

# Sepsis due to *Aeromonas hydrophila*

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## Abstract

Although there are ever increasing reports of extra-intestinal human infections caused by Aeromonads, in both immunocompromised and immunocompetent patients, sepsis remains uncommon. We report a rare case of *Aeromonas hydrophila* sepsis in an immunocompromised individual. The case highlights the clinical significance of *A. hydrophila* as a cause of blood stream infection.

**Keywords:** *Aeromonas hydrophila* and isolation and purification; Sepsis; Case reports

## Introduction

The genus *Aeromonas* is a member of the family Vibrionaceae. *Aeromonas hydrophila* is the most commonly isolated species associated with human infections.<sup>1</sup> *Aeromonas hydrophila* is a Gram-negative, oxidase-positive bacillus that is a common freshwater and food-borne pathogen that can cause enterocolitis, bacteremia, meningitis, and soft tissue infections.<sup>2</sup> *Aeromonas hydrophila* is distributed widely in fresh and salt water, and is also found in food, treated drinking water, domestic water supplies and hospital water supply systems. Typically, patients acquire *Aeromonas* species through oral consumption or direct contact with contaminated water or seafood.

Thus, gastroenteritis and mild-to-moderate soft-tissue infections are the most common presentations.

The majority of the serious infections caused by this organism occur in individuals with certain predisposing conditions, the most relevant example being that of *Aeromonas* septicemia. Individuals with hepatic disorders, malignancies and biliary obstruction are at greater risk in contracting septicemia although it can occur in patients with no apparent immunological and physiological deficits. Septicemia and bacteremia are usually seen in immunocompromised individuals.<sup>1</sup> A case of *Aeromonas* sepsis was also reported from an elderly patient with rheumatoid arthritis being treated

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with tocilizumab.<sup>3</sup> We report here a rare case of sepsis due to *Aeromonas hydrophila* in a patient who has undergone coronary angioplasty.

### Case Report

We report a case of *Aeromonas* sepsis in a 61 year old male resident of Berhampur, Orissa. The patient was hypertensive for the past 10 years with a history of coronary artery disease. He underwent coronary angioplasty for chest pain, in 2011. Within 24 hours he developed fever with chills and rigors, hypotension and breathlessness. He was given aminoglycosides and non steroidal anti-inflammatory drugs (NSAIDS). During the hospital stay, he had episodes of hypotension, decreased urine output without dysuria and sudden onset of breathlessness of class-III severity. Patient was on ayurvedic drugs since a long time for his diabetic state. He subsequently developed altered sensorium, with significant hypoglycaemia and a mild distension of the abdomen. He was then admitted to our hospital on the 4<sup>th</sup> postoperative day.

On examination the patient was drowsy, had mild pedal oedema with blood pressure of 110/70mmHg. Clinically he was diagnosed to have acute respiratory distress syndrome (ARDS) for which he was provided ventilatory support. The earlier medications were discontinued and he was initiated on 4.5gms of piperacillin/tazobactam intravenously 8-hourly and supportive therapy. Neurological consultation was sought for deterioration in consciousness and was thought to be due to acute disseminated encephalomyelitis (ADEM) for which he was given

3 doses of 1gm of IV Solumedrol. He was also given inotropic support for septic shock, adequate hydration with close monitoring of central venous pressure (CVP), urine output, blood pressure and other vitals. Renal function improved with serum creatinine of 1.9-0.7mg/dl.

Three sets of blood cultures were collected after admission. Within 24 hours all the 3 sets grew *Aeromonas hydrophila*. Based on blood culture report Gram negative sepsis was successfully treated with intravenous tigecycline 50mg and meropenem 500mg 12-hourly. Gradually the patient made an uneventful recovery; having residual weakness in all four limbs for which he was given physiotherapy and steroid therapy. Repeat leukocyte count and blood cultures were normal.

