A Study on Antibiogram of *Aeromonas* Isolates from HIV-Positive Human Diarrhoeal Cases in Jammu, India

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ABSTRACT

A number of opportunistic infectious agents including *Aeromonas* spp. are known for causing diarrhoea in HIV patients. The present investigation on analysis of 32 stool samples from HIV-positive diarrhoeic patients in Jammu observed 3 (9.38 %) patients to be positive for *Aeromonas* species. Two isolates (66.67%) belonged to *A. hydrophila* and one to *A. caviae*. Antibiograms of isolates revealed 100% resistance to ampicillin, cephalothin and methicillin. Nitrofurantoin was the most effective being 100% sensitive. Antibiotics with more than 66% sensitivity included amikacin, chloramphenicol, enrofloxacin and ofloxacin.

Keywords: *Aeromonas*, antibiotics, diarrhoea, HIV, Jammu

World over approximately 33.4 million people are living with HIV. The prevalence recorded in India among males was 0.43% and females 0.29% with overall adult prevalence of 0.36% (UNAIDS, 2009). Jammu and Kashmir (J & K) state of India is a low prevalence state with mean prevalence rate of HIV infection among high risk groups (sexually transmitted infections) being 0.3% and 0.04% among low risk groups. There were 2102 confirmed HIV positive cases in the state and the number may show an increasing trend (JKSAPS, 2009). Approximately, 90% of HIV/AIDS patients suffer from chronic diarrhoea (Janoff and Smith, 1998), which is the hallmark of HIV/AIDS in developing countries (Carcano *et al.*, 2005) and the infectious agents, namely *Campylobacter*, *Shigella*, *Plesiomonas*, *Salmonella*, *Aeromonas*, *Yersinia* and *Giardia* species have been isolated in these cases (Obi and Bessong, 2002; Carcano *et al.*, 2005; Kownhar *et al.*, 2007). Among these mentioned infectious agents, *Aeromonas*, considered to be an opportunistic pathogen, is associated with wide spectrum of infections in humans including gastroenteritis in children, aged individuals and immunocompromised patients (Gracey *et al.*, 1982; Agger *et al.*, 1985; Mikhail *et al.*, 1990; Namdhari and Bottone, 1990) besides causing extra intestinal infections like septicaemia, wound infections etc. (Subhashkumar *et al.*, 2006).

The presence of *Aeromonas* in HIV/AIDS diarrhoeic cases has been recorded in certain southern Indian studies while the information in northern India is still lacking. In this aspect, the present study focused on the isolation of *Aeromonas* species from HIV-positive diarrhoeal cases in Jammu region of J & K state, India and studied their antibiogram sensitivity pattern.

The study group comprised 32 HIV positive patients with diarrhoea (passage of 3-4 watery stools per day) attending Integrated Counselling and Testing Centre (ICTC), Govt. Medical College, Jammu during September 2008 to March 2010. Stool/rectal swab
Table 1. Antibiotic sensitivity pattern of *Aeromonas* isolated from stool samples/rectal swabs of HIV-positive diarrheic patients (*n* = 32)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of antibiotic</th>
<th>Human stool isolates*</th>
<th>Sensitive</th>
<th>Intermediate</th>
<th>Resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amikacin (30 mcg)</td>
<td></td>
<td>2 (66.67)</td>
<td>1 (33.33)</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Ampicillin (10 mcg)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>3 (100)</td>
</tr>
<tr>
<td>3</td>
<td>Cephalothin (30 mcg)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Chloramphenicol (30 mcg)</td>
<td></td>
<td>2 (66.67)</td>
<td>0</td>
<td>1 (33.33)</td>
</tr>
<tr>
<td>5</td>
<td>Enrofloxacin (10 mcg)</td>
<td></td>
<td>2 (66.67)</td>
<td>0</td>
<td>1 (33.33)</td>
</tr>
<tr>
<td>6</td>
<td>Gentamicin (10 mcg)</td>
<td></td>
<td>1 (33.33)</td>
<td>1 (33.33)</td>
<td>1 (33.33)</td>
</tr>
<tr>
<td>7</td>
<td>Methicillin (5 mcg)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>3 (100)</td>
</tr>
<tr>
<td>8</td>
<td>Netilmicin sulphate (30 mcg)</td>
<td></td>
<td>1</td>
<td>2 (66.67)</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Nitrofurantoin (300 mcg)</td>
<td></td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>Norfloxacin (10 mcg)</td>
<td></td>
<td>1</td>
<td>2 (66.67)</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>Ofloxacin (5 mcg)</td>
<td></td>
<td>2 (66.67)</td>
<td>1 (33.33)</td>
<td>0</td>
</tr>
</tbody>
</table>

