Acinetobacter spp. an Emerging Pathogen of Septicemia in a Tertiary Care Hospital

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Abstract

Introduction: Bloodstream infections are an important cause of patients serious morbidity and mortality worldwide. Changing bacterial flora and emergence of resistant strains further aggravate the problem. Acinetobacter spp. has emerged as an important pathogen. Multidrug-resistant (MDR) Acinetobacter has become a global threat to the seriously infected patients who critically rely on antibiotic therapy. Carbapenems remain the treatment of choice if isolates are susceptibility to this antimicrobial class. Carbapenem-resistant Acinetobacter isolates are increasingly reported worldwide. MDR of Acinetobacter increasingly jeopardizes the health-care setting, and this is leading to substantial mortality and morbidity globally. The Centers for Disease Control and Prevention considers Acinetobacter a “serious” threat.

Methods: The study was done from September 2014 to August 2015. Blood culture of 1073 samples was processed, of which 374 were positive. The tests were done in the microbiology laboratory of the institution. Blood specimens were collected aseptically into Bactec blood culture bottles. Identification of Acinetobacter species was made on the basis of phenotypic criteria. Antimicrobial susceptibility was done using the disc diffusion method (modified Kirby-Bauer test).

Results: Acinetobacter spp. was isolated in 41 (10.96%) cases, of which Acinetobacter baumannii was isolated in 24 cases (58.54%), Acinetobacter lwoffii was isolated in 17 cases (41.46%). In the present study, Acinetobacter spp. is sensitivity pattern to antibiotics are as follows: Imipenem was sensitive in 33 (80.48%) cases, meropenem was sensitive in 35 (85.36%), levofloxacin in 25 (62.50%) cases, and ofloxacin was sensitive in 22 (53.65%) cases. Polymyxin and tigecycline were sensitive in all cases of Acinetobacter septicemia.

Conclusion: Acinetobacter spp. is emerging as an important pathogen and developing drug resistance. Health education to be provided to the public on the dangers of indiscriminate use of antibiotics. Rational antibiotic use along with implementation of infection control policies are required for control of such infections.

Key words: Acinetobacter spp., Drug resistance, Emerging, Septicemia

INTRODUCION

Bloodstream infections are an important cause of patients serious morbidity and mortality worldwide.¹ Acinetobacter species are the second most commonly isolated nonfermenter in human specimens. Pseudomonas aeruginosa is the most common. Acinetobacter species ranks fourth after P. aeruginosa, Staphylococcus aureus, and Klebsiella pneumonia among the most frequent hospital-acquired infectious agents.² Acinetobacter was considered as opportunistic pathogen of low virulence, and it has recently emerged as an important nosocomial pathogen world over, mostly involving patients with impaired host defense, especially in intensive care units, neonatal units, and surgical wards.⁵ Changing bacterial flora and emergence of resistant strains further aggravate the problem. Acinetobacter spp. has emerged as important pathogens.³ Acinetobacter is strictly aerobic Gram-negative coccobacilli, and it is widely distributed in soil and water but also commonly found in the hospital environment. 33 genomic species of the
Acinetobacter genus have been identified. Acinetobacter is a non-glucose fermenting Gram-negative bacillus, and it has emerged in the past three decades as a major etiological agent of hospital-associated infections giving rise to significant morbidity and mortality particularly in immunocompromised patients. Multidrug resistant (MDR) Acinetobacter has become a global threat to the seriously infected patients who critically rely on antibiotic therapy. Carbenems remain the treatment of choice if isolates are susceptibility to this antimicrobial class. Carbenem-resistant Acinetobacter isolates are increasingly reported worldwide. Tigecycline, a relatively newer glycyxcycline agent, has been reported to have antimicrobial activity against MDR Acinetobacter species. Aminoglycoside agents such as tobramycin and amikacin (AK) are used if susceptible. These agents are usually used in conjunction with another active antimicrobial agent. MDR of Acinetobacter increasingly jeopardizes the health-care setting, and this is leading to substantial mortality and morbidity globally. The Centers for Disease Control and Prevention considers Acinetobacter a “serious” threat.

The aim of this study was to determine the emerging occurrence of Acinetobacter in septicemia and their antibiotic susceptibility pattern.

