Total Aphasia

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(Received March 15, 1977)

INTRODUCTION

There are a number of eminent studies thus far available concerning aphasia as viewed from different aspects and standpoints: clinical, anatomical, encephalopathological, psychiatric and physiological. (Broca[1], Wernicke[2], Liepmann[3], Kleist[4], Jackson[5], Head[6], Goldstein[7], P. Marie[8], Conrad[9], Penfield et al.[10] and so forth). All of the multifarious theories advanced by these authors, however, have proven to fall short of providing to both necessary and adequate extents an explanation of all the symptoms manifested in patients with aphasia. As a result there has undeniably been a tendency for any investigator to go back to the most classical formula of Wernicke and Lichtheim because of its incomparable simplicity, definiteness and easiness of access, even realizing that it has a trait of fabrication.

Now, "aphasiology" (Critchley)[11] has entered on its new phase in recent years, taking a drastic turn on the axis of clinical encephalopathologthology or neuropsychology: its scope has been both extended and divided, quantatively and qualitatively, with the introduction of an interdisciplinary or multidisciplinary approach which enables joint study programming by combining psychoneurology as the main branch involved in the past with other fields of medicine and even other natural sciences and humanities.

Such a trend has led to reappraisal of the "classical system for the classification of aphasias" by some investigators including Jakobson[12], Bay[13], Luria[14], Kreindler[15], Benson & Geschwind[16] and Brown et al.[17].

Having attempted to make a cerebral pathological approach to aphasia, we[18] have keenly felt while dealing with patients with the condition the necessity of taking it as a functional deficiency of the brain as a whole. In the following are presented with some comments on 4 cases of "total aphasia" we have so far encountered, in which there was marked

impairment of understanding of speech with severe disturbances in repetition, writing and reading as well as altered vocal sounds, paraphasia and agrammatism.

REPORT OF CASES

Case 1: A 54-year-old right-handed cabinet-maker.

Family history: Not remarkable. Previous history: Had empyema of the right chest at age 14, and jaundice at age 33. Taste: Smoking, 40 cigarettes a day; no drinking.

Present history: Suddenly muttered something utterly incomprehensible or raised a queer voice while working in June at age 54. No trouble in everyday activities such as putting on or off clothes, taking meals or going to stool. The patient was completely unable to read numerical figures and also had disorientation. He could tell or write his name but couldn't tell his wife's name or his address. He could understand to some extent what his family members spoke to him but was not able to reply properly. Consulted us and then admitted to the Dept. of Psychiatry, Yamaguchi University School of Medicine after having been affected for 4 months without any sign of improvement.

Neurological signs and symptoms: The pupils were circular and of moderate size. No anisocoria was noted. Both light and accommodation reflexes were prompt and complete. Limitation of ocular movement (−); nystagmus (−); the eye-ground and visual field, normal; visual acuity, right 0.4, left 0.8. Hearing was normal. The face was symmetrical; no weakness of the tongue was present; and the pendulum of the palate was perpendicular. Motor and sensory disturbances, muscular rigidity, tremor, ataxia, dysarthria and dysphagia were all absent. Physiological tendon reflexes were within normal limits with no difference between the sides. Pathological reflexes, negative; blood pressure 124/72.

Clinical test findings: No abunormalities were noted in the urine or peripheral blood. Both liver and kidney functions were within normal limits. Wassermann's reaction of the blood was negative. The ECG was within normal range. The EEG, taken twice, was not remarkable on both occasions except for continuous appearance of diffuse alpha activity. The R.C.A.G. disclosed generally tortuous, winding vessels with irregular wall. The A. callosomarginals was distended in compensation for the narrowed A. pericallosa. The venous phase of the circulation was normal.

Psychic symptoms: The patient had a clear consciousness with flat affect, looking flaccid and dull. He spoke nothing spontaneously and was indifferent. The presence of aphasia made it difficult to determine accu-

rately the degree of impairment of intellect, attention, memory and orien -tation, which, however, seemed to be not so serious as was expected.

