

Case Reports: *Aeromonas Hydrophila* Severe Gastroenteritis in Diabetic, Elderly Patients

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Abstract

Introduction: *Aeromonas hydrophila* gastroenteritis is rare in humans and common amongst fish, reptiles and amphibians. In humans, infections caused by *Aeromonas* species usually occur with increased frequency during warmer months. The organism is frequently isolated from meat products and its transmission is by feco-oral route.

Clinical picture: We report 2 cases of *Aeromonas hydrophila* gastroenteritis in elderly, diabetic pa-

tients. Both patients had severe diarrhea and stool cultures grew *Aeromonas hydrophila*.

Treatment and outcome: Both responded to intravenous ceftriaxone and were discharged well.

Clinical implication: It is self limiting in immunocompetent hosts. In elderly, immunocompromised or pediatric patients, it can cause bacteremia and high mortality if not treated early.

Key words: *Aeromonas hydrophila*, gastroenteritis, diabetes mellitus, elderlytion, protocol.

Introduction

Aeromonas hydrophila is a rare human pathogen. Worldwide, soft tissue infections following water-related injuries are the most common. Members of the genus *Aeromonas* are facultative anaerobic, non-sporulating Gram-negative bacilli that are ubiquitous inhabitants of fresh and brackish water. These species have been recognized as pathogens of fish, reptiles and amphibians for many decades, but it is only recently that they have been recognized as significant human pathogen. In humans, infections caused by *Aeromonas* species generally result in either acute

or chronic gastrointestinal illness, septicemia in immunosuppressed individuals, or water- or soil-associated traumatic wound infections [1-3]. We report 2 cases of *Aeromonas hydrophila* gastroenteritis in elderly, diabetic patients who responded well to treatment.

Case report

Case 1: Mr PSK, a 75 year-old Chinese gentleman was admitted on 09/05/2007 with right leg pain, swelling and fever. He had background history of diabetes mellitus with nephropathy, hypertension, hyperlipidemia and ischemic heart disease. He had past history of right leg deep vein thrombosis and pulmonary embolism (confirmed by CT thorax on 23 January 2005) with protein C deficiency. He was on long term anticoagulation since January 2005.

On examination, he was febrile with temperature of 38.1 °C, blood pressure 130/80 mmHg and pulse

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86 per minute. Systemic examination was normal. His right leg was warm, swollen, tender and red. On admission, his full blood count showed hemoglobin 14.3 g/dL, total white $14.9 \times 10^9/L$, (neutrophils 86%, lymphocytes 11%, monocytes 2%, eosinophils 1%), platelets $274 \times 10^9/L$. His CRP was 147 mg/L, fasting blood glucose 5 mmol/L, prothrombin time 29 seconds with PT INR 2.67. Serum electrolytes were normal but creatinine was 331 $\mu\text{mol/L}$ (baseline creatinine before admission was 320 $\mu\text{mol/L}$ due to nephropathy). He was treated with intravenous ceftriaxone 1 gm once a day and cloxacillin 500 mg 6 hourly. His repeat full blood count 3 days later showed hemoglobin 14.6 g/dL, total white $4 \times 10^9/L$, (neutrophils 64.9%, lymphocytes 20.1%, monocytes 13.3%, eosinophils 1.5%), platelets $242 \times 10^9/L$. His blood culture after 48 hours showed no growth and intravenous antibiotics were changed to amoxicillin+clavulanic acid 625 mg twice a day. On the same day after he was started on amoxicillin+clavulanic acid, he complained of loose stools which worsened over the next 2 days. His stools were watery with no blood or mucus. His stool frequency was 12 to 15 times per day. He also had fever and his blood cultures were repeated. His diarrhea worsened while he was on amoxicillin+clavulanic acid. He was taken off antibiotic. His stool Clostridium difficile toxin was negative (x3 specimens). His stool culture grew *Aeromonas hydrophila* sensitive to ceftriaxone, cotrimoxazole but resistant to amoxicillin+clavulanic acid and ciprofloxacin. He was given intravenous ceftriaxone 1 gm once a day. He was treated with intravenous hydration and potassium replacement. His diarrhea improved over the next 3 days. Intravenous ceftriaxone was stopped after 3 days as repeat blood culture was negative after 48 hours. He was discharged well.