*Figures in parenthesis indicate percentage.

samples from these patients were investigated to isolate *Aeromonas* species. The samples were collected aseptically from patients, preferably before initiation of antimicrobial therapy and transported to laboratory over ice and were processed within 2 hours of collection.

Preliminary isolation of *Aeromonas* spp. was done as per the method of Majeed et al. (1989). In brief, the stool samples (1 g)/rectal swabs were enriched in 10 ml alkaline peptone water (APW, pH 8.6) (Hi-Media, India) with incubation at 37°C for 18 h. The enriched inoculate from APW were plated on ampicillin dextrin agar (ADA) (Hi-Media, India), incubated at 37°C for 18-24 h and examined for the presence of large (3-5 mm) honey yellow coloured colonies. Presumptive colonies of *Aeromonas* spp. were further characterized on the basis of oxidase reaction, acid and/or gas production from glucose and motility. For speciation of isolates, seven biochemical tests as described by Carnahan et al. (1991) and five additional tests (Abott et al., 2003) including fermentation of mannitol and cellobiose, decarboxilation of ornithine and lysine, and hydrolysis of arginine were performed as per the standard techniques recommended by Barrow and Feltham (2004). Antibiogram of the isolated *Aeromonas* was carried according to Bauer et al. (1966) disc diffusion technique against a panel of 11 antibiotics (Table 1). Sensitivity or resistance of the isolates for a particular antibiotic was determined by measuring the diameter of the zone of growth inhibition and the results were interpreted as per the manufacturer’s instructions (Hi-Media).

Of 32 HIV diarrhoeal cases, 3 (9.38%) samples yielded *Aeromonas* species. The isolated *Aeromonas* species comprised two *A. hydrophila* and one *A. caviae*. The observation is higher to that of Kownhar et al. (2007) in southern India who out of 200 HIV samples recorded only 2 *Aeromonas* positive samples; however, lower to that of Obi and Bessong (2002). The association of *Aeromonas* with HIV/AIDS diarrhoeal cases has also been reported by Carcano et al. (2005), Lule et al. (2009) and Clerinx et al. (1995). *Aeromonas* spp. as diarrhoeagenic pathogen were isolated in HIV-positive persons in India and South Africa (Mukhopadhya et al., 1999; Obi and
Bessong, 2002). In Kolkata, India, Sinha et al. (2004) reported 6.5% of hospitalized diarrheic cases to be positive for aeromonads, while in Hong Kong, Chan et al. (2003) documented it for 6.9% acute diarrheal cases in adults. In Limpopo Province of South Africa, Obi and Bessong (2002) isolated Aeromonas from 13.3% HIV patients with chronic diarrhoea and in Saudi Arabia, Ibrahim and Colleagues (1996) reported two cases of chronic colitis from immunocompromised patients associated with A. hydrophila.

In our study, results of in vitro antibiograms revealed Aeromonas isolates to be 100% susceptible to nitrofurantoin followed by amikacin, chloramphenicol, enrofloxacin and ofloxacin (66.67%), whereas to ampicillin, cephalothin and methicillin the resistance was 100%. The results are in agreement with earlier reports (Motyl et al., 1985; Vila et al., 2002; Gurol et al., 2006; Jennifer et al., 2006). Samie et al. (2009) reported that Aeromonas species demonstrate differences in their susceptibilities to antibiotics. Cloxacillin (0%) and ampicillin (14%) were the least effective antibiotics. Ceftriaxone (92%) ciprofloxacin (86%), kanamycin (86%), lomefloxacin (86%), ofloxacin (83%) and gentamicin (76%), were more effective antibiotics. The susceptibility of the isolates to antibiotics as reported in our and other studies may be of great value in the empiric management of diarrhoea in HIV patients, although antibiograms may not always correlate with clinical usefulness.

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References


