Spumavirus (Simian Foamy Virus)

Disease Agent:

- Simian foamy virus (SFV)

Disease Agent Characteristics:

- Family: *Retroviridae*; Subfamily: *Spumaretrovirinae*; Genus: *Spumavirus*
- Virion morphology and size: Enveloped, spherical to pleomorphic virions containing prominent surface spikes and a central uncondensed core, ~80-100 nm in size
- Nucleic acid: Dimer of linear, positive-sense, single-stranded RNA, ~11.6 kb in length
- Physicochemical properties: As an enveloped retrovirus, it should be susceptible to many disinfectants, such as 1% sodium hypochlorite, 2% glutaraldehyde, formaldehyde and ethanol.

Disease Name:

- No human disease

Priority Level

- Scientific/Epidemiologic evidence regarding blood safety: Theoretical; transmission from transfusion has not been documented in humans but has been demonstrated in nonhuman primates. No known disease in infected humans.
- Public perception and/or regulatory concern regarding blood safety: Absent; public policy makers in the US have discussed this agent in open public forums without concern expressed by stakeholder groups or other members of the public. Health Canada has enacted a permanent deferral for potential blood donors whose employment involved potential contact with monkeys or their body fluids (effective January 1, 2007).
- Public concern regarding disease agent: Absent

Background:

- The prototype foamy virus was isolated from human material in 1971 from a Kenyan patient; it was closely related to SFV from chimpanzees present in Kenya. Rigorous testing of serum samples from humans with autoimmune diseases by more than one serological assay or by RT-PCR did not confirm infection. Positive results were only observed in persons who may have acquired a zoonotic infection following severe primate bites via a laboratory accident or following an occupational exposure.
- SFV is a retrovirus endemic in wild and captive primate populations. In a number of research centers and zoos, 5.3-23% of individuals were found to be positive for the viral genome. Because seropositivity is a likely indicator of chronic infection, this raises the issue of potential transfusion transmissibility in humans.

Common Human Exposure Routes:

- Wound injury from nonhuman primates in developed world
- Butchering and consumption of nonhuman primates in Africa

Likelihood of Secondary Transmission:

- Not known, but experimentally transmitted by blood in nonhuman primates.
- No male-to-female or household transmission has been observed in humans.

At-Risk Populations:

- Those exposed to nonhuman primates, such as animal handlers, zookeepers, or exotic pet enthusiasts, in developed countries; bushmeat hunters and handlers in the developing world are at risk for exposure to SFV.
- Nonoccupational exposure of tourists to simian retroviruses at sites in Asia, and possibly Africa, where nonhuman primates congregate could pose a risk. The probability of a tourist becoming infected with SFV at a monkey forest in Asia has been estimated to be 0.3% (2.94/1000 travelers) annually.

Vector and Reservoir Involved:

- Nonhuman primates are the natural host.

Blood Phase:

- Lifelong in nonhuman primates
- Identified in peripheral blood lymphocytes from one asymptomatic animal caretaker 20 years after exposure

Survival/Persistence in Blood Products:

- Unknown

Transmission by Blood Transfusion:

- Experimentally transmitted by whole-blood transfusion between nonhuman primates
- In humans, one lookback study showed lack of transmission in four recipients from a donor who was shown to be infected with SFV.

Cases/Frequency in Population:

- In the US, seropositivity only seen with nonhuman primate exposure in 3-5% of zoo workers and research-animal handlers

Incubation Period:

- Unknown in the absence of disease associations

Likelihood of Clinical Disease:

- None recognized despite follow-up of seropositive primate handlers for several years

Primary Disease Symptoms:

- Not applicable

Severity of Clinical Disease:

- Not applicable

Mortality:

- Not applicable

Chronic Carriage:

- >6 months, probably lifelong in nonhuman primates

Treatment Available/Efficacious:

- Not applicable

Agent-Specific Screening Question(s):

- No specific question is in use in the US. A permanent donor deferral for occupational exposure to nonhuman primates was implemented on January 1, 2007, in Canada.
- Not indicated because of the low frequency in the donor population and the absence of disease in humans

Laboratory Test(s) Available:

- No FDA-licensed blood donor screening test exists.
- Cell culture and research assays for antibody and nucleic acids exist.

Currently Recommended Donor Deferral Period:

- No FDA Guidance or AABB Standard exists.
- Permanent deferral in Canada for occupational exposure to nonhuman primates

Impact on Blood Availability:

- Agent-specific screening question(s): Minimal if deferral is confined to occupational exposure to nonhuman primates
- Laboratory test(s) available: Not applicable

Impact on Blood Safety:

- Agent-specific screening question(s): None in the absence of disease association
- Laboratory test(s) available: Not applicable

Leukoreduction Efficacy:

- Unknown; there is the potential for impact in light of strong cell association of many retroviruses.

Pathogen Reduction Efficacy for Plasma Derivatives:

- Multiple pathogen reduction steps used in the fractionation process have been shown to be robust in removal of enveloped viruses.

Other Prevention Measures:

- Appropriate precautions to prevent exposure to infected monkeys

Suggested Reading

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