

## Case Report

# The Effect of Pharmacotherapy Combined with Speech Therapy on Functional Recovery from Aphasia

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## Abstract

Typically, aphasia is a combined speech and language impairments after stroke. The case of current study was an adult male with a global aphasia caused by a cerebral thrombo-embolic infarction. He was entered to the study 7 months of his post-stroke. At first, to determine presence of aphasia, a screening test, the MASTp (Persian Mississippi Aphasia Screening Test) was used. Additionally, his naming ability assessed by 30 pictures. He was treated primarily by Piracetam for 3 weeks and then after one week interval treated by Citicoline for 3 weeks. Along with medication, speech and language therapy was performed, too. The MASTp and naming test were performed after 3 weeks of end of each medication. Primary findings showed that Citicoline is more useful drug for improving speech and language skills than Piracetam. It is necessary to do more study to observe the effect of these drugs on aphasia.

**Keywords:** Global aphasia; Speech and language therapy; Pharmacotherapy; Piracetam; Citicoline

## Introduction

Aphasia is language impairment resulted from damage to areas of the brain responsible for speech and language functions. This disorder can lead to problems in the language functions included understanding, production, reading and writing. Due to these disabilities, the individual gets isolated from the world which was enjoyable before the stroke.

The prevalence of aphasia following the first stroke has been reported 30-38% in acute phase. One-third of people with stroke indicate global aphasia. The person with this type of aphasia will show problems in all aspects of language functions and therefore, treatment in this group is necessary as soon as possible and rehabilitation is mandatory for these patients, indeed [1].

Generally, speech therapy for aphasia includes linguistic and speech therapy. In addition, drug treatments are used along with rehabilitation methods.

Piracetam and Citicoline are two optional drugs that have been investigated in the present study.

Piracetam is a derivative of GABA (gamma aminobutyric acid derivative). The drug has a direct cholinergic effect via releasing acetylcholine and its pharmacological effects are different. Piracetam increases the flexibility of nerve cell membrane to improve neural transmission, which in turn increases cellular metabolism to protect the cells from hypoxia. Also, its multilateral effects on microcirculations improve neural activity. Piracetam injection results in reduced plasma and improves cerebral blood flow [2,3]. Studies that have examined the effects of this drug on aphasia have shown improvements in language performance [4].

Citicoline is a mediator in the biosynthesis of phosphatidylcholine which has beneficial effects on certain pathological conditions of the brain and central nervous system damage like stroke [5].

The therapeutic effects of Citicoline are because of the stimulation of synthesis of phosphatidylcholine by prohibiting the destructive processes, such as activation of phospholipases in the damaged brain [6]. Citicoline increases the brain metabolism and decreasing the size of the lesion by increasing the levels of norepinephrine and dopamine in the central nervous system. Also it prevents the apoptosis along with cerebral ischemia and strengthens the neural plasticity mechanisms [7].

Since these two drugs are the most widely used drugs after a stroke to improve language functions, and no research has investigated the comparison therapeutic effects of these two drugs in persons with aphasia, so this study aimed to examine the effects of each of these drugs along with language interventions in people suffering from global aphasia.

## Case Presentation

The patient, H.j, 56 years old, with damage to the left hemisphere, the fronto-parieto temporal area, insular opercular area, suffered from the global aphasia.

The speech therapy was begun two months after the stroke. According to the speech therapist, the patient's cooperation was very weak. Treatment objectives included the improved oral apraxia symptoms by imitating the therapist in front of the mirror and purposive repetition. The present study was conducted seven months after stroke and along with speech therapy. This study was an Alternative-Treatment method. Inclusion criteria were the patient must have aphasia resulted from thromboembolic infarction, which was determined using the aphasia screening MASTp. Precisely, mentioned test is a valid and reliable screening tool for evaluating language skills after stroke in Persian patients [8]. This test consists of 46 questions including two receptive and expressive indices, each index has 50 score. Patient had to be neurologically reached to the stable status, and had been admitted to the treatment program 6

months to one year after the stroke. Exclusion criteria included second stroke during the study, drug or alcohol abuse, unstable situation like heart dysrhythmias or uncontrolled blood pressure (100/160), and treatment with sedatives or antagonists or agonists.

In the first stage, MASTp was used to diagnose aphasia and determine speech and language impairments. At first, Piracetam was prescribed by the neurologist. The duration of this course was three weeks and the patient received a 800 mg Piracetam pill every 12 hours. Patient's language abilities using MASTp was evaluated after three weeks. One week was considered as wash out for the first drug. Before starting the second drug, the MASTp was performed on the patient and the patient was receiving Citicoline every night for three weeks as vial. Eventually, at the end of three weeks, the patient was again assessed by MASTp. Along with drug treatments, Speech and language therapy was performed three times per week and each session took 15 to 20 minutes.

At the end of treatment course, the obtained results were analyzed and results generally showed Citicoline resulted in more improvement than Piracetam in both indexes of MASTp.

According to the speech therapist, informally, after taking Citicoline, repetition and intentional movement skills were improved that means the reduction of apraxia symptoms.

## Discussion

According to the results of present study, taking Piracetam had no improving effect on the patient's language functions. However, some previous studies have shown the positive effect of Piracetam on overall language skills [1,3]. The reasons of such contradictory results can be the duration of treatment and the specific language therapy program. For example, Huber, et al. studied the useful effect of Piracetam on persons with aphasia and provided six weeks language therapy to their patients. Their results showed that the Piracetam can be useful on aphasia recovery in patients who receive intensive language intervention [9]. In the present study, language therapy was provided for three weeks. Then, maybe duration of language therapy along with Piracetam is an effective component.

Other notable reason can be due to dosage of Piracetam. Some studies, for example Huber, et al (1997), Beiersdorf (2007) and Gungor (2011) prescribed daily consumption of 8.4g Piracetam, which had significant difference from the dosage administered in this study (6.1 g daily) [4,9,10].

Another reason can be the duration of medical treatment and language therapy. The duration of treatment in the present study was three weeks for each of the Piracetam and Citicoline medications; language therapy was started two months after the stroke and continued for three weeks concurrently with the implementation of the study. In the Gungor (2011) study on persons with global aphasia, six months of language therapy was provided; results indicated in comprehension was significantly better than other skills in the end of treatment course [10].

One of the possible reasons can also be the severity of aphasia. The study of Klein, et al. (2004) showed more significant improving effect of Piracetam in patients with Wernicke aphasia and Broca aphasia than Global aphasic patients [2].

The time passed since the beginning of aphasia can be other reason for our study. One study started the pharmaceutical intervention a few days or a few weeks after the beginning of aphasia and has reported its improving effects [4].

According to the results of the present study, the therapeutic effects of Citicoline was more than Piracetam, which is consistent with the study of Secedes, et al (2006) that indicated the Citicoline as a suitable drug for various types and severity of brain disorders [7]. According to the conducted studies, Citicoline was effective in improving defects of consciousness, motor and cognitive in people with aphasic that is consistent with the present study [6,7,11,12].

The results of present study showed that Citicoline is the better optional medication to treat persons with global aphasia.

In general, the present literature review showed that the time passed from the stroke, the severity and type of aphasia and duration of language therapy are possible variables on effects of medication therapy. Also, our study states that Citicoline along with speech therapy can be the best medication for a short time to achieve language performance.

So, more research should be conducted to observe the effects of these drugs in persons with different severity of aphasia, as well as long-term effects of these two drugs in combination with intensive language therapy.

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