

A Survey on Speech Therapy of a Patient Suffering from Wernicke's Aphasia

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Abstract: *Wernicke's aphasia is a kind of language disorder in which the patient has a problem in understanding the language concepts. This disorder may be caused by brain stroke, hit on the head, brain cancer or brain infected illnesses; its amount is related to the place and period of the illness and also to the age of the patient. Wernicke's Area located on the posterior portion of the superior temporal gyrus in the hemisphere which is dominant for language. This area plays a critical role in the ability to understand and produce meaningful speech. A damage here will cause Wernicke's aphasia. Areas 21 and 22 are the auditory association areas. These two areas are divided into two parts; one half of each area lies on either side of area 42 together with they can be called Wernicke's area.*

The researchers in this essay studied a case -patient- who was a seventy-year-old woman with a brain stroke. In this study they used twenty different questions from Nilipoor's test¹. By conducting the test, they concluded that the Wernicke's area was damaged so this part of the brain should be treated.

Key Words: *Wernicke's aphasia, language disorder, brain, psycholinguistics, speech therapy*

1. Introduction:

This research which is about a seventy-year-old lady with a brain stroke on the Wernicke's area was done in a private clinic. This clinic has an equipped speech therapy section. The research was done by Mrs. Safaeian's help, a speech therapist of the clinic. At first we give a definition about aphasia. What is aphasia and what is it related to? Here we studied Wernicke's aphasia and the related problems; but we first tried to introduce Wernicke's aphasia. After introducing Wernicke's aphasia we brought a report from the above mentioned patient, about the kind and

¹ Persian language aphasia test

the result of the test and proceedings for that. One of the disorders which are in speech therapy gamut is the problem of aphasia syndrome. Aphasia means multidimensional decrease in capacity of decoding (like speaking) and encoding (like understanding and change) of meaningful language elements which is manifested as hearing, reading, speaking and writing problems. The first therapy for most of aphasia cases is speech therapy. No certain drug has been found for aphasia yet.

Psychotherapy and group therapy is done besides speech therapy and music therapy for more patient and family protection. The amount of recovery is based on harm intensity and also the place of the brain which has been damaged. There are two factors in recognizing the language disorder: first we should know which hemisphere has been damaged and second if the patient is right or left-handed. As Atae states the left-side of the brain is considered to be adept at task that involves language in all right-handed and most of the left-handed people (1387: 2).

Determining the type of the aphasia identifies the place and the amount of the brain which has been damaged. If there is aphasia, the damage is in cerebral cortex in the left hemisphere.

The one who has a problem with using his/her right hand and has a slight aphasia, we should consider a problem in his/her hemisphere and reject the idea of saying that his/her muscle has a problem. (Ibid: 4)

The gender and the level of education are two important factors in recognizing the illness. Pronunciation disorder is related to the damages which are near the motor area. Infarcts and the other damages in language area of the brain affect language process.

The natural history of language aphasia relies on its reason. When a speech and language pathologist encounters an aphasia patient, first of all he/she pays attention to the reason (infarct, stroke, tumor, ...), the place of the damage (frontal lobe, temporal lobe, parietal lobe, ...), the damaged hemisphere (left or right), the amount of the damage based on C.T. Scan or M.R.I., and the doctor's advice.

We should consider congenital reasons beside the abovementioned factors. Children with aphasiac problem encounter the worst type of language delay. Eisenson states that these patients don't have mental retardation or emotional disability (2002: 190).

In the next phase language pathologist recognizes the type of aphasia and the amount of it by using standard test and clinical observation based on linguistic criteria and finally he/she makes a decision according to the results. But this decision relates to some factors:

- The type and density of neurological disorder.
- Recognition status.

- Body strength.
- Patient and his/her family's interest and motivation.

Some factors like community support, the level of income, race and life satisfaction, influence the patient's rehabilitation process. To access a suitable quality in life, we need a better understanding of patient's psycho-social status to help an aphasiac person.

2. Review of Literature

The first studies about aphasia began in 1761. Pierre Paul Broca - French physician, surgeon, anatomist, and anthropologist - met a patient whose muscles had been weakened in the right side of his body for a long time and could not speak at all. The patient just could utter "Tan". Tan died in April 17th in 1861 and Broca started his study on the patient's brain. During two years, he could study several cases. After that he stated: "there are eight cases which have a problem on their left hemisphere and I think this number is enough to be a base for some theories but I cannot conclude anything. I have to wait for new findings". A place on the left hemisphere which Broca studied now is called Broca's Area.

