CLINICAL STUDIES ON CHINESE MULTILINGUALS WITH DYSPHASIA

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SYNOPSIS

Language studies were done on four multilingual dextral Chinese patients who developed dysphasia from various causes. The left hemisphere appeared to be dominant for all the languages in the four patients. All the languages and dialects were universally involved during the development of dysphasia. In one patient, there was evidence of delayed restitution in the patient's mother tongue (Hokkien) comparing with Mandarin and English which were the languages used in the hospital and for reading.

INTRODUCTION

Much theories and controversies have been written about the pattern of language loss and recovery among the multi-linguals with dysphasia. The Malaysian population is characterised by its multi-racial composition and multi-linguisity. A person may go through different languages at various phases of his life, and uses different languages in different life situations at a single time. An analysis of the language behaviour with the development of dysphasia would thus be interesting.

The written form of the Chinese language is unique with its 'ideographic' character compared with most of the other major world languages which are phonetic. As the right hemisphere plays an important role in spatial interpretation, it is thus not unreasonable to suggest that many Chinese are right hemispheric dominant for language (1). All our patients are Chinese who are fluent in at least one Chinese dialect with two of the four patients able to read and write Mandarin. They developed dysphasia from various causes.

METHOD

All the patients were personally seen and examined by the author (CTT). In addition to general and specific neurological examinations, all the patients had EEG, isotope brain scan, carotid angiography and three had computerized tomography (CT) scans. The language profile (Table I) and laterality quotient (LQ) were deter-

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Table I
Language Assessment

Childhood	Adulthood
Father's tongue	Language at work
Mother's tongue	Books, newsprint, films predominantly used in leisure
First tongue learnt in childhood	Language for thinking
'House language' in childhood	Language used with - wife, children, extended family, friends
'Hometown language'	Language used in "Migrated town"
Education - primary, secondary, tertiary	Language, proficiency in the following order
	Language most used in the following order.

mined. The latter was modified from Oldfield (1971) (2). Patient was asked which hand was preferred in a variety of activities, e.g. unscrewing a jar, opening a door, striking a match, hammering a nail, brushing their teeth, erasing a blackboard, clearing a table, cutting with scissors, raising their hand, eating and writing. Each activity was scored to distinguish habitual use of right and left from interchangeable handedness; two points were assigned for exclusive handedness and one to each hand for ambidexterity. The L.Q. was then determined by dividing the right-left difference by the total number of response times 100. Thus, an L.Q. = + 100 indicates exclusive right handedness. Minus 100 is exclusive left handedness and 0 is perfect ambidexterity.

The language test was personally done by the author (CTT) in various dialects and languages. It was repeated periodically until the clinical state became stable. The patients were assessed in their naming ability, comprehension, fluency in spoken speech, ability in repetition, any use of paraphasia and reading when applicable. In naming ability, pictures of animal and inanimate objects were used. In comprehension test, the patients were required to select from a series of picture cards (matching spoken word to picture). The patients were also required to answer simple questions requiring only yes and no. The test for reading require patients to read aloud; to select from a series of written cards (matching spoken words with written words); and matching picture cards with written cards. As the words chosen were all from the kindergarten books used locally, it was assumed that patients should know the words before the onset of dysphasia.

RESULTS

Case 1. A 41 year old Chinese male owner of a sundry shop complained of occasional right body focal motor seizures without aura beginning at age 29. By age 31, he had progressive difficulty in 'finding' certain words and in writing letters. This was exacerbated following a seizure. Physical examination showed only a mild, non-fluent nominal dysphasia in all the languages he spoke. An ECG revealed left frontal and anterior temporal focal slowing. An isotope brain scan suggested a left deep inferior frontal mass, but cerebral angiography was normal. A CT scan revealed an area of increased density with conray enhancement in the left inferior frontal region. At surgery, a firm mass was found in the white matter of the middle and inferior frontal convolution; histologically, this was a grade 2 astrocytoma. The patient was dextral with an L.Q. of + 100. He was fluent in spoken Mandarin, Hokkien, Cantonese, English and Malay in the following order. He could read and write Mandarin and English. Hokkien was his mother tongue; however, he was educated entirely in English and Mandarin, including a few years at a Chinese university. He thought, did leisure reading and spoke to his family and friends in Mandarin. In the University, lectures had been in Mandarin but textbooks were in English. The patient felt that his dominant language was Mandarin.

