Fatal Yersinia enterocolitica transfusion reaction

Although septicemia is a rare complication of blood transfusion, episodes of transfusion associated sepsis may be fatal. A recent review demonstrated that about half of all reported transfusion-related deaths were caused by transfused erythrocytes involved Yersinia enterocolitica alone. These transfusion reactions are presumed to result from a chain of coincidences in which a mild infection in the donor gives rise to a transient bacteraemia during donation. As Y enterocolitica is one of the few human pathogens that can grow at 4°C, after storage for one to three weeks at 1–6°C a unit of blood could contain numerous bacteria and associated endotoxins.

Human Y enterocolitica infections are particularly frequent in Belgium. Medium-dose diarrhoea is a common manifestation of Y enterocolitica infection and it often goes unrecognized. After the enteritis organism may persist for some time in mucosal, submucosal or lymphoid tissues, and give rise to episodes of symptomatic or cryptic bacteraemia.1

We report a case of fatal Y enterocolitica septicemia in an 82 year old man caused by a contaminated unit of red cells that was collected from an apparently healthy asymptomatic blood donor. The patient had a history of severe cardiovascular disease and chronic renal insufficiency. Three weeks before admission to hospital he developed atrial flutter for which coumarin treatment was started.

On 19 August 1995, the patient was admitted to hospital because of a two day history of anal blood loss, abdominal discomfort, and vomiting. He was haemodynamically stable but blood examination revealed an international normalised ratio (INR) of 10.8 and a haemoglobin of 88 g/l. Colonscopy revealed a tumour of the ascending colon causing mucosal bleeding. The patient was treated with vitamin K. Even after correction of coagulation (INR 1.53), blood loss per anum persisted and haemoglobin further decreased to 73 g/l. One unit of packed cells was given. During the transfusion the patient developed a temperature up to 38.7°C. After transfusion of about 200 g red cell concentrate, the transfusion was stopped and three blood culture sets were taken. Also a sample from the unit of packed red blood cells was inoculated on a separate culture set. Meanwhile the transfusion bag was stored in the refrigerator. The fever was transient, but a few hours later the patient developed shock with hypotension and pallor. Plasma expanders, sympathomimetics, and antibiotics (amoxicillin and gentamicin) were started, but shock and multiorgan failure were progressive. The following day, after incubation at 36.5°C, there was growth of motile Gram negative rods in the culture set inoculated with the packed red blood cells. These were identified as Y enterocolitica biotype 2. Therefore, antibiotics were switched to fluoroquinolones. The patient died four days after the transfusion because of septicaemic shock.

Identification was confirmed by the Belgian Reference Laboratory for Yersinia (G Wauters, Université Catholique de Louvain, Brussels). In addition, blood from the blood-bag side tube of the transfusion bag was inoculated on an aerobic blood culture bottle and remained sterile. Absence of Y enterocolitica in the low temperature growing unit is consistent with a low level of bacterial contamination at the time of collection. The donor of the blood sample was traced. He was a 58 year old healthy man who had spent his holiday in Switzerland the week before the blood donation. He did not recall any gastrointestinal, disturbance, nor did any member of his family. However, he had been very tired after his last blood donation on 31 July 1995, possibly indicating a subclinical infection. A coagulopathy was performed 50 days after the donation but it was negative for enteropathogens even after prolonged enrichment modified on Rappaport medium. Serum taken at the same time demonstrated an antibody titre against Y enterocolitica serologo 0:9 of 1:200 suggesting a recent infection as serum taken at the time of donation showed no agglutination.

About 40% cases of transfusion reaction caused by Y enterocolitica have been described in the English language literature with a mortality rate higher than 60%. Y enterocolitica is the organism most commonly implicated in red cell related transfusion sepsis. The association between Y enterocolitica and transfusion related sepsis can be explained by the fact that this microorganism can grow at refrigerator temperature, and by the stimulation of its growth by exogenous iron (in most reported cases red cell units were more than 25 days old). After several weeks of conservation these units may contain sufficient free haemin to stimulate the multiplication of Y enterocolitica.1 The unit with packed red cells transfused in our patient was three weeks old.

A few studies were done regarding the growth and endotoxin production of Y enterocolitica in packed erythrocytes. When such units were inoculated with low levels of Y enterocolitica (0.1–1 colony forming units (cfu)/ml) the organism proliferated to high titres (>103 cfu/ml) after a lag period of 10–20 days. Endotoxin was detected only after three days.1,2 Several solutions have been proposed to prevent this life threatening infection. Questioning the donors about gastrointestinal symptoms does not appear a sensitive predictor of Y enterocolitica bacteraemia. Only two thirds of donors implicated in yersinia transmission recalled gastrointestinal illness before donation.1 Serology gives numerous cross reactions and false negative results in acute infection.3 A decrease in storage time of packed red blood cells to less than three weeks would have a devastating effect on blood supplies. Also, the addition of antibiotics may cause problems that resolves because of anaphylaxis or other adverse drug reactions. Culturing of all units would be logistically very difficult. Furthermore, if culture is done soon after donation, when fewer than one cell per sample volume is present, it will not be detected.

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Alcohol estimation at necropsy: epidemiology, economics and the elderly

Having read this paper with interest, we feel that it raises several important issues pertinent to necropsies performed on behalf of HM coroner or the procurator fiscal, of which the authors appeared to be unaware.

This is a common misunderstanding that, given the apparently rich source of material from coroners’ necropsies, forensic pathologists seem reluctant to undertake any research using this material. In Britain there have been no noious publications concerning blood alcohol levels in a medicolegal necropsy population because there is no provision under present law for such a study.

Postmortem examinations in England and Wales are carried out either on the request of the coroner, using powers as set out in the Coroners Act 1988 or, with the permission of the person lawfully in possession of the body, under the conditions set out in the Human Tissue Act 1961. In Scotland, the procurator fiscal’s power to request a post-mortem examination is grounded in common law rather than statute. The Human Tissue Act 1961 applies to Scotland as to England and Wales.

Where a coroner has decided to open an inquest, he or she may direct that samples be removed from the body during the course of the postmortem examination for “special examinations” including toxicology. The person carrying out the postmortem examination is required to preserve material that bears upon the cause of death for as long as the coroner thinks fit.1 In England and Wales, the sole purpose of the postmortem examination is to assist the coroner in inquiries that are essentially limited to who the deceased was and how, where, and when they came to their death. Tissue cannot be removed or preserved for any other purpose under the coroner’s authority. In Scotland, the procurator fiscal’s enquiries are directed towards ascertaining “the truth or otherwise of the information given to him as to the date: to investigate the circumstances impartially and in the public interest without fear or favour and to get to the truth: to ensure that any dangerous or faulty practices are exposed so as to prevent their recurrence: to preserve from corruption the sources of evidence: to ensure that homicide does not go undetected and to make, when required, a true report to the officers of the Crown.” Neither the coroner nor the procurator fiscal

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