In 1874, Carl Wernicke, (15 May 1848 – 15 June 1905) was a German physician, anatomist, psychiatrist and neuropathologist, he found that damage to the left posterior, superior temporal gyrus resulted in deficits in language comprehension. This region is now referred to as Wernicke's area, and the associated syndrome is known as receptive aphasia, for his discovery. This area is located near the hearing area on the brain which is a place for analyzing the speech.

Nowadays researches tend to show communication problems in patients and they believe that communication problems are more problematic than speech problems. Some researches show that most of the aphasiac patients can learn verbal and nonverbal skills but they cannot use them systematically.

In 1987, Coelho and Duffy believed that extra cognitive factors are responsible for the reduction of this systematic use.

Different researches show that aphasic patients have problems like programming and using strategies which affects communication skills beside language disorder.

Hinckley and his co-workers found that nonverbal assessments which evaluate virtual thought skills can predict aphasic treatment.

3. Methodology:

In this research we have studied Wernicke's aphasia so first we introduce the main characteristics of it. What kind of aphasia is this and what main characteristics does it have?

And what expectations do we have from an aphasiac patient?

3.1 What is aphasia?

If you made a mistake in speaking then you would know some of the symptoms of that illness. Aphasia is a communication disorder. People with aphasia may have difficulty with the expression and/or understanding of language, as well as reading and writing. These people suffer from language disorders, generally is called aphasia. Thomson states that language aphasia is a disorder in articulation or understanding language whether in speaking or writing (1984: 59).

3.2 What causes language aphasia?

Generally language aphasia happens after a stroke or a hit on the head but it improves gradually (Steinberg, 1982: 210). Aphasia is caused by an injury to parts of the brain that are involved with language. The injury may be the result of:

- Stroke, which is the most common cause
- Severe blow to the head
- Gunshot wound
- Other traumatic head injury
- Brain tumor
- Brain infection
- Neurodegenerative disorders
- Other brain conditions

(McCoy: 2014)

Brain is a terminal for all schools of thought which have studied human behavior (Kaplan et al, 1995: 14). Brain is one of the body organs which is on top of the head and controls thought and emotions (Richard, 2005: 62). So damage to this part may cause some problems. One of these problems is Wernicke's aphasia. Receptive aphasia, also known as Wernicke's aphasia, fluent aphasia, or sensory aphasia, is a type of aphasia traditionally associated with neurological damage to Wernicke's area in the brain, (Brodmann area 22, in the posterior part of the superior temporal gyrus of the dominant hemisphere). Wernicke hypothesized that this area, later named Wernicke's area, must in some way be connected to the auditory area. Later research showed that these areas are indeed connected, by fibres of the arcuate fasciculus (Steinberg & Sciarini, 2006: 251). These patients speak fluently but use random or invented words; leave out key

words; substitute words or verb tenses, pronouns, or prepositions; and utter sentences that do not make sense. As Steinberg and Sciarini state this condition is characterized by speech that often resembles what is called nonsense speech or double-talk. It sounds right and is grammatical but it is meaningless (2006: 257). As this illness may be manifested in some other brain and neurological illnesses a clinical therapist may consider this patient as a psychotic patient who has a thought disorder.

In a psychotic patient understanding speech and written language and ability to repeat phrases is almost good. But in a Wernicke's aphasia these abilities have been ruined and the words are deliriously and systematically important for ever. The psychiatric symptoms may be seen in Wernicke's aphasia are as follows: delirious, paranoia, agitation, tipsiness or incuriosity (Jeypoor, 2005: 910). The damage area is on the Brodmann area 22, in the posterior part of the superior temporal gyrus of the dominant hemisphere which is the communicating center of hearing stimuli. This area is near the Heachl gyrus. Likely this damage stops understanding the codes related to hearing stimuli. The patient is fluent in speaking and even speaks too much. Some patients add syllables to the end of the words or use additional sentences and words. Sometimes this bragging is too much and makes the patient to speak a lot unless force him/her to stop speaking. This case is called logorrhea. Patient's syntax is often accurate and there is no difficulty in his/her pronunciation and accent but all his speech has less meaning. One of the characteristics of this aphasia is that the patient stricken paraphasia which means he/she puts wasteful and incorrect words in the sentence instead of correct ones (Tabarsi, 2009: 3).

