SPEECH-LANGUAGE CHARACTERISITICS IN VIRAL ENCEPHALITIC CHILDREN

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*Dissertation submitted in part fulfill*ment *for the degree of M.Sc. , (Speech and Hearing) to the University of Mysore.*

ALL INDIA INSTITUTE OF SPEECH AND HEARING,
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TO
AMMA, APPA & A THAI

YOU MEAN THE WORLD TO ME

CERTIFICATE

This is to certify that this Dissertation entitled : *"SPEECH - LANGUAGE CHARACTERISTICS IN VIRAL ENCEPHALITIC CHILDREN"*, is the bonafide work in part fulfilment for the Final Year M.Sc. [Speech and Hearing] of the student with Registration No.M 9312.

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CERTIFICATE

This is to certify that this dessertation entitled: *"SPEECH - LANGUAGE CHARACTERISTICS IN VIRAL ENCEPHALITIC CHILDREN* ", has been prepared under my supervision and guidance.

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May 1995

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DECLARATION

I hereby declare that this Dissertation entitled: *"SPEECH - LANGUAGE CHARACTERISTICS IN VIRAL ENCEPHALITIC CHILDREN"*, is the result of my own study under the guidance of Dr. Prathibha Karanth, Head of the Department of Speech Pathology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.

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INTRODUCTION

Just as words never say "all about anything " so we would admit that definitions also fail to say all that should be said about the characteristics of language. " Language " States Caryoll, is a structured system of arbitrary vocal sounds and sequences of sounds which is used in inter personal communication and which rather exhaustively catalogs the things, events and processes of human experience.

According to Bloom and Lahey 1978 , Language is a conventional system of arbitrary symbols that are combined and used in a rule governed manner for communication. Speech is one medium for the expression of language that Vtilizes auditory input and vocal output. Because of the developmental and neurologic relationship between speech and language, a language disorder may be accompanied by speech problems.

Children with language disorder represent a heterogenous population sharing the common feature of a delay or disorder in the acquisition of language.

A language disorder may be thought of as a significant impairment in the use of language whether in its representational cognitive function, its communicative -

relationship function or both. Clearly this statement is too broad to function as a definition.

Language disorders in children encompass all areas of language including vocabulary, meaning, sentence structure, details of grammar such as plurals and tenses and the ability to use language in learning and in other forms of communication. Both receptive and expressive skills may be involved.

Language disorder is used as a descriptive label in that it refers to a description of behavior. The term is not to be used to refer to a diagnostic entity that could explain the behavior, in the way that such terms as dysarthria or acquired aplasia would explain or otherwise account for other kinds of behavior. Thus the term language disorder refers to any disruption in the use of the conventional system of arbitrary signals used by persons in the environment as a code for representing ideas about the world for communication.

Children's language disorders may be classified as primary or secondary based on contributory factors Ludlow 1980 . A primary language disorder is present when the language impairment cannot be accounted for by a peripheral, sensory or motor deficit, a cognitive impairment or adverse

environmental conditions. It is often presumed to be due to dysfunction of the central nervous system. Secondary language disorders include language impairments of hearing impaired and mentally retarded children.

Children's language disorders may be further classified as developmental or acquired based on time of onset Ludlow - 1980 .

Acquired language disorders in children have an onset time after the emergence of language (3 - 12 years).

Acquired disorders are again divided into that of traumatic and convulsion etiology. Traumatic subgroup includes various types of cerebral damage or invasion of cerebral tissue including is chaemic, viral and bacterial agents.

The spectrum of viral neurological diseases ranges from aseptic meningitis to encephalitis to chronic infection. Encephalitis is caused by Arbo virus. It is associated with altered conscionsness, focal neurological signs and seizures. Herpes Simplex encephalitis is the most common cause of nonepidemic encephalitis and occurs throughout the year. It has one of the worst prognoses for mortality and severe neurologic morbidity.

Epidemic encephalitis are caused by Japanese Type B virus. Several workers classify cases as abortive, mild and severe according to the symptoms and signs seen in the cases.

Infectious disorders of the nervous system are a well-recognized cause of acquired aphasia in children. As a result of the destructive nature of the lesions associated with infectious disorder particularly herpes simplex encephalitis, it has been suggested that the language disorder associated with this disorder is more severe than in acquired aphasia associated with other aetiologies.

The present study is aimed at finding the changes in speech and language characterestics that are likely to occur after an attack of viral encephalitis.

Previous studies of patients with encephalitis have approached various aspects of the problem. For example, Miller and Ross 1968 reviewed a series of patients suspected of having encephalitis and found that almost 50% had other acute cerebral disorders.

There have been many studies concerned with the investigation of patients with encephalitis, including examination of the cerebral spinal fluid Smith 1969 , serological testing Miller and Ross 1968; Herner et al 1970 , EEG Cobb 1975 and neuro radiology III is and

Gostling 1979; Kaufman et al 1979 . But there are very few studies done so far in the area of speech and language with respect to these cases.

Studies conducted so far show encephalitis as an aetiologic factor causing acquired aphasia in children. But there are controversial results regarding the type of aphasia acquired by these children. For example, studies done by Branco - Lefevre (1950), Alajouanine & Lhermitte (1965) show non-fluent aphasia in these children whereas Woods & Teuber (1978) & van Dongen et al (1985,91) reported of fluent aphasics in their studies.

Lastly very few studies have been confined to older children with relatively well-devoloped language at the time of insult, rather most studies have included subjects of wider age range at lesion onset, typically those at the time of pre-natal or peri-natal insults.

Review of literature

The spectrum of viral neurological diseases ranges from aseptic meningitis to encephalitis to chronic infection. Further encephalitis may be due to infection with one of several viruses, including influenza group, coxsackie, echo and herpes simplex. The diagnosis is not easy in the early stages of the disorder since other acute brain abscess, cerebral infarction or haemorrhage may present with similar clinical features.

Encephalitis can be of epidemic and Non - epidemic types. Some workers have classified, epidemic cases into 3 groups:-

1) Mild 2) Abortive and 3) Severe including the fulminating cases.

In Abortive cases, fever, headache, malaise are present, and recovery occurs in a few days. They are occasionally seen in epidemics, but are uncommon. The onset of the disease in mild cases is usually acute with high fever 40-40.6.c, headache and stiffness of the neck. With in a few hours many patients develop mental confusion and tremor of the lips, tongue and hands. Rigidity may involve the upper limbs or the whole body. Drowsiness is common.

In severe cases coma develops early. The optic disc are usually normal as are the pupils and their reaction Nystagmus, facial palsy, monoparesis, and spastic tetraparesis are not frequent.

Following are a few studies regarding the clinical features seen in viral encephalitic cases.

Encephalitis may be of gradual onset with increasing clouding of consciousness or abrupt, initiated by sudden on set of convulsions or coma. Neck stiffness and other signs of meningeal irritation may be found. Focal signs may occur. Aphasia, hemiparesis and focal convulsions may occur.

The outcome of encephalitis is variable. In some cases there would be permanent neurological sequelae, whereas in others there might be persisting marked disability. Kenny et al 1965 followed up 7 patients for 1 year and found only minor neurological abnormalities in 2 patients with no evidence of intellectual deterioration. Morality in several series of patients has been reported as approximately 20% Cifarelli and Freirich, 1966 , although other authors have reported excellent recovery rates with only minor neurological sequelae.

Kennard et al reviewed the clinical features and results of investigation in a retrospective series of 60 patients with virus related encephalitis admitted to the London hospital between the years 1963 and 1978. The age range of the subjects was 3 - 76 years. There were 37 males and 23 females. These subjects were divided into 3 subgroups:-

Group 1 - Proven Acute viral Encephalitis.

Group 2 - Presumed Acute viral encephalitis.

Group 3 - Post-infection encephalitis.

Group 1, consisted of 12 patients. Here an acute encephatitis was accompanied or preceded by a viral illness. The infecting virus were mumps, influenza, A 256, mononucleosis or herpes simplex.

The first symptom complained of by 5 of the 6 patients with Herpes Simplex Virus encephalitis was headache, the other patient presented with dysphagia. All 6 were febrile

38 - 39 C on admission. One patient presented with visual hallucinations and 2 became disoriented and then dysphasic during their illness. Grandmal seizures occurred in 2 patients and coma developed in 4. The interval between the onset of headache and of coma was 4-7 days.

In Group-2 encephalitis was caused due to an unidentified virus. There were 17 males aged 3-66 years and 12 females aged 4-51 years in this group. The overall mortality rate was 10% n=3 and the morbidity 28% n=8 . The latter included hemiparesis bulbar palsy and epilepsy. 20 . patients were treated with anti-convulsant drugs, of these 16 made a complete recovery and 4 had a mild neurological deficit.

