CONVERGENCE DIFFICIENCIES

Children vs. Adults
Insufficiency vs. Paralysis

CASE NUMBER ONE

• 8 year boy referred from school- headaches, reading difficulties and blurred vision
• MY EXAMINATION
  • 20/20- with no correction
  • Cycloplegic refraction OD +.50, OS +.75
  • 14 prism exophoria at near, 4 prisms distance
  • Fusional amplitudes at near – 18 (normal-36)

DIAGNOSIS?

• CONVERGENCE INSUFFICIENCY
  • 1. near point of convergence >10cm)
  • 2. reduced fusional convergence amplitudes
  • 3. exophoria or intermittent exotropia- near fixation
  • 4 symptoms- blur, diplopia, headache, fatigue
CONVERGENCE INSUFFICIENCY

- 1. affects 2.25-8.3% of normal children
- 2. higher prevalence in attention deficit hyperactive disorder (ADHD)
- 3. head trauma, illness, stress, lack of sleep may precipitate symptoms

CONVERGENCE INSUFFICIENCY

- Increasingly common as adults age
- 70% of adults >80 years have reduced convergence
- Symptoms become progressively worse with age
- Bifocals may precipitate symptoms
- Exercises less effective than in children
- Prisms usually required

CASE NUMBER TWO

- 62 year old professor of surgery complaining of difficulty reading- several pairs of readers
- 12 prism exophoria - near; 2 prism XP - distance
- 15 prism - fusional amplitude at near
- Symptom-free with 3 diopters base in each lens after no response to exercises

CASE NUMBER TWO

- Two years later- symptoms return
- 18 prism exophoria – near; 2 prism XP – distance
- 11 prism – near convergence fusional amplitude
- Near point of convergence 12 cm
- Symptom-free with 5 diopter base in each lens
- Upgaze noted to be reduced 50%
CASE NUMBER TWO

- One year later- constant diplopia at near
- 16 prism \textit{exotropia} – near; 3 prism XP distance
- Near point of convergence- remote
- Adduction - normal; pupils - normal
- Upgaze limited – 75%
- Diagnosis: Convergence Paralysis

CONVERGENCE PARALYSIS

- Inability to converge
- Exotropia at near
- Pupils may be normal or abnormal
- Upgaze also commonly involved
- \textit{IMPLIES DORSAL MIDBRAIN DISORDER}

CASE NUMBER TWO

- 9 months latter: Parkinson’s disease
- 1 year later- diagnosis changed to Progressive Supranuclear Palsy
- Now all eye movements are restricted- convergence, saccades and pursuits

CONVERGENCE PARALYSIS

- \textbf{NEUROLOGIC CONDITIONS}
- Parkinson’s
- Progressive supranuclear palsy
- Tumors- midbrain/third ventricle
- Head trauma
- Encephalitis
Conclusions

• Convergence insufficiency - common
• Increasing problem over age 70
• Treatment - exercises or prisms
• Convergence insufficiency may evolve to be convergence paralysis, especially in elderly

Conclusions

• Convergence paralysis implies neurologic disease involving the midbrain
• Convergence paralysis is usually difficult to treat even with surgery
• Follow carefully the patient with convergence “insufficiency” and deficiency of upgaze

REFERENCES


“Divergence” Insufficiency

Not What The Name Implies
Interesting Case

- 80 year old man - gradual onset diplopia
- 6 prisms esotropia; ? mild limitation abduction OU
- Eye/lid movements otherwise normal
- MRI, myasthenia antibodies, blood work - normal
- Neurologic examination - normal
- Presumed diagnosis - myasthenia gravis

Interesting Case

- Mestinon pushed to toxicity - no effect
- Prednisone 60mg/day - no effect
- Immunomodulation therapy x's 2 - no effect
- Thymectomy considered
- Maintained on prednisone - 6 years
- Diplopia persisted unchanged

Interesting Case

MY EXAMINATION:

- 6 prisms esotropia - distance; small exophoria - near
- No limitation of abduction in either eye
- No ptosis
- Patient has mild myopia - -2.00 sphere each eye

Not Myasthenia

- No ptosis
- No history of increase with fatigue
- No variability of strabismus
- No response to any therapy
- Most important - the pattern of his strabismus!
"DIVERGENCE" INSUFFICIENCY

1. Esotropia greater at distance than near
2. Decreased divergence fusional amplitudes
3. Esotropia at distance - usually stable
4. Esotropia at near - all most never

In contrast to convergence, no active brainstem divergence center has been identified.

Jampolsky - "these are subclinical sixth nerve palsies"
Abduction-saccadic velocities decreased

CONCLUSION: "DIVERGENCE INSUFFICIENCY IS A SERIOUS NEUROLOGIC PROBLEM?"

SERIOUS PROBLEM?

IN CHILDREN - YES!
14/15 - serious neurologic associations
Hydrocephalus, meningitis, brain tumors, Guillain-Barre syndrome (descending polyneuropathy), encephalocele

REFERENCE


NOTE: Most of the children did not have clinically evident lateral incomitance suggesting a sixth nerve palsy; eye movement recordings - reduced saccades
SERIOUS PROBLEM?

• IN ADULTS- **NO!**
• 4/17- serious neurologic associations
• BUT all of the patients with neurologic disorders
  had other neurologic findings- nystagmus in all 4.

CONCLUSIONS

• “Divergence” insufficiency is a misnomer
• Preferred “Esotropia Greater at Distance”
• In Children- *strongly suggests neurologic problem*
• In Adults over 60 as an isolated finding- *benign*
• Treatment- prisms in most patients; surgery

References