

STIR Bulletin1

Parvovirus case vignette

A teenage male was transfused a number of red cell units (RBC) as part of a chronic transfusion regimen. He presented 10 days later with lethargy and a 30g/L drop in haemoglobin. There was no history of bleeding. Investigations showed a new reticulocytopenia, raising suspicion for parvovirus B19 virus (B19V) infection. Acute B19V infection was confirmed by peripheral blood polymerase chain reaction (PCR). A blood sample collected prior to transfusion was retrospectively tested for B19V by PCR and was found to be negative. Further history excluded any sick contacts or other risk factors for parvovirus, and the transfused red cells were investigated as a possible source of infection. Donor testing was undertaken for all implicated donors. A single donor tested positive for B19V by PCR. The donor was asymptomatic at the time of the donation. These findings are consistent with transfusion-associated B19V transmission with a subsequent aplastic crisis. The patient required further transfusion support and hospitalisation for five days.

B19V is a non-enveloped DNA virus with tropism for erythroid precursors (Brown *et al.*, 1993). It is a common infection, in particular in children when it causes 'slapped cheek syndrome'. Parvovirus enters erythroid precursors in the bone marrow by binding to antigens of the P blood group system (Brown *et al.*, 1993). The infection of erythroid precursors leads to a transient reduction in erythropoiesis. In patients with chronic haemolysis due to sickle cell disease or membrane abnormalities this can lead to a severe anaemia, known as an aplastic crisis.

B19V was first identified in the blood of a healthy blood donor (Cossart *et al.*, 1975). Viraemia is well documented in blood donors and the prevalence estimates vary from 0.03 to 1% (Juhl *et al.*, 2018). Viraemia occurs 1 week after exposure reaching very high initial levels with low level viraemia persisting for a longer duration. Approximately 25% of adults are asymptomatic, and most manifest mild, non-specific symptoms that resolve after 5-7 days (Marano *et al.*, 2015). Three groups of patients may manifest severe symptoms: patients with shortened red cell survival, the immunocompromised patient and pregnant women. Severe symptoms may include red cell aplasia or polyarthropathy.

Despite the prevalence of viraemia in blood donors, transfusion-transmission remains a rarely reported event with relatively few reported cases in the literature. In the majority of cases, there is no significant consequence, which may limit reporting. In addition, transmission generally only occurs with high viral loads. Recipient immunity and co-transfusion of antibodies may further limit transmission. However, in patients with underlying risk factors for severe manifestations of parvovirus, transfusion-associated infections may cause severe consequences (Norja *et al.*, 2012).

Parvovirus B19 can be transmitted through transfusion of plasma-derived products. It is resistant to many methods of viral inactivation (Marano et al., 2015), so when combined with the asymptomatic high-level viraemia in many people, parvovirus is frequently identified in blood products (Norja et al., 2012). In the majority of cases, there is no significant consequence. However, in patients with underlying risk factors for severe manifestations of parvovirus, transfusion-associated infections may cause severe consequences (Norja et al., 2012).

The Blood Service has completed a prevalence study and risk assessment of parvovirus B19. The estimated risk of a significant complication was low overall, and the risk from community exposure far exceeded the transfusion risk for all patient and age groups. When published, the Blood Service will seek formal stakeholder feedback on their recommendation from the study, that blood donor screening is not implemented. The Blood Service recommend clinicians consider the possibility of parvovirus B19 infection in vulnerable patients. In the event of a clinically compatible illness, prompt investigation, diagnosis and treatment, is advised.

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