



Early speech-language intervention in childhood aphasia after a stroke: case report

Intervenção fonoaudiológica precoce em afasia infantil decorrente de um acidente vascular cerebral: relato de caso

Intervención fonoaudiológica precoz en afasia infantil debido a un accidente vascular cerebral: reporte de un caso

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Abstract

Stroke is less common in children than in adults, but it has a devastating power for the future of these individuals, even with signs of better recovery from the changes. The aim of this study is to describe the speech therapy findings of a case of stroke child, showing the progress after 12 months of speech therapy initiated early after acquired neurological injury. This is an individual of 11 years old, male, with neurodevelopment normality and independence to the functional activities during early childhood. In

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Authors' contributions:

NCF evaluation of the individual and elaboration of the therapeutic planning of the clinical case, and in the elaboration of the article;

NGC evaluation of the individual and elaboration of the therapeutic planning of the clinical case, and in the elaboration of the article;

PGC evaluation of the individual and elaboration of the therapeutic planning of the clinical case, and in the elaboration of the article;

VCB consultations, contributing with nursing area and interdisciplinary discussions;

AYF performed the neuroimaging analysis, clarifying knowledge that involves the medical area of neurology and assisting in the elaboration of the article;

DACL children's language disorders and with the co-orientation of this study;

MLC supervised all therapeutic sessions provided to the individual and guided the elaboration of this article.

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March of 2015, he suffered a sudden illness, was referred to the emergency hospital and diagnosed with hemorrhagic stroke, in the left frontoparietotemporal region. Surgical procedures were performed, and hospitalization lasted 25 days. At the time of hospital discharge, there was guidance about the need for speech therapy care. In the first evaluation of language, there was evidence of acquired aphasia of the emissive type, according to the classifications proposed for children. A total of 91 speech therapy sessions lasting 50 minutes were performed for 12 months. When analyzing formal language skills that have remained altered, it is observed that those related to reading and writing are those of greater significance, interfering in school performance and communicative development. Thus, in addition to speech and language therapy until functional communication is possible, it is important that there be school support.

Keywords: Speech, Language and Hearing Sciences; Language; Stroke; Child.

Resumo

O Acidente Vascular Cerebral é menos frequente em crianças do que em adultos, porém possui um poder devastador para o futuro destes indivíduos, mesmo com indícios de melhor recuperação das alterações. O objetivo deste estudo é descrever os achados fonoaudiológicos de um caso de Acidente Vascular Cerebral infantil, evidenciando a evolução após 12 meses de terapia fonoaudiológica, iniciada precocemente, após lesão neurológica adquirida. Trata-se de um indivíduo de 11 anos, gênero masculino, com normalidade de desenvolvimento neuropsicomotor e independência para as atividades funcionais durante a primeira infância. Em março de 2015 sentiu um mal súbito, foi encaminhado para o hospital de urgência e diagnosticado com Acidente Vascular Cerebral, do tipo hemorrágico, em região frontoparietotemporal esquerda. Foram realizados procedimentos cirúrgicos, e a internação durou 25 dias. No momento da alta hospitalar houve a orientação sobre a necessidade de atendimento fonoaudiológico. A primeira avaliação de linguagem evidenciou afasia adquirida do tipo emissiva, conforme as classificações propostas para crianças. Foram realizadas 91 sessões de terapia fonoaudiológica, com duração de 50 minutos, pelo período de 12 meses. Ao analisar as habilidades formais de linguagem que permaneceram alteradas, observa-se que as relacionadas à leitura e escrita são as de maior significância, interferindo no desempenho escolar e desenvolvimento comunicativo. Assim, além do atendimento fonoaudiológico até que seja possível uma comunicação funcional, é importante que haja o apoio escolar.

Palavras-chave: Fonoaudiologia; Linguagem; Acidente Vascular Cerebral; Crianças.

