



COMMUNITY-ACQUIRED NDM-PRODUCING KLEBSIELLA PNEUMONIAE PYELONEPHRITIS: A CLINICAL AND PUBLIC HEALTH CONCERN

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ABSTRACT

Background: New Delhi Metallo- β -lactamase (NDM)-producing *Klebsiella pneumoniae* is an emerging multidrug-resistant pathogen, often associated with healthcare settings. However, community-acquired infections with such strains are increasingly reported, posing diagnostic and therapeutic challenges. **Case Presentation:** A 32-year-old previously healthy woman presented with high-grade fever, flank pain, and dysuria. Imaging confirmed right-sided pyelonephritis. Urine culture revealed *Klebsiella pneumoniae* with extensive drug resistance, including resistance to carbapenems. Molecular analysis detected the presence of NDM-1 gene, confirming a carbapenemase-producing strain. The isolate was susceptible only to colistin and tigecycline. The patient was successfully treated with intravenous colistin and discharged after clinical improvement. **Conclusion:** This case highlights the emerging threat of community-acquired NDM-producing *K. pneumoniae* infections in otherwise healthy individuals. Surveillance and antibiotic stewardship are essential to curb the spread of such resistant organisms in the community.

KEYWORDS : NDM-1, community-acquired infection, *Klebsiella pneumoniae*, pyelonephritis, multidrug resistance, carbapenemase

INTRODUCTION

Klebsiella pneumoniae, a Gram-negative bacillus, is a common cause of urinary tract infections (UTIs). Traditionally associated with nosocomial infections, the emergence of carbapenem-resistant strains, particularly those producing New Delhi Metallo- β -lactamase (NDM), has significantly altered its clinical profile.

NDM-producing strains are commonly encountered in hospitalized patients, but recent reports indicate their emergence in community settings, affecting even previously healthy individuals. This raises serious concerns about horizontal gene transfer and environmental dissemination of resistance.

We report a rare case of community-acquired pyelonephritis caused by NDM-producing *K. pneumoniae* in a young female with no recent hospitalization, highlighting the expanding reach of antimicrobial resistance.

Case Presentation

A 32-year-old married woman from a semi-urban area presented to the emergency department with complaints of high-grade fever (up to 39.5°C), right flank pain, burning micturition, and nausea for 4 days. She had no history of hospitalization, surgery, catheterization, or antibiotic use in the past year. There was no known comorbidity.

On examination, she was febrile (39.1°C), heart rate 104/min, blood pressure 108/70 mmHg. Right renal angle tenderness was present. Urinalysis showed pyuria and positive leukocyte esterase. Blood counts revealed leukocytosis (WBC 14,000/mm³), elevated CRP, and ESR. Renal function was normal.

Ultrasound abdomen suggested right-sided pyelonephritis without obstruction. A midstream urine sample sent for culture grew >10⁵ CFU/mL of *Klebsiella pneumoniae*. Antibiotic susceptibility testing by VITEK-2 showed resistance to all β -lactams, including carbapenems, aminoglycosides, and fluoroquinolones. The isolate was susceptible only to colistin and tigecycline.

Phenotypic Modified Hodge Test and Carbapenem Inactivation Method (CIM) were positive. Molecular testing by PCR confirmed the presence of NDM-1 gene.

She was started on intravenous colistin (2 million units q8h) and supportive care. Fever subsided by day 4, and her symptoms resolved completely by day 10. Repeat urine culture

after 2 weeks was sterile. The patient was counseled on hygiene, handwashing, and antibiotic use.

DISCUSSION

NDM-1 is a metallo- β -lactamase capable of hydrolyzing a broad spectrum of β -lactams, including carbapenems, and is often plasmid-mediated, allowing rapid dissemination among Enterobacteriaceae. While initially reported from healthcare settings, NDM-producing organisms are increasingly isolated from community-acquired infections, likely due to environmental contamination, unregulated antibiotic use, and person-to-person transmission.

This Case Is Significant As It Involved:

- No history of healthcare contact or prior antibiotic exposure
- Isolation of an NDM-producing strain in a community-acquired UTI
- Therapeutic success with last-resort agents (colistin)

The spread of such resistance in the community can severely limit treatment options and increase morbidity. Hence, early diagnosis, appropriate therapy, and infection control measures are crucial.

CONCLUSION

This report underlines the emergence of community-acquired NDM-producing *Klebsiella pneumoniae* in young, immunocompetent individuals. It serves as a warning for clinicians and public health authorities to strengthen antibiotic stewardship, enforce environmental sanitation, and expand molecular surveillance to control the dissemination of carbapenem-resistant organisms beyond hospital settings.

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