

LANGUAGE ASPECTS OF CHILDREN INFECTED WITH HIV

Aspectos da linguagem em crianças infectadas pelo HIV

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ABSTRACT

Purpose: to assess the lexical proficiency and the incidence of phonologic disorders in the language of children infected with HIV. **Methods:** the study population consisted of 31 children between three and seven year-old. For evaluation purposes the Test of Infantile Language – ABFW was applied in the areas of phonology and vocabulary. **Results:** the results obtained were analyzed according to the clinical criteria for the classification of the disease proposed by the CDC and regarding the immunological profile and the viral burden using the Mann-Whitney test for statistical analysis. In the vocabulary evaluation, 100% of the children presented an inappropriate response for their age in at least two distinct conceptual fields. In the phonologic evaluation, 67.7% of the assessed children were considered to be affected by some phonologic disorder. When we compared adequate and inadequate results of phonologic evaluation to the clinical and immunological parameters of AIDS such as clinical classification ($p=0,16$), CD4 count ($p=0,37$) and viral burden ($p=0,82$), we did not detect a statistically significant relation between language alterations and disease severity. **Conclusion:** this research has shown that the studied group presents a high risk for language disorders and that constant phonoaudiological follow-up is essential to identify the alterations in early stage.

KEYWORDS: HIV; Language; Vocabulary; Speech; Child

■ INTRODUCTION

The acquired immunodeficiency syndrome (AIDS) is a chronic infectious disease which started to be considered a pandemic by the World Health Organization in 1993. According to UNAIDS¹ data, 39.5 million people were living with HIV worldwide in 2007, 2.1 million of them being children. The epidemic proportions of the disease represent a serious public health problem, with this being one of the affections that today most requires the attention of health professionals and of the population in general, posing an enormous challenge to the scientific community.

Among the forms of HIV transmission to children, the principal one is vertical transmission from mother to child, with the clinical course of AIDS differing significantly in the pediatric population compared to the adult population. The infection seems to be more aggressive in children, with a shorter latency between contamination and the onset of symptoms and shorter survival thereafter².

Chief among the various infections that can occur in HIV-infected children are upper airway infections, especially sinusitis, otitis externas and otitis media. Outer and middle ear infections can cause transient peripheral hearing loss. It is also known that, as the disease progresses, there is progressive impairment of the central nervous system, including the central auditory nervous system^{3,4}.

The main neurological changes occurring in pediatric AIDS are associated with progressive encephalopathy, which affects 30% to 90% of children, causing deficits in several areas such as motor, speech, language, memory and learning functions. The presence of these disorders varies according to age and to the severity of immunological involvement and is related to brain maturation

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and to the time of onset of neurological disease. The high incidence is due to the fact that HIV is highly neurotropic and that CNS infection occurs very early, and also to the systemic immunodeficiency itself⁵⁻⁸. According to Brouwers et al.⁹, the language deficit is the main characteristic of the neurological dysfunction present in pediatric AIDS patients.

Language is one of the superior mental functions of the cerebral cortex which is based on the genetic expression of characteristic determinants of the CNS and which is subordinated to biological factors common to the human species. However, in the early stages of child development the biological potential undergoes differentiation and is molded according to the cultural environment to which an individual belongs. Thus, language is strictly related to the social and family environment in which the child lives and to cerebral maturation and myelinogenesis¹⁰⁻¹².

The integrity of the peripheral and central auditory systems is highly relevant to the acquisition and development of speech, language and learning. In addition, other factors concur and contribute to changes in the development of HIV-infected children such as psychological and social factors due to the impact of the disease on the family and social environment^{13,14}.

The objective of this study was to assess the lexical proficiency and the incidence of phonologic disorders in the language of children infected with HIV.

■ METHODS

Subjects

The study population consisted of 31 symptomatic and asymptomatic HIV-infected children (48.4% boys and 51.6% girls) ranging in age from 3 years and 4 months to 7 years and 11 months. Exclusion criteria were mental deficiency and hearing losses.

Characterization of the disease according to the criteria proposed by the Center for Disease Control (CDC) showed that 12.9% of the subjects were in the type A clinical category (mild signs and symptoms), 12.9% in the B category (moderate signs and symptoms), 67.7% in the C category (severe signs and symptoms), and only 6.5% were asymptomatic (N category). Thirty children were already taking antiretroviral medication at the time of evaluation.

Data collection and analysis

The children were evaluated for phonology and vocabulary using the ABFW – Children Language Test¹⁵.