Sometimes the patient him/herself coin new words without a special meaning. This process is called neology. When no one understands the patient's speech it is said that he/she stricken jargon aphasia and it means he/she utters nonsense words. The patient also does not understand the others' speech. Sometimes the disorder is too much that the patient does not know even one word of doctors' speech and so they cannot repeat it but off and on, he/she understands some words or some small sentences. In other words if he/she knows nothing he/she will not repeat anything but if he/she knows a little he will repeat some. Sometimes the patient understands the very first words and after that he/she cannot understand. If you show an object to the patients and have them to name it, they cannot do it or say a nonsense name. Reading is also disturbed and its severity is proportioned to disorder in understanding words during speaking. The reason may be because people first learn how to speak through conversation in childhood and after that he/she will be able to learn how to read and if the first storage in mind ruins this connection will be disturbed and the patient cannot read anything. In Wernicke's aphasia writing is always damaged. In this case the patient writes well and readable and in normal speed but he/she puts the letters randomly and makes nonsense words. Jeypoor states that some words may accidentally be written correctly but these are very few among all incorrect ones. There is a little understanding in Wernicke's aphasia and their ability for repetition and mimic is lower than the normal people. They cannot mimic their therapist's speech. Their speech is nonsense has no

coherence. They employ less content words in their speech; on the other hand they use more grammatical words like pronouns and prepositions. Sometimes we can see manmade words among their speech. If we encounter severe cases of Wernicke's aphasia, we'll expect literal paraphasia².

3.3 General characteristics of Wernicke's aphasia

Their descriptive speech has following features: Their utterances are long. They use many sentences with a lot of verbs. As they use repeated words in their sentences so we can say the proportion of kinds of different words to the number of the words is little. It means that they use one or two words with high frequency in their speech. Their speech is really fluent but they get a bad mark in speech tests.

- Patient's speech is clear and is naturally rhythmic with normal syllables, but he/she cannot give the information and the subjects easily because he/she uses extra, incorrect and nonsense words.
- The patient uses incorrect words and sounds. For example he/she says:

“in shabdar - e man ast”

this clover of my is

“in jæbdære mæn ?æst”

instead of saying:

“in dast - e man ast”

this hand of my is

“in dæste mæn ?æst”

Or he/she may use these sentences: “Before I was in the one here, I was over in the other one. My sister had the department in the other one”, “My wires don't hire right” or “I'm supposed to take everything from the top so that we do four flashes of four volumes before we get down low” (Steinberg & Sciarini, 2006: 257)

- The patient has problem to perceive said or written words.
- Writing like speaking has difficulty, although the way of writing might be correct.
- Repeating words and phrases have trouble.
- Naming objects is difficult.

² Paraphasia means moving letters. For example instead of saying table, the patient says: trable or fable.

- There is no or slight hemiparesis and this is because motor cortex is far from the damaged area.
- The patient may know nothing about their deficiency so even in acute cases the illness does not depress them (Thompson, 1984: 59).

3.4 Factors which improve the brain

For almost a century doctors have tried to improve language aphasia using drugs but they were not successful. But futurity of using biological and pharmacology methods seems to be hopeful. Many evidences show that different behavior interventions can affect brain anatomical structure. These studies can be seen more in motor systems because proportion increase in using one type of muscles leads to change in motor cortical.

It seems that neuro-pharmacological or behavioral therapy has more effects in improving language aphasia. Researches on animals with experimental stroke and on humans suffering stroke brings future hope for using drugs. It is important that preventing language aphasia is easier than improving it (ibid: 333).

