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Influence of Broca's Aphasia and Wernick's Aphasia on Language Disorder

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Abstract

Human brain and language are closely related to each other as normal speech production is hampered when brain receives an injury. The names of Paul Broca and Carl Wernick are closely associated with the research of brainlanguage relationship. To find out the practicality of their research it is necessary to study of some cases regarding Broca?s aphasia and Wernick?s aphasia. This article has attempted to analyze the symptoms of aphasia, to explore how this influence language and cognitive behaviors. Based on interviewing three patients the findings reveal that if left hemisphere of human brain gets any trauma normal language production is hampered. The article ends with some suggestion to help the patient?s surroundings recovering language soon.

Index terms— human brain, language, left hemisphere, frontal lobe, temporal lobe, injury, damage, broca?s aphasia, wernick?s aphasia, recovery, etc.

1 Introduction

phasia is the neurological term for any language disorder that resulted from brain damage caused by diseases or trauma. From the beginning of history researchers and doctors tried to find out the relationship between language and brain. Though Plato and Aristotle failed to recognize brain's crucial functions in the language, the writing of the same period e.g. Hippocratic physicians threw much light on the issue. In 1864, Paul Broca observed that any damage to the front part of left hemisphere resulted in loss of speech, whereas damage to the right side did not. The frontal lobe of the left hemisphere is called Broca's area. Thirteen years after Broca, Wernick presented a paper that described another variety of Aphasia which occurs at the back portion of left hemisphere. Both Broca's aphasia and Wernick's aphasia cause language disorder in two different ways. This article has presented three cases regarding language disorder explaining the place and effect of Aphasia on the left hemisphere of the brain of patients.

2 II.

3 Brain and Language

The surface of brain is cortex or grey matter where resides the grammar that represents the knowledge of language. The cortex is the decision making organ of the body. It receives messages from all the sensory organs and it does all voluntary actions. The Author: Jatiya Kabli Kazi Nazrul Islam University. e -mail: khanumfarjana6@gmail.com brain is composed of cerebral hemisphere, one on the right, and one on the left joined by the corpus callosum. In general, the left hemisphere supervises the right side of the body, and the right hemisphere supervises the left side. In the middle of the 19 th century the scientists have assumed that it is possible to discover the particular brain areas where language capacities are located. In the early 19 th century Franz Joseph Gall puts forward the theory of localization. He suggests that frontal lobes of the brain were the location of language. Gall shows that brain is not a uniform mass and is divided into two distinct anatomical faculties. From them one is responsible for language.

10 (PAUSES) ????? ??? ????? (??????) ?. ??? ???? ???? ?? (???? ??) ???? ?????? ??..(PAUSES). ???? ??????, ??? ???? (???????????) ????? ??(PAUSES) ??????.”

He is the pioneer scientist who denies the idea that brain is a structured organ. He instead argues in favor of modularity. In 1864, Paul Broca relates language to the left side of the brain. Here Broca also says that brain is clearly divided and lateralized. Assyrian and Babylonian cuneiform tablets find that if human brain has some fire or happenings or trauma language disorder begins.

Greek Hippocratic physicians find that loss of speech often occurs simultaneously with paralysis of the right side of the body. Language disorder also happens for brain tumor in the left hemisphere or Broca’s area.

4 III.

5 Methodology

For qualitative information depth interviews were done with three patients who have language disorder. Before arranging interview a set of questions was framed. On the basis of the response from the interviewees, additional questions were asked in attempt to expand and enrich the interview experience. During the interviews, both audio-recording devices and note taking were used. The interviews were conducted in the mother language (Bangla) of the interviewees. As the study is related to language production the interviews were translated into English. Later on Bangla sounds were transformed into English on the basis of similarity that carried the best resemblance. In order to clarify the nature of disorder the patient’s speech is quoted directly in case study 1.

6 IV.

7 Patient’s History

A ten years old boy called Rana has got a serious injury in his head by the falling of coconut from a tree. The injured place was the right front side of the A head where left hemisphere is located. He felled unconscious on the spot. After pouring water on the head for some minutes he was taken to the hospital. At the hospital the doctor pushed a saline to him and made some tests. A city scan was done to identify the exact place of the brain injury and the impression was like this: 1. Depressed fracture of right side of frontal bone and left parieto temporal and fronto-parietal regions. 2. Intra cerebral areas and hemorrhagic contusions (left parieto-temporal regions and left frontal region involving cortical areas and adjoining white matter.

