Herpes Zoster Ophthalmicus: The Tip of the Iceberg

Grace H. Anderson, OD, MS
Optometry Resident
Lebanon VA Medical Center

Course Objectives
1. Discuss clinical presentation and management of herpes zoster ophthalmicus (HZO)
2. Understand the clinical relationship between HZO and HIV/AIDS.
3. Review related ocular comorbidities associated with HZO and HIV/AIDS.

Course Outline
1. Introduction
   - Course objectives
2. Case History: Part 1
   - 50-year-old white male with herpes zoster rash on face referred by emergency department to rule out ocular complications; previously diagnosed as cellulitis
   - Patient History: Ocular, medical, family, social
   - Exam findings
   - Diagnosis: herpes zoster ophthalmicus with keratouveitis and secondary glaucoma
3. Herpes Zoster Ophthalmicus
   - Varicella zoster virus
   - Background and epidemiology
   - Clinical signs and symptoms
   - Treatment and management
   - Associated complications and disorders
     - Trigeminal neuralgia
4. Case History: Part 2
   - IOP stabilized and anterior segment inflammation resolved
   - Dilated fundus exam revealed cotton wool spots
     - Differential diagnosis for CWS
   - Lab testing ordered: CBC, lyme, syphilis, HLA-B27, HIV, tuberculosis
     - Diagnosis: HIV and syphilis
5. HIV/AIDS
   - Background and epidemiology
   - Mechanism of infection
   - Clinical signs and symptoms
   - Treatment and management
   - Relationship of HIV and HZO
6. Case History: Part 3
   - Anterior segment and posterior segment findings
   - Co-management with infectious disease clinic
     - CD4 count and HIV viral load
   - Treatment and management
7. Discussion/Conclusion
- Herpes zoster in immunocompromised patients
- Importance of frequent monitoring
Malignant Hypertension: A Case Study

Nellie Chung O.D.
June 5-6, 2020
NW Resident’s Conference
Disclosures

The presenter and organizers for

“Malignant Hypertension: A Case Study”

By: Dr. Nellie Chung
Has no financial relationship with any company or products mentioned in this presentation
Course Objectives

By the end of this lecture, attendees will be able to

1. Identify signs of hypertension and hypertensive retinopathy
2. Use multimodal imaging to aid management of hypertension
3. Understand the pathophysiology of vision loss related to optic nerve damage due to hypertensive retinopathy
Overview

- Introduction
- Case
- Hypertension
  - Classification
  - Presentation
  - Pathophysiology
  - Management
- OCT-Angiography
Introduction

World Health Organization

BP >140mm Hg systolic or >90mm Hg diastolic measured on two different days

1 in 5 Women

1 in 4 Men

<1 in 5 Under Control

<table>
<thead>
<tr>
<th>Blood Pressure Classification</th>
<th>Systolic</th>
<th>Diastolic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Pre-hypertensive</td>
<td>120-139</td>
<td>80-89</td>
</tr>
<tr>
<td>Stage 1 HTN</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Stage 2 HTN</td>
<td>&gt;160</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Hypertensive Crisis</td>
<td>&gt;180</td>
<td>&gt;110</td>
</tr>
</tbody>
</table>
### Urgency, Emergency, or Malignancy

| Hypertensive Crisis/Urgency | >180 Systolic  
>120 Diastolic |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertensive Emergency</td>
<td>End Organ Damage</td>
</tr>
<tr>
<td>Malignant Hypertension</td>
<td>Multiple End Organ Damage</td>
</tr>
</tbody>
</table>

**Hypertensive events:** One-year death rate of greater than 79%

Annual Incidence 2 per 100,000 of Caucasians

Median survival if untreated is 10.4 months

Projected incidence of Hypertensive Emergencies: 1-2 cases per million per year
Risk Factors

- High sodium diet
- High saturated and trans fat diet
- Obesity
- Physical inactivity
- Tobacco/Alcohol use
- Family History
- Stress
- >65YO
- Comorbid diabetes or kidney disease
Patient S.R.

31 YO H/AA M

June 13, 2019: Presented to local hospital with unspecified complaints

- BP 220/118
- Suspected secondary hypertension
- >10 years history of hypertension with poor control
Patient S.R.

