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LD & RIGHT-EAR PEAK: A CASE REPORT

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We all see SSW results for learning disabled children that peak in the LC Condition. It is also fairly common to see high percentages of error for both the LC and RC Conditions, but it is much more unusual to see a RC peak in this population. This report describes such a case.

HISTORY

Sara a 10-8 child was referred to the Midelfort Clinic's Audiology Department for a Central Auditory Processing (CAP) evaluation by her teacher who had heard the examiner discuss auditory perceptual disorders at a seminar. She alerted the mother to the fact that Sara exhibited many of the symptoms of children who have CAP deficits, which prompted Mrs. J. to bring the child in for the evaluation. Mrs. J. had been uneasy as to why Sara was having so much difficulty in school compared to her two older siblings who were considered academically gifted.

Sara is right handed (although there is some evidence of left handedness in the family). She attends a local elementry school and is on grade level in the 5th grade. Unlike her siblings, Sara had a great deal of upper respiratory infection during the first two years of life (a factor often noted in children who are referred because of CAP difficulties). The middle ear problem was managed medically and not surgically.

Mrs. J. indicated that Sara is doing fair work academically, but that it requires great effort for her to maintain even this level of performance. She has major difficulty in oral reading (pronouncing the words that she sees on the page). Spelling and math are also very weak.

Sara is described as immature for her age with a very short attention span. She therefore has great difficulty "staying on task." Both teacher and parent consider this child to be somewhat hyperactive. The audiologist concurs with

this assessment based on her behavior during the testing. As expected in these children, Sara performs considerably better in a one-on-one situation as opposed to in large or small group activities.

AUDIOMETRIC ASSESSMENT

Sara demonstrated essentially normal hearing bilaterally with a three frequency speech average of 13 dB in each ear. These results were consistent with the obtained SRTs of 15 dB. Both tympanograms and acoustic reflexes were within the normal ranges. WDS was 100% in each ear.

A number of CAP tests were administered to Sara to get a better idea of her perceptual skills for auditory information. In addition to the SSW test, the Willeford battery was administered as well as dichotic CVs and the SCAN Test.

The Willeford Battery

TEST	SCORES	RESULTS
Competing Sentence Test	R=100/L= 80	R= pass/L= borderline
Filtered Speech Test	R=76%/L= 40%	R= pass/L= fail1
Binaural Fusion Test	R= 30%/L= 45%	fail2

1 In brain lesion cases, suggestive of right temporal lobe dysfunction
2 In CNS cases, suggestive of brainstem dysfunction

The Dichotic CV Test

pass

In this test there was the expected right ear advantage (REA) for both conditions. There was a minimal REA when attention was directed to the LE and a strong REA when attention was directed to the RE.

The SCAN Test

SUBTEST	RESULTS
Competing Word Section	Mild LEA suggestive of an immature auditory system

The Staggered Spondaic Word (SSW) Test

SCORES:	REF: 8 Cardinal Numbers							R-SSW & S-SSW (same)			
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	RNC	RC	LC	LNC
0	1	0	0	0	1	5	0	0	15	2	0
				NORMS: 10-YR OLDS1=				3	8*	14	3

1 Norms are stated as the outside permissible limits.

BIAS:	REVERSALS	ORDER EFFECT	EAR EFFECT	TYPE B
	No. = 3	2/5	1/6	Diff = 5
NORMS: 10-YR[1]	= 3	Diff = 4	Diff = 5	Diff = 4

[1] Norms are stated as the outside permissible limits.

RESULTS AND DISCUSSION

The results of the SSW test were quite interesting. Itis not very common to see a RE peak in LD cases. Katz (at recent SSW workshops) points out that CAP cases with RE peaks tend to have decoding difficulty involving speech. This is similar to L-AR cases who also have RC peaks (and receptive disorders).

Beyond age 10 there is a smaller percentage of identified LD cases on CAP tests. Thus, it is diagnostically frustrating to see that this child just reached but did not exceed the age norms for a 10-year old on reversals, Ear Effect L/H and Type B-RC (it is extremely rare to find posterior bias of any sort by this age therefore it is interesting to note also that she had a "posterior-looking" pattern for Order Effect, which did not reach the level of significance).