8 Subarachnoid extension of hemorrhage.

The doctors found a depressed fracture on the left frontal bone scalp. After three days an operation was done to replace the bone. The patient did not get his sense yet. He was kept in conservative treatment for fifteen days. During this treatment he was semi conscious. He was unable to move his right side of the body and could not speak. If anybody called by his name he did not respond because he could not hear. But he could understand everything as he opened his mouth when food was given to him. The doctors prescribed some medicine to him and suggested his relatives to exercise the right hand and leg. Gradually he started responding and he was taken to home. The doctors said that his frontal lobe of left hemisphere is injured as his language capability is hampered. But Broca’s area was not totally damaged and he would be recover within one month. According to the doctor, if Broca’s area is damaged the patient will be unable to recover his linguistic capability. It became clearer when an observation was done on his disordered speech. After two months an interview took place with Rana to examine the nature of his speech.

V.

9 Observation

The patient’s linguistic recovery is tested through an interview with pre-framed questionnaire. He is asked to describe what he was doing immediate before the accident. To answer this question it requires him to produce a long description. He keeps silence for some moments after being asked. He takes long pauses before producing some words. The principle observation is the patient’s tendency of using only verb. Sometimes the transition from subject to verb becomes difficult for him. Some utterances are quotable:

” ??? ???? (????????) ??? .....

10 (pauses) ????? ??? ????? (??????) ?. ??? ???? ???? ?? (???? ??) ???? ?????? ??..(pauses). ???? ??????, ??? ???? (???????????) ????? ??(pauses) ??????.”

Rana’s linguistic difficulty includes grammatical incorrectness. He sometimes utters the content words without any sentence structure. Grammatical correctness is lost and irregular series of content words are found on the speech. He sometimes cannot produce the ’r’ sound. He is unable to complete the sentence and he cannot remember his friend’s name and actually what kinds of play they were playing. He skips the word I (???) most of the time and produces some individual words whatever he could remember. He cannot pronounce the unfamiliar words like-city scan, therapy, paralysis, etc. The formation of plural is also problematic.

11 VI.

12 Findings

The interview shows some linguistic disorders which are identical with Broca's aphasia.

Before the accident he was able to read and write. But when he is asked to read his name and address he could not remember some words and mostly the letters. He takes much time and murmurs most of the time. The patient fails to produce the desired sounds. His facial expression shows that he is able to understand the questions but cannot answer immediately.

Another aspect of his linguistic disorder is his inability to produce sentence in correct tense. Most of the time, he does not use any sentence linkers and continues with amalgamation. Sometimes the words are not clear enough to comprehend.

In the pronunciation much difficulty is noticed. There are some sounds like z, j, w and especially the Bengali joined letters are problematic. He feels uneasy at the time of producing these sounds and tries to carry on skipping these words. The injury at the frontal lobe of left hemisphere is responsible for this disorder. Moreover, his right hand and leg is almost paralyzed for the damage of the left hemisphere as left hemisphere supervises the right portion of the body.

There are some noticeable disorders in the patient which are identical with Broca's Aphasia such as labored speech, difficulties in word findings, pauses and difficulties in using linkers. As the patient is only at ten his lateralization is not yet completed and there is a possibility to recover.

13 VII.

14 Patient's History

It is a study on a patient, Sakhina Begum of almost 75 years old. Through the investigation it is found that 18 months ago she got a brain stroke and became senseless for three days. After getting the sense back the patient could not speak and her right side of the body became paralyzed. At the speechless period she was able to understand other's speech. Passing 15 days in complete speechless state the patient started to speak a little. In the meantime she was treated with both the medical and herbal treatment. Later on she was under a long term herbal treatment and gradually her linguistic ability was recovering.

