Human immunodeficiency virus (HIV) and the brain

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Introduction

This factsheet is about how human immunodeficiency virus (HIV) can affect the brain. If you are looking for general information on HIV, organisations like Terrence Higgins Trust (www.tht.org.uk) offer detailed information and support.

HIV can affect the brain in different ways:

1. **HIV-meningoencephalitis** which is an infection of the brain and the lining of the brain by the HIV virus.
2. **HIV-encephalopathy (HIV-associated dementia)** which is the result of damage to the brain by longstanding HIV infection.
3. **Mild neurocognitive disorder** which is problems with thinking and memory in HIV, however is not as severe as HIV-encephalopathy.

1. HIV-meningoencephalitis

What is HIV-meningoencephalitis?

HIV-meningoencephalitis is an infection of the brain and the lining of the brain (called the meninges) by HIV. It can happen a few weeks or months after a person first contracts HIV infection.

Symptoms

The patient may develop headache, neck stiffness, drowsiness, confusion and/or seizures over hours or a few days. Although HIV-meningoencephalitis may remain mild and resolve on its own, it can sometimes be severe and occasionally it may lead to uncontrollable seizures, coma and even death.

Diagnosis and treatment

Although HIV levels may be raised in the spinal fluid, there is no specific test for HIV-meningoencephalitis. The diagnosis relies on excluding other possible causes.

HIV-meningoencephalitis can be treated with anti-HIV treatment (antiretroviral drugs). Some antiretroviral drugs are thought to be more effective in the brain than others, and this may affect the choice of treatment used. Other than antiretroviral drugs, there is no specific treatment for HIV-meningoencephalitis.

Outcomes

Fortunately, most people make a good recovery following HIV-meningoencephalitis. The outcome tends to be much better than for other causes of encephalitis, such as herpes simplex virus. However, some people with HIV-meningoencephalitis are left with a degree of damage to the brain. This may be mild and not affect daily life, for example slight difficulty with concentration or memory. In others, it can be more severe, causing significant physical or mental disability.

As HIV-meningoencephalitis occurs soon after infection it can be the first presentation of HIV and most people would not previously be aware they had HIV infection. The person may have to deal with the fact that they now have HIV infection, as well as dealing with the meningoencephalitis itself.

2. HIV-encephalopathy (HIV-associated dementia)

What is HIV-encephalopathy?

HIV-encephalopathy is the result of damage to the brain by longstanding HIV infection. It is also known as HIV-associated dementia or acquired immunodeficiency syndrome (AIDS)-dementia complex.

Symptoms

People with HIV-encephalopathy have problems with their concentration and memory. Some of those with HIV-encephalopathy may also lose interest in things they used to enjoy doing. They may become withdrawn and stop socialising. Sometimes it may seem as if their personality has changed or that they have become depressed.

HIV-encephalopathy can also cause physical movements to slow down. Things that are usually quick to do, such as putting on shoes or brushing teeth, may start to take a long time. People may find it hard to do fine movements such as doing up buttons. Some experience difficulty walking, for example they may be slow to get going or tend to shuffle rather than stride out. These problems tend to develop slowly over months or even years but can become quite severe and some people may need help to look after themselves.

Treatment and outcomes

HIV-encephalopathy can be treated with antiretroviral drugs. Some improvement in the symptoms of HIV-encephalopathy can occur in the first few weeks or months of treatment.

HIV-encephalopathy is a feature of AIDS, which is the most advanced and severe stage of HIV infection. People with AIDS have abnormally low CD4 (type of immune cells) counts which makes them vulnerable to severe infections and other serious illnesses. If HIV is diagnosed early enough, antiretroviral drugs can prevent progression to AIDS and hence prevent the development of HIV-encephalopathy.

3. Mild cognitive impairment in HIV

What is mild cognitive impairment?

Some people with HIV have mild problems with thinking and memory. Although some people may experience symptoms, in others these may be so subtle as to be barely noticeable.

Mild cognitive impairment is not as severe as HIV-encephalopathy but is more common. Although HIV-encephalopathy only affects those with AIDS, milder impairment can affect people earlier in HIV infection who have normal CD4 counts and are well in other respects.

Diagnosis

There is no specific test for mild cognitive impairment. Simple memory tests, for example memorising objects then repeating them back, may be used. Sometimes the doctor will ask for more formal testing of memory. It is often important to exclude other causes of memory problems. This may involve blood tests for nutrients that can affect the brain if low (e.g. vitamin B12 and folate), tests for hormone problems (particularly thyroid), and tests for infections that can affect the brain (such as syphilis and hepatitis C). In some situations, a brain scan or lumbar puncture may be necessary.

People with mild cognitive impairment are more likely to have HIV in cerebrospinal fluid (CSF) than people without cognitive impairment. However, the significance of this is not fully understood. Many people that have HIV in their CSF do not have cognitive impairment. Conversely, many people with cognitive impairment do not have HIV in their CSF.

Treatment and outcomes

Some anti-HIV drugs are thought to get into the brain better than others do. These drugs may be better at controlling or preventing mild cognitive impairment. However, some anti-HIV drugs may be toxic to the brain and can cause side effects similar to mild cognitive impairment.

While some people with mild cognitive impairment do get a little worse over time, others remain stable, and some improve.

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Thank you!

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