

A Nearly Fatal Case of *Pseudomonas fluorescens* Bacteremia Secondary to a Naturopathic Intravenous Vitamin Infusion

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Abstract

In this article, we report a case of a 52-year-old female with no past medical history who presented with nausea, vomiting, and diarrhea following a naturopathic intravenous vitamin infusion that was administered in her home. She was found to have *Pseudomonas fluorescens* bacteremia, which is not commonly found in humans. We discuss when to suspect contamination, choosing the proper antibacterial regimen, and the potential risks of naturopathic medicine.

Keywords

infectious disease, pulmonary critical care

Introduction

Pseudomonas fluorescens is an organism that has been seen in association with contaminated blood products and contaminated equipment used to administer intravenous (IV) infusions. This case describes a 52-year-old female who developed septic shock secondary to *Pseudomonas fluorescens* bacteremia in the setting of a recent outpatient IV infusion.

Clinical Case

A 52-year-old female with no prior medical history presented with nausea, vomiting, and diarrhea following a vitamin infusion administered in her home.

On the morning of admission, the patient received an IV infusion obtained from an outside institution. The infusion contained ascorbic acid, magnesium oxide, vitamin B complex, zinc, taurine, glutathione, and methylcobalamin. Information regarding the preparation of this infusion is limited. The institute states that the infusion bags come from compounding pharmacies in the United States. Once received, they are mixed into a sterile saline bag by licensed medical professionals at the clinic itself. They are stored in a sterile refrigerator for not more than a few days.

During the infusion, she developed nausea and chills. This was followed by 8 episodes of vomiting and diarrhea. She receives monthly vitamin infusions and has not

previously experienced an adverse reaction. Her home medications include estrogen, progesterone, and testosterone. She also regularly takes various over-the-counter supplements including but not limited to Pregnenolone, DHEA Complete, HUM Skinny Bird (*Caralluma fimbriata*, green tea extract, 5-HTP), HUM Daily Cleanse (chlorella, beet root, red clover, dandelion leaf extract, oregon grape root, milk thistle, glycolic acid, zinc, selenium, copper, manganese, spirulina, and matcha green tea), ChlorOxygen, Moon Juice SuperYou (ashwagandha, rhodiola, and amla), charcoal activator, zinc 50 mg, subcutaneous Lipo-C (methionine, inositol, choline chloride, L-carnitine, thiamine HCl, and dexpanthenol), and Ultra Burn (methionine, choline, B₁₂, thiamine, and inositol). The patient states that she takes these supplements for their anti-aging claims and acquires them from various online retailers.

Review of systems was negative for fever, cough, dysuria, hematemesis, melena, IV drug use, alcohol use, and tampon usage.

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Table 1. Laboratory studies.

| Laboratory studies | Results | Reference interval |
|---------------------|----------|--------------------------------|
| Procalcitonin | 281 | <0.50 ng/mL |
| Hemoglobin | 8.7 | 13.0-17.0 g/dL |
| WBC | 40.0 | 4.0-10.0 × 10 ³ /μL |
| aPTT | 41.0 | 24.0-34.9 seconds |
| D-Dimer | >128 000 | <500 ng/mL |
| Fibrinogen | 256 | 176-456 mg/dL |
| INR | 1.2 | 0.9-1.1 |
| Prothrombin time | 13.4 | 9.8-12.3 seconds |
| Thrombin time | 17.9 | 12.3-15.4 seconds |
| Lactate | 5.4 | 0.5-2/2 mmol/L |
| AST | 1045 | <39 U/L |
| ALT | 466 | <56 U/L |
| Creatinine | 4.6 | 0.55-1.02 mg/dL |
| Blood alcohol level | Negative | N/A |
| Tylenol level | Negative | N/A |
| Salicylate level | Negative | N/A |

Abbreviations: WBC, white blood cell; aPTT, activated partial thromboplastin time; INR, international normalized ratio; AST, aspartate aminotransferase; ALT, alanine aminotransferase; N/A, not applicable.

Initial vital signs include a heart rate of 170 beats per minute and blood pressure of 86/38 mm Hg. Physical examination was significant for diffuse sunburn-like rash (Table 1).

She later developed acute encephalopathy, respiratory distress, and hematochezia. Magnetic resonance imaging of the brain was negative. Chest X-ray revealed bilateral pleural effusions. She underwent colonoscopy, which revealed mild colitis and no evidence of ischemic bowel disease. Blood cultures resulted with *Pseudomonas fluorescens* the following day.

The patient required hemodynamic support with norepinephrine and vasopressin for a total of 5 days. She was treated with aggressive fluid resuscitation. Her antibiotic regimen initially consisted of vancomycin and piperacillin-tazobactam, which was later switched to meropenem for a total of 10 days of treatment. Her kidney function completely recovered and encephalopathy resolved. Her platelet count normalized and white blood cell count was 15.0 (reference: 4.0-10.0 × 10³/μL) on the day of discharge.

The incident was reported to public health as an unusual event with potential implications directly related to the IV infusion. The clinic is currently under investigation. They have been ordered to cease all IV treatments. Thus far, no additional cases have been reported. When the institute was contacted, I was informed that the reason for cessation of IV infusions was due to limited supply.

Discussion

The patient was diagnosed with septic shock secondary to *Pseudomonas* bacteremia likely secondary to a contaminated

IV infusion. Her course was complicated by acute encephalopathy, acute kidney injury, pulmonary edema, and disseminated intravascular coagulation.

Pseudomonas fluorescens is a bacterial organism that is not usually found in humans. It is usually found as a result of contaminated liquids used in invasive procedures. Reported outbreaks include contaminated heparinized saline flush ampules, contaminated water baths used for cooling saline ampules, and drinking water dispensers in a bone marrow transplant unit.¹⁻³

It is pertinent to consider resistant gram-negative rods as a potential etiology of septic shock in suspected recipients of contaminated infusions. The usual organisms found in nosocomial bloodstream infections are *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and *Stenotrophomonas maltophilia*. The incidence of non-pseudomonas nosocomial bloodstream infections is about 3% to 5%. Catheter-associated infections are usually gram-positive organisms. The correct choice of antibacterial agents is key in achieving a successful outcome.

This case highlights the potential risks of naturopathic medicine. Naturopathic licensure does not currently require passage of California specific board examinations and residencies are not a current requirement.⁴ There have been incidences in which IV infusions of naturopathic substances have led to toxicity and death.⁵

Last, it is important to recognize the increased use of unregulated supplements. Dietary supplements, in general, are not Food and Drug Administration-approved. Under the law (Dietary Supplement Health and Education Act of 1994), dietary supplement firms do not need Food and Drug Administration approval prior to marketing their products. We do not believe that our patient's condition was a direct result of her various supplements. However, it posed a difficult challenge in the initial assessment and plan.

Conclusion

Intravenous infusions can be a deadly source of bacteremia in patients with septic shock. Clinicians should maintain a high index of suspicion and take an extensive history. Fortunately, our patient had significant clinical improvement, and she was discharged from the hospital 2 weeks later. We recommend covering with broad-spectrum antibiotics early in the course of disease.

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Ethics Approval

Our institution does not require ethical approval for reporting individual cases.

Informed Consent

Verbal informed consent was obtained from the patient for their anonymized information to be published in this article.

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