

SPECIAL COMMITTEE REPORT

HIV Positivity and Aviation Safety

As directed by the Executive Committee of the Aerospace Medical Association, an ad hoc committee was formed to participate with the Aviation Safety Committee in the preparation of the following report on Human Immunodeficiency Virus and Aviation Safety.

This paper represents the Aerospace Medical Association's (AsMA) position on the topic of Human Immunodeficiency Virus (HIV) and Aviation Safety. The focus of this paper is the subtle, but aeromedically significant neuropsychiatric changes that can occur in the otherwise asymptomatic HIV-positive person.

The Aerospace Medical Association is dedicated to leadership in the area of aviation safety. It is therefore appropriate that we comment as an organization on this emotionally laden, poorly understood, and potentially dangerous issue.

NATURAL HISTORY OF HIV INFECTION

Epidemiology: From its first reported appearance, HIV has spread dramatically, infecting 8–10 million people worldwide. The Centers for Disease Control (CDC) estimates that 800,000 to 1.2 million persons in the U.S. are infected with the virus. The CDC projects a total of 390–480 thousand cases of Acquired Immune Deficiency Syndrome (AIDS) by the end of 1993. No current evidence contradicts the apparent invariable progression from infection to disease, and inevitably to death.

Early Presence in the Central Nervous System (CNS): Part of the natural history of HIV infection is early entry into the CNS as first proposed in the seminal article of David D. Ho (4). An editorial by Black in the same issue (1) states: "The article by Ho, et al, indicates the acute infection of the central nervous system occurs *with seroconversion* (italics added) to the HTLV-III [HIV] agent."

Ho (3) summarizes the incidence of HIV induced CNS damage in AIDS patients: "Neurologic dysfunction is a frequent complication of AIDS. Approximately 60% of patients with AIDS have neurologic symptoms, and 80% to 90% are found to have neuropathologic abnormalities at autopsy. . . ."

In a study by Navia (6), less than 10% of brains from AIDS patients (N = 70) were normal on neuropathologic examination.

That HIV-induced destruction of the nervous system is a common and profound problem for AIDS patients

and that the virus gains access to the CNS early, are no longer contested issues. The present controversy is over the existence and significance of neuropsychiatric problems before the diagnosis of AIDS—when the person is HIV infected, but asymptomatic. Neuropsychiatric problems occurring in an otherwise asymptomatic HIV-infected person as reported in the literature are:

- the dementia complex
- seizure
- suicide
- cerebral infarction
- neuropathy (and myopathy)
- myelopathy and meningitis

DISCUSSION OF NEUROPSYCHIATRIC EFFECTS

The Dementia Complex: The neuropsychiatric problem of HIV infection that is most talked about in aviation medicine is the "dementia complex." This is also the most controversial subset of neuropsychiatric abnormalities. The dementia complex is a syndrome of cognitive, behavioral, and motor disturbances arising from direct and/or indirect insult to the brain by the HIV virus. Components of the dementia complex are described by Toss (8):

"The onset of the ADC [AIDS Dementia Complex] is usually insidious, although subacute onset or abrupt acceleration may occur. Common early complaints include forgetfulness, poor concentration, and mental slowing. Patients frequently note that they 'lose track' of conversations or thoughts, experience increased difficulty in the performance of more complex daily tasks . . . Early motor dysfunction leads to complaints of poor balance and poor coordination . . . Behaviorally, social withdrawal, reduced spontaneity, and apathy are common. . . ."

Although not all-inclusive, the components of HIV dementia complex can be grouped this way:

Cognitive

- forgetfulness
- mild confusion
- loss of ability to concentrate
- difficulty with visual memory/constructional ability
- difficulty with abstract concept formation

Behavioral

- apathy
- withdrawal
- suicidal ideation

Motor

- difficulty with visual motor tracking
- impaired tactile sensitivity
- impaired balance

Other Neuropsychiatric Effects: In addition to dementia complex, seizures (9), suicides and suicidal ideation (5,7), and incipient neuropathy (2) are reported.

Summation of Neuropsychiatric Effects: HIV infection is a progressive disorder culminating in the disease AIDS and, eventually, death. In the majority of cases, neurologic signs and symptoms will become manifest at some point in the course of infection. The appearance of these neurologic problems during the asymptomatic period is of great concern to public safety, especially when the patient is a pilot. This concern derives from an inability to forecast the appearance of neuropsychiatric abnormalities or reliably detect them when subtle.

INAPPROPRIATENESS OF CLINICAL NEUROPSYCHIATRIC TESTING TO DETERMINE FITNESS TO FLY

Even if one could design a test of sufficient sensitivity and specificity to detect subtle deficits, its validity is restricted to the moment. While detection of neuropsychiatric deficit in an HIV-infected person at annual or semiannual intervals may be sufficient to allow timely medical intervention, this is not an adequate safeguard for aviation.

The neuropsychiatric problems of HIV infection are insidious in onset and progressive in development. A "normal" test one day could be "abnormal" the next. The insurmountable obstacle to a useful screening test of fitness to fly is the *inability to predict when and in whom* neuropsychiatric factors will present.

Faced with no valid way of determining those at risk, and realizing that a high percentage of HIV-infected pilots will develop neuropsychiatric abnormalities incompatible with flight safety, the Aerospace Medical Association adopted the following position.

STATEMENT OF POSITION

The Aerospace Medical Association believes the HIV-infected pilot places the flying public at increased and unnecessary risk, and therefore supports testing of pilots for infection by the HIV virus. Individuals confirmed to be so infected should be found medically disqualified for flying duties.

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