



### G130 The Application of Forensic Microbiology in a Fatal Case of Transfusion-Transmitted *Yersinia Enterocolitica* Sepsis

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The goal of this paper is to underline the usefulness of the use of forensic microbiological analysis to explain the cause of death in case of infective disease.

This presentation will impact the forensic science community by presenting the rare case of septic shock due to transfusion-transmitted *Yersinia enterocolitica*. The use of postmortem microbiological investigation on cadaveric blood gives support to the forensic pathologist to diagnose sepsis-related death. In this case, the forensic microbiological analysis allows the exact correspondence between the pathogen agent isolated from transfused Red Blood Cells (RBCs) and the etiological agent that determined the fatal sepsis, *Yersinia enterocolitica*.

This presentation concerns the fatal case of a woman infected by an RBCs transfusion bag contaminated with *Yersinia Enterocolitica*. *Yersinia enterocolitica* is a pleomorphic gram-negative bacillus that belongs to the family Enterobacteriaceae and causes mild disease, most frequently acute diarrhea, terminal ileitis, mesenteric lymphadenitis, and pseudoappendicitis. *Yersinia enterocolitica* most commonly affects young individuals, but whether this represents an increased susceptibility or a greater likelihood of developing symptomatic illness is unclear. Human yersiniosis is attributed to contaminated pork, milk, water, and tofu consumption, as well as blood transfusion. Bacterial sepsis has become the most frequent infectious complication of transfusion, but cases of transfusion-transmitted *Yersinia enterocolitica* sepsis with bacterial isolation are very rare in postmortem examination.

A 37-year-old woman, pregnant with her second child, was admitted to the gynecology and obstetrics unit with diagnosis of post-term pregnancy (41+3 weeks of pregnancy). The course of pregnancy was physiological. The fetus was in cephalic presentation, the amnio-chorial membranes were intact. On the third day of hospitalization labor was induced following amniorrhexis and, in the absence of contractile activity, the oxytocic perfusion was started. The patient responded positively to the oxytocic perfusion and gave birth to a female child with eutocic parturition. The prophylaxis of postpartum hemorrhage was made by administering of oxytocin and methylergometrine, and the suture of a vaginal laceration was performed. The woman, after the parturition, was affected by a hemorrhagic postpartum shock determined by trans-vaginal blood loss estimated at 1800ml during and after the parturition. Blood chemistry and blood count laboratory tests were performed and showed reduction of Hb, Hct (Hb 5.9, Hct 18.6) with a condition of acute anemia. On the fourth day of hospitalization (first postpartum day), the patient was transferred to the intensive care unit for the serious anemic condition; serial blood chemistry and blood count laboratory tests were performed and fresh frozen plasma and RBCs bags were transfused. The patient's clinical condition worsened and she showed a state of shock refractory to therapy, kidney failure, and CID; on the fifth day of hospitalization (second postpartum day), she was admitted to the operating room for an abdominal laparotomy and hysterectomy leaving uterine adnexa *in situ*. In the following days, the woman showed hemodynamic instability, respiratory distress despite the support with vasoactive amines, and mechanic ventilation. On the eighth day of hospitalization (fifth postpartum day), she died of septic shock. A complete postmortem examination was performed 24 hours after death and showed surgery outcomes of hysterectomy. Subpericardial and subpleural petechiae were detected. The other organs did not show specific alterations except for intense vascular congestion and generalized edema. Histological examination showed in lung specimens alveolar septa mildly thickened by edema and capillary congestion, alveolar edema, hyaline membranes lining the denuded alveolar walls, alveolar infiltrates of polymorphonuclear neutrophilic leukocytes, pigmented macrophages, monocytes and plasma cells, alveolar hemorrhages; in kidney specimens acute tubular necrosis and wide hemorrhages. In all organs, in particular in the lungs, small vessels contain fibrin thrombi. The cause of death was a fatal septic shock. On blood samples collected during the autopsy a microbiological analysis was performed using PCR to isolate pathogens responsible for septic shock. PCR analysis showed positive for *Yersinia Enterocolitica*. After the isolation of *Yersinia Enterocolitica* from the dead woman's blood sample, the infected transfused RBCs were identified. High titers of antibodies against *Yersinia Enterocolitica* were detected in the donor's plasma sample one month after blood donation. The donor had no clinical signs of intestinal infection at the time of donation.

**Transfusion-Transmitted, Forensic Microbiology, Septic Shock**