Grand Rounds
Department of Ophthalmology

Sherry Narang M.D.

SUNY Downstate Medical Center

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Case Presentation

- HPI: 35 yo male with a history of glaucoma presents for initial evaluation in the retina clinic. The patient denies change in vision, difficulty seeing at night, floaters/photopsia as well as denies photophobia.
- PMHx: hearing impaired since birth; "heart problem" as a child for which he had surgery
- POHx: glaucoma s/p trabeculectomy OD at age 20
- Medications: none
- Eye gtt: xalatan 1/1, cosopt 2/2, alphagan 3/3
- NKDA
- Family history: no blindness/glaucoma

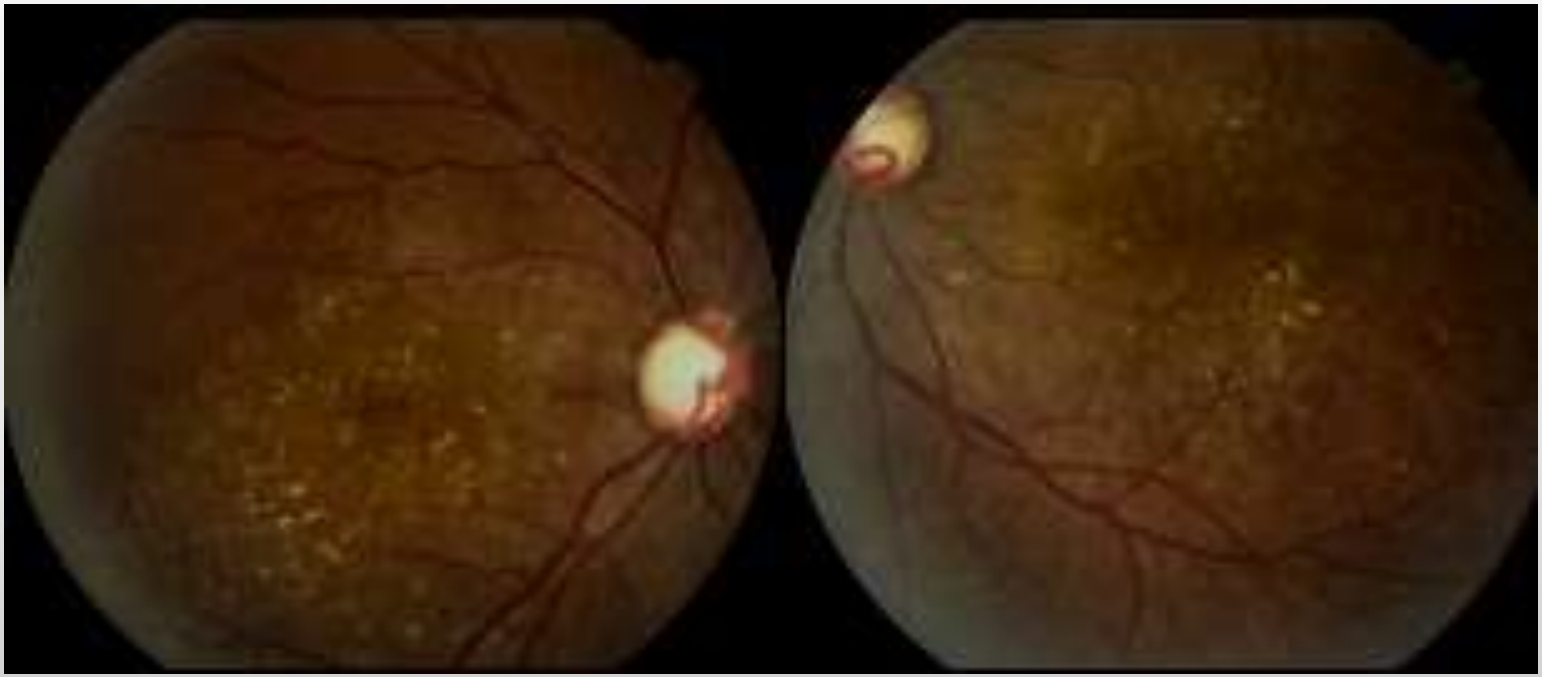
Core competencies: Patient care/interpersonal and communication skills/professionalism

