12 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

Reports of suspected transfusion transmitted infections

Forty-six reports of suspected transfusion transmitted infections were made from blood centres throughout the UK (41 in England and Wales and 5 in Scotland) to the NBS/HPA Centre for Infection Surveillance during 2005. Three reports (1 HBV and 2 bacteria) were determined to be TTIs according to the above definition. Two reports were of predicted HAV transmissions. 40 cases were concluded as not transfusion transmitted infections (14 HBV, 6 hepatitis C (HCV), 1 dual HBV and HCV, 1 HTLV, 4 HIV and 14 bacteria). One case (HCV) is pending complete investigation. A further report was received from the Health Protection Agency of a clinical diagnosis of vCJD in a blood transfusion recipient. All UK blood centres contributed to the scheme.

Case report of transfusion transmitted hepatitis B

A previously hepatitis B surface antigen (HBsAg) negative donor was found to be positive after routine testing in August 2005. An archive sample of a donation made four months earlier was retested and found to be weakly positive for HBV deoxyribonucleic acid (DNA), but negative for all other HBV markers. The plasma from this donation had been discarded however the red cells had been transfused to a female recipient, aged 55 years following a gastro-intestinal haemorrhage. This recipient was tested and found to have evidence of a recently acquired hepatitis B infection: anti-HBV core IgM, anti-HBV core (HBc) and anti-HBV e-antigen (anti-HBe) positive and HBsAg and HBV DNA negative. The investigation concluded that the HBV infection in the recipient was due to an HBV infectious donation in the early acute phase of infection.

Case report of transfusion transmitted *Enterobacter cloacae*

One recipient (63 year old female) received four platelet units following a cerebral bleed due to chronic severe resistant ITP in March 2005. The first 3 units (two apheresis and one pooled platelets) were transfused without problems, however after transfusion of the fourth unit (3 day old pooled platelets) the recipient developed rigors, temperature, tachycardia and wheeze. *Enterobacter cloacae* was cultured from the patient and from the pooled platelet unit. All 4 donors were investigated: *Enterobacter cloacae* was not cultured from arm swabs from any of the donors. Blood and urine cultures from all four donors were also negative. The patient made a full recovery within 12 hours following treatment. The probable source of the recipient's reaction was concluded to be a unit of platelets contaminated with *Enterobacter cloacae*: no source of contamination was identified.

Case report of transfusion transmitted *Staphylococcus epidermidis*

One recipient (36 year old male) developed pyrexia and rigor following transfusion of a pooled platelet unit. Cultures from the implicated unit and the patient grew penicillin resistant *Staphylococcus epidermidis*. Molecular types of isolates from the pack and patient were indistinguishable using pulsed-field gel electrophoresis (PFGE). Four donors were recalled for arm swabbing and, although a number of staphylococci were grown, none of the donors was colonised with the identical strain of *S.epidermidis* found to be contaminating the pack. Skin flora can vary from day-to-day and there was a considerable gap between donation and swabbing, so a donor could not be ruled out as the possible source of contamination. Three related red cell units were recalled; all were free from contamination. The fourth red cell unit was transfused with no report of any adverse events. This case was concluded to be bacterial contamination with *S.epidermidis* of a pooled platelet unit, assumed but not proven to originate from the skin of one of the donors.

Reports of further incidents

Hepatitis A

1. In December 2005 the blood services were notified of a confirmed acute hepatitis A infection in a regular blood donor, who developed symptoms eight days following donation. The archive was tested by polymerase chain reaction (PCR) and found to be positive. The red cell unit was discarded, but the platelets had been used in a pooled platelet unit (suspended in plasma from another donor) and transfused to a female recipient 2 days after donation. Upon notification of the infection in the donor, the recipient was given passive and active immunisation, as per recommended guidelines[25] and tested for HAV. Traces of HAV antibodies were found, which may have been passive transfer from previous blood transfusions. A blood sample 3 months later from the recipient was HAV IgM positive, at a low level and there was a mild elevation in liver function tests. The conclusion of the investigation was that although transmission from a donor with confirmed hepatitis A was predicted, prompt immunisation appears to have prevented transmission or reduced the impact to sub-clinical levels with no sequelae.