After the craniotomy, the patient developed marked dysphasia which recovered to pre-operative level of language performance within a month.

Dysphasia test was performed in Mandarin, Hokkien and English. It was done in three separate occasions at weekly intervals. The patient showed non-fluent dysphasia in all three languages. The naming ability was impaired, but comprehension in all three languages was good. Reading performance was preserved in both Mandarin and English. There was no use of paraphasia. Picture naming showed early recovery of Mandarin and English with the number of correct responses out of ten being 10; 0; 6 for Mandarin, Hokkien and English respectively. The corresponding correct score for second week was 9; 7; 5 and the third week was 10; 10; 8. As shown, Hokkien made rapid recovery at the second week with Mandarin and English continued to improve.

The results were analysed for the frequency that the different languages sharing the same response for the same word (either correct in both languages or incorrect in both languages); it was 22 occasions for Mandarin and Hokkien, 18 occasions for English and Mandarin and 16 occasions for English and Hokkien.

Case 2 was a 45-year old housewife. The patient was an old case of rheumatic heart disease, being previously asymptomatic. She developed fever and chills for 3 weeks. Just before admission, she had an acute onset of headache, right hemiparesis and was in confusional state. On examination, the patient was febrile with signs of mitral stenosis and aortic incompetence. There was a roth spot in left fundus. Spleen was palpable. Neurologically she had right hemiparesis and dysphasia. Blood culture grew streptococcus viridan; CT scan showed a moderate sized haematoma over the left parietal lobe. She was thus diagnosed as subacute bacterial endocarditis with ruptured mycotic aneurysm. With penicillin injection, patient made rapid recovery so that on discharge 6 weeks later, she had minimal dysphasia only.

The patient was dextral with L.Q. of +70. She was fluent in Hokkien, English and Cantonese in the following order. She could read English. Hokkien was her dominant language as it was her mother tongue, she used it in thinking and with her immediate family. She went through English medium of education to lower secondary school level and communicated to some friends in English. Cantonese was the common language used in her neighbourhood in Ipoh.

Language testing showed that initially she was globally dysphasic for English and the Chinese dialects tested. Naming and understanding was poor; the speech was non-fluent. There was no paraphasia. Few days after admission with institution of penicillin, her comprehension for all the three languages and reading skill rapidly improved. Her naming ability, however, lagged behind the comprehension and reading recovery. A week after admission, she could name only one item out of ten in Hokkien, nil in English and Cantonese. Similar results occurred with retesting a week later. Four weeks after admission, the naming ability improved for all the languages with correct responses in Hokkien, English, Cantonese at 12, 8, 12; all being out of 20. Analysis of the frequency that the different languages sharing the same response for the same word (either both correct or both incorrect) showed 16 occasions for Hokkien and Cantonese, 12 occasions for English and Hokkien and 13 for English and Cantonese.

Case 3 was a 39-year old fishmonger. His main problem was a four months history of headache, deterioration in vision, generalised weakness, incontinuence and intellectual fallout. He was admitted after much delay in semi-comatose state with bilateral papilloedema, generalised hyperflexia and extensor planter in the right side. Carotid angiography showed a left temporal mass. CT scan showed a dense area at temporal lobe with extensive cerebral oedema at the left hemisphere. A meningioma was subsequently removed from the temporal horn of left lateral ventricle. Post-operatively, the patient made rapid recovery so that on discharge three weeks after operation he had mild nominal dysphasia, right homonymous hemianopia and mild right hemiparesis only.

The patient was dextral with L.Q. of +50. He was fluent in Mandarin and Hokkien. Mandarin was the dominant language. He used it for reading, thinking and in communicating with most of his friends. Hokkien was his mother tongue, and was the common dialect used in his neighbourhood. He could converse in simple English and Malay only.

Language test was done two weeks after craniotomy. The speech was fluent in both Mandarin and Hokkien; comprehension was good. There was no use of paraphasia, reading performance was also good. Naming ability was impaired for both Mandarin and Hokkien with seven out of 10 correct response in both languages. He gave the same responses (either both correct or incorrect) for Mandarin and Hokkien in all the items to be named. He performed poorly in English and Malay, able to name and comprehend simple words and sentences only. This probably corresponded to his premorbid level of language skill.