Of these "near misses", the Type B is perhaps the most interesting. It is seen infrequently in the LD population (National Sample for LD, 1986). Barrett & Katz (SSW Reports, Feb.1982) noted that is might be associated with the temporal lobe (among other sites).

Two tests other than the SSW had poorer RE than LE scores. They were the Binaural Fusion and the Competing Word Section of the SCAN. If the SSW can be interpreted as suggestive of auditory decoding difficulty then it would help to explain Sara's poor oral reading and spelling as this dysfunction would limit her ability to sound out the words she read and to identify the letter that would go along with the (spoken) words she was told to spell.

Mrs. J. was relieved to learn that Sara's difficulties were likely to be associated with an auditory deficit. Prior to the evaluation she was extremely frustrated with Sara's slow progress and considered using very strict discipline to force the child to do better academically. Her understanding of Sara's problem helped her to deal more realistically with the child's academic progress and to put her energies into actions that are more likely to benefit Sara.

SUMMARY

A child, age10-8, who had oral reading, spelling, and math difficulties in school as well as problems paying attention along with hyperactivity, was seen for evaluation by an audiologist. Despite her early history of otitis media she had essentially normal hearing but significant CAP difficulties on each of the tests in the battery. The RC peak was considered evidence of auditory decoding difficulty which helped to explain her oral reading and spelling difficulties.

DIFFERENTIATING ANTERIOR TEMPORAL CASES FROM OTHER NARs

Jack Katz

In the previous SSW REPORTS anterior temporal cases were compared with cases that had lesions of Heschl's gyrus. There were obvious substantive differences between the former non auditory reception (NAR) group and the latter auditory reception (AR) group. Differences were demonstrated not only on central tests (i.e., SSW and CES), but also on so called peripheral tests (i.e., puretone thresholds and WDS). In addition, the pattern of error for R-hemisphere cases was often dissimilar or opposite that of L-hemisphere cases. The present report is more subtle, in that the object of this work was to determine whether one NAR group differed significantly from another NAR group.

SUBJECTS

Twenty-four cases with diagnoses of anterior temporal lobe lesions were compared to 26 NAR subjects who had cerebral lesions, but not involving the anterior temporal lobes nor diagnosed as a case with a corpus callosum lesion. Thus the comparison was primarily between anterior temporal patients on the one hand and frontal, parietal and occipital lesion cases as well as individuals with deeper lesions of the brain. Cases that had known lesions of the corpus callosum or AR region were excluded. Table 1 shows the sample sizes, mean age percent of females and peripheral hearing test information (puretone thresholds and word discrimination scores)for the subgroups.

GROUP	N	AGE	%MALES	SPEECH AVERAGE		WDS	
				RE	LE	RE	LE
RIGHT ANTER TEMP	12	46 (12.8)	67	15.5 (16.3)	20.1 (19.3)	93.8 (8.5)	93.8 (6.5)
LEFT ANTER TEMP	12	40 (7.0)	58	7.6 (6.0)	7.3 (6.3)	94.2 (5.4)	94.5 (5.7)
OTHER RT HEM NAR	15	37 (13.0)	40	9.1 (7.6)	12.4 (10.0)	97.7 (2.3)	93.3 (6.7)
OTHER LT HEM NAR	11	45 (16.8)	36	7.2 (5.5)	8.5 (7.1)	96.4 (2.3)	95.6 (3.2)

Table 1. Pathological groups, sample size, mean age, % of males, mean speech averages and word discrimination scores along with standard deviations (SD).

The samples size and age distribution are fairly comparable for the Anterior Temporal and the Other NAR groups. Although the overall percentage of males is 50% there was a greater preponderance of them in the Anterior Temporal

groups (especially R-hemisphere cases). In general, there is no reason to believe that sex ratio would have a significant effect on the parameters under study here, with one exception. This will be discussed later.

Analyses of variance were computed to determine whether significant differences ocurred among the speech averages for the groups in either ear or among the WDSs for either ear. None of these comparisons proved significant at the .05 level of confidence.

