

SPEECH PROBLEM FOLLOWING TRAUMATIC BRAIN INJURY

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ABSTRACT

Speech problem following traumatic brain injury is a frequent phenomenon and can complicate rehabilitation of a patient if the problem is not recognized and the therapy instituted on time.

Two hundreds patients suspected of having post-traumatic speech problem by the clinicians and referred for speech therapy during the period 1995-97 were included in this study.

Out of 200 subjects, male: female ratio was 4:1 and the age ranged from 3 to 60 years. Among the referred patients with apparent speech problem 57% were diagnosed as actual speech problem by speech pathologist. Of total speech disorder 66% had dysphasia and 34% had dysarthria. Among the dysphasic patients, 45.5% had Broca's, 22.3% nominal, 10% Wernicke's and 21.2% global aphasia. Among 114 subjects 92 received therapy and 22 were drop out. On completion of speech therapy 67% recovered completely and 33% had partial recovery.

All the patients with traumatic brain injury during their convalescence should have speech assessment by a speech therapist and appropriate therapy should be instituted early in those patients with impaired speech function. A significant proportion of them tend to improve with therapy helping their subsequent rehabilitation.

INTRODUCTION

Traumatic brain injury (TBI) has become a very common disability category in which virtually all function may either be spared or impaired and accounts for the commonest cause of disability and death among children and adolescents in USA (Goldstein and Lewis, 1987) 57.9% of these victims have language disorders, either dysphasia or dysarthric depending on the site of injury. In this study retrospective analysis of patients of TBI with associated speech related disorder, their site of lesion and the response to therapy has been done.

MATERIAL AND METHODS

Two hundreds patients of all age group seen in Birendra Hospital & Bir Hospital in Kathmandu, Nepal with traumatic brain injury and having apparently a speech problem, over a period of two years (1995-97) were included as a study subject. Each of these patients were tested in a silent and comfortable room. By history and general examination, the patients with actual speech problem were identified. These patients were subjected through Western aphasic battery (WAB) test (Kertesz, 1982) to distinguish between language disorder (dysphasia) and speech disorder (dysarthria). WAB test includes fluency test, to examine fluency and character of speech, and comprehension test examine auditory comprehension, verbal command, repetition and naming objects to examine anomic loss. The dysarthric patients were subjected through Frenchay Dysarthria Scale. (Frenchay et al, 1975) which gives scores according to the region affected by the lesion.

Frenchay Dysarthria Scale:

Region effected	Score
Within normal limit	WNL
Respiratory System	1,2,3
Laryngealsystem	4
Resonatory system	5
Posterior tongue	6
Anterior tongue	7
Jaw	8
Lip	9

RESULTS

Among two hundreds cases of TBI, the age ranged from 3 to 60 years with mean of 40 years. The male and female ratio was 4:1

Table 1. Age and sex distribution of the subjects

Age	Male N (%)	Female N (%)	Total N (%)
3-10	45 (30.8)	23 (42.6)	68 (34.0)
11-25	52 (35.6)	16 (29.6)	68 (34.0)
25-50	36 (24.7)	9 (16.7)	45 (22.5)
>50	13 (8.9)	6 (11.1)	19 (9.5)
Total	146	54	200

After taking the history and performing general examination of the 200 patients, only 114 of them were found to have speech problem. Among the 3-10 years group there was total loss of speech for few days. Out of these 114 patients, 66 cases (57.9%) were found to have dysphasia and 48 cases (42.1%) to have dysarthria.

According to WAB test 30 (45.5%) had Broca's aphasia, 15 (22.3%) had nominal aphasia (10.3%) Wernicke's aphasia and 14 (21.2%) had global aphasia. 87.5% of the cases with speech problem had injury in their dominant hemisphere.

Table 2. Types of lesion determined by the site of impact during injury and is apparent

Type of aphasia	Total patients	Percentage	Site of the Lesion
Sever	34	20-50	Complete -55% Partial -45%
Moderate	58	18-30	Complete -45% Partial -52%
Mild	108	20-50	Complete -35% Partial -65%

(Refer- G.C. Scale Mild injury: 13-14 Mod: 9-12 Sever: 3-8)

All the 48 patients with dysarthria improved with speech therapy. The younger age group showed a faster and a more complete recovery which is evident by the following Table:

Age	No of Sessions	Recovery
3-10 years	10-15	100%
10-25 years	15-30	80%
25-50 years	20-40	60%
>50 years	>30-50	40%

8 out of the 48 dysarthric cases had associated cerebellar injury and these patients could make partial recovery inspite of long session of speech therapy. Of the 40 dysarthric patients with cerebellar injury 78% made full recovery and 22% recovered only partially.

