**Ochrobactrum Anthropi** Sepsis in Intensive Tertiary Care

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**Abstract**

Multiresistant *Ochrobactrum anthropi* sepsis occurred in a lady with chronic kidney disease - end stage renal disease on renal replacement therapy with continuous ambulatory peritoneal dialysis. History of comorbid hypertension, diabetic nephropathy, multiple infections along with exposure to multiple antimicrobials were present. *Ochrobactrum anthropi* isolated from two consecutive blood cultures susceptible only to imipenem and sulphamethoxazole-trimethoprim revealed coexistent extended spectrum β-lactamase and Amp C. *Ochrobactrum anthropi* is an emerging opportunistic and healthcare associated pathogen, which requires a high index of suspicion to streamline diagnosis, management, control and surveillance.

**Keywords**: *Ochrobactrum anthropi*, sepsis, emerging pathogen, coexistent extended spectrum β-lactamase and Amp C

**Introduction**

*Ochrobactrum anthropi*, formerly known as *Achromobacter* or Center for Disease Control (CDC) group Vd is an α-proteobacterium belonging to the α-2 subgroup containing *Rickettsia*, *Bracealla*, and *Bartonella* under the family Brucellaceae. It is known to ubiquitously colonize diverse habitats including plants, animals, soil as well as antiseptic solutions and dialysis fluids (1). It is an emerging opportunistic and healthcare associated pathogen implicated in infections related to immunocompromised, neonates, indwelling devices, dialysis, surgery, and cystic fibrosis, and is frequently multiresistant to common antimicrobials (1-4).

The virulence of *Ochrobactrum anthropi* may range from low virulence to monomicrobial infections such as abscesses, necrotizing fasciitis, septic arthritis, peritonitis, pneumonia, and others such as cellulitis, osteocondritis and urinary tract infection (2, 3, 5-9). Outbreaks of endophthalmitis and life-threatening infections such as cather-related bacteremia, sepsis and endocarditis are known (10-16). Together with biofilm formation on catheters, pacemakers, intraocular lenses and silicon tubing, represents its expanding pathogenicity (3).

**Case Report**

A 53 year old postmenopausal lady with chronic kidney disease - end stage renal disease on renal replacement therapy with continuous ambulatory peritoneal dialysis (CAPD) since 26 Feb 2014; presented with reduced appetite and was found to have CAPD peritonitis. History of multiple infections along with exposure to vancomycin, teicoplanin, linezolid, levofloxacin, piperacillin-tazobactam and meropenem was present. Comorbid hypertension was managed by oral clonidine 100 µg thrice, amloidipine 5 mg twice and ecosprin 150 mg once a day; while diabetes mellitus and diabetic nephropathy were managed by sliding scale rapid acting insulin 14-14-10 U along with long acting glargine 80 U h.s. Daily iron, calcium, vitamin D₃ and folic acid supplements along with fortnightly darbopoietin 25 µg were given. She became disoriented and hypotensive with fluctuating oxygen saturation and was shifted to ICU where she was offered non-invasive ventilation and double strength noradrenaline inotropic support. She remained drowsy with intact comprehension and presence of Doll’s eye movement.

The Glasgow Coma Scale was E₃V₃M₆. Plantars gave flexor response. Bilateral infrapectoral crackles were detected. Fluid intake/output was between 1,000-1,500/700-2,500 ml. Haemoglobin was 9.5 g/dl, total leucocytes 1800/mm³ with normal differential count, platelets 50,000/ mm³ and PT/INR 12/12. Blood glucose levels were 265-550 mg/dl, urea 54 mg/dl, creatinine 1.2 mg/dl, albumin/globulin 2.5/2.8 g/ml, Na/K 137-139/4.2-4.6 and total bilirubin 0.4 mg/dl. Liver function tests revealed alanine transaminase 99, aspartate transaminase 26, and alkaline phosphatase 233 mg/dl. Two-dimensional echocardiography revealed a left ventricular ejection fraction of 62% and mild diastolic dysfunction. She developed sepsis followed by disseminated intravascular coagulation and septic encephalopathy. Multiple purpura over both hands and left leg along with bullae on left leg were noticed. She suffered cardiac arrest twice from which she could not be revived despite aggressive efforts.

*Ochrobactrum anthropi* was isolated from two consecutive sets of blood cultures obtained both from peripheral line and phlebotomy. Non lactose fermenting isolate was obtained after subculture from a Blood culture system (BacT/ALERT®) three-dimensional blood culture system (bioMérieux SA, France). Motile nonsporing noncapsulated Gram negative bacilli, positive for catalase, oxidase, urease, citrate, mannitol, sucrose, fructose, arabinose, xylose and inositol along with oxidative pattern in O-F glucose were seen by manual methods. VITEK 2 compact automated system (bioMérieux, France) provided 99% identification probability; bionumber...
Further, the organism’s ubiquity increases its persistence in hospital environments, ease of transmission, colonization and development of resistance. On one hand, it is difficult to delineate hospital and community acquired Ochrobactrum infections, and, on the other, it also furthers its labelling as insignificant colonizer in view of unknown or uncertain pathogenicity (18, 20, 23). Positive culture report may not be associated with clinically manifest infection, owing to muted immune response in critical care patients with multiple comorbidities as well as the immunocompromised, in whom, clinical inflammatory response may not always be related to microbial infection (20). Attributing pathogenicity to an emerging organism remains a clinical conundrum as it may not fit in the overall presentation, management and prognosis of patient; although it may have a role in exacerbation of other comorbidities (18).

Various typing studies such as Multi-Locus Sequence Typing (MLST), multi-locus phylogeny, genomic-based fingerprinting by pulsed-field gel electrophoresis (PFGE) and antibiotyping of Ochrobactrum anthropi have been tried to establish pathogenicity. MLST analysis suggests an epidemic population structure corresponding to a human-associated lineage (2). Human clinical isolates of Ochrobactrum anthropi appeared diverse when analyzed by PFGE, rep-PCR and Internal Transcribed Spacer sequencing (2). Various virulence factors such as virB operon have been identified (2, 19). Ochrobactrum pseudintermedium has also been isolated from clinical isolates (3). Non-pathogenic species of Ochrobactrum can be delineated through 16S rDNA studies (2).

Repeated isolation of Ochrobactrum anthropi from blood in an immunocompetent patient, with history of community exposure and negative surveillance cultures, reflects bacterial translocation from the large intestine where it is a part of normal flora (13). The rising populace of immunodeficient hosts warrants a high index of suspicion. Ochrobactrum anthropi is also a source of biotechnologically useful enzymes, can detoxify xenobiotics and has been evaluated in bioremediation (3).

Conclusion

Ochrobactrum anthropi is an emerging pathogen which can infect both immunocompromised and immunocompetent patients. A high index of suspicion is prudent to optimize the role of Ochrobactrum anthropi in pathogenesis and to streamline diagnosis, management and surveillance.

Conflicts of Interest: None

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References