Table 2 shows the performance of the groups on the SSW and CES tests. It can be seen that for the SSW and CES scores, the results were quite similar for the 4 groups, although the Left Anterior Temporal group may be considered to have a different CES pattern of errors when comparing the RE and LE averages. However, the differences were not statistically significant. The lack of significance might well be due to the large SDs on this test. The same can be said for reversals that did not reach the level of statistical significance.

The only significant finding here among the groups was for the Type A pattern. The major deviation that can be seen is the high percentage of Type As in the Right Anterior Temporal group. In fact the only Type B pattern was for the same group. Thus, 8 out of 12 subjects in the group with right anterior temporal damage had a highly asymmetrical pattern of errors on the 8 CNs which resulted in significant Type A or B patterns. We cannot discount the possibility that this one significant finding was a chance occurance.

GROUP	C-SSW		CES		REV	TYPE A
	RE	LE	RE	LE		
RIGHT ANTER TEMP	.6 (6.6)	7.9 (11.7)	11.4 (19.3)	13.6 (14.1)	3.4 (4.7)	58%
LEFT ANTER TEMP	1.4 (5.8)	5.2 (6.8)	13.6 (12.5)	6.4 (10.7)	2.2 (2.6)	17%
OTHER RT HEM NAR	3.2 (9.0)	5.6 (8.6)	9.1 (10.4)	12.5 (16.9)	5.4 (7.9)	13%
OTHER LT HEM NAR	1.7 (6.4)	3.7 (6.3)	7.7 (9.6)	12.2 (15.4)	6.3 (7.8)	9%

Table 2. SSW and CES means (and standard deviations) for anterior temporal NAR cases versus other NARs.

If the finding of a high percentage of Type A pattens in cases with anterior temporal lobe involvement can be independently supported, then a reasonable rationale would be that the anterior commissure (AC)plays a significant role in this result. The most recent SSW Workshop manual points out that the AC

connects the two temporal lobes [mid-anterior portion] and that the results mimic those of patients with corpus callosum lesions. This includes the common finding of Type A patterns. It states however that 'typical' CES results remain uncertain at this time. This is because we have seen the usual RE CES peaks, as expected, in many AC cases but in some others, we have seen LE CES peaks. This latter finding could not always be differentiated from lesion cases with damage to the body of the corpus callosum. Therefore, it was thought to be instructive here to do a further analysis of the CES patterns in these cases.

The possible influence of sex ratio was also considered. Geshwind and his colleagues have pointed out that the corpus callosum of the average male is thinner than for the average female (associated with the estrogen level during early life). Therefore, if the AC is also smaller in males, then the high incidence of the Type A pattern in this one group might, in part, reflect the higher percentage of males (in addition to the factor of locus).

Of the 8 males in the Right Anterior Temporal group, 6 (75%) of them had Type As while only one of the 4 (25%) females had a Type A. This comparison while dealing with a small population gave results in the expected direction, that males were more likely to have type As relative to their incidence in the group. The CES results are fragmentary because only 7 of the subjects were given the test:

	TYPE A CASES			CASES WITH NO TYPE A	
Sex	CES-R	CES-L	Sex	CES-R	CES-L
M	25	25	F	0	5
M	0	5	F	0	0
M	5	30	M	50	30
M	0	0			
Mdn=	(2.5)	(15)		(0)	(5)

There is no impressive difference between those with and those without Type As. In fact, this difference could reflect the contralateral effect in R-hemisphere cases.

With regard to response bias, all 18 instances of Ear and Order Effects for the two groups were of the anterior type (appropriately so). The overall percentages were 14% Ear Effects and 22% Order Effects. Slightly smaller percentages were obtained for the R Anterior Temporal group because Ear and Order Effects are voided by Type A patterns.

SUMMARY

The comparisons of results for these samples of NAR cases, with and without anterior temporal lobe involvement are not nearly as dramatic as the results in the last issue contrasting anterior and posterior temporal cases. Of course, this tells us that AR and NAR cases look very different on audiometric evaluation (so what else is new) and the AR have posterior bias. This report shows few differences among groups, except for the Type A in the R-Anterior Temporal cases. This finding requires further validation.