19 patients satisfied the clinical criteria for post-infection encephalitis in Group-3. There were 11 men aged 14-69 years and 8 women aged 3-42 years. Prodromal illness were exanthema, non-specific erythematous rashes. The various symptoms and signs found on admission in the 19 patients were Hemiplegia (58%), Fever (42%), Generalized seizure (37%),Neck stiffness ; Drowsiness and Nystagmus 32% Mental change and Ataxia 11% Dysphasia and dysarthria 5% The overall mortality in this group of patients was 5 % n=l and morbidity 42 % n = 8

While encephalitis can cause a loss of language children who have been developing language skills normally can lose them because of a number of factors . Most clinicians probably view the results of severe brain injury, particularly after closed head injury, as being typical cares

of Acquired childhood aphasia ACA However there are many causes of loss or deterioration of language in childhood. Although children have probably been suffering from ACA in its many forms for centuries, only since about 1978 have they become the subject of significant research and clinical interest. Traditionally researchers have divided these language problems into 2 broad groups aphasias of traumatic origin and language problems whose origin is thought to be connected to convulsions.

The traumatic subgroup includes various types of direct cerebral tissue damage including ischaemia and viral and bacterial agents. Although most studies of traumatic aphasias concluded that the prognosis for recovery was good in this group, compared to the bad prognosis in convulsive aphasias, it was diffcult to see how these claims could be substantiated when few used the appropriate forms for longitudinal assessment of language problems and few actual language data were reported.

This lead to the development of the following clinical picture of acquired childhood aphasia as being characterized by short term memory deficits, a period of post traumatic mutism, complete recovery, non-fluency, some comprehension problems, persistent word-finding problems,

absence of paraphasias or Jargon, Some dyslexia and dysgraphia. These features are generally seen in all,the sub-gropus of traumatic category, viz. ischaemia, viral and bacterial infections.

However in 1978, the series reported by Woods and Teuber not only included one child with the usual pattern of a fluent "Jargon" aphasia and severe comprehension problem but proved to be a new starting point in the study of ACA. They tried to document the long term recovery of the group using more suitable assement techniques. This trend has continued, leading to reports of an increasing range of aphasia symptoms in ACA and including a wide range of paraphasias von Hout, Errard and Lyon,1985 .

It has also led to several other reports of fluent aphasias including those by van Dongen, Loonen and van Dongen 1985,91 .

The acquired aphasias of childhood are those language disorders that appear after a period of normal language development and are secondary to cerebral dysfuction. No large scale studies of the epidemology of acquired childhood aphasias have been carried out, but small scale studies Robinson 1987,91 suggest that they are considerably rare than developmental language impairments. Robinson 1987,91 reported 2 series of studies which

suggested that acquired aphasias accounted for between 4 % and 7 % of cases with language impairment in children.

Language disruptions secondary to acquired central nervous system lesions differ between children and adults in multiple respects. Chief among these differences are the development stage of language acquisition at the time of insult and the development stage of the central nervous system.

In adult aphasias premorbid mastery of language is assumed at least to the level of the aphasics intellectual ability and educational opportunities. Acquried aphasia sustained in childhood, however interferes with the developmental process of language learning, and disrupts those aspects of language already mastered.

The second major difference between adults and children sustaining language disrupting neurological insults is the stage of maturity of the CNS at the time of insult. Although most of the data appear to evidence considerable early brain specialization for language and other higher cognitive funcions Best et al 1988 , the remarkable capacity of young children to recover from major cortical insults has been reported repeatedly.

Frequency of occurrence

In 1897, Freud clearly distinguished aquired aphasia from developmental language retardation emphasizing that it ocurred with a much greater frequency after right hemisphere lesion than did acquired aphasia in adults. Subsequent observations were published which though for the most part were single case reports tended to place an emphasis on the motor aspect of the disorder, and the absence of logorrhoae, even in the face of disturbed verbal comprehension. According to Ford 1952 , the clinical picture of childhood aphasia depends on the degree of language mastery achieved by the subject at the moment of cerebral involvement. Simple loss of speech will be the picture in children prior to this stage, while the adult picture of aphasia in encountered only when language acquisiton is complete.

Comparing over all frequency of aphasia in children with left-sided lesions (73%) with that in adults (63%), Robinson (1987,91) found more aphasia in the children, although the difference is not statistically significant, The frequency of aphasia in children is even greater in the children less than 10 years (85%) The frequency of aphasia is 63% in children above 10 years of age i.e. the same as that

for adults.

As early as 1942, Guttman in his study reported that aphasia was as frequent in children as in adults.

Clinical features

It was only since 1942, that systematic analysis of childhood aphasia appeared in the work of Guttman, who described 16 cases of this type, for this author aphasia was as frequent in children as in adults . Childhood aphasia was characterized mainly by an absence of spontaneous language 14 of 16 cases and after the return of speech, by a poverty of expression with a telegraphic style, hesitation and dysarthria. Auditory and visual comprehension of language was disturbed in only 2 of his cases with an extensive lesion.

Aspontaneity of expression occurred chiefly but not exclusively in children of less than 10 years ofage, when the aphasia was of the motor type, the prognosis was good. If some signs of aphasia persisted beyond this time, the prognosis was more guarded.

In 1950, Branco-Lefevre also emphasized that the chief characteristic of childhood aphasia was the impairment of spontaneous language, disordes of verbal comprehension

being exceptional. However defects in writing appeared to him to be frequent and severe, restitution of written expression was clearly slower and more difficult than oral expression.

Alajouanine and Lhermitte (1965) gave a description of the language disorder in childhood aphasia based upon a study of 32 cases due to left hemisphere lesions. The major findings were a frequent reduction in oral, written and gestural expression. Articulatory disorders leading to an absence of speech with reduction of the lexical stock and simplification of syntax was found. Disorders of articulation appeared to them to be correlated with hemiplegia. While logorrhoea was not found in any of their cases, about one third had a disturbance of auditory verbal comprehension, which in four cases was quite serious. Reading was disturbed in slightly more than half the cases. Impairments of writing were present in all children and in four cases, between the ages of 13 and 15, there was a jargon agraphia.

Dysarthric difficulties which may follow the initial period of mutism are very common, according to Alajouanine and Lhermitte were found in 52% of cases. Lesion localization seems to play greatest role, dysarthria was found in 81% of anterior lesions and 20% of temporal usions. In fact all aspects of language including auditory and visual verbal comprehension are more disturbed following anterior

than temporal lesions.

Van Hout & Lyon 1986 reported a case of Wernickes aphasia in a 10 year old boy, subsequent to herpes simplex encephalitis. Their subject exhibited a number of features a typical of the usual descriptions of acquired childhood aphasia in that he exhibited symptoms such as a severe compehension deficit, neologistic jargon, logorrhoea and anosognosia, the latter 2 features in particular usually being described as lacking in aphasic children. Van Hout and Lyon 1986 , attributed the severe language disorder evidenced by their subject to the destructive bilateral damage to the temporal lobe caused by herpes simplex encephalitis.

In the following section, each . language characteristic shown by the aphasic children would be dealt in brief with evidence from several studies done by numerous authors.

Comprehension;-

This is the least studied aspect of language in children with acquired aphasia. Despite pronouncements that receptive disorders are rare or that beyond the acute period comprehension disorders disappear rapidly and virtually

completely Hecaen, 1976, 1983 studies in this area had been done by Guttman (1942) and Alajouanine and Lhermitte (1965) who reported of marked comprehension deficit. Recently several case studies have detailed the recovery of comprehension abilities during the acute period, usually Aram et al 1983 , but not always Dennis et al 1980 , demonstrating complete or relatively good recovery of comprehension skills.

Syntactic comprehension

Dennis (1980) provided a comprehensive study of the acute language status of a 9 year old girl with a left temporoparietal infarct at 2 weeks and at 3 months after lesion onset. She then concluded that although improvement has been observed, at 3 months after a lesion onset the child's comprehension of longer, non-redundant oral commands continued to be impaired and lower level syntactic structures were better preserved than more complex structures involving supra-ordinate schemata, such as embeddings.

In summary, the data suggested that syntactic comprehension often is impaired following left brain involvement. Poor subject performance in right hemisphere lesioned subjects appears to be related to spatial demands of the task and/ or more generalized brain involvement.

Lexical Comprehension

Except for a few detailed case studies, lexical comprehension skills among children with acquired aphasia have been studied very little beyond the administration of the Peabody picture vocabulary test (PPVT, Dunn, 1965). Using the PPVT, Aram et al 1985 have reported lower performance by the lesioned than the control subjects. One of the few studies (Cooper & flowers, 1987) to examine lexical comprehension beyond single - word representation assessed measuring in context using the processing spoken paragraphs subtest of the clinical evaluation of language functions. On this test, significant deficts among the group of chronic brain damaged children were reported due to diffuse nature of brain involment.

In summary based upon studies predominantly assessing single word comprehension, at least mild lexical deficits have been noted in most groups of children with acquired aphasia. Discrepancy between lexical comprehension and production may be more pronounced following left than right lesions.

Language Production

In contrast to comprehension, language production

is the most extensively studied aspect of acquired childhood aphasia. The following are the few of the aspects studied under language production.