Case Presentation (cont)

- Exam:
  - BCVA:
    - OD: 20/25 +1
    - OS: 20/25 +1
  - EOM: full OU
  - CVF: full OU
  - Pupils: 4→2 OU, no APD
  - Tapp: 13/10 @ 10 AM

Case Presentation (cont)

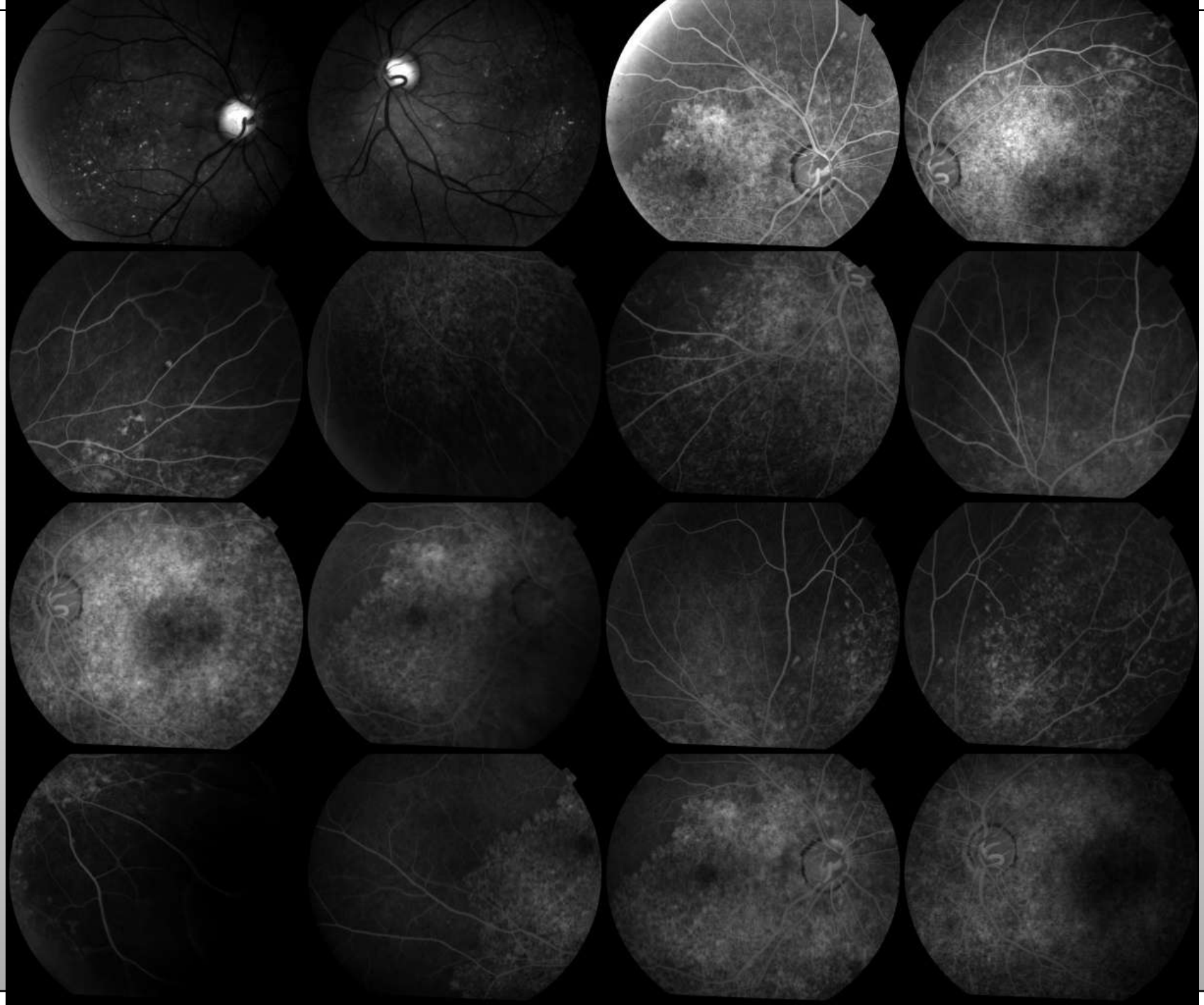
- SLE:
  - LLA: WNL OU
  - C/S: elevated superior nasal bleb OD; white and quiet OS
  - K: clear OU
  - A/C: deep and quiet OU
  - I/P: round and reactive OU
  - L: clear OU