Clinical course: Initial treatment consisted of a brain metabolism improving agent with an antidepressant drug used concurrently because of a marked depressive state into which the patient fell soon after admission. For the first few days of his hospital stay he appeared somewhat embarrassed, not knowing where his bed, the lavatory and bathroom were. Recovering composure then gradually, he voluntarily joined in light labor including those in the garden, in which he was agile enough. He committed suicide in the second month of hospitalization when a speech learning program had improved his condition to an extent that he occasionally gave a spontaneous speech to some words although slowly and with paraphasic elements. No autopsy was done.

Cerebral pathological findings:

A) Aphasia. 1) Expression of language: Slow in tempo and in monotonous accents with a limitation of conjugation. There was prominent omission or misuse of particles, auxiliary verbs and conjunctives. The patient was in a state of "intoxication par le mot" with pronounced alterations in vocal sound and paraphasia in addition to perseveration and jargon-aphasia. A spontaneous speech was also markedly disturbed with regard to the date of his birth, his address and the names of his family members, with the exception of his own name.

2) Naming: Completely unable to name articles in daily use (e.g., scissors, cigarette, knife, pencil etc.). Paraphasia was prominent with severely impaired ability to speak up words.

3) Associated words: Perseveration and paraphasia were extremely marked even in respect of such daily words as "a, i, u, e, o", or the names of days of the week, months or the four seasons.

4) Repetition: Able to repeat monosyllables in general but completely was unable to repeat words or simple sentences, showing a marked degree in delay, perseveration and alteration in vocal sound.

5) Apprehension of language: Completely incaple of indicating or selecting daily necessaries in line with an oral order. In the hand-eye-ear test or "three sheets of paper test" (P. Marie), the instruction of the examiner was repeated by the patient both partially and with some misconceived words. Prominent was a mistake of the right for the left and vice versa.

6) Written language: Completely unable to read or write but poorly comprehend the Japanese alphabet. Unable to write or read aloud at all. Chinese characters but those denoting his own name. The patient read

aloud his own name not fluently but monotonously in altered vocal sound with a taste of twang. He was also utterly incapable of comprehending written letters or dictation.

7) Copying of letters and drawings: Able to copy even rather complicated letters or drawings with normal rapidity.

8) Numbers and calculation: Able to count serial numbers from one until ninety-nine, although the patient counted back from ninety-nine until sixty and, after repeating this process several times, quitted couuting with his head inclined as if in doubt. Also able to write numbers spontaneously in essentially the right way although quite slowly. Unable to calculate numbers, even to add up small numbers.

9) Naming and recognition of colors: Unable to name but able to recognize colors.

B) Apraxia

1) Intransitive actions: Elementary motions were essentially normal.

2) Transitive actions: Put on or off clothes as rapidly as normal adults of his age can do. He remained calm in clothes buttoned up in an erroneously way or with the collar turning up. Transitive motions to be initiated by volition were impossible for him, who couldn't understand what he was instructed to do.

3) Reflexive actions: Able to mimic the motions of the examiner or mimic the position of one limb with the other.

4) Act of composition: Able to draw a cross, triangle, rectangle or circle just as instructed, but often with a tendency toward perseveration. Also able to draw a cube spontaneously although in an awkward way. Composed a geometric figure with matches less skillfully when given a model to pattern after.

C) Agnosia

The patient was able to some extent to indicate colors or recognize articles by tactile sense, and also mimicked motions relatively well. It was so hard as to cause a catastrophic reaction at times but not utterly impossible for him to recognize fingers or discriminate between the right and left. Such a deficiency may be ascribed mainly to disturbed comprehension of language. Agnosia in the strict sense of the word was ruled out in this case.

Case 2: A 59-year-old male, right-handed grocer.

Family history: Not remarkable. Previous history: Early in his fifties the patient was told of having hepertension, which he left untreated subsequently. Underwent laparotomy because of gastric perforation at age 48. Taste: Drinking; smoking, 20 cigarettes a day.