31 YO H/AA M

Initial Visit: July, 02, 2019

<table>
<thead>
<tr>
<th></th>
<th>Right Eye</th>
<th>Left Eye</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVAs sc</td>
<td>20/30</td>
<td>20/20</td>
</tr>
<tr>
<td>IOPs</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Pupils</td>
<td>E RRL, (-)APD</td>
<td></td>
</tr>
</tbody>
</table>

CC: blurry vision in right eye since hospitalization

BP 137/76

Meds: amlodipine, carvedilol, hydralazine, hydrochlorothiazide, spironolactone

Entrance skills and anterior slit lamp examination unremarkable
Tortuous BVs, attenuation, copper wiring

Disc pallor
Frank disc edema

Partial macular star

Tortuous BVs, attenuation, copper wiring
<table>
<thead>
<tr>
<th>Subsequent Visits</th>
<th>DVAs</th>
<th>Pupils</th>
<th>IOPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 10, 2019</td>
<td>20/30-2</td>
<td>20/20</td>
<td>(-)RAPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RRL LE</td>
<td></td>
</tr>
<tr>
<td>August 2, 2019</td>
<td>20/400-1</td>
<td>20/50</td>
<td>(+)RAPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RRL LE</td>
<td></td>
</tr>
<tr>
<td>October 9, 2019</td>
<td>HM @5ft</td>
<td>134/86</td>
<td>(+)RAPD</td>
</tr>
<tr>
<td></td>
<td>20/20</td>
<td>RRL LE</td>
<td></td>
</tr>
</tbody>
</table>

Take Blood Pressure!
July 10, 2019

Peipapillary RNFLT Classification

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS</td>
<td>139</td>
<td>(136)</td>
</tr>
<tr>
<td>NS</td>
<td>114</td>
<td>(102)</td>
</tr>
<tr>
<td>N</td>
<td>101</td>
<td>(72)</td>
</tr>
<tr>
<td>T</td>
<td>74</td>
<td>(78)</td>
</tr>
<tr>
<td>G</td>
<td>111</td>
<td>(98)</td>
</tr>
<tr>
<td>Ti</td>
<td>150</td>
<td>(145)</td>
</tr>
<tr>
<td>Ni</td>
<td>139</td>
<td>(107)</td>
</tr>
</tbody>
</table>

Within Normal Limits

### Guided Progression Analysis: (GPA™)

<table>
<thead>
<tr>
<th></th>
<th>OD</th>
<th>OS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/2/2019 1:08:20 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000-18824</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/9/2019 1:40:28 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000-18824</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Baseline 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/10/2019 12:15:21 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000-18824</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/9/2019 1:38:25 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000-18824</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exam 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/8/2019 1:09:29 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000-18824</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/9/2019 1:40:28 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000-18824</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exam 4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/9/2019 1:40:28 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5000-18824</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Visuoptical Test Results:**
- **OD:** 20/30, 20/30-2, HM @3ft
- **OS:** 20/20, 20/50, 20/20

**OD:** Normal

**OS:** Normal
### Keith-Wagener-Barker Classification

<table>
<thead>
<tr>
<th>Grade</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>No detectable features</td>
</tr>
<tr>
<td>1</td>
<td>Mild or moderate arteriovenous fluorescein leakage</td>
</tr>
<tr>
<td>2</td>
<td>Definite focal retinal hemorrhages, exudates and cotton wool spots</td>
</tr>
<tr>
<td>3</td>
<td>Copper wire</td>
</tr>
<tr>
<td>4</td>
<td>Severe grade 3 retinopathy plus papilledema or retinal edema</td>
</tr>
</tbody>
</table>

[https://www.researchgate.net/publication/328616325_Association_Between_Folic_Acid_Supplementation_and_Retinal_Atherosclerosis_in_Chinese_Adults_With_Hypertension_Complicated_by_Diabetes_Mellitus/figures?lo=1](https://www.researchgate.net/publication/328616325_Association_Between_Folic_Acid_Supplementation_and_Retinal_Atherosclerosis_in_Chinese_Adults_With_Hypertension_Complicated_by_Diabetes_Mellitus/figures?lo=1)
## Mitchell-Wong Classification