Resumen

El accidente cerebrovascular es menos común en niños que en adultos, pero tiene un poder devastador para el futuro de estos individuos aun que se tenga indicios de mejor recuperación de las alteraciones. El objetivo de este estudio es describir los hallazgos fonoaudiológicos de un caso de Accidente Vascular Cerebral Infantil, que muestra el progreso después de 12 meses de terapia fonoaudiológica iniciada precozmente, en un caso de lesión neurológica adquirida. Se trata de un individuo de 11 años, de sexo masculino, con normalidad el desarrollo neuropsicomotor y independencia de las actividades funcionales durante la primera infancia. En marzo el año 2015 sintió un mal súbito, fue remitido al hospital de emergencia y diagnosticado como Accidente Vascular Cerebral, de tipo hemorrágico en la región frontoparietotemporal izquierda. Se realizaron procedimientos quirúrgicos y la hospitalización duró 25 días. En el momento del alta hospitalaria hubo orientación sobre la necesidad de tratamiento fonoaudiológico. La primera evaluación del lenguaje mostró afasia adquirida de tipo emisor, de acuerdo con las clasificaciones propuestas para los niños. Se realizaron 91 sesiones de terapia fonoaudiológica, con una duración de 50 minutos, el período de 12 meses. Mediante el análisis de las habilidades lingüísticas formales que permanecieron cambiada, se observa que las relacionadas con la lectura y la escritura son las más significativas, porque interfieren con el desempeño escolar y desarrollo comunicativo. Por lo tanto, además de la terapia fonoaudiológica hasta que una comunicación funcional sea posible, es importante el apoyo escolar.

Palabras clave: Fonoaudiologia; Lenguaje; Acidente Vascular Cerebral; Niño.

Introduction

Stroke can be defined as the quick development of clinical signs resulting from focal or global disorders of brain function of vascular origin, with symptoms lasting more than 24 hours, causing cognitive and sensorimotor alterations, according to the area and extent of the lesion¹.

It is estimated that one in every five women and one in every four men may have a stroke before 85 years of age, and the risk increases after 55 years². When it comes to children, the variation is from two to eight cases in every 100.000 children until the age of 14 years, being rare and isolated events of important character due to the severity of their complications and variety of etiologies. Some of the main causes of stroke in children are: congenital heart disease, hematologic diseases (sickle-cell anemia, polycythemia, neonatal alloimmune thrombocytopenia), autoimmune diseases, coagulopathies, vasculitis, vascular anomalies, venous infarcts, metabolic diseases, vasospasms, traumas, dehydration, neoplasias, among others^{3,2}. Stroke is less frequent in children than in adults, however, when it occurs, it has a devastating effect on the future of these individuals, even when this population shows evidence of better recovery from the alterations⁴.

Stroke can be divided into two types: ischemic and hemorrhagic. Ischemic stroke is characterized by the obstruction of a blood vessel that blocks the blood flow to the brain cells so they do not receive the necessary nutrients indispensable to their metabolism^{1,2}. The hemorrhagic stroke consists of a ruptured blood vessel causing the extravasation of blood and increase of the intracranial pressure¹. The ischemic stroke is the most common type in all age groups⁵.

Regardless of the type of stroke, one of the most common impairments to affect the subject is the acquired language disorder – called aphasia –, which is characterized by linguistic alterations of discursive and articulatory origin, produced by focal lesion on the central nervous system, in areas responsible for language. It may or may not be associated with other cognitive alterations, making the individual dependent on auxiliary resources for the production and/or interpretation of language⁶.

For children, aphasia can be subdivided into developmental and acquired. If it occurs before two years of age, aphasia is considered developmental,

and after two years, it is considered acquired. The age of two is a marker because, by this time, children must have developed minimal language aspects, such as some phonemes and the ability to produce simple sentences⁷. Classification of the types of aphasia in childhood may also differ according to the linguistic manifestations, generally divided into emissive and receptive aphasia, considering expression and comprehension parameters, respectively⁸.

The type and severity of aphasia are directly related to the site and extent of the acquired neurological lesion. The relationship between cerebral areas and language has been studied for years, showing, mainly, the importance of the left hemisphere, more specifically, the Broca and Wernicke areas⁹. Extra sites influence directly and indirectly the linguistic abilities, as well as the right hemisphere, which is responsible for paralinguistic aspects of communication¹⁰.

Considering the aspects mentioned, it is emphasized that, in all stroke cases, it is of the utmost importance to consider the etiology, clinical history, localization and extent of the lesion, relating such factors to the alterations presented by the affected subjects, especially in those with aphasia, since each case is unique and has different manifestations that might influence all levels of formal language, such as phonology, morphology, syntax, semantics, pragmatics and the lexicon.

The aim of this study was to describe the speech-language findings of a childhood stroke case, evidencing the evolution after 12 months of speech-language therapy. Intervention started early, after an acquired neurological lesion and, thus, the importance of early intervention to provide a favorable prognosis to the individual with aphasia is emphasized.