Core competencies: Patient care/interpersonal and communication skills/professionalism

Case Presentation (cont)

- DFE:
  - V: clear OU
  - C/D
    - 0.85 sharp/pink OU
  - M
    - drusen with salt and pepper appearance OU
  - V/P: no tears/hemorrhage/detachment OU



Differential Diagnosis

- **Salt and pepper retinopathy**
  - Congenital Rubella
  - Leber's congenital amaurosis
  - Congenital Syphilis
  - Cystinosis
  - Albinism (carrier state)
  - Retinitis pigmentosa (carrier state)
  - Choroideremia (carrier state)
  - Phenothiazine toxicity

- **Salt and pepper retinopathy and hearing impairment**
  - Congenital rubella syndrome
  - Congenital syphilis
  - Usher's syndrome

Core competencies: Medical Knowledge/ Systems Based Knowledge

What would you do next?

- Thorough Birth History
  - Congenital infections?
  - Medical problems as a child? Cardiac? Musculoskeletal? Hepatic?
- Thorough family history
  - History of any ocular problems (retinitis pigmentosa/Usher syndrome/cystinosis)
  - Pedigree to determine mode of inheritance (Usher syndrome-x linked; cystinosis-AR; albinism-AR/x-linked)
- Medication use?
  - phenothiazine
- Labs
  - RPR
  - Rubella titers
  - Gene testing (retinitis pigmentosa, choroideremia, cystinosis, albinism)
- Electroretinogram
  - (cystinosis, RP/Usher syndrome, Leber's, choroideremia, phenothiazine toxicity)

Differential Diagnosis

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  - Phenothiazine toxicity
  - Congenital Rubella

- **Salt and pepper retinopathy and hearing impairment**
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  - Usher's syndrome
  - Congenital rubella syndrome

Core competencies: Medical Knowledge/ Systems Based Knowledge

Congenital Rubella Syndrome

- First described in 1941
- Triad of anomalies: congenital heart disease, cataracts, deafness
- Greatest risk during primary infection of the mother
- In pregnant women, the virus infects and replicates in the placenta→placental damage →virus crosses to fetus
- The earlier the infection occurs in the pregnancy, the higher the rate of transmission and the consequences are more profound
  - Immature fetal immune system
  - Majority of maternal antibodies reach fetus after 32 weeks of gestation

Congenital Rubella Syndrome

- If infection occurs during
  - First 11 weeks of gestation →100% infants will be affected
  - 12 to 20 weeks of gestation →30% infants will be affected
  - After 20 weeks of gestation →0% infants will be affected
- Virus can persist in the infected infant for an unknown period of time

Rubella Virus

- Originally known as German measles
- Member of the togavirus family
- Enveloped, single-stranded RNA virus
- Droplet transmission
- Infection occurs 14-21 days after exposure
- Rubella infections are usually mild
- Vaccine released in 1969 after which new cases of congenital rubella have sharply decreased

Core competencies: Medical Knowledge/ Systems Based Knowledge

Systemic Manifestations

- *Deafness (44%)
- Mental retardation
- Cardiovascular defects
- Ocular defects
- Thrombocytopenia
- Hepatitis
- Myocarditis
- Bone lesions
- Dental defects
- Hypospadias
- Cryptorchidism
- Inguinal hernia
- Interstitial pneumonitis
- Meningo-encephalitis
- Cerebral calcification
- Splenic fibrosis
- Nephrosclerosis
- Nephrocalcinosis