Case 2: Mrs LCE, a 76 year-old Chinese lady was admitted on 14 June 2007 with diarrhea, fever and abdominal pain of 3 day's duration. She passed watery stools with no blood or mucus, with a frequency of 6 times per day. She had background history of diabetes mellitus, hypertension and hyperlipidemia. She had total colectomy with ileorectal anastomosis for carcinoma of caecum and sigmoid colon in July 2004.

On admission to the ward, her temperature was 37.7

°C, blood pressure 110/80 mmHg, pulse 96 per minute. She was clinically dehydrated. Abdominal examination showed mild tenderness in the umbilical area without guarding or rigidity. The rest of the examination was normal. Her full blood count showed hemoglobin 14.2 g/dL, total white $7.1 \times 10^9/L$, (neutrophils 73%, lymphocytes 19%, monocytes 7%, eosinophils 1%), platelets $145 \times 10^9/L$. Her fasting blood glucose was 10.1 mmol/L. Her serum electrolytes, urea and creatinine were normal. Her blood culture after 48 hours showed no growth. Her stool culture grew *Aeromonas hydrophila* sensitive to ceftriaxone and cotrimoxazole. She was treated with intravenous ceftriaxone 1 gm once a day for 3 days. Her diarrhea improved over the next 3 days. She was discharged well.

Discussion

The genus *Aeromonas* consists of ubiquitous Gram-negative rods that are widely distributed in freshwater, estuarine and marine environments worldwide. *Aeromonas* species grow at a range of temperatures but are isolated with increased frequency during warmer months (May through October in the Northern hemisphere). The incubation period for gastroenteritis is not well known in humans but may be 3 days [1-3]. The organism is frequently isolated from retail produce sources and meat products. Its transmission is by feco-oral route. For over 100 years, *Aeromonas* have been recognized as the cause of a wide spectrum of disease syndromes among warm and cold-blooded animals, including fish, reptiles, amphibians, mammals and humans. The genus *Aeromonas* was part of the family Vibrionaceae until the mid-1980s when phylogenetic evidence from molecular studies supported separating out the genus as the family Aeromonadaceae. The genus has traditionally been divided into two major groups of species: motile, mesophilic species that can cause human disease and non-motile, psychrophilic species that generally only cause disease in fish [4].

There is increasing evidence to implicate *Aeromonas hydrophila* in incidents of gastroenteritis, although to-date there is only a few incidents implicating food as the vehicle. The illness can be severe especially in the immunocompromised. The method by which

Aeromonas causes illness is due to a number of “virulence factors” which include relatively heat-sensitive enterotoxins, which may or may not need to be pre-formed in food. Aeromonas species are widely distributed in nature but the main source is water. Water may, in fact, contribute to the contamination of foods with Aeromonas. There are reports of food poisoning from Aeromonas, and these have involved mainly oysters and prawns [5,6]. Our patients were non-vegetarian and ate prawns and shell fish.

Aeromonas hydrophila is an uncommon cause of deep-seated infection in man. It is known to cause cellulitis and rarely necrotizing fasciitis [4]. One of our patients presented to us with right leg cellulitis which could be caused by Aeromonas. Aeromonas is known to cause extra-intestinal disease. Gascun *et al* described a case of a pancreatic abscess due to Aeromonas hydrophila [7]. Clark *et al* reviewed hospital laboratory and medical records to identify patients with Aeromonas infection of the hepatobiliary or pancreatic system. A total of 41 episodes in 39 patients for hepatobiliary infection were described. The most common manifestation of Aeromonas hepatobiliary infection among all reported cases was cholangitis (29 of 41 episodes). The majority of infections in their hospital occurred in patients with underlying immunosuppression or malignancy (13 of 15 patients). Infection occurred most commonly in patients with obstruction of the biliary tract due to stones, tumor, or stricture and was associated with a relatively high mortality rate (11.8%) [8].

In adult patients, gastroenteritis induced by Aeromonas is being recognized more frequently. Aeromonas are associated with a range of diarrheal presentations as shown in **Table 1**. Our patients had acute diarrhea but without mucus or blood. Intravenous ceftriaxone was given to these patients as they were diabetics, elderly and had fever with high frequency of stools.

