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# CHALLENGES IN MANAGING MULTIDRUG-RESISTANT INFECTIONS AMONG REFUGEES: CLINICAL EXPERIENCE DURING THE UKRAINIAN WAR

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## ABSTRACT

The war in Ukraine, initiated in 2022, triggered a massive humanitarian crisis with millions displaced. This population exodus posed significant healthcare challenges, including the spread of infections caused by multidrug-resistant (MDR) bacteria. Factors such as disrupted healthcare services, inappropriate antimicrobial use and environmental contamination contributed to increased bacterial resistance.

In this context, in 2023 an 86-year-old Ukrainian migrant was treated in a Spanish hospital for severe infections complicated by MDR bacteria. During hospitalisation, complex resistant strains of *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* were identified. Treatment was guided by culture results, though infections recurred multiple times.

A literature review indicated that infections among displaced Ukrainians commonly involve Gram-negative bacteria such as *P. aeruginosa* and *K. pneumoniae*, often exhibiting high resistance levels. This underscores the urgent need for infection control strategies, improved antibiotic stewardship and enhanced epidemiological surveillance. Additionally, it highlights the importance of international cooperation and networked efforts in managing antimicrobial resistance during conflicts and mass displacement.

## KEYWORDS

Antimicrobial resistance, refugees, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, wounds and injuries, conflict-related infections

## LEARNING POINTS

- Multidrug-resistant (MDR) bacterial infections are frequent among displaced populations from conflict zones, presenting significant clinical challenges.
- Effective management requires multidisciplinary teamwork, stringent infection control measures and rational use of antibiotics.
- Enhanced international cooperation and surveillance systems are essential to combating antimicrobial resistance in crisis contexts.

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## INTRODUCTION

In February 2022, the war in Ukraine triggered a massive humanitarian crisis, displacing millions internally and externally. This exodus created unprecedented healthcare challenges, including the spread of multidrug-resistant (MDR) bacterial infections.

Studies from prior conflicts, such as in Iraq, have shown that wars increase bacterial resistance due to disrupted healthcare, inappropriate antimicrobial use and environmental contamination by heavy metals[1,2]. The situation worsens due to shortages of healthcare personnel and essential medicines, including antibiotics.

In the summer of 2023, our hospital treated a migrant patient from Ukraine. Collaboration with the microbiology department and crucial support from social workers enabled comprehensive care.

## CASE DESCRIPTION

An 86-year-old Ukrainian woman presented with hypertension, dyslipidaemia and permanent atrial fibrillation; she suffered an ischaemic stroke in July 2023, resulting in left hemiparesis. After hospitalisation in Ukraine requiring urinary and nasogastric tubes, she relocated to Spain under challenging conditions. Persistent fever and declining health prompted her admission to Internal Medicine, following referral from her daughter's physician. Blood, ulcer and urine cultures were collected upon admission, despite her lack of residency documentation.

The initial urine culture identified *Pseudomonas aeruginosa* producing NDM-type metallo-β-lactamase, resistant to piperacillin-tazobactam, ceftazidime, cefepime, ceftazidime-avibactam, ceftolozane-tazobactam, ciprofloxacin and amikacin, with intermediate sensitivity to aztreonam and full susceptibility to cefiderocol. Due to cefiderocol unavailability, high-dose aztreonam was initiated. Fever resolved within 48 hours with reduced inflammatory markers, but recurred four days after treatment cessation.

A second urine culture detected OXA-48 producing *Klebsiella pneumoniae*, resistant to all tested antibiotics except cotrimoxazole, prompting a second antibiotic regimen. Post-treatment fever recurred, and a third urine culture revealed the same resistant *K. pneumoniae* strain. Further antibiotic testing was negative, showing resistance even to fifth-generation cephalosporins. Thus, cotrimoxazole was restarted and extended.

During admission, two additional febrile episodes occurred without microbiological isolates. A fourth fever episode was attributed to *Clostridioides difficile* diarrhoea, resolving fully with treatment.