Late onset manifestations

- Insulin dependent diabetes
- Thyroid dysfunction
- panencephalitis

Ocular Manifestations

- Can affect every part of the eye due to the extensive capillary network
- Usually occur in combination with other non-ocular defects
- Most common: Pigmentary retinopathy, Cataract, microphthalmia, glaucoma
- Progressive disease-may develop ocular manifestations later in life

TABLE IV: OCULAR DEFECTS IN CONGENITAL RUBELLA SYNDROME

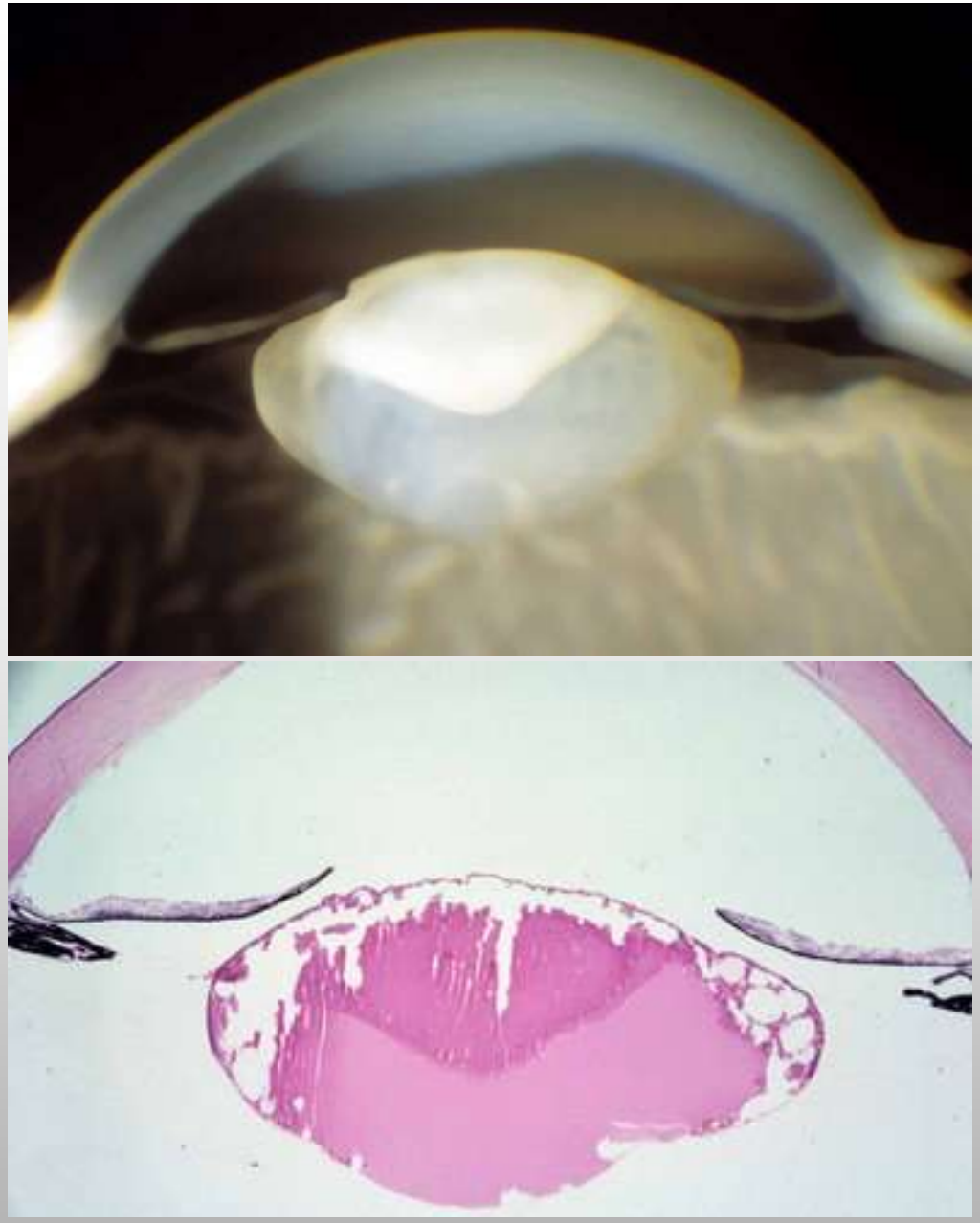
PRENATAL ONSET*	PRENATAL OR POSTNATAL ONSET†	DELAYED ONSET
Iritis	Microphthalmia	Glaucoma
Iridocyclitis	Cataract	Cataract
Corneal clouding	Glaucoma	Optic neuritis
Intraocular pressure elevation	Corneal opacification	Optic atrophy
Virus presence in conjuctiva, aqueous and lens	Retinopathy	Strabismus
	Iris hypoplasia	Nystagmus
	Strabismus	Subretinal neovascularization
	Nystagmus	Keratoconus
	Staphyloma formation*	Lens absorption
	Phthisus bulbi†	Corneal hydrops
	Visual impairment	

