The experience of Wernicke’s aphasia

Brief Communications

The experience of Wernicke’s aphasia

Ronald M. Lazar PhD
Randolph S. Marshall MD
George D. Prell PhD
John Pile-Spellman MD

From the Departments of Neurology (Drs. Lazar and Marshall), Radiology (Dr. Pile-Spellman), and Neurological Surgery (Dr. Lazar), Columbia–Presbyterian Medical Center, and Department of Pharmacology (Dr. Prell), Mount Sinai School of Medicine, New York, NY.

Received May 17, 2000.
Accepted in final form June 21, 2000.

Supported in part by the Doris and Stanley Tananbaum Foundation.

Address correspondence and reprint requests to Dr. Ronald M. Lazar, Neurological Institute, Columbia–Presbyterian Medical Center, 710 West 168th Street, New York, NY 10032; e-mail: ral22@columbia.edu

Article abstract

The authors induced a transient Wernicke’s aphasia in a patient with left frontal arteriovenous malformation by superselective Wada injection exclusively into the lower division of the left middle cerebral artery. The patient was then asked to recall his experience, which the authors matched against his language during anesthesia. The patient’s account showed that there was a more systematic attempt to respond appropriately than the authors could infer from his overt behavior. His narrative suggests that a thought process not measured by aphasia examinations may exist independent of language.

Introduction

The clinical characteristics of Wernicke’s aphasia include fluent speech with literal and verbal paraphasic errors, neologisms and perseverative spoken responses, impaired comprehension, impaired repetition with paraphasias, and errors reading aloud. Occlusion of the lower division of the left middle cerebral artery (LMCA) produces this syndrome, with infarction encompassing the whole posterior temporal, inferior parietal, and lateral temporo-occipital regions. Because of the difficulty in evaluating severe Wernicke’s aphasia, the experience from the viewpoint of the patient is rarely studied with adequate lesion localization immediately before and after naturally occurring cerebral events.

We had the opportunity to query a patient with a left frontal arteriovenous malformation (AVM) about his perceptions of his language abnormality on a task-by-task basis shortly after we deliberately induced a transient Wernicke’s aphasia following superselective injection of anesthetics into the lower division of the LMCA.
Case report.

A 47-year-old right-handed man presented with minor sensory seizures of the right arm and lip. MRI revealed a 2-cm AVM in the left middle and inferior frontal gyri shown on angiogram to be supplied by the LMCA.

During angiography the microcatheter was placed in the lower division of the LMCA (figure), and the patient underwent serial aphasia examinations, evaluating fluency, comprehension, naming, repetition, and oral reading. Tasks were adapted so that the entire examination would take about 3.5 minutes, which was the approximate duration of the peak anesthetic effect. For testing with anesthetic, 50 to 75 mg of amobarbital sodium (USP) and 20 mg of lidocaine opacified with metrizamide were injected, followed less than 1 minute later by repeat language assessment. Twelve to 15 minutes after injection, when anesthetic effects were presumed to have fully dissipated, the language examination was readministered to ensure that functioning had returned to baseline levels. After the entire examination the patient was asked to write his recollections, which were contrasted with the examiner's recorded observations.

Figure. The angiogram following injection of amobarbital sodium and lidocaine, superimposed on its approximate location in the left cerebral hemisphere. The catheter tip is shown to be in the lower division of the middle cerebral artery just distal to the bifurcation.

At baseline and 15 minutes after anesthetic injection, all aspects of language function were entirely normal. The patient recalled that his speech throughout anesthesia appeared to be fluent and intelligible.

"In general my mind seemed to work except that words could not be found or had turned into other words. I also perceived throughout this procedure what a terrible disorder that would be if it were not reversible due to local anesthetics. There was never a doubt that I would be able to recall what was said or done; the problem was that..."
often I could not do it."

The first task required him to rapidly provide the names of animals. He said in fluent, prosodic speech, “one, abril, abril, magardy, amigal, brazair, try to get in, animal, animal, try and reach.” He had no recollection of this task after the procedure.