Present history: In the October of the year when he was 58 years

old he became extremely taciturn, speaking slowly with difficulty in articulation. Two days later he grumbled something incomprehensible. He then became slow in action and marbedly forgetful. The day before his being seen at the Yamaguchi Labor Accident Hospital he even painted his face with the syrup contained in a tin of fruit and, in taking a bath, stood absent-mindedly with his face daubed with soap without having a dip in the bathtub. He could not pronounce the word "razor", but could shave his face. Admitted immediately after the initial examination.

Neurological findings: The pupils were circular and of moderate size. No anisocoria was observed. Both light and accomodation reflexes were prompt and complete. Limitation of ocular movement (−); nystagmus (−); diplopia (−). Exact visual acuity was unknown, but no abnormal findings present except for far-sightedness suitabl to his advanced age.

The arteries in the eye-ground had lumens of vaying size with positive cross-over. There was no apparent narrowing or defect of visual field, although the patient's deficient comprehension of language prevented us from any warrantable judgment in this regard. Hearing impaied; the face symmetrical; no weakness of the tongue present; and the pendulum of the palate perpendicular. Motor and sensory disturbances, rigidity of muscle, tremor, ataxia, dysphagia and dysarthria were all absent. Physiological tendon reflexes were generally somewhat accentuated but without difference between the right and the left sides. Pathological reflexes, negative; blood pressure 170/106.

Clinical test findings: No abnormalities present in the urine or peripheral blood. Both liver and kidney functions were within normal limits. Wassermann's reaction of the blood (2+). The CSF: watery and clear in appearance; initial pressure 190 mmH_2O; disturbance of circulation (−); cell count 10/3; Pandy's reaction (+); reaction for syphilis (−). The ECG was within normal limits. All of the 5 EEGs taken showed dominancy of low voltage fast activity in all areas with normal alpha wave almost absent in occipital area. There were irregular, short runs of 7-8 Hz activity with superimposed beta activity in fronto-central area, and 4-5 Hz theta activity in frontal area. No remarkable asymmetry was noted. The R.C.A.G. demonstrated mild degree of arteriosclerosis; and the P.E.G. showed mild enlargement of the ventral horn of the lateral ventricle.

Psychic symptoms: The patient had a clear consciousness and remained well-mannered. He looked somewhat embarrassed, being euphoric with lowered concentration. He uttered no words spontaneously, and his

intelligence was considered mildly impaired although the exact degree of its disturbance was not known because of aphasic symptoms.

Clinical course: The use of antibiotics for antisyphilitic purposes reduced Wassermann's reaction to (1) in 8 months of hospital treatment. A brain metabolism improving agent was administered concurrently. There was an episode of the patient daubing his face with toothpaste which he presumably mistook for shaving cream. The patient is now under training in speech at our outpatient clinic without remarkable results.

Cerebral pathological findings:

A) Aphasia 1) Expression of language: Slow in tempo, not fluent, and monotonous. The patient made much use of pronouns, with verbs conjugated to a limited extent. Agrammatism was present: he often omitted or misused particles, auxiliary verbs and conjunctives, and had a conversation speaking no subjects but predicates alone. Paraphasia and perseveration were prominent, and jargonaphasia was also noted. He could spontaneously speak his family name without difficulty but not his personal name.

2) Naming: Naming of articles in daily use was seriously disturbed, as the ability to call words out.

3) Associated words: There was severe impairment of speech of associated words with prominent paraphasia.

4) Repetition: There was some difficulty even in repeating monosyllables. Alterations in vocal sound were also noted.

5) Apprehension of language: Completely unable to indicate or select articles as instructed orally. Appeared to be able to some extent to understand, but hardly able to apprehend, simple orders.

6) Written language: Most seriously impaired was the ability to read katakana (the straight-lined Japanese syllabary), followed by that concerning Chinese characters. The ability to read hiragana (the cursive Japanese Syllabary) was injured less severely. Completely unable to write any letters, but able to read hiragana aloud. Alterations in vocal sound (+).

7) Copying of letters and drawings: Able to some extent to copy letters or drawings although unskillfully with omission of details and a marked tendency to draw smaller than the model.

