisphere-dominant aphasics, and the presence of visuospatial deficits. But it does not conform to other past reported patterns, i.e., her disordered writing language and disturbed limb praxis. These confirmations of and exceptions to past patterns indicate that crossed aphasia is not a unitary phenomenon in respect to either language or other cognitive abilities. Rather, it appears that crossed aphasics can display a broad and varied neuropsychological profile.

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