



Original Research Article

Aeromonas salmonicida furunculosis in an adult male

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ABSTRACT

Keywords

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Aeromonas salmonicida is a common pathogen that causes furunculosis and septicemia in variety of fishes. *A. salmonicida* is considered to be non-pathogenic for humans as it cannot grow at 37°C. The present case report is the first case of furunculosis infected by *Aeromonas salmonicida* in a 67-year-old immunocompetent male. *Aeromonas* skin and soft tissue infections can lead to serious life threatening conditions such as cellulitis, necrotizing fasciitis, myonecrosis and septicemia. Early suspicion, diagnosis, and treatment with potent antibiotics are needed to prevent any further complications resulting from infection by this emerging pathogen.

Introduction

Aeromonas salmonicida is facultative anaerobe, Gram negative, nonmotile bacterium which readily ferments and oxidises glucose and give catalase and oxidase test positive (Kim *et al.*, 2011). It is considered as primary pathogen in variety of fishes and not in humans as they cannot grow at 37°C (Ishiguro *et al.*, 1981). Optimal temperature required for its growth has been reported as 22-25°C (Austin *et al.*, 1986). Previously other *Aeromonas* species like *A. hydrophila*, *A. caviae*, *A. veronii* *etc.*, were also considered as pathogen in cold blooded animals only, including fish, amphibians and reptiles but gradually recognised as opportunistic pathogen for humans mainly in gastrointestinal infections and septicemia (Kao *et al.*, 2003). Society is already overburdened with antimicrobial resistant organisms and if nonpathogenic organisms

will change their host preference, virulence and sensitivity, it will be difficult for clinicians and scientists to tackle this problem.

Case History

An adult male about 67 years old reported to tertiary care hospital with complaints of furuncles with purulent discharge on both the legs associated with fever since 2 days before admission. There was no history of sore throat, diarrhoea, urinary discomfort, diabetes, any other localised infection, or chronic illness suggestive of immunocompromised state. On general examination, erythematous, infiltrate plaques with isolated pustules over the lesion associated with local pain and redness were observed on both the legs (Figure1). The WBC count was 30,400/cmm. Purulent

discharge from the site of furuncles, blood and urine sample were sent to microbiology laboratory for culture and sensitivity on same day of admission. The patient was started on antimicrobial regime cefipime tazobactam and teicoplanin.

Result and Discussion

Serology for malaria and dengue were reported negative. Haematology and biochemistry investigation result in Table 1,2 respectively. Urine and blood culture showed no growth of any pathogenic organism. However the purulent discharge from the site of furunculosis revealed plenty of polymorphonuclear cells and gram negative bacilli on gram stain and yielded bacterial growth on blood agar plate.

Bacteriological study

Culture characteristics

Pinpoint yellowish colonies, friable, not easily emulsifiable, beta haemolytic and having entire margin grew on blood agar plate. No growth was observed on MacConkey agar. On Grams staining, gram negative bacilli with no specific arrangement were seen. The organism was nonmotile, catalase positive and oxidase positive. Next day, colour of colonies turned golden yellow whereas size of colonies became larger (Figure 2).

Biochemical features

Biochemical features of the isolated strain are shown in Table 3. Triple sugar iron (TSI) was K/K, hydrogen sulphide production negative, indole formation negative, urease hydrolysis negative and citrate utilisation negative. The isolate was identified as *Aeromonas salmonicida* by mini API (Biomérieux) system.

Antibiotic susceptibility tests

Antibiotic susceptibility was determined by Kirby Bauer's disk diffusion method as per CLSI guidelines. The isolate was found to be sensitive for all the drugs chloramphenicol (30 mcg), ampicillin (10 mcg), imipenem (10 mcg), aztreonam (30 mcg), ceftazidime (30 mcg), ceftriaxone (30 mcg), cefixime (5 mcg), tetracycline (30 mcg), ciprofloxacin (5 mcg), levofloxacin (5 mcg), cotrimoxazole (25 mcg) and amikacin (30 mcg).