8) Calculation: Unable even to add up numbers of one figure mentally, but able, if with figures, to multiply or divide numbers of two figures, although not rapidly enough.

9) Recognition of colors: Able to recognize colors, although not at once and with a pronounced mistake of blue for green and vice versa (faitlesse chromatique).

B) Apraxia 1) Intransitive actions: Almost normal although slow and somewhat awkward.

2) Transitive actions: Unable to act transitively without an object. Observed transitive actions with an object in the hand was exemplified by scratching a cigarette against a matchbox with a match between the teeth or attempting to ignite by striking a match at the wrong end. Able to put on or off clothes.

3) Reflexive actions: Perseveration was prominent. Acts of mimicry were fraught with a mistake of the right for the left and vice versa.

4) Act of composition: Able to draw a triangle or a circle just as intructed orally. However, the patient drew other figures with perseveration, delay and omissions. The closing-in phenomenon (Mayer-Groß) or tracing the model took place in the process of reproduction.

C) Agnosia

There was no difficulty but some degree of confusion due to aphasia in recognition by tactile sense. The patient satisfactorily recognized his fingers with his eyes opened or closed or different segments of his body, but had difficulty in discriminating between the right and left. Good results were generally obtained in the drawing of a map or a route.

Case 3: A 43-year-old, right-handed, male company employee.

Family and previous history: Not remarkable. Taste: Smoking, 10 cigarettes a day; drinking, as moderate as the common run.

Present history: Involved in an automobile accident while walking, to have so hard a blow on the right, frontal region of the head as to cause loss of consciousness of a short duration. Had nausea and vomiting soon after the accident. There was no radiologic evidence of fracture of the skull, nor bleeding into the cerebrospinal fluid. Amitted to a surgical hospital for 3 weeks and then discharged with improved condition to return to his job. Admitted again with dullness of consciousness in May of the same year. There was a persistent variation in the level of consciousness with symptoms of elevated intracranial pressure. Ten days later the patient had a clear consciousness again but with right-sided hemiplegia, language disturbances and dysphagia coming to the foreground. Hospital treatment for 2 years and 6 months under the diagnosis of Wallenberg's syndrome relieved him of all symptoms but the

hemiplegia and language disturbances. Then consulted us at the age of 43.

Neurological signs and symptoms: The nasolabial sulcus was more shallow on the left than the right side. The visual field appeared to be essentially normal. No abnormalities present in the eye-ground. The pupils were of moderate size and circular without anisocoria. Both light and accomodation reflexes were prompt but somewhat incomplete. Horner's sign (−); limitation of ocular movement (−); nystagmus (−). The pendulum of the palate and the tongue were both deviated to the left. Mild degree of dysphagia was present. Tremor of the fingers (+); adiadochokinesis, right (−). Both the finger-to-finger test and the finger-nose test revealed incorrect motions on both sides. Muscle tonus somewhat lowered on the right side. In the right limbs there was mild myoatrophy with mild to moderate disturbance of senses of touch, pain, temperature and vibration. Physiological tendon reflexes were augmented in the right limbs. Pathological reflexes were positive on the left side. The patient walked with a stick in the left hand and the right foot dragging, and was unable to stand on one leg. Blood pressure 180/100-90.

Clinical test findings: Urine and peripheral blood findings were within normal limits, as liver and kidney functions. ECG: No abnormalities present. EEG: in right temporal lead, suppression of alpha wave with sporadic appearance of theta activity and marked asymmetry during hyperventilation; in bipolar lead, suppression of alpha rhythm in r. F. A.T., r.A.T.→T. and r.T.→O. The R.C.A.G. showed marked irregularity of the inner wall of arteries with a 5×5 cm suspected aneurysma at the origin of A. cerebri anterior. V-C index$\gg$0.33.

Psychic symptoms: Had a clear consciousness but was childish and somewhat impudent in behavior. Cooperative in examinations but fatiguable. Had anxiety with prominent lability of affect.