Case 4 was a 21-year old clerk. He was previously in good health. An acute onset of headache, right hemiparesis and mutism brought him to hospital for admission. Carotid angiography and CT scan demonstrated an A-V malformation at the left fronto-parietal area which was subsequently removed.

The patient was dextral with L.Q. of +100. Patient was fluent in English and Cantonese. English was used in thinking, reading and working; he went through his education all in English. Cantonese, however, was his mother tongue and was used extensively with his family and friends. The patient felt that English was his most dominant language.

The patient was initially totally mute for both English and Cantonese after the cerebral infarction. Comprehension for both the languages recovered quickly. Naming ability followed later so that seven weeks after the initial illness patient was able to name 30 out of 32 items in English and 31 out of 32 items in Cantonese. There was no use of paraphasia and the speech was non-fluent.

DISCUSSION

Much has been written about the pattern of the language loss and recovery among polyglots with the development of dysphasia. The earliest being the 'rule of Ribot (Paradis, 1977) which says that the mother tongue acquired in early childhood is the most resistant to damage regardless of their relative degree of fluency at the time of insult (3). Pitres (1895), however, observed that it was often the language most familiar to the patient at the time of insult which recovered best (4). Minowski (1927) emphasised the importance of underlying emotional factors which may influence recovery (5). He has also pointed out that those languages which are written and read as well as spoken, will recover better than 'dialect' or those languages spoken only. Luria (1956) has added that the degree of disturbance of reading and writing among polyglots aphasics may be a function of the degree to which a language is phonetic (6). Thus, lesions in the primary auditory cortex of the temporal

lobe will be most significant in patients with a highly phonetic language, while lesions of the occipito-parietal region will mostly affect patients with ideographic languages, like Chinese. The case reported by Lyman, et al (1938) is an example of this pattern (7). The Japanese has long recognised the interesting phenomenon that in alexia with agraphia, Kanji (ideographic Chinese character) is often relatively preserved in contrast to Kana (phonogram) (Sasanuma et al. 1971, Yamadori, 1975((8, 9). Ojeman and Whittaker (1978) have mapped the cortical regions related to object-naming in two bilingual patients during awake craniotomy and found some variation in the cortical representation although they shared the same common sites (10). We have found similar patterns among three Chinese-English polyglots (Rapport and Tan) (11). This anatomical variation in the cortical representation of language may explain some cases of selective loss and recovery among polyglot aphasics on a structural basis. Charlton (1964) has emphasised that in most cases, all languages are equally affected instead of a selective restitution (12, 13). Paradis (1977) has summarised a number of other variables which may contribute to the manners the language skills are recovered in polyglot aphasics (3). For example, the 'appropirateness factor' or the language most needed, and the environment of the patient's recovery (the language medium of the hospital). Except in Case 2, our patients did not consider their mother tongue, which was usually a Chinese dialect, the most fluent. Mandarin (Case 1, 3) and English (Case 4) which were thought to be the most fluent were also used for thinking and reading (visual factor). However, their pattern of language loss and recovery appear to be consistent with Charlton's finding that in most cases, all languages are involved equally (12). Case 1 showed initial delay in the recovery of Hokkien in comparison with Mandarin and English. This occurred despite the fact that Hokkien was the mother tongue, that there was a lot of similarity between Mandarin and Hokkien, and that he was more fluent in Hokkien than English pre-morbid. This could be attributed to the ward staff who spoke to him mainly in English, and his early visitors who were mainly Mandarin speaking. This case illustrate the importance of visual factor and the language medium of the hospital during recovery.

We have also examined the frequency of two languages sharing the same response when given the same item to name. As expected, the Chinese language (Hokkien, Cantonese and Mandarin) shared the same responses more commonly when compared with English and one of the Chinese language. However, the difference was not as marked as one would expect.

April and Tse (1) reported a case of a 54 year old right-handed Chinese man whose mother tongue was Chinese, but was fluent in both English and Chinese. He suffered a right hemispheric cerebral vascular accident with dysphasia more marked in Chinese than English. To explain the crossed dysphasia in their case, they speculated that his right hemisphere was dominant, offering as support the fact that written Chinese (Mandarin) is an ideographic language. It may thus require more visuo-spatial processing of information in the right hemisphere. The authors postulated that there may be many cases of crossed aphasia among Chinese patients. Our cases do not support their postulation. We have done WADA test on four polyglot Chinese which also showed left hemisphere to be dominant in both Chinese and English languages (11).

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