1. Reduced verbal production :-

Many early reports of acquired aphasia focused upon diminished speech output and telegraphic speech, thought to characterize acquired aphasia in children (Alajouanine et al 1965). Reduced output ranged from mutism to a reluctance to speak and simplified syntax rather than an erroneous one (Alajouanine et al 1965). According to Cranberg et al 1987, reduced output continues to be regarded as the dominant feature of acquired aphasia in children.

In 2 studies done by Keissling et al (1983) on hemiplegic children and Riva etal (1986) on acquired lesions due to diverse etiologies, the results showed that left hemisphere lesioned children preformed poorly in spontaneous conversational language than right-hemisphere lesioned children.

Thus it appears that reduced output and simplified syntax are the typical presentation following left-hemisphere lesions and that syntactic deficits may persist for years.

2. Fluent Verbal Production :-

According to Alajouanine et al (1965), fluent aphasia did not occur or were extremely rare in children younger than 10 years of age. This was attributed to an underdeveloped or underautomatized Broca's area controlling which was incapable of "running on" in the absence of appropriate input from posterior language area. Recently, several examples of fluent aphasia with jargon or logorrhea have been described.

Woods and Teuber (1978) was the first to describe "Jargon aphasia". van Dongen et al's (1985) three cases presented a phrase length of atleast 7 words, a speaking rate of more than 90 words/minute and normal prosody, articulation, pauses and efforts. These patients also exhibited frequent paraphasias.

Paraphasias :

Paraphasias were considered to be exceptional in childhood acquired aphasia (Alajouanine and Lhermitte 1965). Their occurence, however has been described in recent years among children with reduced verbal productions and particularly among the few with more fluent verbal production. Paraphasias are more common during the acute period following acquired brain lesions. Also it is persistent among children with diffuse brain involvement as

opposed to focal or lateralized brain lesions.

Van Hout et al (1985) summarized the verbal and paraphasic errors among children with acquired aphasia. They divided the patients into 3 groups according to the evolution of their paraphasis, which also coincided with the severity of associated problems. For group I and II, the paraphasias resolved in a matter of days and over a few months respectively and for Group III, the parapasias persisted for more than a year. Particularly notable among Van Hout's patients was the severity of associated problems in all but Group I and the diffuse nature of brain involvement in all patients. Three of the four patients in Group III, the most severely impaired group had herpes encephalitis and fourth incurred cerebral trauma followed by a stage III coma.

Paraphasic errors may occur in the acute period following acquired focal lesions in young children with either reduced or fluent verbal outputs.

Naming and lexical retrieval :-

van Dongen and Visch and Brink (1980) have described paraphasic errors on naming tasks. Hecaen(1976,83) reported that 44 % of the left lesioned, but none of the right lesioned children had naming disorders that were

described as being impoverished. van Dongen and Visch-Brink (1988) supported Hecaen's study.

Among the children with left hemisphere lesion non-head injured children (CVA, subdural emphyema, encephalitis) presented more severe and persistant aphasic symptoms with irregular distribution of types of naming errors during recovery.

Aram et al (1987) administered the word finding test (Dennis et al 1984) and the Rapid Automatized Naming Test (RAN: Denekla & Rudel, 1976) to left lesioned, right lesioned and control subjects.

On the Word-finding Test, left lesioned subjects were slower than other subjects in latency of response when given semantic or visual cues and they made errors when given rhyming cues.

On the RAN, left lesioned subjects were significantly slower than the controls in naming all semantic categories (Colours, Numbers, Objects and Letters). In contrast, right lesioned subjects responded as quickly or more quickly than controlled subjects in all semantic categories, yet produced more errors than controls.

Age of lesion onset has been equivocally related to naming deficits among left-lesioned subjects.

Woods and Carey (1979) found left lesioned subjects with lesion's sustained after 1 year of age to be impaired on naming tasks. But Vargha-Khadem et al (1985) and Aram et al (1987) found no relationship between age of lesion on-set and lexical retreival abilities.

It appears that naming and lexical retrieval deficits are common after left but not right hemisphere lesions and for the most part do not appear to be related to age of lesion onset.

Phonological and Articulatory production :-

Aside from the few case reports of phonemic paraphasias (Van Hout et al, 1985), very little detail has been offered relative to phonological production or articulatory abilities among children with acquired aphasia.

Alajouanine and Lhermitte (1965) stated that if the lesion occurred before 10 years of age, disorders of articulation were always present, these disorders were described as a phonetic disintegration no different from those observed in adults.

Reading :-

Despite relatively good recovery for spoken language, long-term reading and writing problems are often,

although not always reported to persist.

Alajouanine and Lhermitte (1965) reported that none of their 32 children with acquired aphasia were able to follow normal progress at school, 18 of the 32 experienced persistent reading problems; 9 were totally unable to read; 5 had a severe alexia for letters, syllables and words. Cranberg et al (1987) and Cooper and Flowers (1987) supported these observations.

Although reading usually is reported as more impaired than spoken language among children with acquired aphasia, this is not always the case at least acutely. Dennis (1980) reported that at 2 weeks following lesion onset for a 9 year old child, reading was higher than oral language, at 3 months reading but not oral language was age appropriate. This case demonstrated that even among children with acquired aphasia, a dissociation between auditory and reading comprehension may exist.

According to Hecaen (1976) reading problems may occur following left-hemisphere insult in the acute period, but usually they disappear rapidly and completely.

Writing and Spelling :-

Although it has been suggested that written

language skills are particularly impaired among children with acquired aphasia, there are no detailed reports regarding this aspect.

Few of the studies done in this area of writing and spellings are as follows:-

According to Alajouanine and Lhermitte (1965), written language was always more severely distributed than oral language. Among their 32 children with acquired aphasia, severe alterations in writing were noted in 19, of whom 8 could copy words and 5 were said to be "dysorthographic" in their spontaneous writing.

According to Hecaen (1976, 83) writing problems in these children tended to persist, even permanently.

Spelling deficits, reported to be relatively common among children with acquired aphasia, also have not been described extensively.

Cranberg et al (1981) and Cooper and Flowers (1987) reported spelling problems in 3 of 8 and 8 of 15 respectively of their children with acquired aphasia.

Vargha-Khadam et al (1983) also found that children with left hemisphere lesions perform more poorly on spelling

tasks than those with right lesioned or control subjects. Cooper and Flowers (1987) studied on residual language and academic impairments in children with ACA. The subjects taken up for the study were 15 in number, who acquired aphasia due to various causes like, closed head injury, encephalitis, CVA and cerebral haematoma. He reported Global aphasia, muteness and reduced receptive skills in his subjects. The tests included in the battery where PPVT-R, Clinical Evaluation and Language Functions shortened version of Token Test and Boston Naming Test.

The encephalitic subjects were reported to have deficits in syntax, word finding, mutism immediately after the attack. Word fluency, receptive language, single word vocabulary were affected.

Time Post onset and Recovery :-

According to Rein vang and Engvik (1980), in adults a significant degree of improvement in the period 2-6 months post onset was noticed. Prims et al (1978) noted significant time changes in spontaneous speech variables in the first year post stroke. Thus the post onset recovery period in adults varies from 2 months to one year. Below given is the recovery pattern seen in children with acquired lesions.

The conseqences of cerebral lesions incurred in

childhood are generally regarded as less serious than those incurred in adult life (Basser 1962; Teuber, 1975). Consequently, it is generally agreed that the prognosis for recovery in acquired childhood aphasia is much better than that expected in adult aphasia (Guttman 1942; Basser 1962; Alajouanine and Lhermitte 1965; Lenneberg 1967). The often described complete or near complete recovery of language function following lesions of the left cerebral hemisphere is frequently cited by two possible explanations.

The "Plasticity" of the immature brain, whereby the non-damaged areas of the brain are capable of assuming language function. Some authors (e.g. Satz and Bullard-Bates, 1981) however suggest that the speed of recovery sometimes witnessed in these children are incompatible with a transfer of language to the right hemisphere. Both hemispheres contain mechanisms for language and language therefore need not be re-learned in the minor hemisphere. According to this proposal, damage to the left hemisphere in children causes a "release from inhibition" in the right hemisphere allowing it to assume a greater role in language function.

Although for sometime it has been generally believed that the prognosis of acquired aphasia in children is good, the findings of several studies reported in the literature suggest that the recovery is not as complete as often stated.

Satz and Bullard-Bates (1981) reviewed the literature relating to the prognosis of acquired childhood aphasia and concluded that although spontaneous recovery occurs in the majority of children with this disorder, it by no means occurs in all cases of the cases included in the studies they reviewed, 25-50% remained unremitted by one year post-onset.

Alajouanine & Lhermitte (1965) reported that 75% of their acquired aphsis subject attained normal or near normal language by one year post-onset of the 8 children who had an unfavourable course in their study, 6 had massive lesions, 1 showed mental deterioration and 1 died.

One-third of the children with acquired aphasia studied by He'caen (1976) attained complete recovery within a period of 6 weeks to 2 years post-onset.

