5.4.13. Patient With Decreased Vision: Classification & Management (XIII): Retrochiasmal Lesions

Introduction

- retrochiasmal visual pathway
  - crossed nasal fibers from the contralateral eye and uncrossed temporal fibers from the ipsilateral eye are located together
- perimetry
  - ⭐ homonymous visual field defects that respect the vertical midline
- rule of congruity
  - anterior lesions
    - dissimilar (incongruous) defects
  - posterior lesions
    - progressively more similar (congruous) defects
  - "rule" of congruity has been called into question
    - 50% of optic tract lesions caused congruous homonymous hemianopia
    - lesions severe enough to produce complete hemianopic defects may occur at any anteroposterior retrochiasmal location

Optic Tract

- etiology
  - mass lesions (aneurysms)
    - ⭐ most common
  - inflammatory and demyelinating lesions
    - occasionally
  - ischemic lesions
    - uncommon
    - surgical disruption of the anterior choroidal artery
- visual field defect
  - incongruous
  - homonymous
  - hemianopia
    - hemifields contralateral to the lesion
- other findings of optic tract syndrome
  - "bow-tie" optic atrophy
  - optic tract consists of
    - crossed nasal fibers from the contralateral eye
      - papillomacular fibers
      - nasal radiating fibers
      - causing atrophy in the corresponding nasal and temporal horizontal portions of the disc
    - uncrossed arcuate temporal fibers from the ipsilateral eye
      - enter the disc at the superior and inferior poles
      - causing atrophy in the corresponding superior and inferior portions of the disc

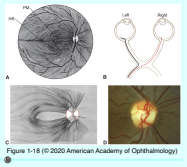

Figure 1-18 (© 2020 American Academy of Ophthalmology)

  - mild RAPD in the contralateral eye
  - more crossed than uncrossed pupillary fibers in the optic tract

Lateral Geniculate Body (LGB)

- highly organized and layered retinotopic structure

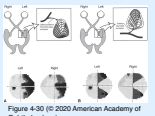

Figure 4-30 (© 2020 American Academy of Ophthalmology)

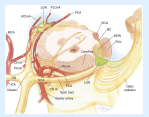

Figure 1-11 (© 2020 American Academy of Ophthalmology)

- ⭐ highly localizing visual field defects
  - disruption of anterior choroidal artery
    - branch of the middle cerebral artery
    - loss of the upper and lower homonymous quadrants
      - with preservation of a horizontal wedge
      - "quadruple sectoranopia"
  - disruption of posterior lateral choroidal artery
    - branch of the posterior cerebral artery
    - very congruous horizontal sectoranopia
- ⭐ visual field defects respect the vertical meridian
  - unlike the uncommon wedge defect observed in glaucoma
- very incongruous homonymous hemianopias can also occur
- sectoral optic atrophy

Temporal Lobe

- optic radiation
  - inferior fibers course from the LGB anteriorly in the Meyer loop of the temporal lobe
    - 2.5 cm from the anterior tip of the temporal lobe
    - damage to temporal lobe anterior to the Meyer loop does not cause visual field loss
  - superior fibers course more directly posteriorly in the parietal lobe
    - homonymous hemianopic defects extending inferiorly
- visual field defects from lesions of Meyer loop
  - homonymous hemianopia
    - hemifields contralateral to the lesion
  - superior
    - ❤ pie in the sky

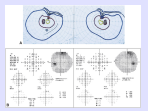

Figure 4-31 (© 2020 American Academy of Ophthalmology)

  - spare fixation
  - incongruous
- etiology
  - temporal lobe tumors
    - common cause of visual field loss
    - neurologic findings of temporal lobe lesions
      - seizure
        - olfactory
        - formed visual hallucinations
      - surgical excision of seizure foci

Parietal Lobe

- etiology
  - most common
    - stroke
- visual field defects
  - hemifields contralateral to the lesion
    - homonymous hemianopia
  - more extensive lesions also involve superior visual fields but remain denser inferiorly
  - parietal lobe lesions involve superior fibers first
    - inferior
- perceptual problems (agnosia)
- apraxia
- parietal lobe syndromes
  - Gerstmann syndrome
    - dominant parietal lobe
    - acalculia
    - agraphia
    - finger agnosia
    - left-right confusion
  - contralateral neglect
    - nondominant parietal lobe
  - reduced optokinetic nystagmus (OKN)
    - asymmetry in the pursuit system likely indicates involvement of area V5 or MT
    - pursuit pathways converge in the posterior parietal lobes (near the visual radiations)
    - elicit the impaired OKN response by moving targets toward the affected side
    - lesions of optic tract or occipital lobe do not affect the OKN response
    - homonymous hemianopia should prompt OKN testing

Occipital Lobe

- visual fibers approaching occipital lobe become more congruous
  - central fibers course to the occipital tip
  - peripheral fibers course to the anteromedial cortex
    - some peripheral nasal fibers are not matched with corresponding uncrossed fibers
      - monocular "temporal crescent"
      - 60°–90°
  - visual fibers localize within the occipital cortex superior and inferior to the calcarine fissure
- visual field defects
  - congruous homonymous hemianopia
    - stroke involving the posterior cerebral artery
      - posterior cerebral artery
      - middle cerebral artery
      - tip of the occipital lobe receives a dual blood supply

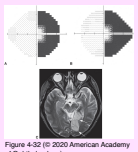

Figure 4-32 (© 2020 American Academy of Ophthalmology)

    - ⭐ sparing the fixational region (macula-sparing)
    - damages the occipital tip
      - watershed area
      - may be the only injured area
    - systemic hypoperfusion
      - most commonly after surgery or other episodes involving blood loss with severe hypotension
    - homonymous paracentral hemianopic scotomata

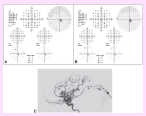

Figure 4-34 (© 2020 American Academy of Ophthalmology)

  - lesion involving only the most anterior portion of the occipital lobe
    - monocular defect of the contralateral temporal crescent
  - Goldmann perimetry is required

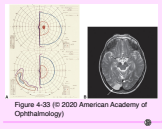

Figure 4-33 (© 2020 American Academy of Ophthalmology)

    - homonymous hemianopia sparing the temporal crescent in the eye contralateral to the lesion
  - homonymous hemianopia that respects both the vertical and horizontal meridians
- associated neurologic findings
  - most occipital lobe lesions encountered by ophthalmologists result from stroke
    - cause no other neurologic deficits
  - cortical blindness from bilateral occipital lobe destruction
    - distinguish cortical blindness from total blindness caused by bilateral prechiasmal or chiasmal lesions
    - normal pupillary responses
    - normal optic nerve appearance
    - bilateral occipital lobe lesions occasionally permit some residual visual function
  - Anton syndrome
    - denial of blindness
    - can be due to a lesion at any level of the visual system severe enough to cause blindness
  - Riddoch phenomenon
    - perceive moving targets but not static ones
    - may also occur with lesions in other parts of the visual pathway
  - unformed visual hallucinations
    - tumors
    - migraine
    - drugs
    - disturbances of the primary visual cortex
  - formed visual hallucinations
    - lesions of the extrastriate cortex or temporal lobe

Visual Rehabilitation

- patients with homonymous hemianopia or quadrantanopia may benefit by referral to a vision rehabilitation specialist
- visual scanning techniques
  - encourage frequent exploratory saccades toward the blind hemifield
- orientation and mobility training
  - help the patient manage daily tasks
- prisms
  - compensate for visual field loss