Title: Anomalous Head Posture with Bilateral High Hyperopia

Abstract: Anomalous head posture (AHP) of ocular etiology is an adaptation to maximize vision and/or binocular function. This case series presents two patients with AHP secondary to uncorrected bilateral high hyperopia in the absence of strabismus.

CASE A

I. Case History (A)
   - 3 year old, Black Male
   - Chief Complaint:
     - The patient’s mother first noted 3 weeks ago an abnormal head posture while the child was watching TV, always with his head tilted toward his right shoulder and chin down.
     - Patient reported intermittent pain around orbit OD and frequently closed that eye.
   - Ocular and Medical History:
     - Unremarkable
   - Medications:
     - The patient was not taking any medications, and NKDA
   - Ocular Family History:
     - Mother- strabismus and possible amblyopia

II. Pertinent findings (A)
   - Clinical: (all data unaided by spectacles)
     - Distance Visual Acuities: 20/125 OD, 20/20 OS with LEA matching
     - Near Visual Acuities: 20/200 OD, 20/25 OS
     - Distance Cover Test: Ortho
       - Comitant in right and left head tilt and right and left gaze
     - Near Cover Test: Ortho
       - No A or V pattern
     - Stereopsis: No global stereopsis detected
     - MEM: +2.50 DS OD, +1.00 DS OS
     - Cycloplegic Refractive Error: OD +8.50-1.25 x 020
       - OS +6.25-1.00 x 155
     - EOMs: Full and smooth range of motion OU
     - Pupils, confrontation visual fields, and overall ocular health were normal OU
   - Physical:
     - When performing bilateral visual acuities, the patient assumed his AHP consistent with that reported by his mother.

III. Differential diagnosis (A)
   - Primary/leading: High compound hyperopic astigmatism OU
     - Refractive amblyopia OD secondary to hyperopic anisometropia
   - Others:
     - Congenital cranial nerve 4 palsy OS
     - Nystagmus with null point in superior left gaze
- Duane’s type 1 OD, or Duane’s type 2 OS
- V pattern esotropia or A pattern exotropia OD
- Cranial nerve 3 palsy OS

CASE B

I. Case History (B)
- 2 year old, Hispanic Male
- Chief Complaint:
  - Patient’s mother reported he did not like to wear his glasses, will remove after only a few minutes of wear time
  - When not wearing glasses, the patient tilts his chin up to watch TV
  - Occasionally, “strong blinks” were noted by mother when uncorrected
- Ocular History: (First exam 14 months prior)
  - High compound hyperopic astigmatism OU with presumed bilateral refractive amblyopia
    - Cycloplegic Refractive Error
      OD: +6.25-1.25 x 012
      OS: +5.75-1.50 x 178
    - Full-time spectacle correction recommended
      OD: +5.50-1.25 x 012
      OS: +5.00-1.50 x 178
  - Patient did not return for 2 month follow-up for refractive amblyopia
- Medical History:
  - Unremarkable.
- Medications:
  - The patient was not taking any medications, and NKDA
- Ocular Family History:
  - Sister-high hyperopia OU, anisometropic refractive amblyopia

II. Pertinent findings (B)
- Clinical: (all data aided by previous spectacles)
  - Near Visual Acuities: 20/50 OD, 20/40 OS with Cardiff Cards at 50cm
  - Near Cover Test: Ortho
    - No Esotropia, No A or V pattern
  - Stereopsis: 240” global
  - MEM: +1.50 DS OU
  - Cycloplegic Refractive Error: OD +5.50-1.50 x 015
    OS +5.50-1.50 x 180
  - EOMs: Full and smooth range of motion OU
  - Pupils, confrontation visual fields, and overall ocular health were normal OU
- Physical:
  - When uncorrected, the patient assumed his AHP consistent with that reported by his mother, worsening post-cycloplegia.