Carrow-Woolfolk and Lynch (1982) suggested that the recovery period in cases of acquired childhood aphasia may extend upto 5 years. Even in those cases where recovery from aphasia occurs, however, there are often serious cognitive and academic problems which remain (Satz and Bullard-Bates, 1981).

Recovery regarding the sequelae of cerebral infections viz. hearing loss was discussed by Smyth, Ozanne &

Woodhouse (1990;pg 71). They stated that there appears to be no doubt that in some instances recovery (either complete or partial) of auditory function can occur following even profound attack, the prognosis of acquired aphasia in children is directly related to the age at onset of aphasia. The aphasia that develop from the time of puberty do not clear up completely.

Guttman (1942) found that children with traumatic etiology improve more than those with vascular disease. Even after a period of years the latter group exhibit severe language deficit, which appear to be permanent(Landau and Kleffner, 1957; Worster-Drought, 1971).

There is minimal or no recovery in patience with traumatic aphasia, a severe coma (7 days) is present, (Lange-Cosack and Tepfer 1973). However, Assal and Campiche (1973) could not confirm this finding.

Guttman (1942) emphasizes the good prognosis of purely motor aphasia in young children. However combined motor and sensory aphasia has a more serious prognosis than motor alone. However, Collingnon et al (1968) contradicts this finding.

In their study, van Dongen and Loonan (1977) took 15 children with different etiologies viz. traumatic and

convulsive types concluded that -

Age does not play a very important role in the recovery of aphasia, the initial type of aphasia, the patient acquires seems to be a prognostic factor, Etiology and severity of auditory comprehension deficit are important prognostic and indicators, and that traumatic aphasia has excellent recovery.

Discrepancy in Studies:-

In recent years the classical descriptions of acquired childhood aphasia have been questioned by the findings of studies that have shown that a fluent aphasia with paraphasia may be exhibited by children in the early stages post-onset.

Although it is not immediately clear why the clinical features of acquired childhood aphasia reported by earlier researchers (e.g. van Dongen, Loonen and van Dongen, 1985).Several explanations have been proposed in this regard:

One possible reason for the disparity could be the difference in the time post-onset of the subjects examine in the different studies.

For instance, Alajouanine and Lhermitte (1965), studied children with acquired aphasia,a number of months

post-onset and did not report of neologisms in the spontaneous speech of their aphasic children. Whereas Visch-Brink and Van de Sandt-Koeuderman (1984) examined their children within a few days post-onset of aphasia and recorded neologisms in their spontaneous speech. The discrepancy in the results is clearly because of the difference in the post-onset period. That is, by the time Alajouanine and Lhermitte(1965) examined their subjects, a number of symptoms, including the presence of neologisms may have disappeared.

Lyon et al (1985) also suggested that the time post-onset may be a factor underlying disparity between the earlier and later studies. But they observe neologisms, perseveration etc. in their subjects long after the acute stage in half of the cases they studied. Thus they concluded that the time post-onset of the language examination does not wholly account for the difference in clinical signs.

Another possible reason for the variation in clinical features lies in the nature of the criteria used to select the aphasic subjects.

In many earlier studies subjects were only included if they had a concomittant hemiparesis or hemiplegia as this was taken as being indicators of the presence of brain damage

& hence served to delineate acquired aphasia from developmental language disorders.

As pointed out by Woods and Teuber (1978), however such a selection criteria could result in a bias towards children withanterior lesions and hence a moto type ci aphasia. It is possible , therefore that this could explain the lack of paraphasias, logorrhoea etc. reported in many earlier studies of acquired childhood aphasia.

van Dongen, Loonen and van Dongen (1985) suggested that difference in aetiology may provide another reason for the discrepancy between reports. They believed that when the etiology is head trauma, recovery may be observed with a short time, so that the fluent characteristics of the aphasia may be either not recognized or not recorded.

Clinically , the aphasia pattern observed in cases of acquired childhood aphasia appears to be predominantly that of a non-fluent aphasia often there is an initial mutism, followed by a period of reduced speech initiation together with a diminished lexicon, simplified syntax, hesitations and dysarthria. Disturbances in reading and writing are also common. This pattern of language disturbance, however, is by no means invariant and fluent aphasia does occur in some cases. According to Satz and

Bullard-Bates (1981), it is unknown whether the variations in the manifestations of acquired childhood aphasia are related to either age/ maturation mechanisms or age independent factors such as lesion site; aetiology, type of lesion or time post-onset of assessment.

Assessment and Evaluation of language disorders:-

Language assessment is an ongoing process that is integrally related to language intervention. It is a process of observation and measurement of a client's language behaviours to determine (1) whether a clinical problem exists. (2) What the nature and extent of the problem are and (3) What course of action must be taken to help the child.

The initial decision in language assessment is to identify or rule out the existence of communication problem. The issue of deciding what constitutes a language disorder in children is not a straight forward process. Given the state of clinical art in available norm referenced tests. Mc Canley and Swisher (1984) suggested that the clinicians be attentive to the psychometric flows of the tests they use in making decisions, use norm-referenced test results in conjunction with other kinds of objective and subjective assessment information.

In order to arrive at a diagnosis regarding a

child's disorder, the nature and extent of the problem, various assessment procedures ought to be undertaken.

In general, there are two types of assessment procedures viz. the formal and informal assessment procedures.

Formal assessment procedures:-

Formal assessments are those assessments conducted by a clinician, who uses a set of standardized questions or tests to evaluate the level at which the child is functioning. This sort of assessment is undertaken in a formal clinical environment.

The main purpose of formalized language testing is to evaluate how a particular child compares with his peer group in language development and skills and to get as much information about the language skills a child has in his/her repertoire, as measured by different tests, as possible in a small amount of time. In order to achieve the first purpose and to establish whether the child has significantly disordered language, it is necessary to use norm-referenced tests, since such tests will have information on how a large group would perform on the test (standard performance).

The second purpose can be met by using a criterion

referenced test that assesses large number of expected behaviourism each of the various language domains and uses structured elicitations to quickly estimate whether or not the child has in his repertoire the skills necessary for executing or handling the various items in the test.

Through the use of valid & reliable test where certain language skills of a child may be compared with normative data, the speech clinician can determine if a child has a significant language problem. How ever, the complete description of a child's language behaviour will involve additional informal measures.

Great emphasis is laid on naturalistic testing to find the patterns that emerge when the child is part of a communicative interaction.

Formal tests have their disadvantages because these tests by their very nature and purpose present language removed from ordinary intentionality.

When taking tests, children do not respond to a test item to share information to make requests. Rather these items entail specialized demands that do not typically occur in the real situations.

Part of the unnaturalness of tests comes from the

removal of contextual clues in order to be assured that the child 'knows' the answer only from the language forms given.

Not only is the intention and the context artificial in test situations, the language itself is often characteristically different from language in every day communicative exchanges, children are asked to label objects, fill in missing words or imitate words or sentences that elicit structures from those they would ordinarily use.

Arguments against the use of formal tests to assess language have been repeatedly and persuasively made (Muma et al 1982, Duchan 1982). Tests cannot be substitutes for structural analysis in finding regularities in children's performance. Tests can be helpful however, if their limitations are taken into consideration.

Individual Communicative abilities and methods:-

Informal assessment procedures:-

These measures include evaluations that are based on knowledge and experience on the part of the clinician but are not standardized. Although not standardized, when carefully planned and executed these informal procedures augment formal language testing in a complete language assessment.

The clinician needs to have some idea how each

child communicates. In the initial informal assessment, the clinician needs to focus attention, on the general communication skills of the child. Such information can be obtained both from case histories/interviews with informants and direct observation.

Through the case history and the interview the clinician learns about the child's birth, physical, social and behavioural development, education and communication.

The interview serves the purpose of getting acquainted with the parents and how they view the problem and react to the child's communicative difficulties. For instance, the clinician may wish to know how the child and the parents communicated with each other, do they use speech or gestures and signs? Does the child understand what is spoken? What do the parents do when they do not understand the child's productions? Answers provided by the parent/teacher should give the clinician a general idea of the child's abilities and method of communication as seen by adults in the child's communication.

Gleaning maximum information necessary for a language assessment from parents while managing to keep the parents at ease, relaxed and confident should be the goal of the clinician in the initial interview.

The clinician should not depend solely on others reports of the child's ability or methods of communication. Many direct observations by the clinician throughout the entire evaluation of the child will be necessary. The clinician can assess how the child relates to his parents, the clinicians, strangers and if possible peers or siblings.

After having gathered as much information as possible, the clinician makes an analysis of the information. This report indicates whether the child has a problem and if so what the nature and extent of it is and what should be done to remediate the problem.

With reference to the norm-referenced tests, the child's performance is typically evaluated in relation to the range of age based norms for that test. If the child's performance falls below this range then that child's language behaviours are considered below normal.

Assessment of speech-language characterestics in Acquired childhood aphasia:-

The clinician progresses towards knowing what to do through the assessment procedure; each professional who sees the child with ACA will assess the situation from his/her perspective. Therefore, the speech and language data will just be a part of the overall profile. The choice of speech

and language assessment procedures is determined by a number of factors. The child's age and level of ability, the presence coexisting disabilities such as motor or perceptual problems; the assessment procedures available, the experience of clinician and the need for repitition of the assessment at any stage during recovery.

