Neuro-imaging for the Ophthalmologist

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“Neuro-ophthalmology is that subspecialty where the diagnosis is made upon reinterpretation of allegedly normal scans.”

William F. Hoyt MD
Objectives

1. Describe what type of neuro-imaging to order.
2. List pitfalls in imaging interpretation.
3. Recognize MRI and CT findings of common neuro-ophthalmology problems.
Outline

I. CT vs. MRI

II. Pitfalls

III. Common Neuro-opththalmology Conditions
MRI is preferable to CT in all of the following except?

A. Brainstem lesion
B. Bitemporal hemianopsia
C. Thyroid eye disease
D. Acute stroke
CT vs. MRI

- Patient factors: metal, claustrophobia
- MRI better for brain/skull base
- CT equivalent in orbit, better for bone
- MRA vs. CTA

CT vs. MRI

- MRI head — diplopia, bilateral optic neuropathy, retrochiasmal VF defect, any suspected intracranial pathology
- MRI Orbit — unilateral optic neuropathy
- CT head — cerebral bleed, hydrocephalus
- CT orbit — Graves, orbital process
- CTA vs MRA — depends on your institution

Outline

I. CT vs. MRI

II. Pitfalls

1. Wrong study
2. No contrast
3. No fat suppression
4. No instructions
5. No persistence
1. Wrong Study

60-yo-man awoke today with blurred vision, imbalance.

PMH: DM, HTN

Exam

VF: R homonymous hemianopsia
Stroke may not show on CT within first 24 hours.
MRI better than CT except in orbit or bone.
What is your access to Neuroimaging?

A. MRI same day if needed
B. MRI within 1 week
C. MRI within 1 month
D. CT only
E. neither available
1. Wrong Study

70 yo wf c/o ptosis 1 day after discharge for DVT. MRI “normal”

PMH: melanoma

Exam: 5 prism diopter
RHT in downgaze, 3mm proptosis + ptosis
Give good instructions & order the correct test of the correct anatomy.
2. No Contrast

40-yo-WF c/o gradual loss of vision OS.

PMH: none

Exam

VA: 20/20, 20/60

Color: 0/10 OS

P: 2+ L-RAPD
If optic neuropathy is present, always order Orbit MRI with gadolinium.
3. No Fat Suppression

30-yo-WF c/o gradual loss of vision OS.

PMH: none

Exam

VA: 20/20, 20/80

Color: 0/10 OS

P: 3+ L-RAPD
4. No Instructions

59-yo-WM c/o double vision x 6 weeks.

PMH: htn

Exam

R 5\textsuperscript{th}, 6\textsuperscript{th}, 7\textsuperscript{th} n palsies
MRI + gadolinium

“L pontine lacunar infarct”

R metatstatic lesion (lung ca)

Give detailed instructions

No Secrets!
4. No Instructions

23-yo-WF c/o diplopia in left gaze

PMH: hyperthyroidism

Exam

mild lid retraction OD,

ET in L gaze

MRI “normal”
4. No Instructions

EOMS routinely misread or overlooked.
Check yourself or call radiologist
5. No Persistence

24-yo-WM c/o visual loss OD x 3 months.

PMH: Ewings sarcoma femur

Exam

R optic neuropathy

MRI x 2 “normal, no mass”

Dx: Optic Neuritis
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**Optic Neuritis?**

- No gad or fat suppression
- + gad & fat suppression
Top 5 Pitfalls - Solutions

1. Get the correct study
2. Give contrast
3. Get fat suppression
4. Give specific instructions
5. Be persistent
The MR image below is

A. T2
B. T1
C. T1 with fat suppression
D. T1 with contrast & fat suppression
T1, T2, Fat Suppression & Gadolinium
Ct vs mri bone
Outline

I. CT vs. MRI

II. Pitfalls

III. Common Neuro-ophthalmology Conditions
   1. Inflammatory
   2. Tumors
   3. Vascular
   4. Miscellaneous
Graves Orbitopathy
CNS Sarcoid
Optic Neuritis & Plaques
Outline

I. CT vs. MRI

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1. Inflammatory
2. Tumors
3. Vascular
4. Miscellaneous
This patient probably has?

A. Double vision
B. Bitemporal field defect
C. Headache
D. Nystagmus
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This patient probably has?

A. Double vision
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D. Nystagmus
Diffusion Weighted Image (DWI)
Outline

I. CT vs. MRI

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   1. Inflammatory
   2. Tumors
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   4. Miscellaneous
Miscellaneous
Thank-you for your attention.