O'Neill JF. "The Ocular Manifestations of Congenital Infection: A Study of the Early Effect and Long-term Outcome of Maternally Transmitted Rubella and Toxoplasmosis." Trans Am Ophthalmol Soc. 1998;96:813-79.

Core competencies: Medical Knowledge/ Systems Based Knowledge

Rubella Cataract

- Unilateral or bilateral
- Infection usually has to occur prior to development of the lens capsule
- Infects the embryonic lens causing lens fibers to degenerate and also a failure to dehydrate→lens opacity
- Transparent secondary lens fibers cover the opaque embryonic lens
- Lamellar, nuclear, or membranous
- Lens can be a reservoir for the virus causing the cataract to progress over time



http://www.images.missionforvisionusa.org

Core competencies: Medical Knowledge

Rubella Cataract

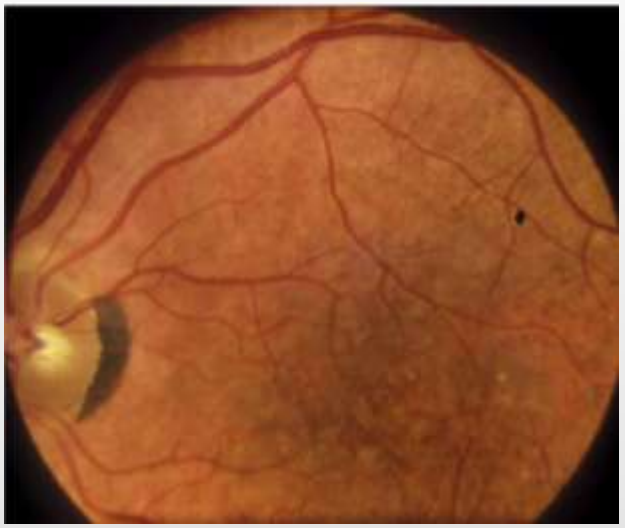
- Cataract surgery may have poor outcomes
  - Poor pupillary dilation
  - Can result in post-operative inflammation due to release of retained virus particles in the lens
  - Can cause the initiation or worsening of secondary glaucoma