The fifth and final fever episode was considered likely to be acute cholecystitis, resolving with empirical amoxicillin-clavulanate. Blood cultures taken throughout the 42-day admission were negative.

The patient also presented a grade IV sacral ulcer from her discharge in Ukraine, initially managed by her daughter. Upon admission, the ulcer showed signs of significant bacterial infection, with purulent exudate and peripheral erythema. Cultures isolated *Proteus mirabilis* producing beta-lactamases and carbapenemase-producing *P. aeruginosa*. Due to lack of surgical specialists, intensive local treatment significantly reduced exudate, improved clinical status and managed pain adequately.

## DISCUSSION

This case posed significant clinical challenges due to complex antibiotic resistance. A bibliographic search in PubMed (January 2025) using terms "War OR 'Displacement of Population' AND 'Drug Resistance'" initially yielded 16 results, with non-relevant or unrelated articles excluded.

Most analysed articles highlighted Gram-negative bacteria such as *Acinetobacter baumannii*, *P. aeruginosa* and *K. pneumoniae* causing infections in Ukraine patient's war wounds. Similar resistance profiles appeared in Ukrainian patients treated internationally[3,4].

Resistance mechanisms commonly identified included the bla NDM gene encoding New Delhi metallo-β-lactamase, along with bla_OXA-48 and bla KPC genes. Genes conferring aminoglycoside resistance (armA and rmt) were also detected, though less frequently[5].

## CONCLUSIONS

This case underscores the severity of MDR bacterial infections in war and mass displacement contexts, notably exacerbated in Ukraine since the conflict began. Bacteria identified in this patient, such as *P. aeruginosa* and *K. pneumoniae*, highlight a recurring resistance pattern among displaced individuals.

Clinical experience underscores the need for multidisciplinary approaches in managing such patients under extreme conditions. Collaboration among microbiology, Internal Medicine and social work was essential for comprehensive patient care. Rational antibiotic use combined with strict infection control strategies was key, despite challenges posed by MDR strains.

Finally, these challenges must inform strategies for improved infection control in conflict-affected regions and ensure appropriate, supervised antibiotic use. Global collaboration and strengthened healthcare networks are essential to mitigate antimicrobial resistance amid ongoing humanitarian crises.

## REFERENCES


1. Verkaik NJ, Wielders CCH, den Boer H, Langerak D, Vogel M, Witteveen S, et al. participating laboratories; SWAB Working Group Surveillance of Antimicrobial Resistance. Antimicrobial susceptibility to last-resort antibiotics in carbapenemase-producing bacteria from Ukrainian patients. *Microbiol Spectr* 2024;**12**:e0114224.
2. Rodero Roldán MdM, Yuste Benavente V, Martínez Álvarez RM, López Calleja AI, García-Lechuz JM. Caracterización de las infecciones de herida entre pacientes procedentes de la guerra ruso-ucraniana en un hospital Role 4. [Characterization of wound infections among patients injured during the Ruso-Ukrainian war in a Role 4 hospital.] *Enferm Infecc Microbiol Clin* 2024;**42**:501–506.
3. Fuchs F, Xanthopoulou K, Burgwinkel T, Arazo del Pino R, Wohlfarth E, Pavlu F, et al. Coexistence of seven different carbapenemase producers in a single hospital admission screening confirmed by whole-genome sequencing. *J Glob Antimicrob Resist* 2024;**39**:184–188.
4. Witteveen S, Hans JB, Izdebski R, Hasman H, Samuelsen Ø, Dortet L, et al. Dissemination of extensively drug-resistant NDM-producing Providencia stuartii in Europe linked to patients transferred from Ukraine, March 2022 to March 2023. *Euro Surveill.* 2024;**23**:2300616.
5. Salmanov A, Shchehlov D, Svyrydiuk O, Bortnik I, Mamonova M, Korniyenko S, et al. Epidemiology of healthcare-associated infections and mechanisms of antimicrobial resistance of responsible pathogens in Ukraine: a multicentre study. *J Hosp Infect* 2023;**131**:129–138.