Clinical course: The use of a brain metabolism ameliorating agent with antihypertensives has kept the patient's condition in a state of lull but with no significant improvement in language disturbances. Hardly willing to join in language training programs. training programs. Now under continued treatment as an outpatient.

Cerebral pathological findings:

A) Aphasia 1) Expression of language: Pronounces articulately but in flattened accents. In speaking sentences, omits particles and misuses auxiliary verbs. Paraphasia, periphasia and perseveration are noted with respect to his own name. Falls into a state of jargonaphasia with "intoxication per le mot" in attempting to speak his address and the date of

his birth.

2) Naming: The ability to call words out is seriously impaired. Literal paraphasia is also noted.

3) Associated words: Marked degree of paraphasia and perseveration is present.

4) Repetition: May sometimes be able to repeat words, when succeeds in eliciting their initial sound, but with alterations in vocal sounds.

5) Apprehension of language: Able to indicate or select articles in daily use essentially as instructed orally. Often fails in the hand-eye-ear test, mistaking the right for the left and vice versa or having a mirror image.

6) Written language: Utterly unable to read katakana or hiragana aloud. Reads Chinese characters less poorly although with a trait of paraphasia. Unable to write as dictated.

7) Copying of letters and drawings: Able to do these although clumsily with omissions and additions.

8) Calculation and numbers: Unable even to add up small numbers. There is impaired recognition of the numerical figures six, seven, eight and nine.

9) Name of colors: Able to classify colors although with perseveration and paraphasia.

B) Apraxia 1) Intransitive actions: Able to act correctly although slow in action on the right side because of hemiplegia on that side.

2) Transitive actions: Unable to act transitively as instructed orally or literally owing to failure to understand what is instructen to do. In everyday life, able to smoke but with impertinent motions.

3) Mimicry: Able to mimic motions although slowly.

4) Act of composition: Able to draw a straight line or a circle. Draws an awkward figure resembling a pentagon when required to draw a triangle. Able to copy a somewhat complicated figure (house, pig, cow, etc.) almost correctly after a model, although not quickly.

C) Agnosia

Recognition by tactile sense is intact on the left side, although sensory disturbances on the right side make it impossible to determine how much it is impaired on that side. Somehow able to mimic motions. Has some difficulty in indicating the fingers and occasionally in discriminating between the right and left. Apprehension of language is seriously impaired, although the exact extent is difficult to determine. No visual

agnosia is present, nor topographic disorientation. There is agnosia of the numerical figures six, seven, eight and nine.

Case 4: A 58-year-old, right-handed, male expublic servant.

Family history: Not remarkable. Previous history: Has had diabetes mellitus with the consequent diabetic diet since the age of 52. Taste: Heavy drinking in the past but has restrained himself from drinking since the onset of the illness; no smoking.

Present history: Consulted an internist complaining of discomfort and general fatigue in June of the year when the patient was 52 years old. Told of having diabetes mellitus and hospitalized for 3 months. Had no paralysis of the extremities nor disturbances of language at that time. For about 4 years that followed, nothing was the matter with him, who was in the management of a local public entity. In March of the year when he was 56 years old, he had palsy of the right half of the body and admitted to a hospital for internal disease. Returned to his job with improved condition 3 months later. In April of the year when he was 57 years old, he had an attack of paralysis of the body at the entrance of his house when he going to attend his office. Admitted to a hospital by ambulance car, being unable to speak words spontaneously and grumbling something incomprehensible when spoken to by his family members. It seems that he had a clear consciousness on admission. Language disturbances became evident with paralysis of the right limbs after admission. Then he was discharged after 3 and a half months of hospital stay with these symptoms remaining unaltered. Underwent training in speech as an outpatient subsequently without results. Then retired from his work in March of the year when he was 58 years old. It was because of disturbed rhythm of sleep that he consulted us at the Dept. of Neuropsychiatry, Yamaguchi University School of Medicine.