Cross and Ozanne (1990) outline one possible model for the assessment of children with ACA, which included standardized tests, informal or non-standardized tests and observation as well as samples of spontaneous language and play. Within the area of language assessment they use the form/content/use division of language to look at syntactic, semantic and pragmatic abilities and additionally reading, writing and speech production.

The actual tests a clinician may choose will depend on many things, but most often on the availability of different test procedures and his/her familiarity of the tests.

Problems in the study of ACA:-

The first problem faced by the clinicians in their study is the rarity of the problem itself. ACA is a rare cause of language disturbance in childhood when compared with

problems of developmental origin. However, most clinicians are also familiar with children who have a history of a short arrest or possible deterioration in early language development, which is sometimes associated with an illness or even a psychological event. There is clearly a grey area between clear cases of ACA preceded by a recognizable period of normal language development and those children who never develop normal language, in whom it is difficult to rule out some interference in normal development.

Bishop (1988 pg. 8) has also stated:"In this field small numbers of subjects are inevitable, but poor measurement of language function is not". However time and time again studies have failed to report language function and aphasic symptoms in sufficient detail. Most early studies such as that of Collignon, Hecaen & Angelergues (1968), relied on subjective reports of informal assessments and bedside observations of the aphasia. Bishop (1988 pg. 8) hoped that "future studies will increasingly supplement clinical observations with objective and standardized measures".

The first part of the process is the comprehensive assessment of the child to produce a detailed language profile. Lees and Urwin (1991 - children with language disorders) suggested that there were five major purposes for

the comprehensive assessment of a child's language problem :-

(1) The establishment of a baseline of that child's language impairment.

(2) From there to contribute to the setting up of an appropriate management plan.

(3) To help the child, family and others come to turns with the history and implications of the conditions.

(4) To help in the recognition of the condition, if it recurs, either in the same family or in others.

(5) To allow longitudinal monitoring of the child's condtion as well as between child comparison in clinically based research.

However, it is not altogether obvious what assessment material would be most suitable for these tasks in children with ACA. Previous studies have often used tests that are designed for developmental problems (Huskisson 1973) such as the Raynell Developmental Language Scales (RDLS, Reynell, 1985) or tests designed for adults with aphasia. In many ways it is difficult to get away from some of these problems. there are so few tests that have been designed primarily for children with ACA.

To conclude, Assessment is a broad concept that includes and goes beyond formal tests. Before an adequate assessment program can be devised the clinician must have a general notion of what is to be subsumed by language. Language can be thought of in three basic dimensions grammar, concepts and words and inter personal use. Formal tests exist that tap the first two dimensios.Tests of interpersonal use are virtually non-existent. In any case, successful assessment always requires that the clinician go beyond the bounds of specific procedures to the basic language dimensions themselves The most reliable and useful language assessment device is a clinician who has a good grasp of language in its various aspects and a willingness to probe.

Methodology

The aim of the present study was to:-

1. Evaluate the pattern of Speech-Language characteristics exhibited by children after an attack of viral encephalitis.

3. Evaluate the extent of regression seen in these Children.

2. Evaluate the role of age of onset if any on the extent and recovery of speech-language skills.

Subjects:

Subjects were selected based on the following 3 criteria:-

1. They had normal speech and language development followed by language loss/impairment subsequent to viral encephalitis.

2. Only those subjects with stable mental and physical states were taken up for testing.

3. Subjects with either Kannada or Tamil as their mother tongue were selected for this study.

Subjects who were able to fulfill the above mentioned criteria were selected from the out Patient units of the Thanjavur Government Hospital, Coimbatore Medical Hospital as well as the out patients referred to the All India Institute of Speech and Hearing, Mysore.

Table I :- Summarising information on subjects.

SI. No.	Age (Yrs.)	Sex	Handedness	Mother Tongue	Language Tested
1	4.0	Female	Right	Kannada	Kannada
11	5.0	Male	Right	Kannada	Kannada
III	8.0	Male	Right	Tamil	Tamil
IV	8.0	Female	Right	Tamil	Tamil
V	9.0	Female	Right	Tamil	Tamil
VI	10.0	Male	Right	Tamil	Tamil
VII	11.0	Male	Right	Tamil	Tamil

All the subjects were diagnosed as having had viral encephalitis after undergoing neurological evaluations and other evaluations in the hospitals where they were admitted for treatment.

Tools used in the study :

1. 3 - Dimensional Language acquisition test.
2. Children's Aphasic screening test.
3. Quick Neurological Screening test.

3D-Language acquisition test was taken up as part of the test battery to evaluate the receptive, expressive and cognitive quotients of the subjects with a language age below 3 years. It is not a language specific test. CAST was chosen to assess the overall deficits of the subjects in terms of writing, spontaneous speech imitation activities etc.

QNST was included in the battery to rule out soft neurological signs in the subjects as a result of viral encephalitis.

3 Dimensional - Language Acquisition Test (3D-LAT).
Herlekar.G (1986)

Age Range : 9 - 36 Months

Time taken : Untimed

The primary purpose 3D-LAT a scale for early language development is to evaluage the language acquisition in young children, and provide the estimates of the receptive, expressive and cognitive age equivalents of each individual. The test is intended for children in the age range of 9 - 36 months, but is also applicable to children beyond 3 years of age, when they show delayed language development to determine their level of acquisition in comparison with children of 3 years and below.

The test includes 27 items under each section (i.e.,) reception, expression and cognition with three items from these for every age group. Nine age groups were made between 9 and 36 months. Each age group has a range of 3 months except for the last group which has a range of 4 months. The items are in the form of questions addressed to the monther/primary care giver and requires specific information regarding everyday observations on the range of language behaviours.

The responses should be recorded in the response sheet. The response on the item should be marked "Plus (+)" when the informant indicated that the behaviour was established, a minus (-), when it had not yet emerged and a plus - minus (+/-) whenever the given language behaviour was only partially exhibited or inconsistently noted.

The test items should be administered till 2 consecutive failures are obtained and test numbers noted. The items failed on the test by a child can be checked with the given norms on each dimension.

Children's Aphasic Screening Test

CAST (1986) Whurr.R and Evans.S

Age Range : Children, no age specified.

Time taken : Untimed.

This is a short screening test which aims to provide a profile of the communcation process eg., ' Listening, comprehension, speech, pre-reading, writing and gesture. It is meant to be used to identify language disturbance in the brain damaged who have an acquired moderate-to-severe impairment of language function. The profile may also prove helpful in planning treatment.

A ring binder contains a display book and manual test objects and cards. Record forms, transcription forms and drawing forms are also included.

There are 25 sub tests, 12 of receptive and 13 of expressive function. Receptive sub tests include tests of Visual perception; and pre-reading test; and auditory

language tests. The expressive category includes four pre-speech tests and six expressive language rests including; naming, sentence formulation, picture description and conversational responses. Two drawing tests and a gestural test are also included. A profile of performance may be plotted on the summary record form. The results yielded are quantitative as well as qualitative and are easy to interpret.

Quick Neurological Screening Test (1978) :

Mutti,M.,Sterling,H.M., & Spalding,N.V.

This test consists of a series of 15 observed tasks that help identify persons as young as 5 years old, who have learning disabilities. While it is primarily intended as a screening device for early identification, it has been demonstrated to be very effective with adolescents and adults who have learning problems.

The tasks included in this test are Hand skill, Figure recognition and production, palm form recognition, Eye tracking, sound patterns, Finger to nose, Thumb and finger circle, Double simultaneous stimulation of hand and cheek, Rapidly reversing repetitive hand movements, Arm and leg extension, Tandem walk, Stand on one leg, Skip, Left right discriminsation and Behavioral.

The total score for the QNST is obtained by tabulating the scores on the 15 sub tests :

* A High Score (a total score exceeding 50) showed that a child is likely to have trouble learning in the regular class room.

* A Suspicious score (a total exceeding 25) usually results from one or more symptoms which may be developmental or neurological, depending on the age of the child and the severity of the symptom. A suspicious total score must have some individual tasks scored in the suspicious or High range.

* A normal Score (a score of 25 or less) is almost always acheived by persons who are not likely to have specific learning disabilities.This means that this children will not have minimal cerebral dysfunction.

This test thus is useful for screening purposes in that it indicates possible deficit areas, however it does not label a child as neurologically handicapped, nor does it diagnose brain dysfunction or damage.

Before the commencement of the evaluations, all the instructions for these tests were translated into Tamil and Kannada as all the tests are in English. Care was taken to

prevent deletion, substitution or distortion of the items from the English version while translating them.

TEST ENVIRONMENT :

Subjects were seated comfortably in a quiet, non-distracting environment. Any potential visual distractive stimuli were removed. Evaluation of the subjects was initiated once the subjects physical and mental condition was stable. Then the 3 tests were administered in the subjects respective languages. All the subjects were tested by the same investigator who is fluent in both Tamil and Kannada.