15 VIII.

16 Findings

Presently the patient is interviewed and asked different questions in order to find out her present linguistic ability. The patient answers every question but her speech is not clear enough. When she needs to produce long sentences it requires hard labor from her. The interviewer asks her whether she feels any trouble in speaking or not. In the answer the patient says "I become very much tired after speaking for several minutes and feel bad in my head." It is noticed that she speaks very slowly and the sentences come out with some pauses. During the interview the patient shows a tendency to avoid speaking much. Most of the time she tries to answer the questions with only single verbs.

As she has weakness in her arm and leg one kind of numbness is noticed. She remains in confusion all the time. She expresses her frustration about the present condition preferring death to the miserable life. The patient whose Broca's area has been damaged by stroke has these kinds of disorder like labored speech, pauses, unclear articulation, tendency to shorten the sentences, physical weakness and frustration. A gradual recovery may occur if the patient gets proper treatment and co-operation from the surroundings.

17 IX.

18 Patient's History

A study was done on a woman of 40 named Nasrin Akhter who had a brain tumor on the temporal lobe of left hemisphere. At time of interview her disease was diagnosed and a brain operation was scheduled. The disease was primarily noticed with some disorders in her speech. The city scan report showed a tumor on her brain just at the back portion of left hemisphere. This specific area is known as Wernick's area.

Carl Wernick describes this variety of aphasia. According to him the patients with this kind of aphasia speak fluently with good intonation and pronunciation but with numerous lexical errors. They often produce jargon and nonsense words. They also have difficulty in comprehending speech.

19 X.

20 Observation

It was very difficult to arrange a successful conversation with the patient. As we are observing her linguistic level a portion of her speech has been translated and quoted here.

The question was about her favorite food and favorite person. She starts speaking and continues this way-" I eat three times a day and sleeps only. Nobody gives me any work to do and they do not love me. You know, when I was young I played chorui Vati(picnic) with my friends and enjoyed much. Watching television is a pleasure to me. My husband loves another woman and stays with her. I don't like him at all."

The speech is started with irrelevant answer to the question. She does not trust her husband though he has no relation with any other woman. Not only her husband she cannot tolerate the other people also. She repeats her words again and again. But she uses small simple sentences and only the content. The function words are not used much in her speech. Her family members inform that sometimes she talks to herself and she is not at all aware about her aphasia.

21 XI.

22 Findings

The interview takes place before the operation in order to observe her linguistic state. The interview is arranged in a friendly environment which helps the patient to speak spontaneously. The research finds that the patient does not bother about the question and speaks whatever she likes. A tendency of repetition is noticed. She is unable to relate and at the time of speaking she becomes angry if anybody interferes. But there is no disorder with her pronunciation. Her shouting in anger proves that she has no problem with the intonation. The doctor's advise her family to keep her in a friendly mood and not to make her excited. As she has a tumor on the back portion of left hemisphere her speech is hampered. Most of the symptoms of Wernick's aphasia are found in her speech. The doctors hope that the patient will recover after the operation and her speech will be normal. The observation finds that the patient with Wernick's aphasia is not a mad but has disordered linguistic state.

23 XII.

24 Conclusion

Language ability is often disrupted in the immediate aftermath of a stroke or severe head injury. In many cases, however, even after extensive injury, language skills return to normal or near-normal spontaneously over a period of weeks or months when the brain recovers from the physical assault. Children under the age of 8-10 are especially likely to recover language skills disrupted by a head injury, probably because in the young and more pliant brain healthy tissue can assume the roles once played by damaged nerve cells. But the brains of adults are less resilient, and lasting language difficulties are more likely to result. Speech therapy and counseling can be very useful to those with persistent language problems. Therapists can train patients to use the language skills that remain intact more effectively. They can teach both patients and families alternative means of communicating, like singing, a skill in which the ability to summon words often remains intact even when non-melodic speech is seriously disrupted. Experts say that the sooner after injury that speech therapy begins the more effective it is likely to be. At least, therapy may help avert the serious emotional and social consequences of aphasia. Therapists and counselors can help patients find new occupations and avocations that are less dependent on language. Through the study and observation of three patients the article has dealt with Broca's aphasia and Wernick's aphasia. The patient's history and research findings show that the degree of recovery depends on the age of patient and on the nature of injury.

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