### Microbiology work up

The isolate from the blood cultures was a Gram negative bacillus that grew on both blood agar and chrome agar (COS & CPS, bioMerieux, Marcy l' Etoile France) aerobically at 37°C on subculture. Morphologically, the colonies were 1-2mm smooth, circular, moist with distinct orange to yellow pigmentation, on both the plates (Figure 1). The organism was a non motile oxidase and catalase positive, non fermentor and was identified as *Aeromonas hydrophila* with ID-GN panel of the Vitek 2 system and the ID 32 GN panel of the mini API (bioMerieux, Marcy l' Etoile France). Antimicrobial susceptibility testing was performed with N090 panel of the Vitek 2 advanced expert system and ATB PSE (5) of the mini API. The isolate



**Figure 1. Colony morphology of *Aeromonas hydrophila* on chrome agar and 5% sheep blood agar**

was susceptible to amikacin, ceftazidime, cefipime, imipenem, meropenem, colistin and tigecycline and was resistant to tobramycin, gentamicin, ciprofloxacin, levofloxacin, ampicillin/sulbactam and piperacillin/tazobactam.

## Discussion

*Aeromonads* were discovered more than 100 years ago. Their taxonomy has undergone a “sea of change” since then; however their role in human infections has been scientifically validated in only the last few decades. *Aeromonas spp.* are ubiquitous mobile Gram-negative rods found in water sources. They cause a wide range of human illness; possible routes of transmission include contaminated food and exposure of wounds to environments that contain the pathogen. Severe *A. hydrophila* infections usually involve immunocompromised people with chronic illness. *Aeromonas* species are also emerging as significant food-borne pathogens.<sup>4</sup>

Three species, *A. hydrophila*, *A. caviae*, and *A. veronii biovar sobria*, account for more than 85% of human infections that are often polymicrobial.<sup>3</sup> Fatality rates range from 28% to 46% in cases of severe bacteremia.<sup>3</sup> The incidence of septicaemia, however, is relatively low, accounting for less than 15% of cases.<sup>5</sup> Bacteraemia is most commonly seen in children and adults and often has been due to *Aeromonas hydrophila*. Gastrointestinal tract infections are the commonest source of *Aeromonads* followed by wound infections. In immunocompromised individuals or those with hepatobiliary disease, they can also cause otitis media, meningitis, endocarditis, peritonitis, cholecystitis and haemolytic uremic syndrome. *Aeromonas hydrophila* was reported in a 3 month old child with meningitis<sup>6</sup>; endogenous infections in asymptomatic and immunocompromised human carriers have also been documented.<sup>5</sup>

In India, the organism has been mainly isolated from the East Coast from sea food. Twenty six percent of fish samples in Gopalpur coast, Berhampur and Orissa, have been found to harbour *A. hydrophila*.<sup>7</sup>

In the present patient, a resident of Gopalpur coast, endemic for *Aeromonas*, a significant hypoglycaemia enhanced by the ayurvedic drugs and neutropenia

as a consequence of hypoglycaemia and the stress of coronary angioplasty could be the probable risk factors for the severe sepsis. Since the patient was a fish consumer, the possibility of transient bacteraemia with *Aeromonas spp* translocated from the gut leading to the sepsis can also be considered.

*Aeromonas spp* produce a beta-lactamase which makes them resistant to penicillin, ampicillin and first generation cephalosporins.<sup>8</sup> The antimicrobial agents most active against *Aeromonas* are the third-generation cephalosporins, imipenem and fluroquinolones.<sup>3</sup> Amikacin is a first line treatment for *Aeromonas* infection due to high efficacy. There are few reports of aminoglycoside resistant *Aeromonas spp*.<sup>1</sup>

In our case, the patient responded to IV meropenem and tigecycline and was treated successfully. Overall mortality rate attributed to this pathogen is approximately 50%, which may be due to several factors. Poor prognostic indicators are pneumonia, haemoptysis, a rapidly progressing infection and concomitant sepsis.<sup>9</sup> Our patient had pneumonia and sepsis. The identification of the causative organism and appropriate antibiotic therapy helped in the successful outcome of the patient. In conclusion, appropriate, and optimal management of these rare, but rapidly progressive, emerging infections is of paramount importance.

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