In the second and third tasks, the patient was asked to follow simple commands and to respond “yes” or “no” following dictated questions (e.g., “Will a cork sink in water?”). He made no responses to these items during anesthesia and he had no recollection of them afterward.

The fourth task required him to label orally pictures from the Boston Naming Test. He recalls:

“Moving on to the pictures, I will never forget the item #1, the tennis racket. I tried extremely hard to state the name of the picture. I knew what I wanted to say, but clearly could not find the word—a very frustrating situation. With my right hand somewhat freed, laying on my chest, I even tried to show I was ‘batting the tennis ball’ with the racket in an attempt to demonstrate what I meant and hoping that doing so would encourage the word to come to mind.”

The patient’s response was “perkbull.”

The patient then added:

“What happened next I will never forget . . . I told (the doctor) in my frustration that I had just bought a tennis racket. But this was not true! What I explicitly meant to say was that I owned a tennis racket . . . My statement was explicitly false, and I knew that I had said it. But I think that no less than 3 times I stated that I had just bought a racket, and kept repeating it as a way of self-correcting my previous incorrect statement. This was even more frustrating as now incorrect words came from me. Having spent a lot of time on this first item, I then elected to move onwards.”

From our observations, the patient never said anything aloud about a tennis racket. On the next four pictures, he called a volcano “chemicol,” had no response to the picture of a dart, responded “trying” to a globe, and said “want to charge him” to the picture of a beaver.

Repetition was tested via the presentation of four dictated sentences. When presented with \textit{The vat leaks}, he responded, “No shook,” and then he made no response to each of the next three sentences. He recalls, “Repeating words and phrases proved to be a disaster. . . . From my perspective, it appeared to be an issue of apparent retention.”

Last, the patient was given 23 words to read aloud, presented in three text lines on a page. He made correct responses to \textit{milk, tree, theory, grieve, and conspiracy}. He made the following errors: “help” for \textit{himself}, “be” for \textit{between}, “chead” for \textit{chin}, and “esculate” for \textit{escape}. Afterward, he stated:

“Reading words aloud along a series of lines was also startling. The first few words and others throughout the reading, but not all, appeared to be a totally random group of letters from the English alphabet. My recall is also that in some cases, there appeared to be even a few more letters than had existed before. Just as an example:

\begin{quote}
Printed word (made up): recollection

My perception: mbldoyeexstyz
\end{quote}

I tried my best to pronounce them but it was clear even to me at the time that I was speaking gibberish. That, I was very sure about. I also recall that I had similar problems as I had with the tennis racket, in that I would see a word, pronounce it, but another word would emit from my mouth—and I was very well aware of it. My attempts to self-correct for these obvious errors only led to further repetitions of the same incorrect word.”

Discussion.

By clinical criteria, our patient had a dense Wernicke’s aphasia indistinguishable from that produced by infarction.
His recollections following the aphasia, however, suggest that there was greater functional competence during the peak anesthetic effect than could be discerned by his overt behavior.

Our patient, for example, was able to derive enough information from the environment that he could determine the nature of the task, attempt to execute it, and monitor internally a decision-making process, albeit ineffectively. His description indicates not only that he could think, but that he could recall afterwards what it was he was trying to do. It has been well-established that Wernicke’s patients can respond appropriately to extralinguistic cues, but the notion that individuals with such profound receptive deficits can analyze their own behavior contradicts traditional assumptions.

We infer from his description and from performance on our tests that visual stimuli exerted more control than spoken language. His report about thinking in the presence of pictures, for instance, suggests semantic categorization had not been completely disrupted but that the phonetic properties of auditory stimuli failed to elicit corresponding representations. The linkage between meaning and his spoken responses also appeared disturbed, both with regard to semantic and to phonetic properties. His description, therefore, suggests that there may not be a unitary underlying abnormality, but rather several independent aspects of Wernicke’s aphasia. More important, perhaps, is that information obtained in the conventional aphasia examination does not reveal the complexity of residual function.

References