III. Differential diagnosis (B)
- Primary/leading: High compound hyperopic astigmatism OU
  - Isometropic refractive amblyopia OU
- Others:
  - A pattern esotropia or V pattern exotropia OD
  - Nystagmus with null point in down gaze
Congenital ptosis OU
Brown’s syndrome

IV. Diagnosis and discussion

- 1.3% of all children have torticollis, or an anomalous head posture. AHP is the result of a disorder in one of the following categories: orthopedic, neurological, or ocular.¹
- Most ocular causes are linked to non-comitant strabismus (63-70%) or nystagmus (17-20%).²,³
- Superior oblique palsy is the most common ocular reason (48%) while others included Duane’s syndrome, nystagmus, inferior oblique palsy, Brown’s syndrome, dissociated vertical deviations, A or V pattern strabismus, refractive error, ptosis, or field loss.³,⁴,⁵
- Chin down posture with bilateral high hyperopia, which resolved with correction, has been previously reported.⁵
- The specific underlying cause cannot be determined reliably by the presenting head posture without further investigation.
- Multidisciplinary investigation of head posture is warranted due to the possibility of multiple contributing factors.
- Existence of a muscle restriction or neurological finding does not exclude an ocular condition.³,⁴,⁵
- Signs/symptoms of high hyperopia: eye rubbing, squinting, strabismus, eye strain, head posturing, abnormal stereopsis, blurred vision.
  - Above findings warrant a full cycloplegic refraction.
  - Orthophoric patients have less obvious symptoms without presence of strabismus and frequently go undetected until a later age.⁶
  - High hyperopia poses a greater risk for amblyopia, but there may also be an extended sensitive period due to binocular deprivation, making refraction beneficial regardless of age.⁶,⁷
- Partial or full hyperopic correction prevents poor visual acuity, strabismus, and amblyopia without hindering normal ocular development.⁸,⁹

V. Treatment, management

- **CASE A**
  - Treatment and response to treatment:
    - Glasses were prescribed for full time wear with +2.00 DS cut from full cycloplegic refractive error in each eye.
    - OD +6.50-1.25 x 020
    - OS +4.25-1.00 x 155
    - Trial of prescription in office yielded decrease in presenting head posture.
    - Family was instructed to monitor for AHP occurrence, as well as signs of strabismus.
    - Patient began patching therapy 2 hours/day OS for amblyopia treatment
    - Monitor 1 month (due September 2014) for visual acuity, alignment, and head posture changes.

- **CASE B**
  - Treatment and response to treatment:
    - Glasses were prescribed for full time wear with full cycloplegic refractive error in each eye.
    - OD +5.50-1.50 x 015
    - OS +5.50-1.50 x 180
o Patient was prescribed 1 gtt 1% cyclogel QAM OU to aid with compliance.
o Family was instructed to monitor for AHP occurrence, as well as signs of strabismus.
o Monitor 3 months (due November 2014) for visual acuity, alignment, and head posture changes.

- **Typical Recommended Treatment:**
  - Correction of high hyperopia has been reported to resolve AHP in patients with refractive error over +5.00 DS.⁵
  - Spectacle correction has been shown to improve VA regardless of age of initial correction or amount of sphere cut from cycloplegic refraction.⁷
  - PEDIG trials show initiation of occlusion therapy has been shown to improve acuities better than spectacle correction alone after 5 weeks in patients with severe amblyopia.
    - 2 hours/day of patching results in the same visual outcome as 6 hours/day in patients with moderate amblyopia.¹⁰
  - Cycloplegia helps to facilitate spectacle wear in children who have difficulty adjusting to a hyperopic prescription due to their inability to relax habitual accommodation.¹¹

VI. Conclusion

- Ocular causes for AHP are most commonly non-comitant strabismus or nystagmus, but rarer causes such as high RE, VF loss, and congenital ptosis are possibilities.
- AHP should be noted and evaluated during exams. If no ocular causation is determined, make appropriate referrals to an Orthopedist and Neurologist.
- **Clinical pearls:**
  - Prevention of amblyopia with correction of high refractive error is the goal, but new methods of detection through observation can also prove beneficial.
  - Ask family and patient about habitual posture or to see pictures, and be observant for changes in head posture during exam, such as with one eye covered or during VA testing.