Transtentorial Herniation with Posterior Cerebral Artery Territory Infarction

A New Mechanism of the Syndrome of Alexia Without Agraphia

H. S. Kirshner, M.D., J. Staller, Ph.D.,
W. Webb, Ph.D., and P. Sachs, Ph.D.

SUMMARY A 39-year-old male developed a right homonymous hemianopsia and alexia without agraphia following emergency surgery for hemorrhage into a left frontal tumor. A computerized tomographic (CT) scan demonstrated low density areas in the left frontal region and in the territory of the left posterior cerebral artery. The alexia without agraphia syndrome appeared to result from compression of the left posterior cerebral artery by a transtentorial pressure cone, a mechanism not previously reported in this syndrome. The behavioral investigation confirmed the diagnosis and replicated recent findings related to the syndrome of alexia without agraphia.

Stroke, Vol 13, No 2, 1982
tated word name, a printed word name, and a picture were compared as facilitators of the patient's ability to identify a word from a list. Letter naming was mildly impaired (12/144 errors), but latencies were much shorter than for words. Latencies increased with length in both the word naming and lexical decision tasks indicating that the patient was reading by a letter-by-letter decoding process. In the cueing test, the dictated words were more effective than either the printed word name or picture, indicating the preservation of auditory language processing. These results were similar to previous findings in alexia without agraphia.

Discussion

The patient's reading disorder appeared typical of alexia without agraphia in bedside testing, in the BDAE, and in the experimental test battery. Alexia with preserved writing, difficulty in naming colors, short term memory loss, and right homonymous hemianopia are all characteristic of the syndrome. Letter-by-letter reading and ability to interpret dictated spelled words have also been emphasized. The hallmark of alexia without agraphia, however, is the remarkable ability of the patient to write sentences to dictation, yet not to read these same sentences.

The pathogenesis of the syndrome in our patient appeared to involve hemorrhage into the left frontal tumor, with creation of a transtentorial pressure cone, compression of the posterior cerebral artery, and infarction of the left occipital lobe.

Compression of the posterior cerebral artery and resultant temporo-occipital infarction has been well documented in cases of transtentorial herniation. While survival after transtentorial herniation is unusual, cases with both cortical blindness and hemianopia have been reported. Kertesz reported a case of alexia and visual agnosia secondary to severe head trauma with prolonged coma, but no evidence for transtentorial herniation or posterior cerebral artery compression was presented. The behavioral syndrome of alexia without agraphia has not previously been described as a sequel of transtentorial herniation.

The experimental findings of preservation of letter reading and letter-by-letter decoding of words confirm previous findings in alexia without agraphia. These findings are not easily explained by the traditional model of alexia without agraphia, which postulates a disconnection of the intact right visual cortex from left hemisphere language centers, and especially from the left angular gyrus, which is thought to be a center for intermodality associations such as the visual to auditory transcoding needed for reading. The direct site of this disconnection is thought to be the splenium of the corpus callosum which, along with occipital lobe, is supplied by the posterior cerebral artery. Most instances of alexia without agraphia in
The literature have been caused by stroke in the territory of the left posterior cerebral artery. Reports of alexia without agraphia in other pathological conditions affecting the left occipital lobe — including tumors, surgical resection, trauma, and intracerebral hemorrhage, all of which should not affect the corpus callosum — suggest that anatomical disconnection may not fully account for the syndrome. Others have suggested that an occipital white matter lesion alone may be sufficient to disconnect the right visual cortex, or even both visual cortical areas, from the angular gyrus. The experimental and clinical findings in alexia without agraphia can also be explained by a disturbance of a more fundamental visual process such as the ability to perceive more than one language stimulus simultaneously or the ability to recognize a "visual word form." The status of these competing theories regarding the mechanisms of alexia without agraphia will have to await the verdicts of future research.

Acknowledgments

We thank Dr. James E. Hays for providing helpful information about the patient's surgery and clinical course. Mrs. Jane S. Smith, Ms. Mary Henry, and Ms. Beth Gehrke assisted with preparation of the manuscript.

References

5. Patterson JV, Bramwell E: Two cases of word blindness. Med Press Circ 79: 507-508, 1905
Transtentorial herniation with posterior cerebral artery territory infarction. A new mechanism of the syndrome of alexia without agraphia.
H S Kirshner, J Staller, W Webb and P Sachs

*Stroke*. 1982;13:243-246
doi: 10.1161/01.STR.13.2.243

*Stroke* is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 1982 American Heart Association, Inc. All rights reserved.
Print ISSN: 0039-2499. Online ISSN: 1524-4628

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://stroke.ahajournals.org/content/13/2/243

**Permissions:** Requests for permissions to reproduce figures, tables, or portions of articles originally published in *Stroke* can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

**Reprints:** Information about reprints can be found online at:
http://www.lww.com/reprints

**Subscriptions:** Information about subscribing to *Stroke* is online at:
http://stroke.ahajournals.org//subscriptions/