Since all the 3 tests had to be administered on each subject, adequate rest period and reinforcement were given to them, in between each test.

After the completion of each test, scores were recorded in their respective response sheets by the investigator and calculation of the total scoring was done as per the instructions given in their respective test manual.

The results obtained are presented and discussed in the next chapter.

RESULTS AND DISCUSSION

The results and discussion of the present study on Speech-language characteristics in viral encephalitic children is centered around the following aspects :-

* Onset
* Symptomatology
* Regression in language with respect to the chronological age.
* Speech and Language characteristics.

Table II :- Depicting subjects chronological age and the time post onset at the time of the study.

Subjects	Chronological age	Sex	Time post onset
1	4.0	F	3 Mths
11	5.0	M	2 Mths
III	8.0	M	8 Mths
IV	8.0	F	2 Mths
V	9.0	F	4 Mths
VI	10.0	M	2 1/2 Mths
VII	11.0	M	3 Mths

As shown in the table, the post onset period of the infection in the subjects ranged from 2 months to 8 months.

Table III :- Depicts the clinical features exhibited by the subjects and its percentage of occurrence :-

Symptoms	Percentage
Fever	100 %
Seiure	85.7 %
Loss of Consiousness	85.7 %
Vomitting	57.14 %
Hemiplegia	14.28 %

From Table III, it is evident that fever was seen in all the subjects followed by seizure and loss of consciousness in about 86% . The symptom of vomitting was relatively less and hemiplegia was seen in only 14% of the subjects.

Table IV :- Depticting the chronological age and language age of the subjects.

Subj-ects	Chronol-ogical age (yrs)	^GE (IN MTHS.) ON LANGUAGE RECEPTIVE AGE AGE	EXPRESSIVE AGE	3D-LAT LOGNITIVE AGE
1	4.0	< 9 (0.75 Yrs.)	< 9 (0.75 Yrs.)	< 9 (0.75 Yrs.)
11	5.0	< 9 (0.75 Yrs.)	< 9 (0.75 Yrs.)	< 9 (0.75 Yrs.)
III	8.0	30.2 (2.5 Yrs.)	25.8 (2.2 Yrs.)	28.2 (2.4 Yrs.)
IV	8.0	33.2 (2.8 Yrs.)	29.4 (2.5 Yrs.)	28.2 (2.4 Yrs.)
V	9.0	10.0 (0.8 Yrs.)	11.0 (0.9 Yrs.)	< 9 (0.75 Yrs.)
VI	10.0	30.2 (2.5 Yrs.)	33.9 (2.8 Yrs.)	31.3 (2.6 Yrs.)
VII	11.0	21.0 (1.8 Yrs.)	18.7 (1.6 Yrs.)	16.0 (1.3 Yrs.)

The above Table, depicts the receptive, expressive and cognitive ages of the subjects on 3D-LAT,

The table shows receptive age ranging from less than 9 months to 33.2 months.The expressive age ranges from less than 9 months to 31.3 months. The cognitive age ranges from less than 9 months to 31.3 months. Given that the subjects chronological age ranged from 4 - 11 yrs. their regression in terms of communication skills is considerable.

Table V :- RESULTS ON CHILDRENS APHASIC SCREENING TEST :-

SUBJECTS	max	I	II	III	IV	V	VI	VII	avg
A. VISUAL SUBTESTS		SUBJECTS - SCORES							
Matching objects to objects	5	0	0	5	5	0	5	5	2.9
Matching objects to pictures	5	0	0	5	5	0	5	5	2.9
Matching pictures to pictures	5	0	0	5	3	0	5	5	2.6
Matching colors to colors	5	0	0	5	5	0	5	1	2.3
Matching shapes to shapes	5	0	0	5	5	0	5	5	2.9
Matching letters like shapes	5	0	0	5	5	0	5	2	2.4
B. AUDITORY SUBTESTS									
Selecting to Auditory command objects	5	0	0	5	5	0	5	5	2.9
Selecting to Auditory command pictures	5	0	0	5	3	0	5	5	2.6
Selecting to Auditory command animal picture	5	0	0	4	5	0	3	4	2.3
Selecting to Auditory command animal actions	5	0	0	l	4	0	5	2	1.7
Selecting to Auditory command use of objects	5	0	0	4	3	0	5	0	1.7
Selecting to Auditory command colors	5	0	0	3	0	0	4	0	1.0
RECPETIVE TOTAL	60	0	0	52	48	0	57	39	28
C. PRE-SPEECH AND SPEECH SUBJECTS									
Imitation of tongue movement	5	0	0	0	5	0	5	3	1.9
Imitation of speech sounds	5	0	0	0	5	0	5	3	1.9

Imitation of Animal noises	5	0	0	3	5	0	5	4	2.4
Completing sequence	5	0	0	2.5	5	0	5	0	1.3
D.EXPRESSIVE LANGUAGE SUBTESTS									
[Naming objects	5	0	0	5	5	0	5	2	2.4
Sentence formulation * Describing use of objects	5	0	0	4	5	0	5	0	2.0
* Describing Animal actions	5	0	0	4	4	0	5	0	1.9
* Describing Composite pictures	5	0	0	1	4	0	3	2	1.4
Conversation responses to questions	5	0	0	4	4	0	4	3	2.1
Sentence formulation describing drawing	5	0	0	0	4	0	4	2	1.4
DRAWING SUBJECTS									
Copying Shapes	5	0	0	3	5	0	4	0	1.7
Copying Letters/ Numbers	5	0	0		0	0	4	0	1.0
GESTURE									
Imitation use of objects	5	0	0	5	5	0	5	4	2.7
EXPRESSIVE TOTAL (MAX - 65)	65	0	0	39.5	56	0	58	20	24.8
OVERALLL TOTAL (MAX - 125)	125	0	0	!91.5	104	0	115	59	52.8

The above table depicts the performance of the subjects in terms of visual, auditory, prespeech and speech, and expressive language, drawing and gesture subtests. As it is shown in the table three subjects were unable to score any point in this test. The other four subjects had scores ranging from 59-115 out of total score of 125.

Table VI :- Depicting the results of QNTS.

Subjects	Results
I	High Scores
II	High Scores
III	High Scores
IV	Suspicious Scores
V	High Scores
VI	Suspicious Scores
VII	High Scores

Results of QNST shows that 5 out of the 7 subjects i.e., 71.4% of the subjects showed soft neurological signs even after the acute period of the infection. 28.6% of the subjects fell in the suspicious category.

From the results of 3D-LAT, the amount of language regression can be deduced. Subjects I and II with a chronological age of 4 and 5 years respectively were found to

function at a level less than 9 months in terms of receptive, expressive and cognitive aspects of language. So the amount of regression is more than 3. and 4.3 years with respect to their chronological age. Subject V is also seen to function at nearly the same level as that of the above mentioned subjects. This subject with a chronological age of 9.0 yrs, had a regression of 8 yrs in terms of receptive language and expressive language and 8.25 yrs. in terms of cognition.

Subject VII had a receptive age of 21 months, expressive age of 18.7 months and a cognitive age of 16.0 months. The chronological age being 11 yrs, there was a regression of 9 yrs. seen in this subject. The other 3 subjects of ages 8 and 9 yrs. with a better performance on 3D-LAT, compared to the other subjects, had a receptive age ranging from 30.2 - 33.2 months, expressive age 25.8 - 33.9 months and cognitive age 28.2 - 31.3 months. The amount of regression in these subjects being 5.2 - 7.5 yrs. in terms of performance in different areas of receptive and expressive language, CAST showed that subjects I, II & IV obtainted a score of 0 in this test, only 2 subjects were able to cross the score of 100 i.e., subjects IV and VI, obtained a score of 104 and 115 respectively out of a total score of 125.

subject VII had a poor score of 59. Subject III obtained a relatively better score of 91.5,

Except for the 3 subjects with 0 scores, the other 4 subjects i.e., III, IV, VI and VII obtained maximum score of 5 in all the subtests under visual tests. Subject VII had difficulty in matching colors and letter like shapes.

In the Auditory subtests; the scores ranged from 0 - 5. Subjects III, IV and VII had difficulty selecting to auditory command, use of objects, animal actions and colors. Subject had difficulty in selecting animal pictures, because this particular subject had difficulty in distinguishing between rat and dog.

In the pre-speech and speech subtests, subject III had difficulty imitating tongue movements, animal noises and number sequence. Because of hemiplegia of the left side of the body and due to tongue involvement, he had restricted movement of his articulators. Subject VII again had poor scores in these aspects due to the slow movement of his articulators. Their speech was unintelligible as a result of the motor involvement.

In the Expressive language subtests, Subject VII, obtained scores 2 and 3 in naming and conversation subtests respectively. In tasks involving sentence formulation

regarding use of objects, animal actions, composite pictures and drawing, this subject obtained 0 score. None of the subjects could formulate proper grammatical sentences, while describing composite pictures. They would either name the objects in the pictures and the verbs or just names of few of the objects.

