

Salmonella arizonae Bacteremia in a 16-Year-Old Male Patient with Cavernoma: A Case Report

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Citation: Bonanos G, Xaplanteri P, Dimitrakopoulos O et al. *Salmonella arizonae* Bacteremia in a 16-Year-Old Male Patient with Cavernoma: A Case Report. *Microbiol Infect Dis*. 2020; 4(4): 1-3.

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Received: 28 October 2020; **Accepted:** 12 November 2020

ABSTRACT

Bacteremia due to *Salmonella enterica* subsp. *arizonae* is extremely rare and most commonly involves immunocompromised patients. Herein we present a 16-year-old Greek male with bacteremia after craniotomy due to cavernoma. The patient kept turtles as companion animals. In our case we suggest that the turtles our patient kept as companion animals were the source of infection. *S. arizonae* nested in the brain lesion and bacteremia was due to perioperative manipulations.

Keywords

Cavernoma, Bacteremia, *Salmonella arizonae*.

Introduction

Salmonella arizonae belongs to the family of *Enterobacteriaceae*. It is a rare human pathogen that causes severe disseminated infections most commonly in immunocompromised hosts [1,2]. Herein we present the case of a 16-year-old Greek male patient who was diagnosed with cavernoma and suffered from bacteremia due to *S. arizonae* after surgery. The patient kept turtles as companion animals.

Case Presentation

A 16-year-old Greek male patient with free medical history was transferred to the Emergency Department of our Hospital due to intense headache, dizziness, somnolence, and vomiting. Those symptoms had started earlier the same day, whilst he reported mild diarrhea for a fortnight.

The vital signs on admission were: blood pressure 140/85 mmHg, pulse rate 66 beats/min, temperature 36.8°C (98°F), oxygen saturation 97% (FiO₂:21%), blood glucose levels 122 mg/dL (normal values 75-115 mg/dL). Physical examination revealed neck stiffness, whereas Kernig's and Brudzinsky's signs were negative. The patient reported direct contact with turtles as companion animals one month prior to the onset of symptoms.

Computed tomography (CT) scan and Magnetic resonance imaging (MRI) revealed a 3.4×2.3×3.1 cm lesion in the left parietal lobe next to the occipital horn of the ipsilateral ventricle with signs of hemorrhage (Figure 1). These findings were consistent with cavernoma. The patient underwent craniotomy and removal of the lesion. Post-surgery he developed fever up to 38.5°C (101°F). Blood samples were collected and sent to the Microbiology department for culture and were inoculated into BacT/ALERT 3D (bioMérieux, Marcy-l'Étoile, France) blood aerobic and anaerobic culture bottles. Identification of the culpable microorganism was

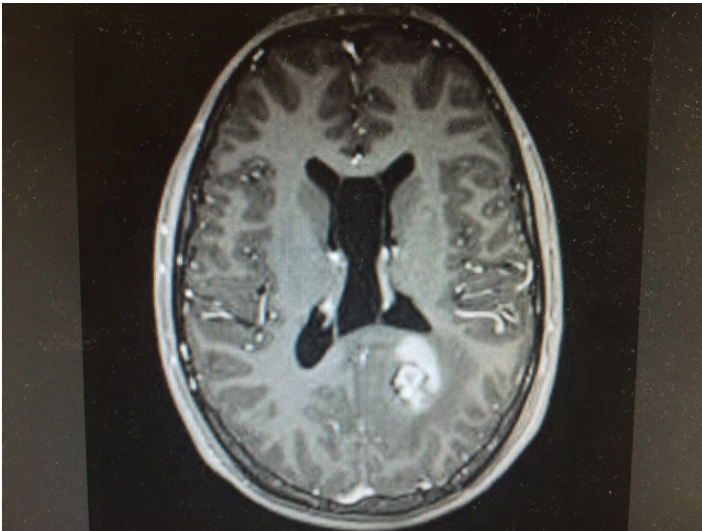


Figure 1: Patient's computed tomography (CT) scan showing the presence of a lesion of dimensions 3.4×2.3×3.1 cm in the left parietal lobe next to the occipital horn of the ipsilateral ventricle with signs of hemorrhage consistent with cavernoma.

