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A rare case report of *Aeromonas salmonicida* causing neonatal septicaemia

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Summary

Aeromonas salmonicida, a pathogen known primarily for causing septicaemia and furunculosis in fish, has rarely been implicated in human disease due to its inability to grow at 37°C. However, we report a rare and fatal case of neonatal septicaemia caused by *A. salmonicida*, isolated from a preterm neonate in Central India. The organism was identified using the Vitek 2 compact system. This case highlights the expanding pathogenic potential of *Aeromonas* species in humans, especially in immunocompromised hosts. The objective of this report is to describe a rare case of *A. salmonicida* bloodstream infection in a preterm neonate, outline the diagnostic process, and discuss clinical implications.

Key words: *Aeromonas salmonicida*, bloodstream infection, neonatal septicaemia, preterm, India.

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Case Report

A preterm male neonate weighing 810g was born at 31 weeks of gestation via vaginal delivery at a tertiary care hospital in Nagpur, India. The mother, a 31-year-old G2P1D1, had beta-thalassemia trait, with no serologic evidence of Human Immunodeficiency Virus (HIV), HBsAg, or Hepatitis C Virus (HCV). She experienced Premature Rupture of Membranes (PROM) and severe pre-eclampsia (Table 1).

The baby, one of dichorionic diamniotic twins, was admitted to the Neonatal Intensive Care Unit (NICU) for respiratory distress and was diagnosed with hyaline membrane disease and acyanotic congenital heart disease. Surfactant was administered using the LISA technique. Initial C-Reactive Protein (CRP) was normal (0.7 mg/L) but later increased to 31 mg/L, prompting a diagnosis of sepsis. Liver function tests showed total bilirubin of 7 mg/dL; Complete Blood Count (CBC), Kidney Function Test (KFT), and Ultrasound Sonography (USG) of the abdomen were initially normal, though thrombocytopenia developed later.

Blood cultures were performed, and empiric treatment with IV piperacillin-tazobactam, amikacin, and meropenem was initiated. After 18 hours of incubation at 37°C, blood agar showed non-hemolytic, pinpoint yellowish colonies. No growth was seen on MacConkey agar. Gram staining revealed Gram-negative bacilli. The organism was non-motile, catalase- and oxidase-positive with biochemical reactions revealed TSI (K/K), indole negative, methyl red and Voges-Proskauer positive, urease and citrate negative.

Due to ambiguous biochemical results, identification was confirmed by the Vitek 2 compact system, which identified the isolate as *Aeromonas salmonicida*. Despite treatment, the neonate's condition deteriorated, and he succumbed to respiratory failure.

Repeat cultures were not performed. Other specimen cultures including Cerebrospinal Fluid (CSF) and urine were sterile.

Discussion

Aeromonas species were first isolated from frogs by Sanarelli in 1891 and are known to cause disease in both cold- and warm-blooded animals [10]. *A. salmonicida*, first identified in 1894 from Bavarian trout hatcheries, is a Gram-negative, facultative anaerobe, non-motile bacillus known for its virulence in cold-water fish, especially salmonids [5,11]. It is typically found in freshwater and is rarely associated with human infection due to its inability to thrive at 37°C [8]. Most strains lose virulence above 30°C [1].

Human infections by *A. salmonicida* are exceptionally rare. Based on this search of the literature, using PubMed/MEDLINE for *Aeromonas salmonicida* infection/human, nine reports were found. To the best of knowledge, this is only the fourth report of *Aeromonas salmonicida* infection from India which has been documented so far.

Clinical manifestations of *A. salmonicida* in humans vary and have included bacteremia, endocarditis, ophthalmic infections, and acute febrile illness - primarily in immunocompromised individuals. Documented cases are included in Table 2.

This case broadens the clinical spectrum of *A. salmonicida* infection, underscoring its potential as an opportunistic pathogen even in neonates. The isolate's identification using the Vitek 2 compact system reflects the utility of automated platforms for detecting unusual pathogens. However, the system's limitations are notable. Misidentification of *Aeromonas* species as other genera, such as *Vibrio* or two strains of *A. schubertii* being mistaken

Case Report

Table 1. Patient's characteristics and outcome.

Event	Day of life	Details
Birth	Day 0	Preterm male, 810 g, DCDA twin, 31 weeks gestation
NICU Admission	Day 0	Respiratory distress; diagnosed with hyaline membrane disease
Surfactant therapy	Day 0	Administered via LISA technique
CRP rise	Day 1	Increased from 0.7 mg/L at admission to 31 mg/L
Blood culture sent	Day 1	Culture and sensitivity requested
Culture growth detected	~18 hours post-incubation	Gram-negative bacilli; further biochemical testing performed
Identification (Vitek 2)	Day 3	<i>A. salmonicida</i> confirmed
Clinical deterioration	Day 3-4	Progressive tachypnoea, worsening respiratory distress
Outcome	Day 4	Neonate declared dead despite resuscitation efforts

NICU, Neonatal Intensive Care Unit.

Table 2. Summary of reported human cases of *Aeromonas salmonicida* infection.

Author(s)	Year	Country	Clinical presentation	Patient details	Suspected source/exposure
Carta <i>et al.</i> [2]	1994	Italy	Corneal ulcer	Male, history of ocular trauma	Eye rinsed with tap water after reed injury
Yang <i>et al.</i> [12]	2008	Turkey	Peritonitis	Patient on CAPD	Ingestion of cooked fish
Tewari <i>et al.</i> [10]	2014	India	Acute febrile illness	Adult patient	Not specified
Katz <i>et al.</i> [4]	2015	USA	Bacteremia	Adult patient	Not specified
Moore <i>et al.</i> [7]	2017	USA	Bacteremia	Adult patient	Not specified
Varshney <i>et al.</i> [11]	2017	India	Postoperative endophthalmitis	Post cataract surgery patient	Possibly hospital-acquired
Salehi <i>et al.</i> [9]	2019	Iran	Endocarditis	Adult patient	Not specified
Yang <i>et al.</i> [13]	2020	Iran	Acute febrile illness	HIV-positive patient	Not specified
Lodha <i>et al.</i> [6]	2022	India	Urinary tract infection	Adult patient	Not specified
Present study	2024	India	Neonatal septicaemia	Preterm neonate (31 weeks GA, 810 g)	Environmental/hospital exposure suspected

for *A. sobria* and *Vibrio damsella*, and occasionally for *Elizabethkingia meningosepticum* has been documented [10], calling for cautious interpretation and, where necessary, supplemental confirmatory testing.

Conclusions

Aeromonas salmonicida is an emerging zoonotic pathogen with the potential to cause life-threatening infections in vulnerable populations, including neonates. Clinicians should consider it a possible etiological agent in sepsis cases unresponsive to standard treatment, particularly when environmental exposure is suspected. Advanced microbiological diagnostics like Vitek 2 can aid in identifying rare organisms, though results must be interpreted carefully due to possible misidentifications.

This report serves to raise awareness of the pathogenic potential of *A. salmonicida* in humans and calls for more robust surveillance, particularly in immunocompromised and neonatal populations.

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