FACT SHEET
Office of Communications and Public Liaison
National Institute of Allergy and Infectious Diseases ▪ National Institutes of Health

Neurologic Complications of HIV

About half of all people infected with HIV, the virus that causes AIDS, develop infections or other problems involving the brain or spinal cord. These neurologic complications may include inflammation of the brain (encephalitis) or of the membranes surrounding the brain (meningitis), infections of the brain, brain or spinal cord tumors, nerve damage, difficulties in thinking and behavioral changes (AIDS dementia complex) and stroke. Meningitis, encephalitis and certain other neurologic disorders can develop when individuals are first infected with HIV or during the symptom-free period that follows initial infection. Most neurologic complications, however, develop later in the course of HIV disease.

The neurologic disorders associated with HIV may stem from damage done by HIV to the nervous system or by microbes or cancers that appear when the immune defenses of the body are impaired. Microbes that invade the brain include the fungus *Cryptococcus neoformans*, papovavirus-JC (which causes primary multifocal leukoencephalopathy or PML), herpes simplex virus, varicella zoster virus, cytomegalovirus and the parasite *Toxoplasma gondii*. Cancers to which people with HIV are particularly susceptible and which can affect the nervous system include lymphoma and Kaposi's sar-coma. Some neurologic disorders may be caused by an autoimmune reaction, in which the body's immune system cells attack brain or nerve cells that have proteins resembling those carried by HIV.

Peripheral neuropathy--nerve damage to the arms, legs or feet can be caused by infections, an autoimmune reaction, or drugs used to treat HIV infection, such as didanosine (ddI) and dideoxycytidine (ddC).

Symptoms and Diagnosis

The most common symptoms of central nervous system disorders related to HIV infection are poor concentration, forgetfulness, slowness of thinking or headache. Less common symptoms include clumsiness, seizures, difficulty communicating or walking, incontinence, numbness or paralysis and visual disturbances.

Because many people with HIV infection have more than one neurologic complication and because several of these neurologic disorders have overlapping diagnostic features, the cause of a person's neurologic symptoms can be difficult to pinpoint. Patients may undergo brain scans

such as computerized tomography (CT) or mag- netic resonance imaging (MRI) to help their doctors identify brain abnormalities. Doctors also may examine a sample of the fluid that bathes the brain and spine for signs of infection. The fluid sample is removed from the spine through a needle. Nerve or muscle testing is sometimes helpful as well.

Often, when they are not sure what is causing the neurologic problems, doctors will prescribe medication based on the symptoms the patient is experiencing. If the medication works and the patient improves, the suspected diagnosis is probably correct. If the patient does not get better, the doctors may need to remove a small sample of brain or nerve tissue for examination to look further for the cause or causes of the symptoms.

Treatment

If doctors find an infection to be the cause of the neurologic symptoms, patients are given appropriate antibiotics, if available. Doctors use the drugs amphotericin B, sometimes combined with flucytosine, or fluconazole to fight cryptococcal brain infections. Pyrimethamine combined with sulfadiazine or clindamycin often is effective for toxoplasmic encephalitis. Following treatment for these conditions, patients must continue to take these medications to prevent a recurrence of the infection.

Doctors treat nerve inflammation caused by herpes zoster with the antiviral drug acy- clovir. The drug cytarabine or high doses of zidovudine (AZT) can be used to treat patients with PML. Doctors use AZT or ddI to treat patients with neurologic complications that appear to be caused by HIV itself, such as AIDS dementia complex. Radiation therapy may help patients with lymphoma or Kaposi's sarcoma that has spread to the brain or spinal cord.

Treatment for peripheral neuropathy depends on the cause, site and extent of nerve damage. A number of different types of medications can be used, including AZT and gancyclovir, nonsteroidal anti-inflammatory drugs, as well as analgesics or antidepressants for pain. Patients may improve if they undergo plasmapheresis, a procedure in which blood plasma is removed and replaced by donor plasma. Some nerve disorders may spontaneously improve without therapy.

Research

The National Institute of Allergy and Infectious Diseases (NIAID) funds research aimed at finding the causes of and better ways of diagnosing and treating the neurologic complications of HIV infection. Several new therapies currently are being evaluated for safety or effectiveness in NIAID-sponsored clinical trials.

For more information on these or other studies, call the AIDS Clinical Trials Information Service:

1-800-TRIALS-A
1-800-243-7012 (TDD/Deaf Access)

For federally approved treatment guidelines on HIV/AIDS, call the HIV/AIDS Treatment Information Service:

1-800-HIV-0440
1-800-243-7012 (TDD/Deaf Access)

NIAID, a component of the National Institutes of Health, supports research on AIDS, tuberculosis and other infectious diseases as well as allergies and immunology.

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