Hayward states following factors as improving ones:

- The period of illness
- Changes happened after the accident
 - The patient's condition has been worse
 - No changes happened to the patient's condition
 - The patient's condition is improving
- Patient's age

For example young adults can improve the damages which are fatal to the adults (1362: 50) Therapy is needed exactly after damage. Although there is no surgery or drug to improve patient's condition, speech therapy is more effective and can accelerate therapy with the following ways:

- Exercise and practice: make weak muscles stronger
- Flash cards: help patients improve remembering words and increase the number of vocabulary
- Charts: The patient can point to the pictures on the chart and show his/her idea

- Workbook: Using it the patient can improve his/her skill in reading and writing
- Computer: Computer applications can improve the patient's skills in speaking, reading, recalling and hearing

The level of patient's improvement is based on the amount, place and reason of damage.

Age, general health, motivation, enthusiasm, being left or right-handed is the other factors. The amount of therapy and the period between diagnose and therapy is also important (Longe, 2002: 332). For recovery in human being and animals' motor system, dextro-amphetamine along with exercise can accelerate improvement. Although drug and other biological treatment cannot replace speech therapy, but it can help improvement as a subsidiary method and other biological treatments like cell transplantation can be useful (Crystal, 1981: 147).

4. Findings

The case study is a seventy-year-old lady with a brain stroke and Wernicke's aphasia.

At first we compiled an assessment of the kind of patient's speech and his/her perception to realize the type of aphasia. After determining the severity of damage based on a Nilipoor's test and clinical observations we will diagnose the type of aphasia and the level of speech disorder. As in this case the most damage is on patient's perception and recognition, so we start therapy from auditory stimulations to increase grammar and vocabulary perception. Analyzing language data and preplanned questions we realized some problems with patient which are all mentioned below:

1. This patient is very weak and slow in perceiving imperative sentences. For example when we asked her to fist the patient gazed at us for about two minutes and could not know our mean. Or when we asked her close her eyes or put her hand on the desk or show us the ceiling she could not understand what we asked and just looked at us.
2. The second problem was discriminating and perceiving vocabularies and words. For this we asked her "where is the fork?", "where is the glass?" and "where is the apple?" She had lost her ability to determine vocabularies. And in spite of the objects around her she could not show them.
3. Discriminating and perceiving verbs was the other problem. Here we showed her pictures for "sleeping", "sitting", "laughing", and "running". Then we asked her to show us the action on the board. For example we asked her, "In which picture is someone sleeping?" After asking ten questions she could just discriminate two verbs.
4. As it was said, these patients have problems recognizing their body members. For example when we asked her "show us your nose", "show your lips", or "show your

fingers” she showed us her other parts of the body or just gazed at us. She answered four questions out of ten correctly.

5. The patient could not discriminate her right side from left. For example we wanted her to show her right ear or shake her left arm. This time she could do two out of eight and it meant that she could not recognize her right side from left.
6. She had problems understanding intricate concepts. We asked some intricate yes/no questions as follows:

Does cork sink?

Does stone sink?

Is one kilo of apple heavier than three kilos?

As we expected, the patient could not answer even one out of ten or it is better to say that she could not understand the questions at all.

7. After reading a very simple and short story, she had problems understanding and answering the related questions from it. It is interesting to say that all the questions were yes/no type. The sample story is given here:

Ali wanted to move from Isfahan city to Tehran city. He decided to take a train when his wife was taking him to the train station. After reading the story we asked her this question what if the train had gone before Ali arrived?

Surprisingly she could not answer all five questions.

8. To explain about her speech it should be mentioned that when we say “this patient had a fluent speech” we do not mean that there was no problem. Her speech was fast but with paraphasia. For example she said “deeb³” instead of “seeb⁴” and pronounced the words incorrectly. It was interesting that she thought she pronounced correctly and when somebody laughed at her she got angry. In a sentence she repeated a word ten times and used one or two lexical words instead of different words. Her main problem was speaking meaninglessly, without any cohesion, or using words without any semantically or phonologically relation like the following sentence: For example instead of saying “I saw the desk.” She said: “I saw the water”.
9. Her grammar was also wrong and disordered. It means her speech showed that she was not a normal person. Mostly she put the verbs at the beginning of the sentences. And

³ deeb /di:b/ has no meaning

⁴ seeb /si:b/ means apple in Persian

also subjects and verbs did not have agreement. Or sometimes her sentences were without any verbs. For example when we asked her “Explain about your food and tell us what you are eating.” She said “Food, spoon, spoon, spoon, food”. There were no verbs and she thought that she was right. Her sentences did not have agreement. For example she said:

| | | |
|--------------------|------|---------------------|
| | Anha | raft. ⁵ |
| Instead of saying: | Anha | raft-and. |
| | They | verb (go)-pl, past. |

10. There were a lot of pauses in her sentence when we asked her to explain about her stroke. Speech therapist believed that it was because she wanted to remember her past. She uttered these:

I ... went ... I there died [laughing] [two minutes later] I on the tree went ... then saw that I died.⁶

11. She had visual memory problem. When we put three pictures of different things, a banana, an apple and a pen in front of her and asked her close her eyes and recall the objects and name them she could not recall them easily.