performed by Vitek® 2 Advanced Expert System (bioMérieux). Blood cultures were positive for *Salmonella enterica* subspecies *arizonae*. Antibiotic susceptibility testing was performed by the disk diffusion method for ampicillin, ceftriaxone, amoxicillin/clavulanic acid, chloramphenicol, sulfamethoxazole/trimethoprim, and a gradient method (Etest, bioMérieux) for ciprofloxacin, according to EUCAST guidelines [3]. Blood isolates proved susceptible to all antibiotics tested (ciprofloxacin MIC=0,032 mg/L).

The patient was initially treated empirically with vancomycin and meropenem for three days. As soon as the laboratory results were available, the treatment changed to ceftriaxone for ten days. Ceftriaxone was considered the antibiotic of choice since its ability to penetrate the blood-brain barrier is well described [2].

No stool culture was performed. The patient was discharged on oral ciprofloxacin 500 mg every 12 hours for ten additional days. His recovery was full and without complications.

Discussion

Salmonella arizonae is a facultative anaerobic Gram-negative bacterium that belongs to the family of *Enterobacteriaceae*. It causes animal infections in reptiles, hens, ducks, rats, and companion animals such as dogs and cats [1]. Its first name was *Salmonella* sp. Dar-es-salam type, variety from Arizona, then renamed to *Arizona hinshawii*. The name *Salmonella enterica* serotype *Arizonae* was attributed in 1983 [1]. In 1987, Le Minor and Popoff based on genomic and biochemical characteristics suggested the name *S. enterica* subsp. *arizonae* [4].

S. arizonae is an uncommon human pathogen that causes severe systemic infections in patients with impaired cell-mediated immune response [1]. It is estimated to enter the human body

through swallowing of an infected food product. Afterwards and via bloodstream it disseminates to the lymphatics. It survives and proliferates inside macrophages, causes destabilization of actin filaments with the aid of an ADP ribosyltransferase. Various intervals (from 3 months to 6 years) have been described in literature regarding the time needed from exposure to the manifestation of disease [1]. Our patient reported direct contact with turtles that he kept as companion animals one month prior to infection.

Most *S. arizonae* infections described from 1980 to 2005 originated from the southwestern States of USA. They concerned patients under organ transplantation, immunosuppressive treatment due to malignancies, and human immunodeficiency virus (HIV) infection. In those geographic areas the local Hispanic population uses remedies made of reptile products, especially from rattlesnakes, which were considered the source of infection [1]. In Greece *S. arizonae* has been isolated from pig carcasses, and therefore pork meat can be a potential source of transmission to consumers [5]. Isolation of *S. arizonae* from stool specimens is complicated since most strains are lactose fermenters and therefore is falsely considered non-pathogens in the laboratory routine [6].

Nontyphoidal *Salmonellae* resistant to third generation cephalosporins, nalidixic acid and fluoroquinolones have been reported [2]. The nature of infection leads to prolonged periods of therapy and there are often recurrences [1]. The strain isolated from our patient was susceptible to ceftriaxone and ciprofloxacin and antibiotic therapy was administered for 20 days' time.

Salmonellae invade aneurysms, vascular grafts, and prosthetic valves during bacteremia with a mortality rate up to 60% [7]. *S. arizonae* has been described as a rare pathogen of the central nervous system causing meningitis in neonates and children [8-11].

Disseminated infections due to *S. arizonae* involving the cardiovascular system are so far extremely rarely described in literature. They involve the pericardium, atherosclerotic abdominal aorta, and primary aortoenteric fistulas [1,12,13].

A few cases worldwide involve vein inflammation due to *Salmonellae* complicating deep vein thrombosis [14,15]. In our case it seems that the microbe evaded and nested in the vascular lesion after bacteremia. Afterwards, and because of the perioperative manipulations, the infection evolved.

To our knowledge this is the first reported case worldwide of *S. arizonae* bacteremia after craniotomy due to cavernoma.

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