43 | TORQUE TENO VIRUS (TTV) COMPLEX

This fact sheet is archived and will not be further updated without further evidence that the pathogen poses a threat in the context of transfusion medicine.

43.1 | Disease agent

- Torque teno virus (TTV) including SEN virus (SENV)

43.2 | Disease agent characteristics

- Family: *Anelloviridae*; Genus: *Alphatorquevirus*. There are more than 30 species in this complex recognized.
- Virion morphology and size: Nonenveloped, nucleocapsid of unknown symmetry, 30–50 nm in diameter.
- Nucleic acid: Circular, negative-sense, single-stranded DNA, ~3.6–3.8 kb in length
- Physicochemical properties: Not well-described.

43.3 | Disease name

No associated disease; human infection with these agents is nearly ubiquitous and despite early associations with syndromes ranging from asthma to hepatitis to pregnancy-associated morbidity, no disease associations have been confirmed for TTV or other *Anelloviridae*.

43.4 | Priority level

- Scientific/Epidemiologic evidence regarding blood safety: Absent; transmission documented, but no disease associated despite extensive studies.
- Public perception and/or regulatory concern regarding blood safety: Absent
- Public concern regarding disease agent: Absent

43.5 | Background

- In 1997, Japanese investigators discovered TTV using representational difference analysis from a blood sample of a patient with posttransfusion non-A to -E hepatitis.
- The name torque teno virus was selected by a working group on the circoviruses after torques (necklace) and tenuis/teno (thin), thereby preserving the widely used term, TTV, which originally employed the initials of the patient (T.T.).
- Phylogenetic analysis showed TTV to represent the prototype virus for a vast group of heterogeneous agents unrelated to any known human or animal hepatitis viruses.
- SENV was discovered in Italy by using degenerate primers from TTV. Although originally thought to be novel, it was subsequently shown to be a member of a genetically diverse group of viruses in the TT complex.
- Despite their source from hepatitis cases, subsequent studies showed that these viruses are ubiquitous (prevalence rates up to 90% in adults) and that neither agent is a cause of human hepatitis.
- *Anellovirus* concentrations are under evaluation as markers for immune function after solid organ and hematopoietic stem cell transplantation.

43.6 | Common human exposure routes

- Parenteral transmission is the major route of transmission, but the fecal-oral route is similarly suspected to contribute to spread of the virus.
- Sexual transmission probable.

43.7 | Likelihood of secondary transmission

- Probably moderate, but the extent of secondary spread is not well-defined.

43.8 | At-risk populations

- Blood component recipients
- Injection-drug users
- Household contacts
- Sexual partners

43.9 | Vector and reservoir involved

- Humans

43.10 | Blood phase

- Persistent viremia is common.

43.11 | Survival/persistence in blood products

- Survives refrigeration and freezing.

43.12 | Transmission by blood transfusion

- Well documented in prospective studies

43.13 | Cases/frequency in population

- The prevalence of viremia ranged from 2% to 12% in blood donors; however, using primers for highly conserved sequences, TTV DNA has been detected in >90% of some populations.
- Prevalence of TTV ranges from 40% to 70% in hemophiliacs, dialysis patients and injection-drug users, but could be higher with different primers.

43.14 | Incubation period

- In nonhuman primates, viremia is detected 4–7 days after intravenous injection and 7–10 days after oral inoculation.

43.15 | Likelihood of clinical disease

- SENV and TTV were originally suspected to be etiological agents for acute and chronic non-A to -E hepatitis, hepatitis-associated aplastic anemia, acute liver failure, or cryptogenic cirrhosis, but these associations have been excluded.

43.16 | Primary disease symptoms

- No virus-specific symptoms have been identified.

43.17 | Severity of clinical disease

- No clinical disease association has yet been established; thus, any clinical relevance of the TT complex is speculative.

43.18 | Mortality

- None

43.19 | Chronic carriage

- Asymptomatic carrier state frequent

43.20 | Treatment available/efficacious

- No treatment required.
- Interferon treatment has been associated with viral clearance during treatment of coinfections with other hepatitis viruses.

43.21 | Agent-specific screening question(s)

- No specific question is in use.
- Not indicated because transfusion-transmitted dis-ease has not been demonstrated.
- No sensitive or specific question is feasible.

43.22 | Laboratory test(s) available

- No FDA-licensed blood donor screening test exists.
- Virus detected by NAT.

43.23 | Currently recommended donor deferral period

- No FDA Guidance and/or AABB Standard exist.
- There is no indication for deferral in the absence of disease associations.

43.24 | Impact on blood availability

- Agent-specific screening question(s): Not applicable
- Laboratory test(s) available: Not applicable.

43.25 | Impact on blood safety

- Agent-specific screening question(s): Not applicable
- Laboratory test(s) available: Not applicable.

43.26 | Leukoreduction efficacy

- Unknown but unlikely to be effective against a noncell-associated virus.

43.27 | Pathogen reduction efficacy for plasma derivatives

- Not inactivated by solvent-detergent.
- No data on other inactivation procedures, but some similarities to porcine circovirus 2 and chicken anemia virus exist, which demonstrate extreme resistance to pasteurization or prolonged dry heat methods similar to those proven effective for other pathogens in plasma products.

43.28 | Other prevention measures

- None

SUGGESTED READING

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