Clinical case presentation

This study was based on the clinical case of a patient enrolled for therapy at the Speech-Language Pathology Outpatient Clinic of the institution. It was not submitted to Ethics Committee for Research with Humans (CEP) because, when treatment started, the patient's legal guardian signed an authorization for the use of data, as foreseen and granted by the institution, without the need of approval by the CEP.

The patient came to the Speech-Language Pathology Outpatient Clinic along with his parents, who participated on the anamnesis and reported the following clinical history: 11-year-old male subject with normal neuropsychomotor development and independence in functional activities during early childhood. In March 2015 he felt ill and had syncope, being rescued shortly after – approximately 10 minutes – and referred to the emergency hospital. A neurological evaluation was conducted, including a cranial CAT scan using the Multi Slice equipment, which provides multiplanar reconstructions without intravenous injection of iodinated contrast agents. Hemorrhagic stroke on the left fronto-parieto-temporal region was immediately diagnosed, and the subject went into neurosurgery to stop the bleeding. Four days later there was a new hemorrhage focus followed by cerebral edema, and another surgical procedure was needed for intracranial decompres-

sion. Hospital discharge occurred 25 days after the onset, and the family was advised regarding the need for speech-language intervention.

The first language assessment was performed in April 2015. The Aphasia Rehabilitation Test – adapted version¹¹ and the Token Test – children adapted version¹² were used for evaluation, and evidenced an emissive acquired aphasia, according to the classification proposed for children^{7,8}.

The subject underwent 91 50-minute sessions of speech-language therapy within a period of 12 months. The intervention was carried out alternatively by three distinct therapists, according to the curricular cycle of the undergraduate course in Speech-Language Pathology and Audiology. All sessions were supervised by one single expert advisor. Therapeutic planning was comprehensive to cover all the speech-language alterations found in the evaluation (table 1).

Table 1. Pre and post speech-language intervention evaluations

Abilities	Results pre-intervention	Results post-intervention
Fluency	Normal	Normal
Reading	Altered	Altered
Writing	Altered	Altered
Naming	Altered	Normal
Repetition	Altered	Normal
Evocation	Altered	Normal
OL Comprehension	Normal	Normal
WL Comprehension	Altered	Altered

Notes: OL: oral language. WL: written language

Discussion

Among the types of stroke, the ischemic is the most common regardless of the age group, and it is related to hereditary risk factors. On the other hand, the hemorrhagic stroke is more related to problems of vascular malformation, with or without the presence of other acquired or hereditary risk factors¹³.

Some of the vascular anomalies are arterial or arteriovenous malformation and arteriovenous fistulas. Among these, the arteriovenous malformation deserves attention. It is characterized by arteriovenous fistulas that have an epicenter called nidus, which is composed by arteries that feed and increase the volume of the veins and may be present at birth or become evident during

the individual's development, without decreasing or regressing spontaneously. Puberty hormonal changes or traumas may mobilize the growth of the arteriovenous malformation, causing the drainage veins to become more evident, tortuous and distended, possibly leading to hemorrhage¹⁴. Some criteria established in the 60s are still used, and thus puberty is considered to begin at the age of eight years for girls and nine years for boys¹⁵. Although the ischemic stroke is the most common, the reported case regards a hemorrhagic stroke that occurred during puberty and resulted from arteriovenous malformation, which is the main risk factor for this type of stroke in children, corroborating the literature findings.