Neurological signs and symptoms: Anisocoria was present with the right pupil larger than the left. Both light and accommodation reflexes were prompt and complete. Limitation of ocular movement (−); nystagmus (−). There was evidence of mild arteriosclerosis in the eye-ground, but the papilla was normal. No disturbances in visual field appeared to be present. Hearing defect was absent. The face was not significantly asymmetrical. The uvela was perpendicular. No rigidity of muscles was noted, but gross tremor of the fingers of the right hand. Dysphagia (−); dysarthria (−). Physiological tendon reflexes were spasmodically accentuated on the right but normal on the left side. Pathological reflexes: Trömner reflex (+); Hoffmann reflex (+); ankle clonus, right (+), requiring spastic gait for the right foot. Mild sensory disturbances appeared to be

present in the right limbs, although their severity was difficult to determine exactly. Blood pressure 120/84.

Clinical test findings: Peripheral blood findings and liver and kidney functions were all within normal limits. The ECG showed arrhythmia absoluta; the EEG showed continuous runs of diffuse alpha wave with lack of asymmetry. The R.C.A.G. gave evidence of obstruction of the left middle cerebral artery.

Psychic symptoms: Had a clear consciousness and remained courteous but with a prominent trait of euphoria and infantilism. Dull, absent-minded and somewhat embarrassed. Mild disturbance of intelligence noted but with awareness of language disturbances.

Clinical course: Treatment consisted of a cerebral vasodilator and a brain metabolism ameliorating agent administered in combination with training in language. No improvement was obtained for 3 months until the treatment was discontinued at the request of the patient's family members. The blood glucose level was got under control by a dietary regimen alone. At home the patient spent every spare moment in lying in bed, being hardly interested even in newspapers or TV programs. He took meals with a spoon instead of chopsticks in the right hand.

Cerebral pathological findings:

A) Aphasia 1) Expression of language: In a low voice, monotonous, irregular in tempo, and unaccented. The words he spoke spontaneously, except for "yes" and "no", consisted largely of monosyllables repeated perseveringly. Completely unable to utter anything meaningful including his own name.

2) Naming: Almost unable to name things with a serious degree of paraphasia.

3) Associated words: Able to pronounce a series of vowels as such, but pronounced consonants in vocalized forms. An extremely marked degree of paraphasia, periphasia and perseveration was noted.

4) Repetition: Able to repeat monosyllabic vowels only. Repeated di-or polysyllabic words with the sound of the first syllable persevering.

5) Apprehension of language: Able to indicate or select articles in daily use as instructed orally only when instructed several times repeatedly and often after thinking for more than 30 seconds. Able to act according to a simple oral order, such as "Close your eyes" or "Put out your tongue". In the hand-eye-ear test, however, a mirror image was noted with a mistake of the right for the left and vice versa. Able to obey an oral order pertaining to elementary motions of his own body.

Table 1. Summary of symptoms and signs in our 4 cases

Case No.	Age	Sex	Handedness	Understanding	Spontaneous speech	Alternation in vocal sound	Repetition	Writting	Copying	Caluculation	r.-l. disorient.	Apraxia	Agnosia	EEG	CAG	Neurol. Findings	Localisation
1.	54	M.	r.	1+	3+	2+	3+	1+	0	3+	2+	0	0	diffuse alpha	A. pericallosa l. narrowing		r. front. lobe area
2.	59	M.	r.	1+	2+	2+	3+	3+	3+	1+	2+	3+	0	4–5 Hz activity in both frontal	arteriosclerosis	WaR (2+)	both front. lobe area
3.	43	M.	r.	2+	3+	2+	2+	1+	3+	3+	0	0	0	slow alpha	aneurysm of A. cereb. ant. r.	hemiplegia r.	brain stem (?)
4.	58	M.	r.	2+	3+	2+	2+	3+	0	3+	1+	1+	0	diffuse alpha	obstruct. of A. cereb. med. l.	hemiparesis r.	r. temp. pariet. area

0; not impaired, 1+; slightly impaired, 2+; moderately impaired, 3+; severely or perfectly impaired.

6) Written language: Able to obey a written order only when it is simple and in Chinese characters, and not when it is written in katakana or hiragana. Unable to read aloud his name written in Chinese characters, but able to write it with his right hand, although clumsily. Wrote his address with much omissions.

