

Aeromonas salmonicida: A very rare but potential threat to human

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ABSTRACT

Aeromonas salmonicida is a ubiquitous Gram-negative bacterium. It mainly found in aquatic ecosystem. It is most common pathogen in salmonids. Reported infections due to *A. salmonicida* in humans are very rare. A 5-year-old child admitted with fever since more than a week and loose motions. The blood culture showed growth of *A. salmonicida*. The child responded well to intravenous antibiotics and discharged after 5 days of admission. *A. salmonicida* is a rare but potential pathogen for human infections. Modern diagnostic methods are being effective in diagnosing it and empirical antibiotics (Cephalosporin) are helpful in treating it.

Key words: *Aeromonas salmonicida*, Blood culture, Child, Human infection

The genus *Aeromonas* (family, *Aeromonadaceae*) has many species and consists of Gram-negative rods or bacilli that are mainly found in aquatic environments [1]. There are four most commonly known species of *Aeromonas*; *hydrophila*, *Sobria*, *Caviae*, and *Salmonicida*. *Aeromonas hydrophila* has been the most common cause of human infection [2]. *Aeromonas salmonicida*, which is the only non-motile species in the genus *Aeromonas*, is primarily a fish pathogen [3].

This species firstly found in 19th century and considered as one of the main pathogenic bacteria responsible for significant loss in the aquaculture industry, especially in salmonid culture [3,4]. The optimum temperature considered for the growth of this organism is around 25°C. Hence, it is usually not being considered as a human pathogen (body temperature is ~37°C). Therefore, reports of human infections with *A. salmonicida* are very rare [5,6]. In this paper, we report one of the first case of blood stream infection due to *A. salmonicida* in pediatric age group in Maharashtra, India.

CASE REPORT

A 5-year-old female child admitted in tertiary care center, Nagpur, Maharashtra in October 2022 with history of intermittent fever, pain in abdomen, and loose motions. Child had received oral antibiotics (Cefixime) on OPD basis but did not improve.

On admission, child was hemodynamically stable with high-grade fever (armpit temperature 39.4°C) and hepatomegaly which

were only significant finding. The patient was started on empirical treatment and higher antibiotics (Piperacillin and tazobactam) after sending the essential blood investigations.

Tests result showed white blood cells (WBCs) on lower side, high C-reactive protein (CRP), and elevated transaminases levels. Ultrasound of abdomen showed hepatosplenomegaly. Dengue and Widal test were negative. The patient responded to given treatment and became afebrile after 2 days of treatment. Blood culture (automated aerobic culture: blood sample taken in BacT Alert PF bottles then incubated) showed growth of gram negative bacilli (subculture on Blood and MacConkey agar Fig. 1) after 9.9 h which was later reported as *A. salmonicida*. Hence, the foresaid antibiotic continued as per the sensitivity report. On detailed history to find out the source of infection, we did not find any significant history of contamination of food or water.


Gradually, child improved clinically with increased appetite and general well-being. Blood reports also showed improvement in WBCs and declining trend of CRP and transaminases. Thereafter, child was discharged after completion of course of antibiotics.

DISCUSSION

Some species of the genus *Aeromonas* were first reported as a pathogen of vertebrates in 1891 [7]. The genus *Aeromonas* has been considered an animal pathogen since its first reported as cause of septicemia in frogs and sick fish [8,9]. At present, there are 36 species described in the genus *Aeromonas* out of which 19 are considered as pathogens, causing a broad spectrum of infections in human [10].

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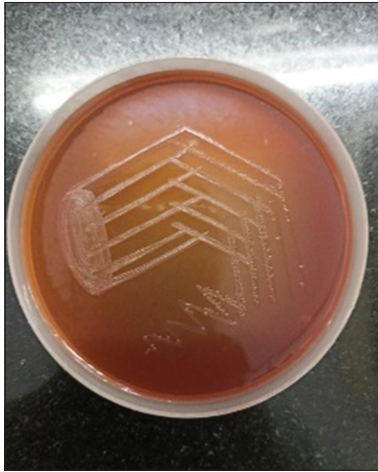


Figure 1: Petridish showing subcultured medium

In 1970s, *Aeromonas* species were divided into two groups: Mesophilic group (motile and optimal growth at 35–37°C), responsible for several infections in humans and called as *A. hydrophila*, and a psychrophilic group (non-motile and optimal growth at 22–28°C) responsible for fish diseases and called as *A. salmonicida*. Among *Aeromonas*, important fish pathogens are *A. salmonicida* and *A. hydrophila*, which particularly affect salmonids and causes various infections such as ulcers, hemorrhage, furunculosis, and septicemia [8,9].

Fishes, such as tilapia and salmonids consumed by humans, have many *Aeromonas* spp. that after molecular identification corresponded to *A. salmonicida*, *Aeromonas bestiarum*, *Aeromonas veronii*, *Aeromonas encheleia*, *A. hydrophila*, *Aeromonas allosaccharophila*, and *Aeromonas bivalvium* [11,12].

Aeromonas species generally causes infection in fishes but some species including *A. salmonicida* have also been rarely reported in human infections [13,14]. Although, there are very few literature reported about the infection or isolation of *Aeromonas* from human. The main reason of poor reporting is difficulty in diagnosing this bug. Therefore, the true prevalence of *Aeromonas* species around the world is still unknown, because many countries lack proper isolation techniques, and hence, cases are not accurately diagnosed and reported [15].

Earlier *Aeromonas* was considered as opportunistic infection and was found mainly in immunocompromised host. Few cases of endophthalmitis, endocarditis, and blood stream infection have been recently reported [16-18]. Now, it is considered as a primary pathogen for human [19]. As per the literature search, there is no specific age group affected by this bacteria. As compared to previous report of Ishiguro *et al.*, in 1981, growth of *A. salmonicida* is unlikely at 37°C and so in humans, which is contradictory to our report [14].

Except for a few strains and the species *Aeromonas trota*, *Aeromonas* are described as resistant to ampicillin [20]. These are also resistant to other penicillin and first-generation cephalosporins [21,22]. This emerging antibiotics resistance also raising a concern in future about the potential health risk in human and selective and judicious use of antibiotics.

CONCLUSION

A. Salmonicida is a rare but potential health risk for human due to emerging antibiotic resistance. Modern diagnostic techniques are required for the diagnosis of *A. salmonicida*. Future scope for research on how this bacterium causing infection at 37 °C or more. Emerging infections due to commensals and opportunistic organisms.

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