10 Transfusion Transmitted Infections

Definition

A report was classified as a **transfusion transmitted infection** if, following investigation: -

- The recipient had evidence of infection post-transfusion, and there was no evidence of infection prior to transfusion and no evidence of an alternative source of infection

And, either

- At least one component received by the infected recipient was donated by a donor who had evidence of the same transmissible infection,

Or

- At least one component received by the infected recipient was shown to contain the agent of infection

In 2004, and for the first time since surveillance of TTIs began in 1995, there were no reports of bacterial sepsis resulting from transfused components or of transmission of microbial infections for which blood in the UK is routinely tested. However, one report was made of an incident involving the transfusion of a unit of platelets contaminated with *Staphylococcus epidermidis* from a donor's arm but transmission to the recipient could not be confirmed.

Reports of suspected transfusion transmitted infections

34 reports of suspected transfusion transmitted infections were referred from blood centres throughout the UK (33 in England and Wales, 1 in Scotland) to the NBS/HPA Centre for Infection Surveillance for investigation. Only one report (hepatitis E) was determined to be a TTI according to the above definition.[i] Of the 33 remaining reports, in 31 (14 bacteraemia, 1 hepatitis A, 10 hepatitis B, 5 hepatitis C, 1 HIV) transfusion was not implicated as the source of infection. One (hepatitis C) involved a recipient transfused with 143 units during 1993 that could neither be confirmed nor refuted as a TTI, and one (HHV8) is pending complete investigation. All UK blood centres contributed to the scheme.

Case report of transfusion transmitted hepatitis E

A repeat donor reported onset of jaundice 23 days post donation. The archive sample from the donation was tested and found positive for HEV RNA. The platelets and red cells from this donation had been transfused and the recipients were traced and tested; the plasma had been discarded. The platelet recipient (55 year old female) was tested 84 days after transfusion, and had not developed markers for hepatitis E infection. The 65 year old male recipient of the red cell unit tested positive for HEV RNA and HEV IgM two months post-transfusion. He remained asymptomatic apart from mild jaundice and abnormal liver function tests, which may not have been noted if he had not been under surveillance. He became HEV RNA negative three months post-transfusion. No source of the donor's infection was identified. Sequence and phylogenetic analysis showed identity between donor and recipient viruses.

Reports of further incidents

Bacteria

1. A 75 year old female patient with chronic lymphatic leukaemia developed rigors, vomiting and pyrexia following transfusion of a 5-day old pooled platelet unit. The transfusion was terminated and the patient recovered. An identical strain of S.epidermidis was isolated from the transfused platelet pack and from the venepuncture site of one of the four contributing donors. However, the organism was not isolated from the recipient following the reaction. This is evidence of bacterial contamination of a platelet pool from a donor's arm and suggests arm cleansing was inadequate. Although transmission to the recipient was not confirmed it would seem likely.

[i] For inclusion and exclusion criteria and method of surveillance see SHOT 2003 annual report.[27]

2. A 5-day old grossly contaminated pooled platelet unit was identified by visual inspection by the hospital before it was issued to the ward for transfusion and 12 hours before it expired. The unit was returned to the blood centre for testing and was found to be contaminated with *Escherichia coli*. This represents a "near miss" incident, i.e. had it not been recognised, transfusion of a bacterially contaminated unit could have occurred. Subsequent testing of the donor found no evidence of E.coli on the donor's arm.

Other organisms

1. A report was received of an incident involving the transfusion of a unit of red cells from a donor who was retrospectively found positive for malaria antibodies. In January 2005, an individual with a past history (1986) of treated malaria presented as a blood donor. The individual had previously donated blood in September 2004 and because of a procedural error this donation was not tested for malarial antibodies. The red cells were transfused in October 2004 to an elderly female for treatment of a gastrointestinal haemorrhage. The recipient had died of her underlying disease in January 2005. Although no blood samples were taken in January, earlier samples showed no malarial parasites. Subsequent samples from the donor showed high levels of malarial antibodies but were negative for all other tests, including polymerase chain reaction (PCR). Whilst transmission of malaria is unlikely, this incident emphasises the need for robust procedures to ensure the reliability of discretionary testing. [ii]

2. In 2004, the National CJD Surveillance Unit reported a case of possible prion transfusion transmission.[25] In 1999, an elderly patient received a unit of non leucodepleted red blood cells. The donor developed symptoms of vCJD 18 months after donation and died in 2001. The diagnosis of vCJD in the donor was confirmed at post mortem. The recipient died of causes unrelated to vCJD five years after the transfusion. Autopsy revealed protease-resistant prion protein (PrP^{res}) in the spleen and in a cervical lymph node. The patient was a UK resident, so dietary exposure to bovine spongiform encephalopathy (BSE) cannot be excluded. It is uncertain whether the individual would have subsequently developed clinically evident vCJD or posed a risk for iatrogenic transmission. The patient has a different genotype at codon 129 of the prion protein to that found so far in people with vCJD. This may affect estimates of future incidence of vCJD in the UK.

