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Severe *Serratia liquefaciens* Sepsis following Vitamin C Infusi by a Naturopathic Practitioner

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ABSTRACT

A 66-year-old female patient developed severe *Serratia liquefaciens* sepsis follov infusion treatment by a naturopathic practitioner. The clinical course of the infect characterized by several complications, and the direct costs of the hospital stay ar 40,000 Euro. Genotypically identical *S. liquefaciens* was isolated from the residu given to the patient, as well as from the washbasin overflow and from two other i careful inspection of the dispensing facilities and review of procedures used to pr revealed several indications of poor hygiene. However, the source of contaminati fully clarified. This case report raises questions about the local facilities and pers required for naturopathic practitioners to conduct invasive procedures and demon hygiene can lead to severe morbidity and high cost.

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CASE REPORT

A 66-year-old female patient presented with symptoms of septic shock, meningis consciousness. Her medical history revealed a carcinoma of the cervix (stage IIIb treated by primary radiotherapy 3 years previously. The day before, she had recei infusion containing 200 ml (i.e., 30 g) of vitamin C, 50 ml of lactopurum (homeo of lactic acid in water for injection), and 250 ml of isotonic 0.9% sodium chloride peripherally inserted venous catheter. Immediately after termination of the infusi

suffered from neck pain, vomiting, and fever. First, she was given symptomatic n
antipyretic and antiemetic drugs), but during the night, her state worsened dramat

On admission to the intensive care unit, the patient was comatose, her skin was p
and the peripheral pulses were not palpable. Clinically, we found signs of mening
count was 22.8×10^9/liter, and the level of vitamin C in serum was 55.9 mg/liter
5.0 to 15.0 mg/liter). Blood cultures revealed growth of *S. liquefaciens* that was s
piperacillin plus tazobactam, cotrimoxazole, cefotaxime, ceftriaxone, and gentam
to ampicillin, cefazolin, cefuroxime, and nitrofurantoin. At the time of admission
tazobactam were given empirically as antibiotic medication. A sample from the r
original infusate was obtained for culture and also revealed growth of *S. liquefaci*
by API 20E (BioMerieux). The initial antibiotic therapy was conducted until the
admission, and *S. liquefaciens* could not be isolated any longer after this initial pe

The further clinical course was characterized by a protracted septic shock with di
intravascular coagulation (D-dimers > 20 mg/liter); the clinical picture of systemi
response syndrome, with a great need for catecholamines to support circulation; a
distress syndrome; reversible acute renal failure; severe anasarca;, and transient h
Mechanical ventilation had to be conducted for about 1 month. On the 37th day a
patient was transferred to a medical unit, and on the 68th day, the patient, who wa
physical and psychic state (reactive depression), was dismissed from the hospital
treatment in a rehabilitation center.

S. liquefaciens is an infrequent but increasingly recognized cause of transfusion-r
associated with a high rate of mortality (1, 7). Recently, two outbreaks of *S. lique*
infections in a critical care unit (4) and at a hemodialysis center (3) have been des
the environmental sources of *S. liquefaciens* remained unclear. In this paper, we p
of severe *S. liquefaciens* sepsis following administration of a vitamin C infusion b
practitioner, which was associated with a contaminated washbasin overflow and p
practice.

Inspection and microbiological investigations. After notification to the loc
administration, we were asked to assist in the investigation of the case. First, we c
inspection of the dispensing facilities. The room where the infusion was prepared
was small, and there was only limited workspace for preparation of infusions. Th
constructed with an overflow hole, a type of design that is not recommended for u
hospitals. A dispenser for hand disinfectant solution was lacking.

Second, we undertook a review of the procedure used to prepare the infusate. Thi examples of poor aseptic technique. (i) Some of the infusion components were ta punctured bottles. (ii) In order to remove air bubbles, the infusion tubing was wo with the distal end of the tubing touching the washbasin overflow hole. (The was safeguard to prevent flooding in case a tap is left running while the plug is in; the located at the top of the washbasin.) (iii) Compliance with hand disinfection was the puncture site of the infusion container was not disinfected.

Samples were taken from the table surface and from different sites of the washba aerator, armatures, surface, and overflow hole) for microbiological analysis. Exce from the overflow, none of the samples revealed growth of *S. liquefaciens*. The re another two repeatedly punctured infusion bottles containing water for injection a sodium chloride solution drawn from the same room also revealed growth of *S. li* Samples from sealed containers (identical batches) of the infusion components (i. lactopurum, and isotonic 0.9% sodium chloride solution) as supplied by the manu no bacterial growth. Pulsed-field gel electrophoresis (PFGE) showed that all isola genotypically identical to the *S. liquefaciens* isolates from the patient's blood and infusate given to the patient. Figure 1 shows the PFGE fingerprint patterns of clir environmental *S. liquefaciens* strains.

Discussion. There is no doubt that the severe *S. liquefaciens* sepsis described in acquired from a contaminated naturopathic vitamin C infusion. The protracted co complications associated with this case underline the severe morbidity associated sepsis. In transfusion-related *S. liquefaciens* sepsis, the fatality rate is reported to (7). The direct cost of the hospital stay is estimated at 40,000 Euro, the range prev for nosocomial bloodstream infections (6).