METHODS

The study was done from September 2014 to August 2015. Blood culture of 1073 samples was done, of which 374 were positive. The tests were done in the microbiology laboratory of the institution. Blood specimens were collected aseptically into Bactec blood culture bottles after cleaning proposed venepuncture sites with 70% alcohol, then povidone iodine, and finally, 70% alcohol to remove the iodine at the end of venepuncture. 5 mL of blood was collected from each patient, injected into the bottle, and transported to the microbiology laboratory for incubation in the Bactec blood culture system. Gram stain and subcultures using MacConkey and blood agar plates were done for culture bottles were growths were indicated other specimens were inoculated on MacConkey agar and blood agar and incubated at 35-37°C for 18-24 h. Acinetobacter species grew on MacConkey agar appearing as a non-lactose fermenter. All Gram-negative coccobacilli isolates were tested for catalase and motility. All catalase-positive, non-motile Gram-negative coccobacilli were subjected to an oxidase test. All oxidase negative organisms were inoculated into peptone broth. Gram-negative coccobacilli were identified as Acinetobacter spp. based on the reactions on the identification. Identification of Acinetobacter species was made on the basis of phenotypic criteria that is Gram-staining, colony morphology, penicillin susceptibility, oxidase, catalase and urease activity, citrate reduction, gelatin hydrolysis, glucose and lactose fermentation, and growth at 37°C and 44°C.

Antimicrobial susceptibility was done using the disc diffusion method (modified Kirby-Bauer test). The inoculum was prepared from a suspension of the organism made by picking 2 or 3 colonies of the organism and making an emulsion of it in peptone water. This suspension was then compared against a turbidity standard (0.5 McFarland standard). Using a sterile swab stick, Mueller-Hinton agar plates were inoculated with the broth cultures. Antibiotic-impregnated discs were placed on the surface of the agar and incubated at 35-37°C for 24 h. The diameter of the zones of inhibition was measured with a calibrated meter rule and interpreted with the standard interpretative Clinical and Laboratory Standards Institute charts.
RESULTS

The study was done from September 2014 to August 2015 in the Department of Microbiology of the tertiary care hospital. Blood culture of 1073 samples was done, of which 374 were positive. S. aureus was isolated in 123 (32.88%) cases. Methicillin-resistant S. aureus was isolated in 84 (22.46%) cases. Coagulase-negative Staphylococci was isolated in 37 (9.89%) cases Chart 1. In 34 (9.09%) cases, Klebsiella spp. were isolated. Other organisms were isolated in 55 (14.71%) cases Chart 2. Acinetobacter spp. was isolated in 41 (10.96%) cases, of which Acinetobacter baumannii was isolated in 24 cases (58.54%), Acinetobacter lwoffii was isolated in 17 cases (41.46%). In the present study, Acinetobacter spp. is sensitivity pattern to antibiotics are as follows: Imipenem was sensitive in 33 (80.48%) cases, meropenem was sensitive in 35 (85.36%), levofloxacin in 25 (62.50%) cases Chart 3. Ofloxacin was sensitive in 22 (53.65%) cases. Polymyxin and tigecycline were sensitive in all cases of Acinetobacter septicemia.

DISCUSSION

The study was done from September 2014 to August 2015 in the Department of Microbiology of the tertiary care hospital. Blood culture of 1073 samples was done, of which 374 were positive. Acinetobacter spp. was isolated in 41 (10.96%) cases, A. baumannii was isolated in 24 cases (58.54%), and A. lwoffii was isolated in 17 cases (41.46%).

In the present study, Acinetobacter spp. was isolated in 41 (10.96%) cases. In a study done by Saravu et al., in 2015, Acinetobacter spp. was isolated in 10% of cases. In a study done by Marwah et al., in 2015, Acinetobacter spp. was isolated in 14.9%. In a study done by Nwadike et al., in 2014, Acinetobacter spp. was isolated in 9% of cases. In a study done by Jyothi et al., in 2013, Acinetobacter spp. was isolated in 12.2% of cases. In a study done by Shete et al., in 2009, Acinetobacter spp. was isolated in 10.8% cases. In a study done by Arora and Jaitwani in 2005, Acinetobacter spp. was isolated in 12.3%.

Increasing rates of Acinetobacter infections may be due to lapses in infection-control practices. In these situations, “colonization pressure,” which is a function of the proportion of patients already colonized or infected with Acinetobacter, can affect the likelihood of cross-transmission between patients. Acinetobacter has been implicated in many outbreaks. Acinetobacter, once considered as an opportunistic pathogen of low virulence, has recently been emerged as an important nosocomial pathogen world over, mostly involving patients with impaired host defense, especially in intensive care units, neonatal units, and surgical wards.

In the present study, A. baumannii was isolated in 24 cases (58.54%).
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therapeutic options available for infected patients and has increased the length of stay and mortality.

CONCLUSION

MDR Acinetobacter septicemia may cause severe clinical disease that is associated with a high mortality. The increase in the infection rate due to a particular pathogen may be due to lapses in infection control measures. Therefore, continuous bacteriological surveillance, implementation of infection control policies, careful disinfection of intensive care equipment, and rational antibiotic use are required to control such infections.

Acinetobacter spp. is emerging as an important pathogen and developing drug resistance. Health education be provided to the public on the dangers of indiscriminate use of antibiotics. Rational antibiotic use along with the implementation of infection control policies are required for control of such infections.

REFERENCES