How Far We've Come: Promoting Resilience Following Significant Early Life Neurological Insult

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LITERATURE REVIEW & OBJECTIVE

Extant literature asserts the potential adverse late effects associated with early cognitive insult, such as multiple brain tumor, brain resections, refractory seizures, and early life exposure to chemoradiotherapy,. Despite what history and literature tells us regarding prognostic outcomes, it is possible for patients to rewrite their narratives and demonstrate resilience and terrific response to rehabilitation. A longitudinal, single case study of the impact of therapeutic intervention on a young patient who experience each of the aforementioned injuries is presented here.

BACKGROUND

Patient is a 14-year-old Hispanic female diagnosed with atypical Teratoid Rhabdoid Tumor (ATRT) at age 2. She was treated as per Dana Farber ATRT protocol, which included brain resection and 51 weeks of intensive chemoradiation therapy. Complications included peripheral neuropathy, osteopenia, Bell's palsy, ptosis of the eyelid, seizures, and bilateral hearing loss. She is currently 12 years post-chemoradiation. A right temporal lobectomy (age 11) controlled refractory seizures and cognitive regression. Patient received intensive neurorehabilitation and serial neuropsychological assessments (age 4, 7, 10, 14).

METHODS

- Wechsler Intelligence Scale for Children (WISC-V)
- Expressive Vocabulary Test (EVT-3)
- Peabody Picture Vocabulary Test (PPVT-5)
- Clinical Evaluation of Language Fundamentals (CELF)
- DKEFS (Verbal Fluency, Design Fluency)
- Wide Range Achievement Test (WRAT-5)
- California Verbal Learning Test for Child (CVLT-C)
- Beery-Buktenica Visual Motor Integration, Sixth Edition
- Grooved Pegboard
- Questionnaires: BASC, MASC, ABAS, BRIEF

ASSESSMENT RESULTS

WISC-V	Standard Score	Percentile	Descriptor
Verbal Comprehension	73	4	Below Average
Visual Spatial	72	3	Below Average
Fluid Reasoning	72	3	Below Average
Working Memory	69	2	Exceptionally Low
Processing Speed	69	2	Exceptionally Low
Full Scale IQ	*64*	*1*	*Exceptionally Low*
General Ability	68	2	Exceptionally Low
Nonverbal Index	65	1	Exceptionally Low
Cognitive Proficiency Index	64	1	Exceptionally Low
	Scaled Score	Percentile	Descriptor
Verbal Comprehension Subtest			
Similarities	7	16	Low Average
Vocabulary	3	3	Exceptionally Low
Visual Spatial			
Block Design	4	2	Below Average
Visual Puzzles	6	9	Low Average
Fluid Reasoning			
Matrix Reasoning	4	2	Below Average
Figure Weights	6	9	Low Average
Working Memory Subtest			
Digit Span	4	2	Below Average
Picture Span	5	5	Below Average
Processing Speed Subtest Scores			
Coding	4	2	Below Average
Symbol Search	5	5	Below Average
	Standard Score	Percentile	Descriptor
PPVT- 5	65	1	Exceptionally Low
EVT- 3	70	2	Below Average
	Scaled Score	Percentile	Descriptor
CELF-5: Following Directions	6	9	Low Average
CELF-5: Recalling Sentences	5	5	Below Average
DKEFS Verbal Fluency	Scaled Score	Percentile	Descriptor
Letter Fluency	4	2	Below Average
Category Fluency	5	5	Below Average
Category Switching	4	2	Below Average
Switching Accuracy	6	9	Low Average
DKEFS Design Fluency			
Filled Dots Total	12	75	High Average
Empty Dots Total	11	63	Average
Switching Total	7	16	Low Average
WRAT-V	Standard Score	Percentile	Descriptor
Math Computation	65	1	Exceptionally Low
Spelling	68	2	Below Average
Word Reading	63	1	Exceptionally Low
CVLT-C Immediate	T Score	Percentile	Descriptor
List A Learning Trials (4-5-7-6-7)	21	<1	Exceptionally Low
CVLT-C Immediate	Z Score		
Learning Slope	-1.5	7	Below Average
Semantic Clustering	0	50	Average
Serial Clustering	0	50	Average
List B	-0.5	32	Average
Delayed			
Short Free Recall	-3.5	<1	Exceptionally Low
Short Cue Recall	-3	<1	Exceptionally Low
Long Free Recall	-3.5	<1	Exceptionally Low
Long Cued Recall	-2.5	1	Exceptionally Low
Recognition			
Correct Hits	-2	2	Below Average
False Positives	-2.5	1	Exceptionally Low
	Standard Score	Percentile	Descriptor
Beery VMI	45	<1	Exceptionally Low
Grooved Pegboard	Standard Score	Percentile	Descriptor
Dominant Right Hand	61	1	Exceptionally Low
Non-Dominant Left Hand	<50	<1	Exceptionally Low

INTERPRETATION

Assessments dating back to early childhood demonstrated an initial decline in her performance between testing, with generally impaired performance across most domains. However, there has been some change in that trajectory between the last two assessments (2017 and 2022), demonstrating age expected growth with some true gains in several areas. Despite her performance continuing to range from Below Average to Exceptionally Low across most domains, there are significant areas of personal strength and growth, including her verbal reasoning, executive functioning, and quantitative reasoning abilities, which currently fall within the broadly average range compared to same-aged peers. Important to note, these are areas of strength have been largely targeted during therapeutic intervention.

CONCLUSIONS

Research has established that children with multiple cognitive insults early in life have a high likelihood of adverse outcomes. However, this case study demonstrates that even for children who have had multiple, chronic, insidious early life neurocognitive insults, the implementation of intensive and directive therapies can alter their trajectory and allow steady gains to be made. These findings also highlight the importance of taking a biopsychosocial approach for informing therapy led by a strong treatment team. It is critical to integrate the strengths of the individual, their family, the treatment team, and the environment when supporting the treatment goals of the patient and their loved ones.

CONTACT

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