7) Copying of letters and drawings: Able to copy letters or drawings with right hand, although very poorly. There was a marked degree of omission in copying a somewhat complicated drawing.

8) Calculation and numbers: Unable to count serial numbers. Read numbers of two figures slowly and articulately, often mistaking the unit. Calculation with figures possible for the patient includes no more than addition and subtraction of numbers of one figure. Able to pick up pencils in a number of one figure as indicated. In short, the patient's ability to apprehend numerical figures was less seriously impaired than his other abilities or functions.

B) Apraxia 1) Intransitive actions: Able to put on or off clothes, although not promptly because of motor paralysis.

2) Transitive actions: Often unable to act transitively because of failure to understand an oral order. Able to act correctly with an object: e.g., striking a match and then blowing out the fire, or handling a key.

3) Mimicry: Essentially able to mimic simple motions, although somewhat slowly because of motor paralysis.

4) Act of composition: Unable to draw an extremely simple geometric figure according to an oral instruction. Able to pattern only a circle after a model. Unable to draw a cube.

C) Agnosia

Able to some extent to recognize numerical figures but recognizes letters poorly. Able to recognize colors only to the extent of classifying them. Also able to recognize persons. Topographic orientation was impossible to evaluate because of severely impaired apprehension of language. Has difficulty in recognizing the fingers or discriminating between the right and left. Able to calculate no more than small numbers with figures.

A summary of symptoms and signs observed in these 4 cases is given in Table 1.

DISCUSSION

Disturbances of language (aphasia) or of cognition or action (agnosia, apraxia) are not sheerly those involving neurological elements, nor are they attributable to a psychic disorder. A number of problems

hence remain to be solved in these respects, which are not fully amenable to understanding or interpretation in terms of focal signs as in sensory or motor disturbances. Kleist[4] and Nielsen[19] advocated a thoroughgoing mechanical localization theory in this context, which has much contradiction and unreal features involved in explaining or construing actual cases. Aphasia should be a subject to be studied not only from the encephalopathological or psychiatric standpoint but in various other fields including natural sciences and humanities. On the other hand, the argument that aphasia represents one of the types in which the underlying total dysfunction of the brain manifests itself (Head[6], Goldstein[7], Conrad[9], etc.) appears to make light of neuropathological accomplishment with too much emphasis on a dynamic associative psychological approach. The concept of aphasia has taken a drastic turn in recent years, with multiple sets of methodology made available by which to approach the condition. The advance in brain surgery has made it possible to gain access to aphasia through electrophysiological studies of the brain (Penfield et al.[10]). In addition, some new developments have taken place in the neuropathological study of aphasia, e.g., suggestion of the third speech area or emphasis on the upper nuclei in the brain stem as the seat of speech function.

Progress has also been made in the joint study of aphasia with other branches of medicine, psychology, linguistics, information science and anthropology, with a number of reports thus made public in succession concerning new tests for aphasia (Goodglass et al.[20], de Renzi et al.[21], Pizzamiglio et al.[22], Huber et al.[23], Sasanuma[24,25], Nagae[26]) or the system of classification or the theoretical consideration of aphasias (Kreindler[15], Alajouanine[27], Lhermitte[28], Gloning et al.[29], Benson et al.[16], Hamanaka[30] etc.).

Now, newly proposed classification systems for aphasias are an extension or development of the classic version of classification in which some transitional or mixed forms are placed between sensory and motor aphasias as the extremities. For the time being, it might be practical to rely on such a system in determining the relative position of individual cases. However, typical cases are so rare as a matter of fact that clinicians often find it difficult to evaluate actual cases properly.

Our four cases may reasonably by considered to have total aphasia with serious disturbances in both expression and apprehension of language.

