Bilateral Horizontal Gaze Palsy and Visual Midline Shift Syndrome in a Pediatric Patient Post-CVA: A Case Study

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I. Case History
- 9-year-old Asian male
- Chief Complaint: unable to track with both eyes, ever since the stroke about 1.5 years prior
- Medical History: CVA secondary to Pontine Hemorrhage, Hypertension
- Ocular History: Lateral gaze palsy OU, CRET, Amblyopia OD
- Medications: Amlodipine, Labetalol, Baclofen
- PT, OT, Speech & Language therapy

II. Pertinent findings
- VA (Cardiff) w/ Habitual SRx: OD 20/32, OS 20/32
- CT: ~20 pd CRET at far/near
- EOM: Restricted horizontal conjugate gazes
- NPC: TTN
- Cycloplegic Ret: OD +3.75-1.25x180, OS +1.00-1.00x180
- Visual-spatial localization: 50-60% accuracy, misses consistently to his right (5 pd BD & BL yoked prism trial: 90-100% accuracy, improved posture)
- Physical: forward-leaning posture, right shoulder elevated, right head tilt, poor tone of left side, nonverbal

III. Differential diagnosis
- Primary: Lateral gaze palsy OU, Visual Midline Shift Syndrome
- CN VI Palsy
- Divergence paralysis
- Duane syndrome

IV. Diagnosis and discussion
- Bilateral Horizontal Gaze Palsy
  - The pathway responsible for normal horizontal eye movements includes the PPRF (paramedian pontine reticular formation), CN VI nucleus, MLF (medial longitudinal fasciculus), and CN III subnucleus.\(^1\) Disruption of this pathway causes restricted horizontal conjugate eye movements but leaves convergence ability intact.\(^1\)
- Visual Midline Shift Syndrome (VMSS) – Anterior & Right
  - VMSS occurs when there is a mismatch in the awareness of one’s visual space and internalized midline. Anterior VMSS diagnosis based on the patient's forward-leaning posture. Right VMSS diagnosis based on visual-spatial localization testing and head/body posture to right side. Yoked prism trial (BD for anterior VMSS, BL for right VMSS) confirmed the suspected VMSS.\(^2\)
- Esotropia OD
V. Treatment, management

- Treatment of VMSS: Yoked prism lenses (2 pd BD and 2 pd BL)
- At 2 month follow-up: family reported improved eye tracking (no longer using his finger to track) and improved posture
- Prescribed 2 home vision therapy activities to expand the range of horizontal gaze motion:
  - Doll's eye movement for Vestibular-Ocular Response stimulation
  - Wheelchair spinning to evoke Post-rotary nystagmus
- Communicated with PT, OT, and teacher regarding visual conditions and recommendations

VI. Conclusion

- For nonverbal patients, Visual Midline Shift Syndrome can still be diagnosed based on observation of posture, balance, and spatial localization.
- Yoked prism lenses are effective in modifying posture and increasing visual-spatial awareness in CVA patients.
- By providing a neuro-optometric evaluation and treatment options, we can improve the quality of life for patients suffering from the debilitating effects of a CVA.