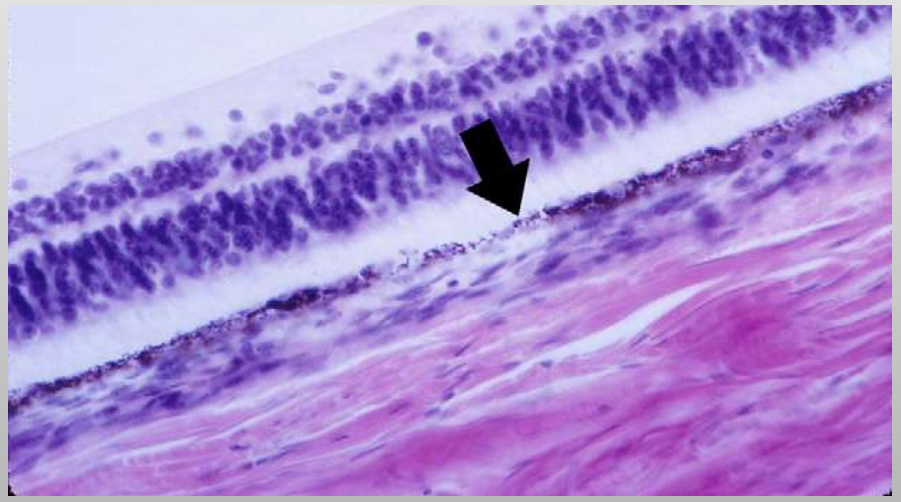
Microphthalmos

- Occurs in 10% of children with CRS
- Eye is less than 16.6 mm in axial length
- Occurs as a result of generalized slowing of replication due to the rubella virus → ocular "failure to thrive"
- Often have co-existing ocular anomalies (glaucoma and/or cataract)

Rubella Retinopathy

- Occurs in 22% of children with CRS
- Unilateral or bilateral
- Diffuse mottling of the RPE with focal areas of decreased and increased pigmentation→"salt and pepper fundus"
  - Most commonly occur in the posterior pole
- Neural retina and choroid are unaffected





Lorenz B & Moore T.

Rubella Retinopathy

- Vision and ERG usually are normal
- Usually nonprogressive
- Subretinal neovascularization can be a rare complication due to progressive atrophy of the RPE

Glaucoma

- Occurs in 10% of children with CRS
- Congenital
  - Result of failure of absorption of the mesoderm of the angle or failure of Schlemm's canal to differentiate
  - Can be an isolated anomaly
- Secondary
  - Result of trabeculodysgenesis or persistent viral damage to the trabecular meshwork
  - Can also occur as a result of chronic uveitis
  - Usually occurs in eyes with microphthalmos or cataracts
  - Develops in the second decade of life
  - Poor visual prognosis

Diagnosis

- Serology
  - Can be difficult to interpret due to transplacental passage of antibodies
- Amniocentesis with PCR of amniotic fluid
- Viral isolation
  - Preferred method
  - Nasopharyngeal swab, CSF, urine
- Placental biopsy

Core competencies: Medical Knowledge/ Systems Based Knowledge

Our Patient

- We explained the retinal findings to the patient and the need for routine follow-up due to the chance of developing subretinal neovascularization
- The patient was continued on all of his glaucoma medications and referred back to the general ophthalmology clinic for continued management of his glaucoma

Core competencies: Professionalism/Patient Care

Reflective Practice

- This was an interesting case especially because congenital rubella syndrome has become very rare since the advent of the rubella vaccine
- It involved good communication with the patient to impress upon him the chronic nature of his disease and the need for close follow-up, especially with a glaucoma specialist

Core competencies: Professionalism/Patient Care

Core Competencies

- Patient Care-our patient received the appropriate treatment and education for his condition as per evidence based medicine.
- Medical Knowledge-we used this case as a learning opportunity to increase our knowledge about congenital rubella syndrome
- Practice Based Learning and Improvement-this case helped us to focus our learning on the current treatment modalities for the complications associated with congenital rubella syndrome

Core Competencies

- Interpersonal and Communication Skills-We were able to communicate with the patient regarding his condition and to impress upon him the chronic nature of his syndrome
- Professionalism-we discussed the clinical findings with the patient in a manner that he understood all of the his ocular findings and the possibility for future complications
- Systems Based Practice-we demonstrated an awareness of the health care system so that we could effectively call upon our resources and provide the best treatment for our patient.

References

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Thank You

- Dr. Gutman
- Dr. Glatman