Cumulative data, 1995-2004

Figure 9, page 47, shows the cumulative number of reports of suspected TTI's and post-transfusion reactions made to NBS/HPA Centre for Infections Surveillance since October 1995. Table 15, page 47, shows the cumulative number of reports of TTIs by year of transfusion.

COMMENTARY

- In 2004, and for the first time since surveillance of TTIs began in 1995, there were no reports of bacterial infection by transfused components or of transmission of microbial infections for which blood in the UK is routinely tested. However, one report was made of an incident involving the transfusion of a unit of platelets contaminated with S.epidermidis from a donor's arm but transmission to the recipient could not be confirmed.
- The identification of a case of transfusion transmitted hepatitis E in 2004 prompted the insertion into the donor selection guidelines in 2005 of an entry for hepatitis E (http://www.transfusionguidelines.org.uk/docs/pdfs/tdsg02r3.pdf). The guideline states that an individual must not donate blood until 12 months after their (or their contact's) recovery from hepatitis E infection. This is compatible with guidelines for other types of viral hepatitis. Prior to this change, general guidance for any individual with a history of hepatitis infection applied.

[ii]Discretionary testing is testing that is performed on selected donations in addition to routine mandatory testing. This includes testing for malaria, and other infections, where a donor has reported possible travel or other exposure during the pre-donation donor health check, as recommended in the donor selection guidelines. For further information see UK Guidelines at http://www.transfusionguidelines.org.uk.

- Post donation information led to the ascertainment of the transfusion transmitted hepatitis E incident in 2004; the recipient was asymptomatic and the transmission may not have been detected had the donor not contacted the blood service about his suspected infection. Although there were unlikely to be any serious consequences following this transmission of hepatitis E, this incident illustrates the importance of post donation information and the need to act upon it.
- Surveillance of TTIs tends to be biased towards ascertainment of acute cases that are clinically apparent. Each year the number of reports received is small and fluctuations are to be expected. However, this year's findings are consistent with the current very low estimated risk of HIV, HCV and HBV infectious donations entering the UK blood supply,[26] and with the implementation of the strategy to divert the first 20-30mL of each blood donation in 2002 to reduce the risk of bacterial contamination of components.
- With the report of a second case of possible prion transmission in 2004, evidence to support the transmission of human prion disease through transfusion accumulates. However, in both cases the possibility that the recipient acquired infection through dietary exposure to BSE could not be ruled out. A number of precautions are in place to reduce the risk of transmission through blood transfusion.
- The Standing Advisory Committees (SAC) of the Joint UKBTS/NIBSC Executive Liaison Committee (JPAC) make recommendations to the Guidelines for the Blood Transfusion Services in UK in relation to the prevention of transfusion-transmitted infections. For example, SAC Transfusion Transmitted Infection (SACTTI) regularly reviews the residual risk of transfusion transmitted HCV, HIV and HBV infections to assess the need for additional testing methods, such as HIV RNA testing, HBV DNA or anti-HBc. SAC Care and Selection of Donors ensures donor deferral criteria are optimal in terms of exclusion of donors with behaviour that may put them at high risk of contracting transfusion transmissible infections.

RECOMMENDATIONS

- Efforts to prevent bacterial contamination of blood components should continue. These include
  - Continuation of diversion of the first 20-30 mL of the donation (likely to contain any organisms entering the collection needle from the venepuncture site).
  - Careful attention to adequate cleansing of donors' arms.
  - Adherence to BCSH guidelines (1999)[14] with regard to the visual inspection of blood components for any irregular appearance immediately prior to transfusion.

  Action: UK Blood Services, hospital transfusion laboratories, staff undertaking pre-transfusion bedside checking
- Hospitals should consult guidelines and the blood service about the investigation of transfusion reactions suspected to be due to bacteria. Attention should be paid to the sampling and storage of implicated units or their residues.

  Action: HTTs
- Hospitals should continue to report and investigate all possible incidents of post-transfusion infection appropriately and adequately.

  Action: HTTs
- UK Blood Service collection teams should ensure donor selection guidelines are adhered to at all times in order to prevent transmission of blood borne infections.