2. In July 2005 a donor notified a blood centre that he had been clinically diagnosed with hepatitis A, 3 weeks after donation. The red cell component of this donation was discarded. The recipient of the platelets died of other causes, prior to testing for HAV. The FFP was transfused to a patient with alcoholic liver failure. When tested this recipient had evidence of immunity to HAV (HAV IgM negative, total HAV positive). This patient subsequently died. There was insufficient sample from the donor's index archive to test by PCR. A previous archive sample from the donor was HAV IgG negative. The donor has not responded to requests for additional samples and to date no serology for the donor has been seen by the blood services. The donor's record is flagged for HAV testing at their next attendance. This case is concluded to be a predicted potential transmission of hepatitis A, where the diagnosis in the donor was not confirmed and no transmission to any recipient was detected due to death or probable immunity.

vCJD

In early 2006 a further case of vCJD associated with a blood transfusion was reported. In 1997 a patient received a unit of non-leucodepleted red blood cells. The donor developed symptoms of vCJD about 20 months after donation and subsequently died. The recipient developed symptoms in 2005 and a clinical diagnosis of vCJD was made in early 2006. The recipient is a methionine homozygote at codon 129 of the prion protein gene. As the recipient is a UK resident, dietary exposure to bovine spongiform encephalopathy (BSE) cannot be excluded. The recipient was alive at the time of preparation of this report. (For more information on variant CJD see http://www.cjd.ed.ac.uk/).

Reports from previous years

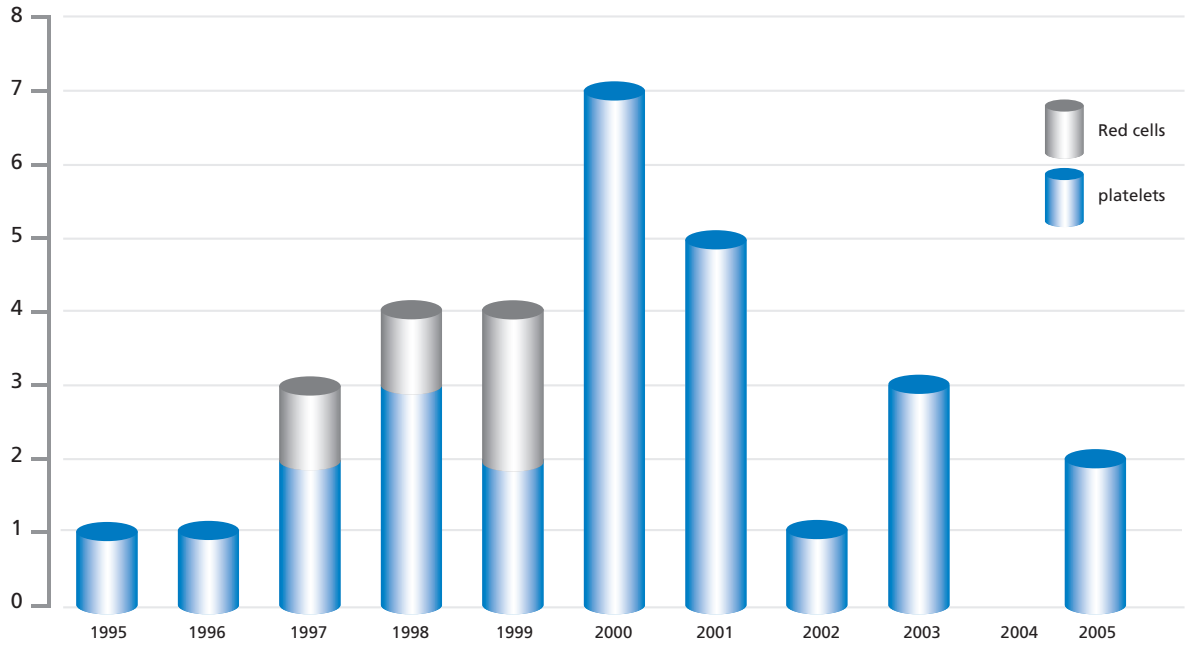
The case reported as pending in 2004 (HHV-8) is now nearing completion; all donors have been recalled and have provided blood samples for HHV-8 testing. Results will be reported when available.

