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Neurology
Disclosures

• Dr. Mukerji reports no disclosures
Historical Perspective

“Patients..[with this syndrome] ..present with a variable, yet characteristic constellation of abnormalities in cognitive, motor, and behavioral function…with time, intellectual impairment becomes more pervasive broadly affecting nearly all aspects of cognition, with further slowing and inaccuracy of performance. In parallel, gait unsteadiness gives way to frank weakness…variants of the syndrome occur..in some patients an agitated mental state with mania or other forms of organic psychosis may occur.”

Price et. al Science 1988
Case Summary

– 48 year old man with a lifestyle at high-risk for HIV acquisition
– Weight loss for 1 year; painful lymphadenopathy; purple macules on his hard and soft palate; cytopenia; fever
– Behavioral Abnormalities (hyperactive agitation) and Encephalopathy
– Mild Motor Deficit and Gait Impairment
– Seizures

– CSF Pattern: Normal opening pressure, mild CSF pleocytosis (7 cells/ml; 80% L), elevated total protein, and normal glucose
Case Summary: Neurological Pace

Advanced
(<200 CD4/mm³)

- Pneumocystis jiroveci pneumonia
- Mycobacterium avium complex
- other major OIs
- Kaposi’s sarcoma, non-Hodgkin’s lymphoma, other neoplasms

- Recurrent or chronic
  - lymphocytic pleocytosis, normal glucose
  - HIV-associated dementia
  - Cryptococcal meningitis
  - Cerebral toxoplasmosis
  - PML
  - Primary CNS lymphoma
  - CMV-E
  - Vacuolar myelopathy
  - CMV-PR
  - Herpes zoster (shingles)

- CMV-MM
- Distal symmetrical polyneuropathy
  - zidovudine myopathy
  - myopathy

Daroff 2013
**Case Summary: Neurological Pace**

**SUBACUTE, PROGRESSIVE DECLINE OVER 1 WEEK**
Salient Features of Patient’s Confusion

Executive Dysfunction
- Fails to orient
- Per perseverative Behavior
- Inability to follow two step commands
- Minimally goal-oriented tasks are delayed
- Rigidity of thought (abstract reasoning)

Disinhibition/Apathy
- Agitation
- Frenzied
- Disinhibited social behavior
- Apathy to self appearance

Gait Disturbance
- Ataxia of Gait: The act of walking is impaired/slowed not explained by weakness, loss of sensation or spasticity

Psychomotor Underactivity

Behavioral Disturbance
Frontal Lobe Syndrome Helps Explain Most of Dominating Salient Features

Likely dealing with Frontal lobe syndrome and the circuits or white matter tracks to subcortical tissues (Basal Ganglia and Thalamus)

Bonelli 2007; statdx
Patient’s Speech Disorder Stems from the Frontal Lobe

OUR PATIENT
- Perseverative;
- Maintained recall, naming, and basic comprehension
1. Loss of impairment with the production or comprehension of spoken/written language: Aphasia

2. Disturbances of speech and language stemming from altered higher-order processes (delirium, confusion)

3. Defect in articulation with intact mental functions: Dysarthria

4. Alteration or loss of voice: aphonia
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Loss of impairment with the production or comprehension of spoken/written language: Aphasia

Hypothesis: Restricted Language Output Consistent with Psychomotor Underactivity and Frontal Lobe Dysfunction
Epilepsia Partialis Continua of Right Face
Seizures

• 2 minute episode of aphasia
• 2\textsuperscript{nd} episode of staring, twitching, inability to speak with confusion
Symptoms

- Executive Dysfunction/
  Psychomotor Underactivity/
  Behavioral Disturbances
  - Bilateral Frontal Lobe
  and Inputs to Deeper
  Subcortical Structures

- Possible Right
  Motor Deficits
  - Left Frontal Lobe

- EPC+ Partial Complex
  Seizure
  - Suspect Frontal or
  Temporal Lobes

Multifocal Process Affecting **Frontal Lobes Bilaterally** and **Deeper White Matter**
Structures, Potentially Temporal Lobes with a Constellation of Psychomotor
Slowing/Behavioral Disturbances/Motor Impairment and Seizures in the setting of AIDS
Differential Diagnosis for Frontal Lobe Dysfunction

• Nutritional Abnormalities
  – Weirnicke’s encephalopathy due to thiamine deficiency.
  – Vitamin B12
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- **Toxic or Metabolic Encephalopathies**
  - Hyponatremia; Hypomagnesemia; Hypoglycemia; Uremia
  - Fulminant encephalopathy in HIV-individuals with drug abuse
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• Prion Disease

MRI Read: Abnormal T2 hyperintense signal within the frontoparietal white matter, slightly more prominent in the right frontal lobe, extending into the genu of the corpus callosum, without significant local mass effect or abnormal restricted diffusion.
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• Intracranial Lesions
  – Infiltrative Neoplasms

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Infiltrative Neoplasms

CNS Lymphoma

- T2/FLAIR
- Mass Effect: Yes

Glioblastoma

- T1 + Contrast
- DWI
- Mass Effect: Yes

Unlikely based on the MRI read

Statdx; Dr Hani Al Salam, Radiopaedia.org, rID: 8945
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- **Prion Disease**

- **Intracranial Lesions**
  - Infiltrative Neoplasms
  - Infectious Organisms

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Infectious Differential Diagnosis for Frontal Lobe Dysfunction

• Toxoplasmosis Encephalitis
• Abscess
• Varicella-zoster leukoencephalitis
• CMV encephalitis
• Progressive Multifocal Leukoencephalopathy
• HIV-associated Leukoencephalopathy

(CNS tuberculoma or cryptococcus) unlikely given CSF studies and lack of positional headache
Infectious Agents

Toxoplasmosis

Varicella encephalitis

CMV encephalitis

T2/FLAIR

Varicella encephalitis

CMV encephalitis

T1 + Contrast

Varicella encephalitis

CMV encephalitis

DWI

Varicella encephalitis

CMV encephalitis

Mass Effect

Varicella encephalitis

CMV encephalitis

Clinical presentation + Imaging Read does not fit the pattern for our patient

Statdx; Aygun 1998
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Classic PML Patterns in AIDS

**T1 hypointensity**: 15% of HIV-associated PML may have enhancement

**T2 Hyperintensity involving the subcortical U fibers**: “Scalloped” cortex

**DWI**: Newer lesion has slightly restricted diffusion along its margins; older lesion is unrestricted

**Mass Effect**: NONE
HIV-1 Encephalitis Pattern in AIDS

T2/FLAIR
T2 hyperintensity ("hazy") appearance; Periventricular and centrally located

T1
T1 imaging is typically without abnormalities in white matter. Atrophy is usually present. No contrast enhancement

+Contrast

DWI
None

Mass Effect
None
PML vs. HIV encephalitis

Peripheral Extension
PML

Central/Periventricular
HIV encephalitis

T2/FLAIR

T1 +Contrast

DWI

Must request read of T1 images and determine the extent of white matter abnormalities on T2 images
Imaging
HIV encephalitis

Cognitive dysfunction
Symmetrical Motor Abnormalities
Gait Impairment
Variant: mania and agitation

Our patient
Cognitive dysfunction
Asymmetric Motor Abnormalities
Gait Impairment
Mania and agitation

Given abundance of frontal motor system and visual pathway involvement on imaging without true focal weakness or visual deficits,
- HIV encephalitis is preferred
Dr. Mukerji’s Diagnosis

HIV encephalitis in setting of advanced immunosuppression