Phonology testing consisted of two tests, imitation and naming, both containing all the phonemes of the Portuguese language. The imitation test consisted

of 39 words and the naming test consisted of 34 figures.

In the analysis of the phonologic processes, the authors observed which of the fourteen processes the child presented. Ten of these processes are present during normal language development and four are idiosyncratic processes. Productivity was later calculate, with a process being considered productive when it appeared in 25% of the total possibilities of its occurrence.

The phonologic processes considered to be productive were compared to normal parameters as established by the test, according to the age of the child and classified as adequate or inadequate.

Vocabulary was tested by presenting 118 figures divided into nine conceptual fields (clothing, animals, foods, means of transportation, furniture and utensils, professions, places, shapes and colors, toys, and instruments). The productions analyzed were defined as Usual Word Designation (UWD) upon the correct naming of a word, as Non-Designation (ND) in the absence of naming, and as Substitution Process (SP) when any other word was used for naming.

This research was conducted with the permission of the Ethics in Research in humans and animals University of São Paulo – USP, protocol 5054-2003.

The results obtained in each conceptual field were compared to those expected for each type of production in the corresponding age range and considered to be adequate or inadequate for age.

The data obtained in these evaluations were later related to the degree of disease involvement according to CDC classification, to CD4 count and to viral burden using the Mann-Whitney test.

■ RESULTS

Evaluation of phonologic development

Twenty-eight of the 31 children studied (90.3%) presented the use of some phonologic process in a productive manner. Twenty-one of these (75%) used some phonologic process at an age exceeding the one predicted for its elimination and the processes presented were as expected for age in only seven, i.e., 67.7% of the children evaluated had a phonologic disorder.

Within the observed processes that are part of normal development, the phonologic process of simplification of consonant encounter was the one most frequently detected in the speech of the children, being present in 26 of them and being considered inadequate in 11 (35.5%). The process of liquid consonant simplification was the one that most presented inadequate productions, being

observed in 16 children and being considered as a disorder in 15 of them (48.8%).

When we compared adequate and inadequate results of phonologic evaluation to the clinical and immunovirological parameters of AIDS such as clinical classification ($p=0.16$), CD4 count ($p=0.37$) and viral burden ($p=0.82$), we did not detect a statistically significant relation between language alterations and disease severity.

Evaluation of vocabulary

In the evaluation of vocabulary, 100% of the children presented an inadequate response in at least two conceptual fields. Analysis of the responses obtained in each conceptual field showed that the largest number of changes involved words referring to "places", with 96.8% of the children presenting inadequate production for age, followed by the conceptual fields referring to "clothing" (80.6%), "toys" (74.2%), "shapes and colors" and "professions" (71%), "means of transportation" (54.8%), "furniture and utensils" (48.4%), and "animals" (22.6%).

Thus, 24 of the 30 children evaluated (77.4%) presented inadequate production in five or more conceptual fields and seven (22.6%) presented four or less inadequate conceptual fields.

Since all children showed altered responses in the vocabulary test it was not possible to perform a statistical analysis correlating the presence of alterations to the severity of the disease. Similarly, it was not possible to determine a statistical correlation between the phonologic and vocabulary changes and the use of antiretroviral drugs since all the children evaluated had been using these medications for more than five years.

■ DISCUSSION

In view of the increase in the number of cases of vertical HIV transmission and consequently of the number of infected children due to the feminization of the epidemic, AIDS started to require a different and multiprofessional approach from the scientific community, motivating research directed at prevention and at the various manifestations present in pregnant women and their children.

According to characterization of the disease by the CDC classification, only 6.5% of the children studied here were asymptomatic and most children 67.7% were assigned to the C category. This confirms the fact that pediatric AIDS is a disease of early occurrence with a short latency period and more aggressive than the infection observed in adults^{2,16}. This fact was also noted when we observed that 30 of the 31 children analyzed were already

taking antiretrovirals at the time of evaluation, a fact that did not permit us to make any inferences about the use of medication and the changes detected.

We observed that even clinically stable children can present impaired language development that may go unperceived without an evaluation since we detected a significant number of children with phonologic and lexical disorders regardless of the severity of infection. This led us to conclude that a regular and detailed evaluation of language function is essential in order to refine the strategies of intervention.

The relation between more advanced disease stage and changes in cognitive functions has been reported in some studies¹⁷⁻¹⁹. In contrast, in the present study we did not detect a relation between phonologic and vocabulary alterations and the clinical, immunological or virological parameters of Aids, in agreement with Blanchette et al.²⁰ and Boccelli et al.²¹ who did not detect a relation between CD4 count and neuropsychological changes, a fact that may be explained by the high incidence of changes and the large number of children assessed in an advanced stage of the disease in the cited studies.