Total aphasia denotes a condition in which almost all functions concerned in expression and apprehension of language are lowered or abo-

lished. It is considered to be a combination of Broca's and Wernicke's aphasias. In total aphasia the language disturbances are often complicated by apraxia and agnosia, and sometimes by unilateral motor- and sensory disturbances. Total aphasia occurs only as a result of a lesion in an extended range of speech area, such as vascular damage involving the entire drainage of the A. cerebri media. It is said to be difficult to recover from and, even if ameliorated, leave either the Broca or the Wernicke form of aphasia behind. Total aphasia is difficult to distinguish from Broca's aphasia; P. Marie[8] regarded the former as the severe form of the latter. Alajouanine[27] also classified "aphasie totale" (Dejerine) under the category of Broca's aphasia.

There are a number of reports so far available concerning the language disturbances involving the Japanese syllabary (kana) more seriously than Chinese characters in patients with aphasia in our country (Akimoto[31], Sakamoto[32], Ohashi[33], Imura[34], Sasanuma[25], Yamadori[35], etc.). This phenomenon has been attributed to the fact that Chinese characters are hieroglyphic or ideographic whereas the kana are phonetic symbols: visual comprehension is believed to play a major role in mastering the former. Of great interest is the fact that the process of learning languages in our country is also much implicative in this regard.

In Case 1, the etiology appears to be vascular in nature, in view of the sudden onset as well as the left carotid arteriographic findings and EEG patterns. The narrowing of the A. pericallosa as an offshoot of the A. cerebri anterior is suggestive of circulatory disturbance in the drainage of the artery. A lesion in the area of the left anterior cerebral artery, however, is said to entail left-sided apraxia, monoplegia of the right lower limb or right-sided hemiplegia dominant in the lower limb and rarely give rise to Broca's aphasia. A lesion may be presumed to exist in the anterior cerebral artery area in this case, where, unfortunately, the patient was not subjected to autopsy, making it impossible to determine the anatomical site and extent of the lesion. This is an exceptional case not in conformity with the conventional anatomical knowledge, since a lesion in such a stie gave rise in this case not to any appreciable degree of agnosia, apraxia, disturbance of intelligence or even neurological symptoms and signs but to serious form of total aphasia alone, exactly the reverse being the case in most reported instances.

Suspected in Case 2 is cerebrovascular disturbance of syphilitic origin, or damage to the frontal lobes as suggested by the EEG and PEG tracings. It is said, however, that there are few patients with aphasia due to damage in such an area and that unilateral obstruction of the anterior cerebral artery produces no or slight, if any, clinical mani-

festations. (Kameyama[36]). Disturbances in the frontal lobe area have been associated with the development of primitive reflexes, pseudobulbar palsy or akinetic mutism, and more frequently with apraxia than with aphasic symptoms. The last feature holds true in this case as well.

Case 3 has a previous history of injury to the head and neurological manifestations of Wallenberg's syndrome, for which a lesion in the brain stem is probably responsible. The CAG. demonstrated the presence of aneurysma at the origin of the right anterior cerebral artery. This is a case of interest in the context of the speech function localized in the frontal lobes and brain stem.

A disturbance in the right median cerebral artery is suspected in Case 4, which was a right-handed patient. Of great concern in this case is the presence of many features which cannot be fully explained by the classic theory of localization, rather than the question whether there is predominance of cerebral function.

Further investigation is needed as to the 4 cases illustrated here, which differ in many respects from those documented previously.

SUMMARY

The cerebral pathological findings obtained in 4 cases of total aphasia have been presented. Of these, Case 1 is considered to have a lesion in the right anterior cerebral artery area, which gave rise to severe total aphasia alone without such concurrent manifestations as agnosia, apraxia, disturbance of intelligence or neurological symptoms or signs. Cerebrovascular disturbance of syphilitic origin, especially a lesion in the frontal lobes was suspected in Case 2, where aphasia concurred with apraxia. In Case 3 with a previous history of injury to the head, there was Wallenberg's syndrome with evidence suggestive of aneurysma at the origin of the right anterior cerebral artery. This case, in which aphasic symptoms were outstanding, is of interest in view of the relationship between language disturbances and the nuclei in the brain stem. Case 4, a right-handed patient with aphasia due to a lesion in the right median cerebral artery, is also of signilicance in dealing with the problem of predminance of cerebral function.

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