Human immunodeficiency virus (HIV) disease was first described in 1981 in the USA in young homosexual men presenting with opportunistic infections associated with severe immune deficiency. The virus itself was identified 2 years later and the link between HIV and acquired immune deficiency syndrome (AIDS) was established.

When the immune system is sufficiently depleted for the patient to develop opportunistic infection it is considered to have progressed to AIDS, and a CD4 count of less than 200 cells/µl is taken as AIDS-defining. Sub-Saharan Africa remains the most heavily affected, and in 2007 72% of the world population of HIV patients lived in this region. The global epidemic trend has stabilised but the prevalence remains high. In 2007 the estimated number of infected individuals was 33 million. Managing these patients has placed a huge financial burden on the already strained resources of Third World countries. HIV has brought an array of new clinical presentations and has also generated new syndromes. HIV vasculopathy was first described as an entity in 1987 and may present with arterial occlusive disease and aneurysmal disease, or spontaneous arteriovenous fistula. The incidence of symptomatic vasculitis is in the region of 1% of HIV-infected patients.

Aneurysms

This disease affects much younger patients than those with degenerative atherosclerotic aneurysmal disease. The median age is between 30 and 40 years. However, the majority of patients infected with HIV are females and the reason for the male preponderance of aneurysmal disease is unknown. The pathogenesis of the aneurysms is uncertain. Histology shows obliterator endarteritis involving the vasa vasora of the major vessels. These vessels are surrounded by neutrophils, which in turn are surrounded by a cuff of plasma cells, lymphocytes and monocytes. This eventually leads to thrombotic occlusion of the vasa vasora with transmural necrosis of the vessel wall, probably due to ischaemia. HIV protein is noted in the lymphocytes, but the significance of this is uncertain as this is noted in lymphocytes throughout the body of HIV infected patients.

Routine cultures of the aneurysm wall have revealed no bacteria or other opportunistic infection, but this has been noted in one or two cases and is thought to be a sporadic finding. The pathogenesis is possibly related to some immune complex mechanism.

The common sites for the aneurysms are the common carotid (Fig. 1) and the superficial femoral artery (Fig. 2). They can, however, be found throughout the body, tend to be multiple, and typically have a multi-loculated appearance (Fig. 3). Many are in fact false aneurysms due to disruption of the vessel wall at the point of transmural necrosis. Symptomatic symptoms and signs depend on location of the aneurysm and, for example, there may be compressive symptoms due to airway obstruction or possibly haemodynamic instability due to rupture. Thromboembolic complications are also frequent, as is associated venous thrombosis. Any patient presenting with aneurysm should be screened for multiplicity using ultrasound and CT scanning as required.

CD4 counts are below normal in more than 90% of patients with a median of less than 400 cells/µl and the CD4:CD8 ratio is usually reversed, indicative of advanced immunosuppression. However, the AIDS-defining level of less than 200 cells/µl is not a pathognomonic finding. Low serum albumin with elevated globulin is a consistent feature.
Occlusive disease

HIV-associated arterial occlusive disease is recognised as a specific clinical entity.

As for aneurysmal disease, young males with a median age of 30 - 40 years are mainly affected; it is difficult to explain this male preponderance.

The underlying cause of occlusive disease is thought to be related to vasculitis. The histological findings are similar to those found in HIV-associated aneurysmal disease, as described previously. It would appear that the manifestations are a different expression of the same vasculitic process. It has been suggested that a hypercoagulable state might be involved.

There have been reported findings of anti-phospholipid antibody syndrome, deficiencies of free protein S, protein C and anti-thrombin 3, but these have been sporadic reports. The hypercoagulation states have been tested for in our own series and were found not to be present.

Clinically most patients present with advanced disease and critical ischaemia affecting the lower limb. In most patients the disease is confined to one limb, for reasons that are obscure. It is interesting to note that on Duplex Doppler imaging there is what appears to be a pathognomonic sign with hypoechoic spotting within the arterial wall (string of pearls sign).

Thromboembolic complications are also frequent, as is associated venous thrombosis.

It would seem logical to offer antiretroviral therapy irrespective of the CD4 level as this manifestation is a pointer to an advanced stage of the disease. However, HIV-associated vasculopathy is not cited in the WHO clinical staging system.

Patients should be optimised as per standard practice prior to intervention although those with full-blown AIDS are probably best managed conservatively. The combination of a low CD4 count and low albumin (less than 35 g/l) are pointers towards poor operative results.

On arteriography it is notable that the vessels appear pristine proximal to the occlusion, as they do in the contralateral limb. The involved limb usually has extensive disease extending into the small- and medium-sized arteries with poor runoff (Fig. 4).

The management of patients with arterial thrombosis has yielded poor results. The available options are thrombo-embolectomy and thrombolysis, but the limb salvage rate has been in the region of 27%. This is thought to be due to the fact that it is mainly a vasculitic process with superimposed thrombosis, and removing the thrombus does not, in effect, solve the problem, which has a very high re-thrombosis rate. Some authors have reported acceptable patency rates in patients with disease distribution allowing for arterial reconstruction. A significant complication in all patients in whom surgery is attempted has been the high rate of superficial wound sepsis and graft sepsis.

Vascular surgical principles should be adhered to when managing patients with HIV-associated occlusive vasculopathy and management should be individualised. Low CD4 count should not exclude patients from surgical intervention as the surgical outcome has shown to be independent of CD4 levels.

As for aneurysmal disease, it would appear that these patients should be offered antiretroviral therapy.

References
HIV-associated vasculopathy


In a nutshell

- HIV-related vasculopathy (aneurysmal and occlusive disease) may be different expressions of the same pathological process.
- This is, in both cases, due to an obliterator vasculitis affecting the vasa vasora of the vessels characterised by white cell cuffing around the vessels.
- Most patients have low CD4 counts, which indicate advanced immunosuppression although this is not an AIDS-defining condition.
- In each case management should be on individual merit. Symptomatic aneurysms should be treated as should occlusive disease.
- The operative results with aneurysm surgery are reasonable although the limb salvage rate with obliterator disease is poor.
- A case should be made for antiretroviral treatment in this group of patients.


New Scientist 2009; 30 May