Our findings strongly suggest that contamination of the infusion had occurred on naturopathic practitioner, although the mode of contamination could not be fully possibility of intrinsic contamination of one of the components used to prepare th largely eliminated, since samples from other containers from the batches supplied manufacturers were found to be sterile. In addition, the same *S. liquefaciens* strai used components from different manufacturers. Based on a careful inspection and dispensing procedures, we found several indications of poor aseptic technique tha contributed to the contamination of the infusate. Our first hypothesis was that wh bubbles from the tubing, the distal end of the tubing could have touched the overf washbasin, which was also found to be contaminated with genotypically identical

However, this hypothesis did not satisfactorily explain the contamination of the r infusate within the bottle, which was largely protected from contamination in this chamber. Moreover, the time between preparation of the infusate and administrat was too short to allow sufficient growth of *S. liquefaciens* within the bottle to pro clinical picture: i.e., the occurrence of the febrile reaction immediately after admi infusion suggested the presence of considerable amounts of lipopolysaccharides. cases of *S. liquefaciens* contamination of blood, the implicated erythrocyte units v days, with a mean age of 28 days (7, 9).

More likely, *S. liquefaciens* was inoculated into the infusion bottle by improper m Grohskopf and coworkers (3) described an outbreak of *S. liquefaciens* bloodstrea hemodialysis center caused by puncturing single-use vials multiple times and poc free residual epoetin alfa. Sharing of unlabeled heparin and insulin vials was also outbreak of *S. liquefaciens* bloodstream infections in a critical care unit (4), altho proven to be directly implicated in the outbreak.

To our knowledge, the identification of an overflow as an environmental reservoi is unique in the scientific literature. Although its role in the contamination of the speculative, the recommendation to install washbasins without an overflow hole i (5) is further supported by these findings. In the study of Grohskopf et al., the *S. l* epoetin alfa probably originated from the hands of health care personnel transient soap or hand lotion (3). In our study, the soap was not investigated.

Our case report raises questions about the local facilities and personal qualificatic naturopathic practitioners and groups with related occupations to conduct invasiv as infusion treatments. Systematic data on the frequency of infectious complicatic medicine are lacking (2), and only a few case reports exist: e.g., a case of endocar with prosthetic heart valves caused by *Propionibacterium acnes* after a series of ' and semipermanent acupuncture needle procedures by a natural healer (8). These that that the hygienic prerequisites in naturopathic settings should be on a level c in conventional ambulatory medicine. As a consequence of the case described in health authorities now offer special vocational training to natural practitioners to techniques and have implemented a stronger focus on hygiene in their examinatic

In summary, our case report demonstrates that infusion therapy should be perforn hygienic conditions and that failures can lead to severe morbidity and high cost.

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REFERENCES

1. **Boulton, F. E., S. T. Chapman, and T. H. Walsh.** 1998. Fatal reaction to transfusion of r contaminated with Serratia liquefaciens. Transfus. Med. **8:**15-18. [PubMed] [Full Text].

2. **Galeazzi, R. L.** 1992. Adverse reactions to natural remedies Ther. Umsch. **49:**86-92.

3. **Grohskopf, L. A., V. R. Roth, D. R. Feikin, M. J. Arduino, L. A. Carson, J. I. Tokars, Jensen, R. E. Hoffman, and W. R. Jarvis.** 2001. Serratia liquefaciens bloodstream infect of epoetin alfa at a hemodialysis center. N. Engl. J. Med. **344:**1491-1497. [PubMed] [Free

4. **Harnett, S. J., K. D. Allen, and R. R. Macmillan.** 2001. Critical care unit outbreak of Se contaminated pressure monitoring equipment. J. Hosp. Infect. **47:**301-307. [PubMed] [Ful

5. **Kommission für Krankenhaushygiene und Infektionsprävention.** 1981. Anforderunge funktionelle und bauliche Gestaltung von Pflegeeinrichtungen. Anlage zu Ziffer 4.3.1 der Krankenhaushygiene und Infektionsprävention des Robert-Koch-Instituts, Lieferung 5:1-5. Stuttgart, Germany.

6. **Pittet, D., D. Tarara, and R. P. Wenzel.** 1994. Nosocomial bloodstream infection in criti length of stay, extra costs, and attributable mortality. JAMA **271:**1598-1601. [PubMed].

7. **Roth, V. R., M. J. Arduino, J. Nobiletti, S. C. Holt, L. A. Carson, C. F. Wolf, B. A. Le W. R. Jarvis.** 2000. Transfusion-related sepsis due to Serratia liquefaciens in the United S **40:**931-935. [PubMed] [Full Text].

8. **Scheel, O., A. Sundsfjord, P. Lunde, and B. M. Andersen.** 1992. Endocarditis after acu treatment by a natural healer. JAMA **267:**56.

9. **Woodfield, D. G.** 1991. Transfusion acquired Serratia liquefaciens septicaemia. N. Z. Me

FIGURES AND TABLES

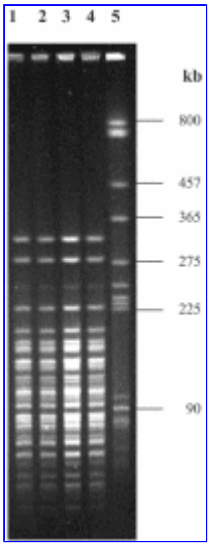

FIG. 1.
PFGE fingerprint patterns of *S. liquefaciens* strains from environmental an Lanes: 1 and 2, washbasin overflow hole; 3, remainder of the infusate give patient's blood culture; 5, standard *S. typhimurium* strain LT2. (more ...)