The data obtained here characterize a severe impairment of phonologic and lexical parameters, characteristic aspects of expressive language, in agreement with literature reports stating that changes in expressive language are one of the most marked characteristics of HIV-infected children²²⁻²⁴.

Several studies of Brazilian Portuguese have demonstrated the processes most often observed in phonologic disorders, such as simplification of consonant encounter, simplification of liquid consonants, elimination of the final consonant, deafening of fricative or plosive consonants, frontalization of palatal consonants, simplification of velar consonants and plosivization of fricative consonants. The processes more frequently occurring in the general population were also detected in the present study, such as deafening, simplification of consonant encounter and simplification of liquid consonants²⁵⁻²⁸.

When distinguishing between the phonologic processes of development and the idiosyncratic processes we observed results similar to those reported by Oliveira and Wertzner²⁷, with a predominant use of the phonologic processes of development, while the idiosyncratic processes occurred only in association with the processes of development.

Very little is known about the lexical development and semantic skills of children with language alterations, but Lahey and Edwards²⁹ demonstrated that these children present a larger number of changes than children with normal development. This was also observed in the present investigation in which

all children assessed presented an inadequate number of named items for age in at least two of the semantic fields evaluated.

Brew³⁰ and Gay³¹ stated that we should always consider that these patients usually are the product of risk pregnancies due to the maternal condition of HIV infection, regardless of whether the mothers correctly used antiretroviral therapy. In addition, the lack of a social stimulus and of healthy child feeding during the first year of age contribute even more to the general morbidity of these children.

The main objective of the present study was to investigate the speech development and lexical competence of HIV-infected children. The results obtained permit us to assume that the language changes detected may be due to different factors: a) involvement of the CNS by HIV infection, b) negative environmental factors, and c) other unfavorable co-morbidities. Because this was a qualitative study involving a small number of participants, we did not perform statistical analysis.

Thus, HIV-infected children represent a group at high risk to present language alterations and a more advance stage of the disease is related to greater impairment of phonologic and lexical aspects although it is not a determinant factor for the presence of alterations.

Thus, it can be seen that frequent follow-up of HIV-infected children by a speech therapist, a professional qualified for the detection of changes

in language, permits an early identification of such changes. This permits intervention and rehabilitation in parallel to drug treatment since, the earlier the changes can be detected and treated, the greater the possibility of overcoming them. Intervention can prevent the future installation of learning difficulties and of behavioral changes due to delayed language proficiency, with potential harm to the quality of life of these children.

■ CONCLUSION

The care for seropositive children should be provided by a multidisciplinary team covering all the aspects of HIV infection. It should be pointed out that the use of adequate techniques permitting an early diagnosis and drug treatment associated with sequential evaluations by a multiprofessional team have modified the profile of HIV-positive patients infected by vertical transmission who are currently of an age to procreate, thus posing a new challenge to the scientific community.

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RESUMO

Objetivo: avaliar a proficiência lexical e a incidência de distúrbios fonológicos na linguagem de crianças infectadas com HIV. **Métodos:** a população do estudo consistiu de 31 crianças com idades entre três e sete anos. Para avaliação foi utilizado o Teste de Linguagem Infantil – ABFW foi nas áreas de fonologia e vocabulário. **Resultados:** os resultados obtidos foram analisados de acordo com os critérios clínicos para a classificação da doença, proposta pelo CDC e sobre o perfil imunológico e a carga viral através do teste de Mann-Whitney para análise estatística. Na avaliação de vocabulário, 100% das crianças apresentaram uma resposta inadequada para a sua idade em pelo menos dois campos distintos conceituais. Na avaliação fonológica, 67,7% das crianças avaliadas foram consideradas afetadas por algum distúrbio fonológico. Quando comparamos os resultados adequados e inadequados da avaliação fonológica para os parâmetros clínicos e imunovirological de AIDS, tais como classificação clínica ($p = 0,16$), contagem de CD4 ($p = 0,37$) e carga viral ($p = 0,82$), não se detectou uma relação estatisticamente significativa entre alterações de linguagem e severidade da doença. **Conclusão:** a pesquisa mostrou que o grupo estudado apresenta um alto risco de distúrbios de linguagem e que acompanhamento fonoaudiológico constante é essencial para identificar as alterações precocemente.

DESCRIPTORIOS: HIV; Linguagem; Vocabulário; Fala; Criança

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