Aeromonas salmonicida was first discovered in a Bavarian brown trout hatchery by Emmerich and Weibel in 1894 (Amos, 2011). It infects cold blooded vertebrates living at low temperatures mainly salmonid fish hence named salmonicida. Compared with other pathogenic aeromonads *A. salmonicida* can also be found in environment, diseased fish and water and may be transmitted by all these sources. Until recently *Aeromonas salmonicida* is considered to be a fish pathogen. Major sources described for *Aeromonas* species in gastrointestinal infection are environment-water-animal complex and ingestion of contaminated foods whereas sources reported for extraintestinal infection are either direct soil or water contact or ingestion of contaminated food followed by bacteremic dissemination from gastro intestinal tract. It has pathogenic factor S layer which mediates tissue adherence as in other *Aeromonas* species like *A. hydrophila*, *A. veronii* so it may also act as pathogen in humans like other species (Igbinosa *et al.*, 2012). In the present case, the patient presented with non healing furuncles on both the legs infected by *A. salmonicida*. Infection in this case may have been acquired due to contact with dirty soil or water as these organisms have been reported to be present in aqueous environments.

Table.1 Haematology results over *Aeromonas salmonicida* infection

| Tests | Results | Normal range |
|--|---------|--------------------------------|
| Total leucocyte count | 30400 | 4-10 x 10 ³ /cmm |
| Differential leucocyte count | | |
| Neutrophils | 87 | 40-80 % |
| Eosinophils | 2 | 1-6 % |
| Lymphocytes | 8 | 20-30 % |
| Monocytes | 3 | 2-10 % |
| Basophils | 0 | 0-2 % |
| Red blood cell count | 4.37 | 3.8-4.8 x 10 ⁶ /cmm |
| Mean corpuscular volume | 79 | 83-99 fl |
| Mean corpuscular haemoglobin | 26 | 27-32 pg |
| Mean corpuscular haemoglobin concentration | 32.9 | 31.5-34.5 g/dl |
| Haemoglobin | 11.4 | 13-17 g/dl |
| Platelet count | 411 | 150-450 x 10 ³ /cmm |

Table.2 Biochemistry results over *Aeromonas salmonicida* infection

| Tests | Results | Normal range |
|----------------------|---------|---------------|
| Creatinine | 1.9 | 0.6-1.4 mg/dl |
| Total bilirubin | 0.7 | 0.1-1.2 mg/dl |
| Direct bilirubin | 0.3 | 0-0.3 mg/dl |
| Indirect bilirubin | 0.4 | 0.1-1 mg/dl |
| SGOT | 42 | 5-50 U/L |
| SGPT | 38 | 0-40 U/L |
| Alkaline phosphatase | 70 | 30-90 U/L |
| Sodium ion | 134 | 135-148 mEq/L |
| Potassium ion | 4 | 3.5-5.5 mEq/L |
| Protein | 7.1 | 6.6-8.7 g/dl |
| Albumin | 3.2 | 3.4-5 g/dl |
| Globulin | 3.9 | 2.6-4.1 g/dl |

Table.3 Biochemical characteristics of *Aeromonas salmonicida*

| Biochemical tests | Results |
|-----------------------------|-------------------------------|
| Triple sugar iron | Alkaline slant and butt (K/K) |
| Gas from glucose | Negative |
| H ₂ S production | Negative |
| Urease hydrolysis | Negative |
| Indole formation | Negative |
| Methyl red | Positive |
| Voges - Proskauer | Negative |
| Citrate utilisation | Negative |
| Esculin hydrolysis | Positive |
| Gelatin hydrolysis | Positive |
| Catalase | Positive |
| Oxidase | Positive |

Figure.1 Furunculosis by *Aeromonas salmonicida*



The present case report is the first case of furunculosis infected by *A. salmonicida* in an immunocompetent male. Although the isolate was found sensitive to all drugs (by Kirby Bauers method), however recently antibiotic resistant *A. salmonicida* strains have been recognised as a serious concern owing to their potential health risk to humans and animals (Tewari *et al.*, 2014). The members of the genus *Aeromonas* may also produce beta lactamase which makes them resistant to ampicillin and first generation cephalosporins. Has this problem been evolved by humans only who are devising techniques and facilities to cross all the boundaries and getting interacted with all types of living and non living things?

Thus, in light of the complications associated with *Aeromonas* skin and soft tissue infection, utmost microbiological vigilance is required to promptly identify this rare organism so that timely management of the condition is possible with appropriate antibiotics and surgical debridement, irrigation etc, if required.

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