Wide angle fundus imaging and Fluorescein angiography in evaluation and management of intraocular tumors

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Advances in Ocular Imaging

Kowa  Topcon  Retcam
Wide-Field (Digital) Imaging.

- **Field-of-view**: The instantaneous field-of-view (FOV).
- **Field-of-regard (FOR)**: Total field of imaging available with camera.

**What would we do differently if we could remotely image the entire eye?**

Wide Angle Imaging

- **Retcam**
- **Panoret**
- **Optos**
Wide angle viewing: Staging of Retinoblastoma

- **Reese-Ellsworth Staging system (1963):** Predicts visual prognosis with external beam radiotherapy
  - **Group I: Very favorable prognosis:**
    - Single tumor, $< 4$ DD at or behind the equator.
    - Multiple tumors, $< 4$ DD at or behind the equator.
  - **Group II: Favorable prognosis:**
    - Solitary tumor, 4-10 DD at or behind the equator.
    - Multiple tumors, 4-10 DD at or behind the equator.

- **Reese-Ellsworth Staging system**
  - **Group III: doubtful prognosis:**
    - Any lesion anterior to the equator.
    - Solitary tumors larger than 10 disc diameters behind the equator.
  - **Group IV: unfavorable prognosis:**
    - Multiple tumors, some $> 10$ DD.
    - Any lesion extending anteriorly to ora serrata.
• Reese-Ellsworth Staging system
• Group V: very unfavorable prognosis:
  • Massive tumor involving over half the retina.
  • Vitreous seeding.

Retinoblastoma

• Staging:
• International classification of retinoblastoma (2003) is based on the rate of ocular salvage with systemic chemotherapy
• A
• B Very favorable. Tumor confined to
• C the retina
• D Unfavorable. Tumor dispersed to adjacent spaces
• E Unsalvageable
Retinoblastoma

- Staging:
  - International classification of retinoblastoma
  - Group A:
    - Tumor Not more than 3mm
    - Located more than 1.5 mm from optic disc and 3 mm from fovea

- Group B:
  - Tumors confined to the retina ≤ 10mm
  - Any location
  - No subretinal fluid beyond 3 mm from the base of the tumor
Retinoblastoma

- **Group C:**
  - Any size tumor < ½ the eye
  - Subtle dispersion
  - Fine vitreous seeds
  - No dispersed tumor masses
  - Subretinal seeds less than 3 mm from the tumor

Retinoblastoma

- **Group D:**
  - Diffuse disease with significant vitreous or subretinal seeding
    - Subretinal fluid in more than one quadrant of the retina
    - Subretinal fluid, present or past, without seeding, involving up to total retinal detachment
• Group D:
  – Tumor(s) may be massive or diffuse
  – Diffuse subretinal seeding, present or past, may include subretinal plaques or tumor nodules
  – Diffuse or massive vitreous disease may include "greasy" seeds or avascular tumor masses

Wide Angle Viewing

• Extremely valuable in:
  – Treatment monitoring
Documents Plaque Centration

IOAM, 3 cycles
IOAM, 3 cycles
5 months follow up: Subretinal seeds recurrence/ Enucleation

Direct Gonioscopy:

- Case: 1.5 year-old male
- Ciliochoroidal mass:
  - PLSU
• Case: 1.5 year-old male
• Ciliochoroidal mass:
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• Pathology:
  – Ectopic lacrimal gland

Direct Gonioscopy:
Medulloepithelioma
CB masses

- 18 YOM
- CB mass followed for the last 4 years
- Growing on UBM

[Images of CB masses and UBM scans]
Differential Diagnosis

• Adenoma (non-pigmented ciliary epithelium)

• Medulloepithelioma

• Metastasis

• Melanoma

Transcleral Resection
Specimen
• Granulomatous inflammation

• Non-caseating

• ZN-negative

• ?? Sarcoidosis, chest X-ray normal, ACE normal
Follow up of Pediatric age group > 3 years vs GA

8 YOF
VA: 6/24
5 YOM
Monophthalmic
VA: 6/36

32 YOF
Mom
Choroidal Tumors Diagnosis and Management

Choroidal Melanoma:

- Most common primary intraocular malignancy in adults
- Dendritic melanocytes (neural crest origin)
- Opaque media
- Initial evaluation of thickness
- Follow up of treatment response
- A-scan: Low to medium reflectivity
- B-scan: Acoustic hollowness, choroidal excavation, + angle kappa

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• 45 year-old-female with choroidal melanoma

16 YOF
Peripheral choroidal mass
Wide Angle FF/A
63 YOF: Melanoma
Post-Ru 106 / TTT
TumorExtent
55YOF
Enucleation

Autofluorescence
1 year
VA: 6/9
Choroidal Metastases

• 47 year-old female with multiple breast metastases

FNAB:
Highly reliable
Uncertain diagnosis
Difficult technique
Experienced cytopathologist
• 72 year-old female with choroidal mass: unknown primary

• Classically:
  – FNAB: indirect ophthalmoscopy:
    • Inverted image
    • Laterally rotated image
    • Mastering and meticulous manipulations
    • Hundreds of cases with a steep learning curve
Interventional Photo-guided choroidal biopsy

- Adenocarcinoma
• 57 YOF
• DVA OS for 3 months

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Lymphoma: 60 YOF

FNAB

• Plasmacytoma in a 65 YOF
Hemorrhagic Lesions Simulating Melanoma

- 58 year-old female
- Choroidal Mass OS x 1 month
- VA: 6/18
Discussion

- New Investigative tools: Wide Angle FF/A is a primordial tool in management of intraocular tumors

- Paradigm shift with a whole chapter in panoramic view and peripheral fundus changes

- In tumors: Early diagnosis and timely intervention is imperative in SURVIVAL
Remember:

– WHEN DEALING WITH CANCER
YOU ARE DEALING WITH LETHAL DISEASE
YOU ARE DEALING WITH HUMAN LIFE

NO ROOM FOR TRIAL AND ERROR

EYE SALVAGE WILL DEPEND ON PROPER
DIAGNOSIS AND SOUND MANAGEMENT

EVERY EFFORT IS JUSTIFIED TO SAVE AN EYE
WITHOUT COMPROMISING LIFE

Wide angle fundus
Digital Screening:

• Retcam
Thank YOU