Subjects IV and VI had good scores ranging from 3-5 in all the above mentioned subtests.

In the drawing subtests, Subject VII again could not copy shapes and letters/numbers. Subject IV could copy shapes but not letters/numbers. Subject III and VI obtained a score of 3 and 4 in both tasks respectively.

In the subtest involving imitation of the use of objects, subjects III, IV, VI and VII obtained maximum scores of 5 except for the subject VII with a score of 4.

Thus it is seen that either there is complete regression in both expressive and receptive language or if the language has been relatively spared, then there are deficits seen in both expressive and receptive skills. But the average expressive language is slightly worse than reception possibly because of the additional contribution of motor involvement.

Results on the QNST showed soft neurological signs to be present in all of the subjects. While 28.6 % of the subjects were suspected to have soft neurological sign, the remaining definitely showed soft neurological signs.

According to Alajouanine and Lhermitte (1965), the spontaneous recovery period extends upto 1 year. But according to Hecaen (1976) and Carrow-Wool folk et al (1982) the recovery period extends upto 2 years and 5 years respectively. But these authors, do not report of recovery, in their subjects.

In view of the fact that all the subjects of the current study were tested within a period of one year post onset, no conclusive observation can be made regarding spontaneous recovery. However, parents of subjects reported of 25 - 50% recovery in their children within the first few months of infection. But, parents of 4 subjects did not report of any significant recovery in communication skills in their children even after 3 - 8 months of post onset.

Regarding the symptomatology exhibited by the subjects, one study from the literature can be quoted. Kennard et al in their study conducted from 1963-78 on viral encephalitic cases reported of all the symptoms present in the current study. The age group they had considered was 3 -

76 years and the subjects were 50 in number.

Even though the symptoms seen in the present study was in accordance with Kennard et al's study, the percentage of occurence of these symptoms was greater in this study.

This discrepancy between the results could be due to the number of subjects and their age range in the two groups. In the present study, the number of subjects included were 7 and their age range was 4 - 11 years. But in Kennard et al's study, the number of subjects were 50 and the age range 3- 76 years, which is a very wide range.

Regarding the amount of regression with respect to the receptive and expressive language skills, most of the studies on acquired aphasic children, were done with head injury or CVA population. These children, show deficits either in the receptive or expressive language. But in the present study, all the subjects show deficits in both the above mentioned language skills. This is because of the diffuse nature of the insult in viral encephalitis. There is no focal lesion in this infection. Cooper and Flowers (1987) studied the residual language and academic deficits in children with acquired aphasia. They selected children with closed head injury, cerebral haematoma, encephalitis and cerebro-vascular accidents. They reported of Global aphasia,

mutism immediately after the attack, which when recovered gave rise to deficits in syntax, limited single word vocabulary, word finding difficulty, reduced comprehension skills. Thus they reported of deficits in all areas of language.

The results of the present study, depicts deficits in all the aspects of language, which is in agreement with Cooper and Flower (1987) study.

van Dongen and Visch - Brink (1988) compared the naming abilities of head injured children and non-head injured children (CVA, encephalitis) and they concluded that non-head injured children, presented more severe and persistent aphasic symptoms with irregular distribtion of naming errors during recovery. Naming is affected to a considerable degree in our subjects too.

According to Alajovanine and Lhermitte (1965) disorders of articulation and hemiplegia are related. Here subject III had left-sided hemiplegia and due to the involvement of tongue had articulatory disorder. The present study is thus in agreement with the above mentioned study. They report of dysarthric difficulties also. In this study subjects IV and VII exhibited dysarthric difficulties after the initial phase of mutism.

Severe regression in language including both reception and expression was seen in all the aspects of language. Expressive language is affected to a slightly greater degree than receptive language because of motor involvement.

SUMMARY

Children with language disorders represent a heterogeneous population sharing the common feature of a delay or disorder in the acquisition of language. It encompasses all areas of language including vocabulary, meaning and sentence structure.

Under the acquired language disorders of the traumatic type, we have viral encephalitis, a neurological disease caused by arbovirus. The outcome of encephalitis is variable, acquired childhood aphasia, being one of its features.

The review of literature outlines the following features as characteristic of acquired aphasia in children due to head injury, viral and bacterial encephalitis, cerebro-vascular accidents, short-term memory deficits,period of post-traumatic mutism complete recovery is the rule. Generally non-fluent aphasia is seen, some comprehension problems are present persistent word-finding problems. A absence of paraphasia or Jargon and finally some dyslexia and dysgraphia is evident in these cases.

In order to ascertain these characteristics a small scale study was carried out on children diagnosed as having viral encephalitis. The subjects included in this study were 7 in number consisting of 4 males and 3 females having Kannada and Tamil as their mother tongue. The age range of the subjects was 4 - 11 years.

A battery of three tests were administered on these subjects of which two are language tests viz., 3D-LAT and CAST to determine the areas and extent deficits in language and the third one a neurological screening test, QNST, to investigate continuing presence of soft neurological signs. The subjects were evaluated in the out patient departments of Government hospitals, in a 9 quiet distraction free environment. The important findings of this study are

(1) Viral encaphilitis being a fatal infection, many a times leads to severe regression and communication and motor skills in children. Even if the child improves in communication abilities, telegraphic speech, dysarthria would be evident in their speech.

(2) There is no correlation between the age of onset and recovery.

(3) Fever, seizures, loss of consciousness and vomitting are the symptoms seen in nearly all the subjects of viral encaphilitis in this particular study.

(4) Expressive and receptive language are both severely effected, but expressive langauge is slightly worse than receptive language due to motor involvement.

(5) Correlation between hemiplegia and disorders in articulation was found. Dysarthric difficulties were also found in a few subjects.

(6) Deficits in all the aspects of language seen viz. speaking, writing, imitation, matching tasks etc.

(7) Even after the acute period, soft neurological signs were present in all the subjects.

(8) The pattern of deficits seen in viral encephalitic children is unlike any other traumatic sub group viz. head injury and CVA. So these children should be considered as a separate group.

Implication of the study :

The main implication of this study is that, these viral encephalitic children do not belong to the overall category of acquired aphasics with deficits in particular aspects of language. These children show deficits in all aspects of language including both expression and comprehension.

Since this was a small scale study with only seven subjects, it needs to be followed by more longitudinal large scale studies, so that we obtain a clear picture of speech and language characterisitics in viral encephalitis and its eventual outcome.

CAST being a screening tool is an effective means of obtaining a definite picture regarding the areas of deficits in language. It can serve both as a evaluative and therapeutic tool.

As seen in this study, most children with viral encephalitis show a severe regression in communication skills. When these children are taken up for therapy, intensive speech language stimulation should be rendered in the spontaneous recovery period, so that communication skills recover faster and in a complete manner.

Clinicians should keep in mind that only very few children attain complete recovery from encephalitis. Many of these children would have unremitted cognitive and

neurological deficits. Hemiplegia leaving loss and mental retardation are likely to persist as sequelae in these children.

Taking all these aspects into consideration, the clinician should use effective therepeutic methods to restore normal or near normal language in these children. AAC may be considered as short or long term alternates.

LIMITATIONS 0F THESE STUDY

1. The number of subjects taken up for the study are few in number. So generalization of the results are limited.

2, 75% of the cases in this study had complete regression in their communicative skills. A larger subject sample will be required to specify the range of Speech-language characteristics seen in post-encephalitic children.

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APPENDIX - I

3 D - LANGUAGE ACQUISITION TEST: SCORES SHEETS

Name: Date of testing:

Age: Date of birth: Sex:

Father's Name: Age:

Education: Occupation: Income:

Mother's Name: Age:

Education: Occupation: Income:

Language :

Problem:

Brief History of the Problem:

Hearing loss: M.A: IQ:

RLA: … ELA: . CLA:

Item No	Age range (in months)	R	E	C	Remarks
1	9 -11				
2					
3					
4	12-14				
5					
6					
7	15-17				
8					
9					
10	18-20				
11					
12					
13	21-23				
14					
15					
16	24-26				
17					
18					

Item No.	Age range (in months)	R	E	C	Remarks
19	27-29				
20					
21					
22	30-32				
23					
24					
25	33-35				
26					
27					

CHILDREN'S APHASIA SCREENING TEST
ASSESSEMENT RECORD FORM

Name:
Address:

Age:
Hemiplegia:
Handedness:

Date of Assessment:
Date of Birth:

RECEPTIVE FUNCTION (INPUT) — EXPRESSIVE FUNCTION (OUTPUT)