12. She was also very weak in hearing memory. By hearing memory we mean temporal or short memory. For example we pronounced these words continuously: banana, apple and tree. Then after a few seconds we asked her to repeat the words. She could just recall the word “tree” which was the last one.

13. The patient had problem in mimic. The difference between mimic test and hearing test is that in latter we want the patient to repeat some words but in mimic the patient should repeat just one word. When we asked her to repeat the word “book”, she could not. We did the test several times with different words but each time the result was the same. But surprisingly she could repeat some words in her speech [without asking her to do that] just by emotional stimuli. As the patient was illiterate we could not take written test.

⁵ In Persian language in this sentence there should be a suffix- an *and* /ænd/- at the end of the verb which means: “they” and shows the past tense as an agreement.

⁶ Symbol “...” indicates pause.

14. In natural situations and when she was mute, she did her job normally and there was no difference between her and a normal person. We knew her problem when she started speaking.
15. She uttered meaningless sentences like a delirium which a child produces when he/she got a fever.
16. She used the prepositions “of” and “in” a lot. For example instead of saying “I went there.” She said: “I went of there; I in the room was in the clothes”.
17. She was not able to realize her position while speaking so she was speaking continuously without paying attention to turn taking. When we did not stop her speech she spoke much. As the speech therapist said one of the ways to improve her illness was to stop the patient speaking. For meeting this, the therapist stopped her speech by saying that “Your sentence finished and you should finish your speech; now stop speaking and let someone else speak”.
18. She could not memorize the things. For example we taught her something but she was not able to answer although we helped her. In this case the therapist believed that the weakness in hearing perception leads to this outcome.
19. Her intonation, stress and rhythm were too odd. We could not see the above mentioned factors in her speech in their place. She did not use any acceptable model in her sentences. The intonation was the same in questions and statements. She produced questions like statements and this made her utterances vaguer. And finally it is better to say that the therapist hopefully mentioned they could improve the illness with more speech therapy because she said they previously had many similar patients who were recovered.

5. Conclusion

After analyzing the given data by researchers they came to this conclusion that the patient's Brodmann area 22, in the posterior part of the superior temporal gyros of the dominant hemisphere which controls language perception was damaged. As there is no definite and identified drug to improve this kind of illness we can recover some parts of the patient's ability by using speech therapy. So we can support the patient's remaining abilities and make his/her language competence more active. In this case study we helped the patient to improve her abilities by using the therapist's help and giving suggestions to the patient's family. Generally in most of the cases we can treat the aphasia by retraining. This treatment consists of stimulating the patient's hearing which can be held from simple to more intricate ones. After hearing trigger the patient learns how to recognize the letters, words and sentences, and this helps the patient to recover his/her ability. The speech therapist should also pay attention to psychotherapy during

speech therapy to help the patient mentally because if the patient him/herself wants to improve the result will be much better.

6. Suggestions and Recommendations

Patients with Wernicke's aphasia usually do not recognize their errors and they don't understand what we are saying either, but they can usually understand social cues-smiling and nodding, laughing when we are laughing. These social responses usually lead family to believe that the person has a better understanding of speech than they actually do. So it is advised to do the following treatment strategies:

Using gestures when we speak. Gestures can represent objects or actions while we are talking.

Writing down key words while speaking. Almost everyone with aphasia retains word recognition, especially when paired with spoken information.

Talking about things that are relevant to "right now". Using the sentences like "do you want a drink?" when we are at the dining table is understood better than "how are you getting to the park?" with no immediate context.

Not shouting if the person isn't hard-of-hearing.

Slowing our speech a little when talking. Pausing frequently for them to "catch up".

Being close enough to maintain eye contact.

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