<table>
<thead>
<tr>
<th>Grading</th>
<th>Retinal signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild retinopathy</td>
<td>Generalized arteriolar narrowing, arteriolar nicking, opacity (copper wire), arteriolar wall, or a combination of these signs</td>
</tr>
<tr>
<td>Moderate retinopathy</td>
<td>Hemorrhage (blot, dot, or flat), microaneurysm, cotton wool spot, hard exudates or a combination of these signs</td>
</tr>
<tr>
<td>Severe retinopathy</td>
<td>Moderate retinopathy plus cystoid macular edema or vitreous hemorrhage</td>
</tr>
</tbody>
</table>

# Modified Scheie Classification

<table>
<thead>
<tr>
<th>Grade 0</th>
<th>No change from normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>Arterial narrowing</td>
</tr>
<tr>
<td>Grade 2</td>
<td>Obvious arterial narrowing with focal irregularities</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Add: Retinal hemorrhages, exudates, cotton wool spots, retinal edema</td>
</tr>
<tr>
<td>Grade 4</td>
<td>Add: papilledema</td>
</tr>
</tbody>
</table>
### Clinical Presentation

#### Symptoms of Hypertension:
- Loss of vision
- Eye pain
- Headaches
- Nosebleeds

#### Severe:
- Fatigue
- Nausea
- Vomiting
- Confusion
- Anxiety
- Chest Pain
- Muscle Tremors

#### Objective

<table>
<thead>
<tr>
<th>Blood Vessels</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation</td>
<td>Crossing</td>
</tr>
<tr>
<td>Copper wiring</td>
<td></td>
</tr>
</tbody>
</table>

| Optic Nerve           |                                    |
| Edema                 | Ischemia                           |

| Macula                | Macula star                         |
| Edema                 |                                    |

| Retina                | Retinal Hemorrhages (flame, dot blot)|
| Exudates              | Cotton wool spots                   |
Anatomy

Hypertensive Retinopathy

1. Generalized narrowing
2. Structural changes
3. Breakdown of blood-retina barrier

Secondary Ocular Effects
- Retinal Vein Occlusions
- Retinal Arterial Macroaneurysms
- Ischemic Optic Neuropathies

https://www.ahajournals.org/doi/10.1161/CIRCRESAHA.115.301146
Optic Neuropathy in Malignant Hypertension

Process:

1. Non-perfusion of short posterior ciliary arteries
2. Infarction of the retrolaminar portion of disc
3. Damage of cells

https://www.semanticscholar.org/paper/The-role-of-blood-flow-in-glaucoma-Wentz-Seizys/42612506ae5da3f6db26bf2d67b828693a51651f
Management

Co-management with primary care

Lab work:

- Echocardiogram
- Serum electrolytes
- Serum creatinine
- Urinalysis
- Fasting lipid profile
- Serum glucose
- Hemoglobin A1C

Secondary Hypertension

- Kidneys
- Cushing's Syndrome
- Hyperthyroidism
- Obstructive Sleep Apnea
- Cardiovascular Disease

Follow up with patient!

TAKE BLOOD PRESSURE!
OCT-Angiography

Detects moving blood

Vascular Layers:
- Superficial capillary network
- Deep vascular network
- Avascular outer retina
- Choroidal vascular network
- Middle capillary plexus

Could it replace fluorescein angiography?
Retinal Vascular Layers Imaged by Fluorescein Angiography and Optical Coherence Tomography Angiography

Richard F. Spaide, MD; James M. Klancnik Jr, MD; Michael J. Cooney, MD

Optic Nerve Head and surrounding region in the right eye →

← Comparison between the fundus angiographic image and the layers seen in OCT angiography of the macula
Foveal Avascular Zone Enlargement

- Previous studies have shown enlargement of FAZ in patients with diabetic retinopathy was associated with progression
- OCT-A is a quantitative measurement of capillary density in direct relation to disease
Conclusion

- Recognize the signs
- Manage it as early as possible
- Helpful to repeat visits
- Is OCT-A the new gold standard for imaging?
- Vision loss is directly related to optic nerve atrophy

Take Blood Pressure!
BIG THANK YOU TO:

Dr. Kathryn Dailey
Dr. Judith Oh
Dr. Jeffery Hiett
Dr. Ashley Bailey
References