Cumulative bacterial data

Since 1995, 31 cases of transfusion transmitted bacterial infection have been reported, of which 6 recipients died (Figure 18). The majority of these cases relate to platelet units (9 apheresis and 18 pooled). In 2004 there was a further incident involving contamination of a pooled platelet pack with *staphylococcus epidermidis*, which did not meet the TTI definition because transmission to the recipient was not confirmed, but it would seem likely (not included in figure 18).

Figure 18

Confirmed bacterial transfusion transmitted infections, by year of transfusion and type of unit transfused (Scotland included from 10/1998)



Further cumulative data is available at http://www.hpa.org.uk/infections/topics_az/BIBD/menu.htm.

COMMENTARY

- For a case to be reported to this surveillance system, an infection must first be diagnosed, transfusion suspected as the means of acquisition/transmission, and this suspicion has to be communicated to the blood service. Under-ascertainment can be the result if omissions occur at any of these stages. Therefore surveillance of TTIs tends to be biased towards ascertainment of acute cases that are clinically apparent or investigation of newly acquired infection in returning blood donors. However, each year some infections among individuals who have received blood transfusion(s) in the past are reported to the blood services and investigated. All cases reported to the blood services have been reported to SHOT.
- Each year the number of reports received is small and fluctuations are to be expected. 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.
- Notification from blood donors of infections that developed post donation enabled the blood service to identify two cases where transmission of HAV was predicted. Prompt action with passive and active immunisation to one recipient appears to have either prevented transmission or reduced the impact to sub-clinical levels. This emphasises the importance of blood donors notifying the blood service of infections detected after donation.
- The report of a third case of vCJD infection in a recipient of non-leucodepleted red blood cells provides further evidence that vCJD may be transmitted through blood transfusion. In all three cases the possibility that the recipient acquired infection through dietary exposure to BSE could not be ruled out. For the first reported case it was estimated that the chance of observing a case of vCJD in a recipient in the absence of TTI was about 1 in 15,000 to 1 in 30,000.[26] A number of precautions are in place to reduce the risk of transmission through blood transfusion. These include leucodepletion of blood components and the exclusion of candidate blood donors who have received transfusions since January 1st 1980 from donating blood.

- Although 16 cases suspected to be due to bacteria were reported and investigated during 2005, only two cases were confirmed. It is important that hospitals notify the blood services as soon as bacterial infection in a recipient is suspected and return the pack for complete investigation. The small number of confirmed bacterial cases seen in the past two years is encouraging and suggests that actions to reduce bacterial contamination, such as sample diversion pouches and enhanced donor arm cleansing, are effective.
- The Standing Advisory Committees (SAC) of the Joint UKBTS/NIBSC Professional Advisory 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, the SAC Transfusion Transmitted Infection (SACTTI) regularly reviews the residual risk of transfusion transmitted HCV, HIV and HBV infections to assess any need for additional testing methods, such as HIV RNA testing, HBV DNA or anti-HBc. The 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 increased risk of contracting transfusion transmissible infections.

RECOMMENDATIONS

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

  Action: HTTs.
- Donors should be reminded to report any infections developing post donation to their local blood centre.
- 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 Blood Services.
- 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)[20] with regard to the visual inspection of blood components immediately prior to transfusion, to check for any irregular appearance.

  Action: UK Blood Services, hospital transfusion laboratories, staff undertaking pre-transfusion bedside checking.
- Hospitals should consult 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 and packs returned to the blood service for testing.

  Action: HTTs.