VISUAL — AUDITORY — SPEECH AND LANGUAGE — WRITING — GESTURE

SUBTESTS	No Correct Max. 5 ↓	Performance Profile	Comment Margin
A VISUAL SUBTESTS			
A1 MATCHING Objects to Objects			
A2 MATCHING Objects to Pictures			
A3 MATCHING Pictures to Pictures			
A4 MATCHING Colours to Colours			
A5 MATCHING Shapes to Shapes			
A6 MATCHING Letter like Shapes			
B AUDITORY SUBTESTS			
B7 SELECTING TO AUDITORY COMMAND Objects			
B8 SELECTING TO AUDITORY COMMAND Pictures			
B9 SELECTING TO AUDITORY COMMAND Colours			
B10 SELECTING TO AUDITORY COMMAND Animal Pictures			
B11 SELECTING TO AUDITORY COMMAND Animal Actions			
B12 SELECTING TO AUDITORY COMMAND Use of Objects			
RECEPTIVE TOTAL (MAX. 60)			
C PRE-SPEECH AND SPEECH SUBTESTS			
C13 IMITATION of Tongue Movements			
C14 IMITATION of Speech Sounds			
C15 IMITATION of Animal Noises			
C16 COMPLETING Sequence 1-10			
D EXPRESSIVE LANGUAGE SUBTESTS			
D17 NAMING Objects			
D18 SENTENCE FORMULATION Describing Use of Objects			
D19 SENTENCE FORMULATION Describing Animal Actions			
D20 SENTENCE FORMULATION Describing Composite Pictures			
D21 CONVERSATION Responses to Questions			
D22 SENTENCE FORMULATION Describing Drawing			
E DRAWING SUBTESTS			
E23 COPYING Shapes			
E24 COPYING Letters / Numbers			
F GESTURE			
F25 IMITATION Use of Objects			
EXPRESSIVE TOTAL (MAX. 65)			
SUMMARY — OVERALL TOTAL (MAX. 125)			

APPENDIX - III

ALL INDIA INSTITUTE OF SPEECH & HEARING: DEPT.OF SPEECH PATHOLOGY

QUICK NEUROLOGICAL SCREENING TEST - REVISED EDITION -RECORDING FORM

Name_____ DATE_____

ADDRESS_____ AGE_____ SEX_____

EXAMINER_____ GRADE_____

SCHOOL_____

(and/or source of referral)_____

_____ TOTAL SCORE_____

Indicate letter H, S, or N in box above each subject category

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

H = High (above 50)

S = Suspicious (26-50)

N = Normal (0-25)

1. Hand Skill (Circle Hand Preference R L)

Holds pencil clumsily, tightly (circle which)	1
Prints	2
Keeps eyes close to paper	1
Exhibits observable tremor	3

Comments:

Total

4 or above	H
2 or 3	S
0 ot 1	N

2. Figure Recognition and Production

	Score
Names fewer than five figures	1
Draws figures on horizontal plane	1
Executes very slowly or very rapidly (circle which)	1
Draws figures too large, too small, irregularly (circle which)	1
Rotates paper to write or draw	1
Biases figures left or right (circle which)	1
Self-directs drawing orally	1
Demonstrates poor closure	1
Demonstrates poor angle execution	3
Exhibits observable tremor	3

Comments:

Total

6 or above	H
2 or 5	S
0 or 1	N

3. Palm Form Recognition (Note instructions for under age 8)

			Score
Responds with letters rather than numbers (if numbers fail, try letters)			1
Right Hand	3	(A)	1
	9	(C)	1
	5	(E)	1
	7	(O)	1
Left Hand	2	(B)	1
	8	(T)	1
	4	(H)	1
	6	(N)	1

Comments:(Also note L-R difference in item 15.)

Total

7 or above	H
4 to 6	S
0 to 3	N

4. Eye Tracking (Circle Eye Preference R L)

	Score
Moves head while eye tracking	1
Exhibits horizontal jerkiness	3
Exhibits vertical jerkiness, incoordination	3
Displays distractibility	3

Comments:

Total

7 or above	H
4 or 6	S
0 to 3	N

5. Sound Patterns w Motor Oral

	Score
Succeeds only with rhythmic pattern	1
Misses any one sequence	1
Alternates hands, uses one hand, claps hands(circle which)	1
Affected by loudness or softness (circle which)	1
Uses reversals (e.g. does 1-3-2- or 2-3-1)	1
Reveals speech irregularities (eg lisps)	1
Perseverates (doesn't know when to stop)	3
Misses oral reproduction (two or more patterns)	3
Misses motor reproduction (two or more patterns)	3

Comments:

Total

10 or above	H
6 to 9	S
0 to 5	N

6. Finger to Nose

Score

Exhibits poor left-right discrimination (holds up mirror hand) score in item 14: check here)

Is usually fast or slow (circle which)	1
Moves hand consistently to right or left of target in space (examiner's hand)	1
Moves hand consistently to top or bottom of target in space (examiner's hand)	1
Misses tip of nose by one - half to one inch	1
Misses tip of nose by more than one inch (note if consistently does so in one place)	3
Random or unsteady control of movement	3

Comments: (Note L-R difference in item 15).

Total

4o or above	H
2 or 3	S
O or 1	N

7. Thumb and Finger Circle

Score

Exhibits poor left-right discrimination (holds up mirror hand) (Score in item 14: check here)

Reverses pattern (goes from little finger to index)	1
Shows overflow or slight movement in fingers of opposite hand	1
Indicates flat circle, constricted small circle, incomplete circle (circle which)	1
Holdshand facing him, concentrates intently, often with body tense	1
Registers random body movement, twitching in opposite side	3
Manifests confusion regarding next finger, skips fingers	3

Comments: (NoteL-R difference in item 15).

Total

6 or above	H
4 or 5	S
O to 3	N

8. Double Simultaneous Stimulation of Hand and Cheek

Score

Jerks involuntarily when cheek is touched	1
Occassionally does not feel hand stimulation	1
Does not feel hand stimulation on both sides (normal under age 6)	3
Consistently does not feel hand stimulation on one side (abnormal at any age)	3
Displays unusual sensory behavior (names inappropriate location)	3

Comments: Note L-R difference initem 15)

Total

3 or above	H
1 or 2	S
O	N

9. Rapidly Reversing Repetitive Hand Movements

	Score	
Uses floppy rotation or finger motion	1	
Employs unusually fast or slow rate (circle which)	1	
Displays double hand bounce, rigid or tense finger position	1	
Distinct left-right difference (note also in item 15)	3	
Manifests asymmetry (one side differs from other)	3	

Comments:

Total		
4 or above	H	
1 to 3	S	
0	N	

10. Arm and Leg Extension

	Score	
Displays random body, hand, or tongue movement (circle which)	3	
Reveals extreme muscle tension (note hypo-or hypertonic tendencies)	3	
Unable to hold position (extremities move lower involuntarily)	3	
Unable to hold position (whole body moves forward involuntarily)	3	
Reveals unusual finger position (e.g. clawing of fingers)	3	
Demonstrates wrist dip	3	
Exhibits observable tremor or twitch (circle which)	3	

Comments: (Note L-R difference in item 15)

Total		
9 or above	H	
3 or 6	S	
0	N	

11. Tandem Walk (10 feet)

	Score	
Harder to do backward	1	
Harder to do with eyes closed	1	
One hand curls, in other hand curls out	1	
Leans left or right (circle which)	1	
Takes wide steps or steps on own toes (circle which)	1	
Exhibits pigeon-toed stance and bent knees	3	
Demonstrates poor balance (note arm waving)	3	
Displays random body movement (note if more movement in upper or lower extremities)	3	

Comments: (Note L-R difference in item 15)

Total		
7 or above	H	
4 to 6	S	
0 to 3	N	

Ref: QNST: Quick Neurological Screening Test

Revised Edition: Margaret, Mutti, Harold Sterling & Norma Spolding

12. Stand on One Leg (Circle Foot Preference R L)

		Score
Exhibits poor left-right discrimination (mirrors leg stance) (score in item 14: check here)		
Demonstrates poor balance	1	
Impossible to do with eyes closed	1	
Harder to do on left or right leg (circle which and note also ~~xxx~~ in item 15)	1	
Stands with body contorted	1	

Comments:

Total

3 or 4	H	
2	S	
0 or 1		

13. Skip

		Score
Demonstrates poor balance	1	
Reveals left-right differences (note also in item 15)	1	
Hops or skips on one foot	1	
Unable to perform (significant after age 6 with girls- after age 8 with boys)	3	

Comments: ~~xxxxxxxxxx~~ Total

4 or above	H	
2 or 3	S	
0 to 1	N	

14. Left-Right Discrimination (Score from item 6, 7 and 12)

	Score
Poor left-right discrimination (mirroring) fromitem 6	1
Poor left-right discrimination (mirroring) from item 7	1
Poor left-right discrimination (mirroring) from item 12	1

Comments:

Total

2 or 3	S	
0 to 1	N	

15. Behavioural irregularities

	Score
Demonstrates unusual behaviour patterns (eg. hair twisting, scratching)	1
Perseverates	1
Talks excessively	1
Exhibits withdrawal symptoms	1
Fidgets, touches (circle which)	1
Shows defensiveness, anxiety	1
Displays excitability, distractibility, impulsivity (circle which)	1

Total

3 or above	H	
2	S	
0 or 1	N	

Comments: Note S's approach to motor planning, sequencing, and rhythm throughout subtests. Circle L-R differences for items 3 6 7, 8 9 10 11 12 13).