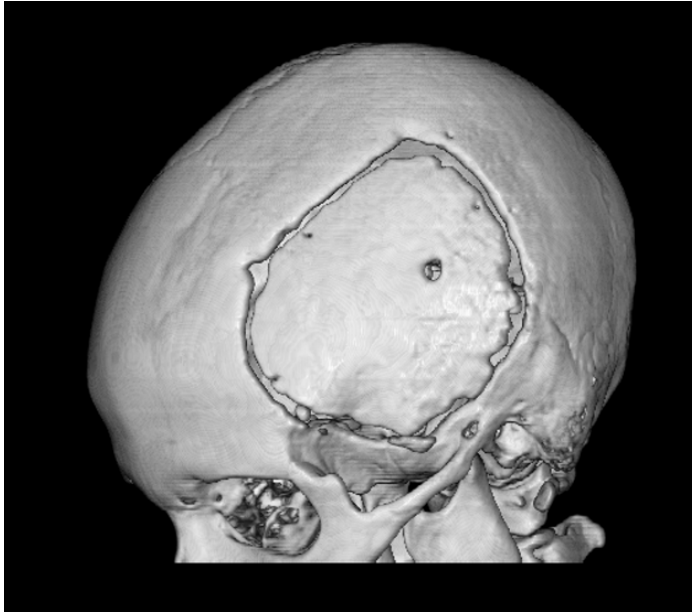


Figure 1. Control after left frontoparietotemporal craniectomy

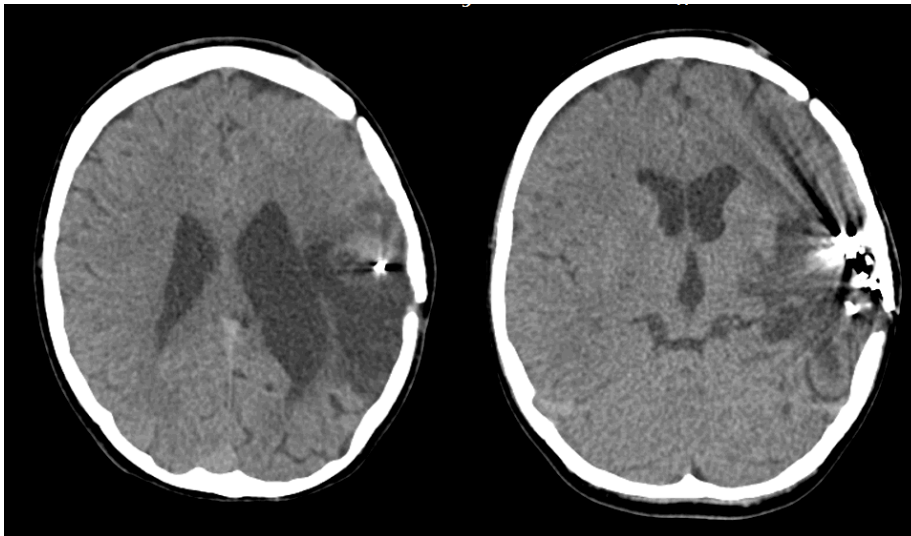


Figure 2. Cranial CT scan after craniectomy, evidencing hypoattenuating area of sequel aspect in the left frontoparietotemporal region

The relationship between type, localization and extent of the lesion and manifestations in the individual's communication also deserves attention, since the temporal, parietal and prefrontal lobes of the left hemisphere act directly in lexical-semantic processes¹⁶, and there is strong correlation between temporoparietal areas and tasks of discourse, repetition, naming, reading and writing comprehension⁹. The patient's brain lesion comprises the

abovementioned areas, except the prefrontal region, which reinforces the relationship between linguistic manifestations and localization of the acquired neurological lesions in the case studied.

The effects of a brain lesion in children are different from the effects in adults¹⁷. When a child is affected by a brain lesion that completely injures her dominant hemisphere, she might present aphasia. However, she has better chances of language

recovery, since the cerebral reorganization, due to the neuroplasticity, presents higher potential, compared to adult and elderly individuals. This fact has possibly contributed to the rehabilitation process in this case report, since the patient started speech-language intervention at 11 years of age.

Regarding early rehabilitation, when the patient is submitted to therapy from the acute phase of the stroke, recovery may be twice greater than spontaneous recovery. Moreover, if speech-language therapy is started after the acute phase, results may be less expressive, although still significant¹⁸. Considering that speech-language intervention was started early – about one month after the brain injury –, it was possible to notice significant improvements in communicative abilities. The comparison between the assessments pre and post speech-language intervention showed that only three from the six abilities altered on the initial assessment did not present expressive improvement.

By analyzing the formal language abilities that remained altered after 12 months of intervention, it was noticed that those related with reading and writing were the most significant, interfering with academic performance and communicative development. Therefore, speech-language therapy must be accompanied by school support. Hence, although childhood aphasia has better prognosis, this child will need monitoring for a longer period, comprising the entire childhood, until the complete language acquisition during the school period, due to possible difficulties⁸. This reinforces the importance and need of communication and partnership with the entire school team, providing quality to the rehabilitation process.

Conclusion

A childhood brain injury is not something common and casual. Over the years, the variety of children affected has been increasing exponentially, therefore, further studies are necessary, since its etiology, diagnosis and prognosis are challenging. It is important that this individual is early assisted, reinforcing the importance of intervention in the period of greater neuroplasticity, and that he is followed up until he achieves functional communication. Moreover, it is highlighted the importance of the association between speech-language and

neurological findings to increase the success in the processes of language rehabilitation.

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