Most cases are self-limited, but supportive therapy and antimicrobials are often indicated in the pediatric, geriatric, and immunocompromised populations [4]. Rarely Aeromonas species have also been implicated in cases of ocular infections, osteomyelitis, meningitis, respiratory infections following “near-drowning”, pelvic abscesses, otitis, cystitis, endocarditis, peritonitis, cholecystitis and joint infections [4,9]. Aeromonas species can be generally identified in the microbiology laboratory as oxidase-positive, polar flagellated, glucose-fermenting, facultatively anaerobic, Gram-negative rods that are resistant to the vibriostatic agent O/129 and unable to grow in 6.5 percent sodium chloride [10]. Most cases of Aeromonas-associated diarrhea are self-limited. While therapy may be helpful in pediatric, geriatric and immunocompromised patients (or in severe cases in healthy adults), there are no controlled clinical trials that clearly show that administration of antibiotics is beneficial. Therapy is always warranted for wound infections and bacteremia [4].

Most strains from motile Aeromonas species are resistant to penicillin, ampicillin, carbenicillin and ticarcillin, and susceptible to second and third generation cephalosporins, aminoglycosides, carbapenems, chloramphenicol, tetracyclines, trimethoprim-sulfamethoxazole and the fluoroquinolones [11,12].

Conclusion

Aeromonas hydrophila gastroenteritis is not common in humans but recently more cases are being reported in humans. It is usually self limiting in immunocompetent hosts but in elderly, immunocompromised or pediatric patients it can cause bacteremia and should be treated aggressively with second or third generation cephalosporins.

Table 1. DIARRHEAL PRESENTATIONS ASSOCIATED WITH AEROMONAS

1. Acute secretory diarrhea often accompanied by vomiting
2. Acute dysenteric form of diarrhea with blood and mucus
3. Chronic diarrhea usually lasting more than 10 days
4. Choleric type including rice-water stools
5. Traveller's diarrhea

References

1. *Aeromonas hydrophila*. Material Safety Sheet Index. Copyright Health, 2001. Available at: <http://www.phac-aspc.gc.ca/msds-ftss/msds6e.html>. Accessed on 16 June 2007
2. Vally H, Whittle A, Cameron S, Dowse GK, Watson T (2004) Outbreak of *Aeromonas hydrophila* wound infections associated with mud football. *Clin Infect Dis* 38:1084-1089
3. Gracey M, Burke V, Robinson J (1982) *Aeromonas*-associated gastroenteritis. *Lancet* 2:1304-1306
4. *Aeromonas* Infections. Amy Horneman, J. Glenn Morris 2007. Available at: <http://www.uptodate.com>. Accessed on 12 July 2007
5. Kirov SM (2003) Bacteria that express lateral flagella enable dissection of the multifunctional roles of flagella in pathogenesis. *FEMS Microbiol Lett* 224:151-159
6. Galindo CL, Sha J, Fadl AA, Pillai LL, Chopra AK (2006) Host immune responses to *aeromonas* virulence factors. *Curr Immunol Rev* 2:13-26
7. De Gascun CF, Rajan L, O'Neill E, Downey P, Smyth EG (2007) Pancreatic abscess due to *Aeromonas hydrophila*. *J Infect* 54:59-60
8. Clark NM, Chenoweth CE (2003) *Aeromonas* infection of the hepatobiliary system: report of 15 cases and review of the literature. *Clin Infect Dis* 37:506-513
9. Ouderkerk JP, Bekhor D, Turett GS, Murali R (2004) *Aeromonas* meningitis complicating medicinal leech therapy. *Clin Infect Dis* 38:36-37
10. Carnahan AM, Chakraborty T, Fanning GR, Verma D, Ali A, Janda JM, Joseph SW (1991) *Aeromonas trota* sp. nov., an ampicillin-susceptible species isolated from clinical specimens. *J Clin Microbiol* 29:1206-1210
11. Motyl MR, McKinley G, Janda JM (1985) In vitro susceptibilities of *Aeromonas hydrophila*, *Aeromonas sobria*, and *Aeromonas caviae* to 22 antimicrobial agents. *Antimicrob Agents Chemother* 28:151-153
12. Overman TL, Janda JM (1999) Antimicrobial susceptibility patterns of *Aeromonas jandaei*, *A. schubertii*, *A. trota*, and *A. veronii* biotype *veronii*. *J Clin Microbiol* 37:706-708