  Action: UK Transfusion Services

Figure 9: Reports of possible TTI's in the UK in England and Wales made to NBS/HPA Centre for Infections surveillance, by year of report to 31/12/2004 (Scotland included from 10/98)

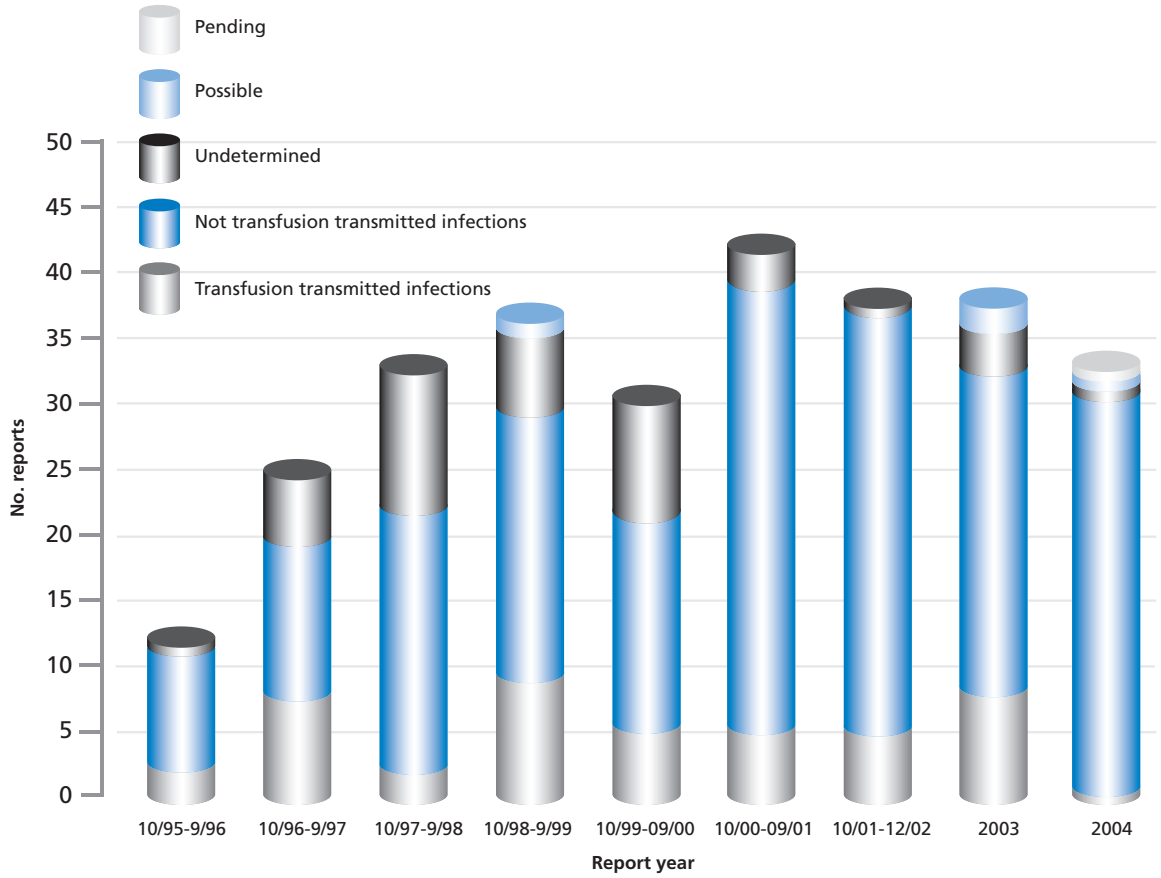

Table 15

Cumulative total of reports of TTI's made to NBS/HPA Centre for Infections surveillance between 1/10/1995-31/12/2004 by year of transfusion and infection. The number of incidents is shown with the total number of identified infected recipients in brackets.

Year of transfusion	Pre 1997	1997	1998	1999	2000	2001	2002	2003	2004	Total	Deaths[a]
Infection											
HAV	1(1)	-	-	-	1 (1)	-	-	-	-	2	-
HBV	3(3) [b]	1(1)	1(1)	2(3)	1(1)	-	1(1)	1(1)	-	10	-
HCV	1(1)	1(1)	-	-	-	-	-	-	-	2	-
HIV[c]	1(3)	-	-	-	-	-	1(1)	-	-	2	-
HEV								-	1(1)	1	-
HTLV I	2(2)	-	-	-	-	-	-	-		2	-
Bacteria	2(2)	3(3)	4(4)[2a]	4(4)[a]	7(7)[3a]	5(5)	1(1)	3(3) [a]		29	7
Malaria	-	1(1)[a]	-	-	-	-	-	1(1)	-	2	1
vCJD	1(1)	-	-	-	-	-	-	-	-	1	-
Possible prion transmission	-	-	-	1(1)	-	-	-	-	-	1	-
Total [d]	11(13) [b]	6(6)[a]	5(5)[2a]	7(7)[a]	9(9)	5(5)	3(3)	5(5)	1(1)	52	8

Notes: [a] Infection was implicated in the death of a recipient.

[2a] Infection was implicated in the deaths of 2 recipients.

[3a] Infection was implicated in the deaths of 3 recipients.

b One household member who was caring for the recipient has been diagnosed with acute HBV.

c One additional investigation failed to confirm or refute transfusion transmission of HIV infection during the early 1990s. As the patient had received multiple transfusions, and had no other risk factors for infection, transfusion with HIV infectious blood was concluded to be the probable, although unproven, source of infection.