In dysphasic patients the rate of recovery varied according to the type of dysphasia which was evaluated by the number of session required for recovery.

Type of Dysphasia	No of Sessions	Recovery Complete	Partial
Broca's dysphasia	25-30	90%	10%
Wernicke's dysphasia	30-40	60%	40%
Nominal aphasia	>50	x	100%
Global aphasia	>50	x	100%

DISCUSSION

Speech is an important contributory factory to the development harmony of human society and puts us above the rest of the animal kingdom. Speech is produced as a result of complex pathway of nervous system. The auditory, visual, or tactile impulses are passed to the temporal area or Heschl's gyrus. From here the impulses are passed on to Wernicke's area, the language receptive area, where the incoming signals are integrated and interpreted. The message then goes to the Broca's area, the motor area for production of language, through fasciculae. Broca's area co-ordinates language production using respiratory, phonation, articulation and resonance system (Arbib et al, 1982).

Among the different causes of speech disturbances, trauma to the head has been a major contributor. Majority of head injury victims are likely to suffer from atleast some transient cognitive motor or sensory problems (Kingston, 1985). Speech problem, as a consequence of TBI, has been highlighted since 1961 by Broca's and has been found in 60% of such victims (Goldstein and Lewis, 1987). The injury mainly is caused during primary brain injury and further aggravated by secondary injury.

The group most commonly effected, in this study, was of the age group 15-30 years, male predominating, most probably due to greater exposure to the risks of accidents.

The site of impact during the injury determined the type of speech related disorder that was seen during convalescence. Broca's conclusion that frontal lobe injury resulted in language disorder still holds true (Broca's, 1882) in this study also, 59.1% of those who had Broca's dysphasia had evidence of injury of frontal lobe in CT or MRI. Aphasia following Lesion in the dominant hemisphere (Broca's 1865) was also observed in all of the cases. Anomic dysphasia is stated to be found in any form of TBI but in this study 10% of the cases presented with anomic dysphasia and all had left temporal haematoma.

Clinically obvious aphasia after TBI on appropriate testing by an expert may have intact spontaneous speech (Goldstein and Lewis, 1987). The study showed that 42% of the patient with apparent speech problem were labelled as normal after appropriate examination emphasizing the need of assessment by a speech expert. Prognosis, regarding recovery of speech problem, following TBI fares better than brain insults by other causes e.g. stroke (Goldstein, 1987). Out of the 114 patients who received speech therapy, 70% had complete recovery and 30% had partial recovery. It was observed that the children, who comprised 10% of the patients, presented with more severe degree of disability but made a quicker and more complete recovery.

The severity of head injury was observed to played no role on predication of the out come in terms of the degree and the rate of recovery. It was observed that 30% of mild head injury patients had anomic dysphasia which required more than 50 session to achieve even partial recovery where as 50% of the severely injured patients had Broca's dysphasia who made complete recovery within 25 to 30 sessions.

Dysarthric patients have better chance of recovery compared to the dysphasic patients (Hemlatha 1987) which was also evident in this result. Of the 48 dysarthric patient, 80% had complete recovery and regained preinjury language status compared among the dysarthric patients whom only 60% made full recovery. The dysarthric patients who in addition had cerebellar injury needed longer sessions and could make only partial recovery. Comparable to the result given by Hemlatha in 1987, the victims with Broca's aphasia, which frequently was the commonest type of dysphasia, showed an acceptable recovery in 25 to 30 sessions compared to the other types of dysphasia's which required even more than 50 sessions.

It was observed that the chance of recovery from the speech problem had the best chance if therapy was instituted early, with in 4 weeks. After six weeks, the chance of full recovery was less as they gradually lost the motivation and started accepting the disability. We have also observed in this study that the patients who started therapy soon after they have regained their consciousness had almost complete recovery compared to those who were referred later in the subsequent follow up. The later group needed longer sessions and could make only partial recovery.

CONCLUSION

A significant proportion of traumatic brain injury patients are prone to have language disorders. During their convalescence they all should have their speech assessed by a speech pathologist. Appropriate therapy instituted in time. Significant proportion these with speech problem tend to improve by therapy, therapy by helping in their subsequent rehabilitation. Speech therapy is seen to be effective in early post injury period. Few of them make poor recovery which may be due to lack of motivation, the type of speech problem they develop depending on the site of impactor their age factor like younger patients showing better prognosis compared their elder counterparts.

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