

## **HIV-Associated Neurocognitive Disorders (HAND)**

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### **Educational Objectives**

**By the end of the session, learners will be able to:**

1. Describe three categories of HIV-associated neurocognitive disorders (HAND) and two features that distinguish them from other neurodegenerative disorders
2. Outline an appropriate workup for HIV-associated neurocognitive disorders (HAND)
3. Apply an interdisciplinary approach to the treatment of HIV-associated neurocognitive disorders (HAND)
4. Model informative counseling for caretakers regarding prognosis

### **Suggested reading:**

1. Thompson A, Pieper A, Treisman G. HIV-associated neurocognitive disorders. Available at: [http://www.uptodate.com/contents/hiv-associated-neurocognitive-disorders?source=search\\_result&search=hiv+dementia&selectedTitle=1%7E150](http://www.uptodate.com/contents/hiv-associated-neurocognitive-disorders?source=search_result&search=hiv+dementia&selectedTitle=1%7E150). Accessed April 4, 2014.
2. American Academy of HIV Medicine (online). Older Age and HIV-Associated Neurocognitive Disorder (HAND). Available at: <http://hiv-age.org/wp-content/uploads/2013/11/21.-Older-Age-and-HIV-Associated-Neurocognitive-Disorder-HAND.pdf>. Accessed July 25, 2014.

### **CASE ONE:**

**Mr. Wander is a 61-year-old gentleman with past stroke without sequelae, hepatitis C virus (HCV) infection not on treatment, HIV diagnosed at age 37 on efavirenz, tenofovir and emtricitabine, who presents to the emergency room stating “a man who takes care of horses” gave him a pill which made him ill. He denies other specific complaints or symptoms. He reports that he takes “approximately 4 medications daily” but is unable to elaborate the name, dosage and timing of any of his medications. His last CD4 is 170 cells/mm<sup>3</sup> and his viral load is undetectable. He has prior meningoencephalitis due to toxoplasmosis.**

**Mr. Wander is your clinic patient whom you met for the first time 6 months ago – he missed his last follow-up appointment. The emergency room doctor calls you at the clinic to see if you can help provide more background information.**

**Questions:**

1. What are HIV-associated neurocognitive disorders (HAND)?
2. What are different types of HAND, and how would you figure out which type Mr. Wander has?
3. What is the pathophysiology of HAND?
4. How common is HAND?
5. To investigate risk factors related to Mr. Wander's neurocognitive deficits, what questions should you ask on the history? Your answer should address HIV-disease factors, comorbidities and host genetic factors.
6. What clinical features would you look for on Mr. Wander? What kinds of problems in his daily activities might you find? Your answer should address cognitive deficits, mood disturbances and motor symptoms.

**CASE ONE CONTINUED:**

As we know, Mr. Wander does not know the name, timing and dosage of his medications, even though he manages them on his own. When questioned further, Mr. Wander reports he does not shop for grocery or cook, and simply eats most of his meals out, usually at McDonald's since it is cheap, although you notice that he has lost 20 Lbs since his last visit with you 6 months ago. He thinks he has been paying rent, but does not remember when he last did that. He used to like going out for walks and sitting outside with his friends, but has not done so since he fell on the sidewalk last month which resulted in the fear of falling and increased weakness. He appears disheveled, and reports tooth pain that makes it difficult for him to chew. Mr. Wander has no recreational drug use.

7. What else should you consider to obtain Mr. Wander's complete history?

**CASE ONE CONTINUED:**

Concerned that Mr. Wander does not remember when he last paid rent, you ask to call his landlord to obtain further information. The landlord reports that Mr. Wander has always been a bachelor and never married or has children. He never has visitors and lives alone in the apartment. Mr. Wander started to miss his payments about a year ago, but was able to pay retroactively after being reminded. Lately, the landlord has reminded him a few times but still has not received payments for the last 2 months. Mr. Wander is close to being evicted since he is not

able to pay rent. The landlord recalls stories of the police delivering Mr. Wander to the apartment after being found lost in his neighborhood, and an incident in which Mr. Wander set off the fire alarm because he left the stove on.

