Title:
Managing Ocular Manifestations in Brachio-oculo-facial syndrome (BOFS)

Authors:
1. Tea Avdic, O.D. (Ocular Disease Resident, Bascom Palmer Eye Institute / NOVA Southeastern University)
2. Celina Ann Diego, O.D. (Ocular Disease Resident, Bascom Palmer Eye Institute / NOVA Southeastern University)
3. Audina M. Berrocal, M.D. (Professor of Clinical Ophthalmology, Bascom Palmer Eye Institute)

Abstract:
10 year old Caucasian male with history of BOFS presents for Doctor directed follow up. Patient is s/p PPV/PPL, right eye (10/17/2012). Current treatment includes spectacle correction, patching and regular retinal examination, which remain stable.

Case Report Outline:

A. Case History:
- Patient demographics: 10 year old Caucasian male
- Chief Complaint: Doctor directed follow up for management of BOFS. Patient denies any vision changes.
- Medical history: BFOS (ocular coloboma, ear malformation, neck hemangioma)
- Family History: Brother with BFOS. Mother with iris coloboma.
- NKDA/No medications

B. Pertinent Findings:
- Visual Acuity (distance sc): 20/800 OD, PHNI. 20/15-2 OS
- Refractive Error: OD: +19.00+1.75x090, OS: +0.25 sph
- Tonometry (Tonopen): 20 mmHg OD, 23 mmHg OS
- Pupils: Iris coloboma of the right eye. Round, reactive left pupil. No APD
- Confrontation Visual Fields: Constricted OD, FTFC OS
- Cover Test: 35 prism diopter CRET, 18 prism diopter RHT
- Motility: Full and smooth OD/OS
- Biomicroscopy and Fundus Examination:
  - External: Microphthalmia OD, WNL OS
  - Lids/Lashes: WNL OU
  - Conjunctiva/Sclera: WNL OU
  - Cornea: Microcornea with peripheral scars at 3 and 10 o'clock OD, WNL OS
  - Anterior Chamber: Deep and quiet OU
C. **TFAP2A deletions**

- Iris: Inferior coloboma OD, Piebald iris OS (brown wedges at 10,2,6 o'clock with green interspersed pigmentation)
- Lens: Aphakic OD, Clear OS
- Vitreous: Vitreous opacities OD, Clear OS
- Optic Nerve: coloboma OD. Healthy, pink, distinct OS
- Macula: coloboma involving macula, ONH and choroid. WNL OS
- Vessels: Normal OU
- Periphery: Chorioretinal coloboma, retina appears flat OD. WNL OS

Echography: B scan and Quantitative A- scan OU

**Axial Eye Lengths:**

- OD: 21.6 mm
- OS: 23.4 mm

**OD:** Moderately dense vitreous opacities and membrane formation. There is a thin membrane traversing the vitreous cavity from anterior to the equator to posterior to the equator, inserting in the optic disc area where a thick stalk is noted. No retinal detachment noted. There is a large coloboma of the optic nerve head. No retrobulbar optic nerve cysts are noted.

**OS:** Vitreous is clear. No retinal detachment noted. There is normal appearance of the optic nerve head.

D. **Differential Diagnosis:**

- Isolated autosomal dominant chorioretinal coloboma
- Brachio-oto-renal syndrome (BOS)

D. **Diagnosis and Discussion:**

- BOFS is a rare autosomal dominant disorder which manifests with characteristic anomalies of ophthalmic, auricular and craniofacial structures (2).
- There are fewer than 100 described cases (4).
- Diagnosis is based on clinical findings, but no formal diagnostic guidelines exist (4).
- Mutations (deletions/insertions/missense) in the TFAP2A gene are associated with BOFS. The gene is located on chromosome 6 and encodes the AP2 alpha transcription factor (3).
- Microphthalmia, nasolacrimal duct obstruction and ocular coloboma are among the most common ocular anomalies in patients with BOFS (1).
- While extracranial malformations are uncommon, renal (1) and congenital heart anomalies can occur. Renal anomalies are found in point mutations but are not found in TFAP2A deletions (3).
E. Treatment and Management:
- No treatment
- Renal and cardiac ultrasonography is indicated
- CT imaging of temporal bone (for hearing correction)
- Children with BOFS should be managed by a multispecialty team (plastics, ophthalmology/optometry, otolaryngologists, speech therapists, counseling)
- Monitor for changes over time

F. Conclusion:
- Genetic counseling
- Low vision referrals, spectacle correction, patching
- RD precautions in patients with chorioretinal colobomas
- Cosmetic strabismus surgery, cosmetic contact lenses for iris coloboma
- Counseling/emotional support

Sources: