CASE SERIES

Acinetobacter junii: A rare pathogen causing opportunistic infections from a tertiary care hospital

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Abstract

Acinetobacter are Gram-negative coccobacilli comprising of *Acinetobacter baumannii* and *Acinetobacter lwoffii* as commonly isolated species of the genus *Acinetobacter* from clinical specimens. The other species of the genus *Acinetobacter* are rarely isolated from clinical specimens and usually considered as environmental contaminants. *Acinetobacter junii* has rarely been reported globally causing opportunistic infections in immunocompromised individuals. We reported a series of four clinical cases due to *Acinetobacter junii* infection in a tertiary care teaching institute from Uttar Pradesh, India. Among these reported cases first case was peritonitis, second and third cases were catheter associated urinary tract infection and fourth case was ventilator associated pneumonia. All these cases were reported among immunocompromised individuals and *Acinetobacter junii* was identified by VITEK-2 Compact automated system which was further reconfirmed by conventional biochemical tests. These isolates were found to be susceptible against most of the antimicrobials.

Keywords: *Acinetobacter junii*, Opportunistic infections, Rare *Acinetobacter* species, Healthcare Associated Infections, Catheter Associated Urinary Tract Infection

Introduction

Acinetobacter species are Gram-negative coccobacilli and have emerged as a major cause of nosocomial infection. They are ubiquitous in nature and cause infections which are difficult to treat due to Multidrug Resistance (MDR) [1]. These bacteria have tremendous capacity to colonize, exhibiting their role in Healthcare Associated Infections (HCAIs) especially in the patients with underlying comorbidities or immunocompromised states [2]. *Acinetobacter baumannii* is the representative species as well as most commonly isolated species of the genus *Acinetobacter* from clinical specimens. *Acinetobacter baumannii* is a well-established and important cause of various clinical conditions especially from healthcare settings [3]. The species of *Acinetobacter* other than *Acinetobacter baumannii* are rarely isolated from clinical specimens causing various infections specifically associated with HCAIs in patients with underlying risk factors [3, 4]. *Acinetobacter junii* is rarely reported as human pathogen [5]. *Acinetobacter junii* is reported only from few case reports documenting its clinical association with Urinary Tract Infection (UTI), corneal ulcer, bacteremia, pneumonia and septicemia [3-8]. We are presenting four cases of *Acinetobacter junii* in this case series from our tertiary care hospital from Uttar Pradesh, India.

Case-1: Peritonitis in an immunocompromised individual

A 57 year old male patient presented with abdominal distention and pain over abdomen with ascites,

Chronic Liver Disease (CLD), hepatitis C virus infection, type 2 Diabetes Mellitus (DM) and pulmonary tuberculosis on Anti-tubercular Treatment (ATT). The ultrasonography guided ascitic tap was done following aseptic procedure and the ascitic fluid was subjected to aerobic bacterial culture and Antimicrobial Susceptibility Testing (AST). The isolated, Non-lactose Fermenting (NLF) and single type of colonies grown on culture media were found to be Gram-negative coccobacilli (Figure 1) and identified as *Acinetobacter junii* (Bionumber 0000000100500102) by Vitek-2 compact automated system (from bioMerieux, France).

Case-2:Catheter Associated Urinary Tract Infection (CAUTI) in an immunocompromised individual on hemodialysis

A 52 year old male patient presented with complaint of decreased urine output. He was a case of Hypertension (HTN) with Coronary Artery Disease (CAD), Type-2 DM (T2DM) and diagnosed as Acute Kidney Injury (AKI) on Chronic Kidney Disease (CKD). After taking written and informed consent, hemodialysis was done followed by Foley's catheterization. On third day of Foley's catheterization, he developed paraphimosis, pain and burning over lower abdomen. Catheter urine sample, collected following proper asepsis and sample collection guidelines, was subjected to aerobic culture and AST. The isolated, NLF and single type of colonies with significant colony count of $>10^5$ colony forming units (CFU)/ml grown on culture media were found to be Gram-negative coccobacilli (Figure 1) and identified as *Acinetobacter junii* (Bionumber 0040000100-500102) by Vitek-2 Compact automated system.

Case-3: CAUTI in an immunocompromised individual

A 60 year old male patient, with hypertension and type-2 DM presented with acute exacerbation of Chronic Obstructive Pulmonary Disease (COPD) on medication. Patient was being managed conservatively and Foley's catheterization was done. Patient developed lower abdominal discomfort and fever with chills on fourth day of Foley's catheterization. Catheter urine sample collected following proper asepsis and sample collection guidelines was subjected to aerobic culture and AST. The isolated, NLF and single type of colonies with significant colony count of $>10^5$ CFU/ml grown on culture media were found to be Gram-negative coccobacilli (Figure 1) and identified as *Acinetobacter junii* (Bionumber 0040000100500102) by Vitek-2 Compact automated system.

Case-4: Ventilator Associated Pneumonia (VAP) in an immunocompromised individual

A 71 year old female patient with hypertension and type-2 DM presented with a history of fall on ground followed by weakness of the right side of the body and breathlessness. She was diagnosed as a case of Cerebrovascular Accident (CVA) leading to right sided hemiparesis. She was being managed conservatively and kept on ventilator support. She developed high grade fever on fourth day of hospital stay. On further investigations, pleural effusion with pneumonia was detected and Bronchoalveolar Lavage (BAL) fluid was collected and subjected to aerobic culture and AST. The isolated, NLF and single type of colonies grown on culture media were found to be Gram-negative coccobacilli (Figure 1) and identified as *Acinetobacter junii* (Bionumber 0040000100500100) by Vitek-2

compact automated system (from bioMerieux, France). All the *Acinetobacter junii* isolates were further confirmed by conventional biochemical tests (Table 1). The AST results of the isolated bacteria are shown in Table 2. The summary of all the four cases is shown in Table 3.

Table 1: Biochemical test results of *Acinetobacter junii*

Biochemical test	**Result**
Catalase test	Positive
Oxidase test	Negative
Indole production test	Negative
Citrate utilization	Positive
Triple Sugar Iron (TSI)	Acidic slant/Acidic butt without H_2S production and without gas production
Nitrate Reduction test	Positive
Lysine Decarboxylase test	Negative
Arginine Dihydrolase test	Negative
Ornithine Decarboxylase test	Negative
ONPG test	Positive
Motility testing	Motile
Lactose fermentation test	Positive
Mannitol fermentation test	Positive
Arabinose fermentation test	Negative
D-Glucose fermentation test	Positive with acid production and without gas production

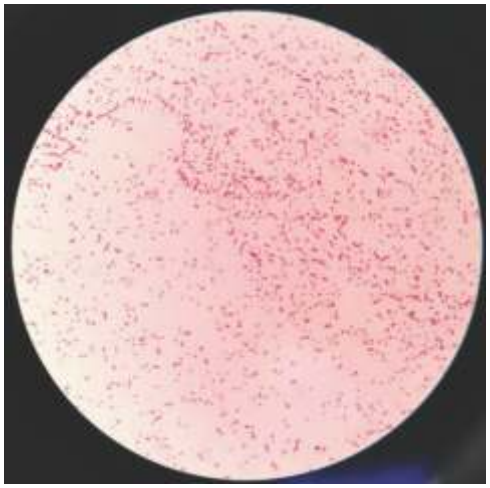

Figure 1: Gram stained smear of *Acinetobacter junii* showing Gram negative coccobacilli

Table 2: Case wise comparison of AST pattern of *Acinetobacter junii* isolated from all of the 4 cases

Antibiotics	AST Result (MIC in µg/mL)			
	Case-1	Case-2	Case-3	Case-4
Piperacillin-Tazobactam	S (⩽4)	R (⩾128)	R (⩾128)	R (⩾128)
Ceftazidime	S (1)	R (⩾64)	S (⩽0.5)	R (⩾64)
Cefepime	S (⩽0.12)	S (⩽0.12)	S (⩽0.12)	S (⩽0.12)
Imipenem	S (⩽0.5)	S (⩽0.5)	S (⩽0.5)	S (⩽0.5)
Meropenem	S (⩽0.25)	S (⩽0.25)	S (⩽0.25)	S (⩽0.25)
Amikacin	S (⩽2)	S (8)	S (⩽2)	S (⩽2)
Gentamicin	S (⩽1)	I (8)	S (⩽1)	S (⩽1)
Ciprofloxacin	S (0.12)	S (0.12)	S (0.12)	S (0.12)
Minocycline	S (⩽0.5)	S (⩽0.5)	S (⩽0.5)	S (⩽0.5)
Colistin	I (2)	I (2)	I (⩽0.5)	I (2)
Trimethoprim-Sulfamethoxazole	S (20)	S (20)	S (20)	S (20)

S-Susceptible, I-Intermediate susceptibility, R-Resistant

Table 3: Summary of case series

Patient Details	Case 1	Case 2	Case 3	Case 4
Age / Gender	57 years / Male	52 years / Male	60 years / Male	71 years / Female
Clinical profile	Abdominal pain, abdominal distension	Decreased urine output, lower abdominal pain and burning	Acute exacerbation of COPD, lower abdominal discomfort, fever with chills	Right sided hemiparesis, shortness of breath
Underlying conditions/ Comorbidities	Chronic liver disease,Hepatitis C virus infection, Chronic Type-2 DM, Pulmonary tuberculosis on ATT	Hypertension, CAD, Chronic Type-2 DM, AKI on CKD on Haemodialysis	Hypertension, Chronic Type-2 DM, COPD on medication	Hypertension, Chronic Type-2 DM
Bacteriological Profile	Ascitic fluid C/S: NLF, Gram negative coccobacilli identified as *Acinetobacter junii*	Urine C/S: NLF, Gram negative coccobacilli identified as *Acinetobacter junii*	Urine C/S: NLF, Gram negative coccobacilli identified as *Acinetobacter junii*	Bronchoalveolar lavage fluid C/S: NLF, Gram negative coccobacilli identified as *Acinetobacter junii*
Clinical Diagnosis	CLD with HCV infection with Type-2 DM with Pulmonary tuberculosis with peritonitis	Hypertension with CAD with Type-2 DM with AKI on CKD with CAUTI	Hypertension with Type-2 DM with COPD with CAUTI	Hypertension with Type-2 DM with VAP
Targeted antimicrobial therapy	Ceftriaxone	Meropenem	Amikacin	Amikacin
Follow-up and outcome	Recovered and discharged after 15 days	Recovered and discharged after 21 days	Recovered and discharged after 20 days	Recovered and discharged after 15 days

Discussion

Acinetobacter species are usually considered as opportunistic pathogens [3]. *Acinetobacter baumannii* is well established and most common pathogenic as well as representative species of the genus *Acinetobacter* implicated in various HCAIs. The species of the genus *Acinetobacter* other than *Acinetobacter baumannii* and *Acinetobacter lwoffii* are rarely reported as pathogens including *Acinetobacter junii*. Association of *Acinetobacter junii* with various clinical conditions are rarely reported in few case reports and case series. *Acinetobacter junii* is an opportunistic pathogen found to be associated with various immuno-compromised states, underlying pathologies and comorbidities [3-8]. *Acinetobacter junii* also causes clinical infections in patients receiving prior antibiotic therapy or invasive therapy [9]. All the available case reports are associated with immunocompromised states and most of them are HCAIs. We reported four clinical cases due to *Acinetobacter junii*. In this case series, all the four cases were opportunistic infections due to *Acinetobacter junii* as all the cases were associated with immunocompromised states.

The classification of constituent members of the genus *Acinetobacter* is based on DNA-DNA hybridization and previously they were difficult to be identified by various phenotypic methods due to overlapping biochemical test results with each other. Now *Acinetobacter* can be easily and reliably identified and speciated by various automated identification and AST systems available including VITEK-2 compact [8, 10].

On reviewing the AST results, all the isolates were susceptible against most of the antibiotics. The resistance against piperacillin-tazobactam was observed among three isolates while resistance against ceftazidime was observed among two isolates and all other antibiotics were found to be sensitive. Being sensitive against most of the antibiotics, treatment of *Acinetobacter junii* infection is not a matter of concern. Similar antibiotic resistance patterns were also reported in other case reports [3, 6].

Current trends of antimicrobial resistance among various species of *Acinetobacter* revealed that *Acinetobacter baumannii* is resistant against most of the antimicrobials and sensitive only against colistin which is considered as last resort of drug. Species level identification of *Acinetobacter* is important to prevent misuse of reserved and last resort of antibiotics as *Acinetobacter junii* is sensitive against most of the antibiotics in contrast to *Acinetobacter baumannii* which is resistant against most of the antibiotics. We did not perform molecular testing for confirmation of species level identification and detection of resistance genes due to limited resources.

Conclusion

Acinetobacter junii is an important opportunistic pathogen causing infections especially HCAIs among immunocompromised individuals and associated comorbidities. Species level identification of all *Acinetobacter* isolates isolated from clinical specimens is important to prevent misuse of high end antibiotics. Only isolation of *Acinetobacter junii* on culture from clinical specimens is not sufficient, correlation with clinical findings, host's immunity and other comorbidities are also important to establish its association with clinical conditions.

Proper implementation of hospital infection control practices to prevent spread of the opportunistic HCAIs and antimicrobial stewardship to prevent emergence of antibiotic resistance should be done.

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How to cite this article:
Singh P, Pandey A. *Acinetobacter junii*: A rare pathogen causing opportunistic infections. *J Krishna Inst Med Sci Univ* 2023; 12(4):168-174

Submitted: *26-July-2023* ***Accepted:*** *26-Aug-2023* ***Published:*** *01-Oct-2023*