Treatment of Aphasia

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Approximately 1 million people have aphasia in the United States today, yet with properly targeted therapy in selected patients effective communication can be restored. Current approaches to treatment of aphasia include psycholinguistic theory-driven therapy, cognitive neurorehabilitation, computer-aided techniques, psychosocial management, and (still on an experimental basis) pharmacotherapy. *Arch Neurol. 1998;55:1417-1419*

Language is not located in autonomous modules strategically implanted within the left hemisphere (a comprehension module in Wernicke's area, an output module in Broca's area, the 2 connected by a single, hardwired cable). Neuroimaging studies of the last 15 years and contemporary analyses by cognitive neuroscientists have shown that multiple, complex, and overlapping cerebral systems underlie the elements of language.[1,2] Each system seems to consist of a widely distributed network of cortical and subcortical components, both within and beyond the classic left hemispheric zone of language.

Linguistic and nonlinguistic cognitive functions, such as attention, memory, and executive system functions, are interdependent and may be affected to different degrees in patients with aphasia. Knowledge of how language can be influenced by nonlinguistic cognitive functions (traditionally assigned to the right hemisphere or considered to be linked to frontosubcortical systems) has been useful in developing new approaches to the treatment of aphasia.

This review addresses 3 issues: relevance of aphasia therapy to neurologists, current state of the art, and future trends.

IMPORTANCE OF APHASIA THERAPY TO NEUROLOGISTS

The number of people with aphasia in the United States today, primarily as a consequence of stroke and traumatic brain injury, is estimated at about 1 million.[3] Eighty thousand new patients with aphasia are added to the pool each year from stroke alone.[4]

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For some individuals with aphasia, loss of the ability to communicate is tantamount to loss of personhood, and any help they can receive to recover function in this cognitive domain is treasured. Neurologists should know that current approaches to aphasia therapy, carefully tailored to treatment of specific signs and symptoms, actually help selected individuals with aphasia communicate more effectively. Contemporary research in basic neuroscience, cognitive neuroscience, and neuroimaging is expanding our therapeutic options for treatment of aphasia in ways that might not have been considered possible just a few years ago. Consequently, neurologists should work more closely and consistently with speech/language pathologists to help their patients with aphasia.

CURRENT APPROACHES TO APHASIA THERAPY

Efficacy

One reason, I suspect, that many neurologists have been skeptical about the value of aphasia therapy was the relative dearth of statistically valid and reliable studies documenting benefit of aphasia therapy over spontaneous recovery. Research in the last 10 years has changed that picture.

In a meticulously detailed study on the efficacy of treatment for individuals with aphasia, Robey[5] carried out a meta-analysis of 21 studies that provided sufficient information for inclusion. He evaluated 3 classes of effect size: untreated recovery, treated recovery, and treated vs untreated recoveries. He excluded from his analysis all case studies, all studies using single-subject designs, all studies for which the report contained insufficient quantitative information to allow the calcula-

tion of an effect size, and all studies reporting uninterpretable effects. His conclusions document the clear superiority in performance of individuals receiving treatment. The effect of treatment beginning in the acute stage of recovery was nearly twice as large as the effect of spontaneous recovery alone, while treatment initiated after the acute period achieved a smaller, but nevertheless appreciable, effect.

Holland and colleagues[6] provided another compelling review of treatment efficacy studies in aphasia. Disregarding case reports in which only anecdotal testimonial data were presented, they noted that nearly 200 studies pertaining to aphasia treatment have been published in the English language alone. Included in these reports were large and small group investigations, single-subject experiments, and single-case studies. Holland et al conclude that individuals with aphasia meeting specific selection criteria who are treated improve more than those who do not receive treatment. Improvement was documented in both the quantity and quality of language.

Treatment Approaches

The critical clinical issue in current approaches to aphasia therapy is the necessity to individualize the therapeutic modality for the specific aphasic sign or symptom being targeted and the specific person being treated. Traditional methods of aphasia therapy have been improved by careful selection of timing and frequency of treatment delivery, more precise delineation of which aphasic deficit to focus on, more reasoned matching of therapy technique to deficit, and modification of treatment modality as the syndrome evolves. For each of these clinical elements, an informed neurologist, working in therapeutic partnership with the speech/language pathologist, can manifestly aid the patient.

Output-Focused Therapy. Most speech/language pathologists still use the technique known as stimulation-response or direct retraining of deficit, as one aspect of their therapy program. First, the aphasic deficit is identified and, then, repetitive drill through several modalities (eg, reading or repetition) is encouraged. An endless array of sophisticated modifications of this traditional approach has been developed.[7]

A newer technique, called melodic intonation therapy (MIT), is neurobehaviorally based. Through its Therapeutics and Technology Assessment Subcommittee, the American Academy of Neurology has identified MIT, currently in use worldwide, as an effective form of output-focused language therapy.[8,9] Melodic intonation therapy is a formal, hierarchically structured treatment program based on the assumption that the stress, intonation, and melodic patterns of language output are controlled primarily by the right hemisphere and, thus, are available for use in the individual with aphasia with left hemisphere damage. Melodic intonation therapy, in essence, consists of intoning normal language with exaggerated rhythm, stress, and melody. The subcommittee determined that MIT was effective for patients with Broca's aphasia, if used in its full and formal manner.

