A fatal case of post-transfusion sepsis caused by *Yersinia enterocolitica* after delivery

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Introduction

In recent years there has been a progressive strengthening of the safeguards that protect patients from unsuitable blood products. Blood donors are asked several questions concerning possible risk factors that may affect the safety of the donated blood and are deferred from donation if some of them are acknowledged. Moreover, blood donations are tested for numerous infectious agents, which has led to a significant reduction of viral infections after blood transfusion[1,2]. However, bacterial sepsis remains a significant hazard of transfusion. Among all blood components, red blood cell preparations are the most used and they are more frequently infected by Gram-negative bacteria, primarily members of the Enterobacteriaceae family[3-5]. *Yersinia enterocolitica* (*Y. enterocolitica*) is not inhibited in the range of 2-6 °C, which is the storage temperature of red cell concentrates. This, in addition to the pH of preparation of red blood cell units (7.3), supports bacterial growth[6].

Here we report a fatal case involving a woman, who had haemorrhagic shock in the early post-partum period. She required the transfusion of seven bags of red blood cells which, shortly after, led to the onset a *Y. enterocolitica* post-transfusion sepsis with a fatal outcome. In this case, the microbiological investigation performed on cadaveric blood supported the diagnosis of sepsis-related death. The presumably infected transfused red cell concentrate was identified by detection of high titres of antibodies against *Y. enterocolitica* in the donor's plasma.

The case

A 36-year old woman, gravida 2, para 1, at late term (gestational age 41 weeks +3) after induction of labour, had a vaginal delivery. She lost a total of 1,800 mL of blood during the delivery and required the transfusion of seven bags of red blood cells.

During the transfusion the woman's body temperature increased to 38 °C and she had some episodes of bilious vomiting and haematemesis, but a trans-abdominal ultrasound did not reveal any pathological signs. The patient also require mechanical ventilation because of severe respiratory failure. Antibiotic therapy with teicoplanin and subsequently with linezolid was administered and the patient was supported with dobutamine, adrenaline and noradrenaline.

During the 4 days after delivery, the woman's general condition worsened, with marked hypotension and refractory shock, associated with disseminated intravascular coagulation, acute renal failure with acute tubular necrosis, hepatic failure and an acute respiratory distress syndrome despite the mechanical ventilation. This pathological picture led to the death of the patient. An anaerobic blood culture from the patient was positive for *Y. enterocolitica*, but this result was obtained only after the patient's death.

A complete autopsy was performed 24 hours later. Histological investigations were performed on sections of organs taken during the autopsy and a microbiological analysis was carried out on post-mortem blood collected from the right and left heart cavities during the autopsy.

The autopsy revealed the presence of several subepicardial and subpleural petechiae, whereas the other organs did not show any specific alteration except for a severe vascular congestion and oedema. The histological examination of lung samples showed alveolar oedema, hyaline membranes lining the denuded alveolar walls, alveolar infiltrates of polymorphonuclear neutrophil leucocytes, alveolar haemorrhages and fibrin thrombi in the small arteries; in kidney samples there were copious fibrin thrombi in capillaries, extensive interstitial haemorrhages and acute tubular necrosis.

We used Seeplex Diarrhea-B2 ACE Detection (Seegene, Inc., Songpa-Gu, Seoul. Korea): this assay is composed of primer mixtures that are able to identify *Clostridium perfringens, Y. enterocolitica, Escherichia coli O157:H7,* and VTEC (Verocytotoxin-producing *Escherichia coli)*. Polymerase chain reaction (PCR) inhibitory effects were assessed by co-amplification of an internal control included in the primer mixtures. Multiplex PCR was performed according to the manufacturer's instructions. The detection limit declared by the manufacturer is 200 copies/reaction. PCR products

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