8. What would you focus on during the physical exam? How would you distinguish HAND from other neurodegenerative disorders, such as Alzheimer's?

**CASE ONE CONTINUED:**

On exam, Mr. Wander has a temperature of 98.6, blood pressure of 140/90, heart rate of 76, respiratory rate of 16, and oxygen saturation of 99% on room air. He is alert without fluctuation in consciousness, although he is only oriented to place and person. He has no focal neurological symptoms or sensory deficits, but is hyperreflexic diffusely with the inability to perform rapid pronation/supination of his hands.

He scores 6/27 on PHQ-9 and 20/30 on the MoCA, losing points in clock-drawing, memory, attention, sentence repetition, delayed recall and orientation.

9. What work up would you order? Include all laboratory tests, procedures, imaging and testing that are appropriate.

**CASE ONE CONTINUED:**

Laboratory results show that Mr. Wander's hepatitis C titer is undetectable, and his liver function tests (LFT) are normal. Otherwise, B12/folate level, TSH, syphilis and lumbar puncture are unremarkable. Brain MRI does not show signs of infection, malignancy, or other neurodegenerative diseases, although chronic microvascular changes are present. However, there is no acute infarction. You diagnose Mr. Wander with HIV-associated dementia.

10. How would you treat Mr. Wander? Should you switch his regimen in the setting of newly-diagnosed HAD?

**CASE ONE CONTINUED:**

With newly diagnosed HAD, you are concerned that Mr. Wander has not been taking his ART. As a result, you also repeats his CD4 and viral load, only to find

that his CD4 is now 100 cells/mm<sup>3</sup> with a viral load of 150,000 copies/mL. Resistance testing shows that he is now resistant to efavirenz.

11. Would you switch Mr. Wander's regimen? What do you need to consider if you choose new agents for him?
12. How would you monitor treatment?

**CASE ONE CONTINUED:**

Based on test results, you decide to switch Mr. Wander to darunavir, ritonavir, tenofovir, and emtricitabine. However, you are still concerned that he would not be able to manage his medications, not to mention the fact that Mr. Wander may be evicted soon.

13. What would you do next?

**CASE ONE CONTINUED:**

Since Mr. Wander has mild depression on PHQ-9, you decide to start him on antidepressants without referring to psychiatry. You make a note to monitor him for signs of mania.

You refer Mr. Wander for physical and occupational therapy. Your social worker submits an application to an assisted living facility, and home health aid by VNS is provided.

You refer Mr. Wander to a geriatrician, who helps simplify all of his medications to twice per day and orders blister packs for him. She also helps determine that Mr. Wander would like one of his neighbors whom he sees everyday and whom he became friends with to be his health care proxy. She plans to see him back in one month to continue discussion regarding his wishes and manage his failure to thrive.

A month later, Mr. Wander returns for a follow-up visit with his home health aid, who asks when to expect cognitive improvement on the current treatment. She also wonders if anything can be done to prevent or delay further cognitive decline.

14. How would you counsel Mr. Wander's home health aid?

**Additional reference:**

1. Antinori A, Arendt G, Becker JT, et al. Updated research nosology for HIV-associated neurocognitive disorders. *Neurology* 69 (2007):1789–1799.
2. Heaton RK, Franklin DR, Ellis RJ, CHARTER Group, HNRC Group J. HIV-associated neurocognitive disorders before and during the era of combination antiretroviral therapy: differences in rates, nature, and predictors. *Neurovirol* 17.1 (2011):3-16.
3. Levine AJ, Service S, Miller EN, et al. Genome-wide association study of neurocognitive impairment and dementia in HIV-infected adults. *Am J Med Genet B Neuropsychiatr Genet* 159B.6 (2012):669.
4. Tozzi V, Balestra P, Salvatori MF, et al. Changes in cognition during antiretroviral therapy: comparison of 2 different ranking systems to measure antiretroviral drug efficacy on HIV-associated neurocognitive disorders. *J Acquir Immune Defic Syndr* 52.1 (2009):56
5. Vivithanaporn P, Heo G, Gamble J, et al. Neurologic disease burden in treated HIV/AIDS predicts survival: a population-based study. *Neurology* 75.13 (2010):1150-8.