Treating Linguistic Deficits—Psycholinguistic Approach. The psycholinguistic approach to aphasia therapy applies information-processing models of normal cognition to an understanding of language disorders.[10,11] An attempt is made to identify the locus of the language deficit within the cognitive/linguistic structure of normal language. An analogy might be the search for a missing or defective enzyme within a complex metabolic system. The premise underlying this approach is that a specific aphasic sign or symptom may be the surface clinical manifestation of different underlying deficits within the cognitive structure of language. Only by uncovering the precise underlying psycholinguistic deficit can therapy be properly targeted. To date, the clinical phenomena of anomia and agrammatism have been most responsive to this approach.

Treating Related Neurobehavioral Deficits—Cognitive Neurorehabilitation. A newer approach to aphasia therapy is based on the idea that the ability to communicate is dependent not only on linguistic competence but also on related neurobehavioral functions, such as attention and memory. The assumption is that brain damage that produces aphasia also produces disturbance in other, language-related cognitive functions, and that treatment of these other cognitive deficits can facilitate communication. Holland[12] outlines the strengths and limitations of this approach.

For example, virtually all individuals with aphasia develop perseveration, which interferes with communicative capability. In 1988 Helm-Estabrooks and colleagues[13] introduced Treatment for Aphasic Perseveration,[9] and demonstrated that cognitive therapy focused on related neurobehavioral deficits, in this case perseveration, can improve language function in individuals with aphasia.

McNeil and colleagues[14] have long argued that individuals with aphasia suffer a deficit in allocation of attentional resources and proposed an "integrated attention theory of aphasia," asserting a relation among attention, arousal, and language processing. This argument receives support from contemporary research in cognitive neuroscience, in which a left hemisphere attentional system linked to language has been described by Posner.[15] Indirect evidence exists that attempts to treat attentional dysfunction in individuals with aphasia may ameliorate the language disorder; and experimental studies are just beginning to test this hypothesis.

Computer-Aided Therapy. Of the many attempts to benefit individuals with aphasia by means of computer-aided therapy, perhaps the most creative was introduced by Baker and colleagues[16] in the middle of the 1970s[17] and further developed by them and by Weinrich and colleagues[18] over the next 20 years. Computerized visual communication (or C-VIC) was designed as an alternative communication system for patients with severe aphasia and is based on the notion that those with severe aphasia can learn an alternative symbol system (alternative to the symbol system used in natural language) and can use this alternative system to communicate. Pictures or icons, representing meaningful concepts or things, are developed and loaded into a computer. The patient with aphasia learns to manipulate these

icons on the computer screen for purposes of communication. According to Weinrich and colleagues[18] most patients with severe aphasia whom they tested could master the mechanics of the system, learn icons for proper and common nouns, and use them in simple sentences, although they produced their sentences agrammatically. Nevertheless, teaching patients with severe aphasia to communicate by computer, even with agrammatic output, is a remarkable achievement.

Treating the Whole Person—Psychosocial Aspects and Pragmatics. Martha Taylor Sarno,[19] one of the pioneers of modern aphasia therapy, has also been one of the staunchest supporters of the effort to manage the whole patient, to help the patient recover functional communication using all techniques possible in a comprehensive therapy program. She says that "the condition of aphasia should not be limited by a definition which separates the language pathology from the person."

One of the most active movements in current aphasia therapy is related to Sarno's cautions. Group treatment, focusing on regaining conversational skills, and on developing alternative strategies for communicating despite aphasia, is becoming increasingly popular.[20] Interpersonal social contexts for developing effective supported communication are themselves the focus of treatment.[21,22]

One technique that has gained considerable popularity is Promoting Aphasics' Communicative Effectiveness (or PACE).[23] In this program the emphasis is on enhancing communicative ability, nonverbal as well as verbal, in pragmatically realistic settings. Use of compensatory strategies is encouraged, with less of a focus on relearning a lost or deficient linguistic skill, and more on improving communication by any means possible.

NEW DIRECTIONS IN THERAPY FOR APHASIA

Pharmacotherapy for aphasia is a new, still experimental, and somewhat controversial adjunct to other therapeutic approaches, and one which may, at last, capture the attention of neurologists on behalf of their patients with aphasia.[24,25] In contemporary cognitive neuroscience, disorders of memory are being fractionated, with different components of memory systems correlated with abnormal levels of specific neurotransmitters. Similar attempts are being made to understand the cognitive neurochemistry of language. Grossly, and as yet without fully adequate experimental support, language output abnormalities have been linked to dopaminergic system deficiencies[26] and anomia and auditory comprehension disorders have been linked to cholinergic system deficiencies.[27] Single-case studies, in which the patients serve as their own controls, have demonstrated remarkable improvement in language function following pharmacotherapy for aphasia using this chemicocognitive model. Few well-controlled studies have been carried out, however, and these, to date, have been less convincing than the single-case studies. Nevertheless, a detailed and critical review of the topic concludes "when used as an adjunct to behavioral therapy, pharmacotherapy appears to have benefit."[25]

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