From Tent to Culture:

Clinical Microbiology and Antibiotic Resistance in Disaster Field Hospitals

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Background:

Over the past decades, the Israel Defense Forces (IDF) Medical Corps has been repeatedly deployed to humanitarian disaster zones worldwide, rapidly establishing and operating advanced field hospitals under austere conditions. These missions integrate clinical, surgical, and laboratory capabilities, providing advanced medical care to populations affected by the collapse of local healthcare systems. These field hospitals meet the World Health Organization (WHO) definition of a Level 3 Field Hospital, including advanced surgical capacity, intensive care, hospitalization, imaging services, and clinical laboratories. In disaster field hospitals, clinical microbiology relies on manual, culture-based and biochemical methods, with antimicrobial susceptibility testing also performed manually, as automated laboratory systems are not feasible in deployed settings.

Methods and Evidence Base:

This lecture integrates clinical and microbiological data from Israeli field hospitals deployed following the 2010 Haiti earthquake and the 2015 Nepal earthquake. Key studies include Miskin et al. (NEJM, 2010) and Lachish et al. (Travel Medicine and Infectious Disease, 2020), which analyzed bacterial pathogens and antimicrobial resistance mechanisms identified in disaster-related wound infections. These findings are discussed in the context of WHO and CDC recommendations for empiric management of skin and soft tissue infections in emergency and disaster settings.

Key Findings:

In both disasters, infections were dominated by Gram-negative pathogens, with unexpectedly high rates of multidrug-resistant (MDR) and extensively drug-resistant (XDR) organisms. Advanced resistance mechanisms including extended-spectrum beta-lactamases (ESBLs), and carbapenemases such as NDM were detected. These observations reveal a substantial mismatch between international empiric treatment guidelines and the actual microbiological landscape encountered in disaster medicine.

Implications for Pandemic Preparedness:

As with newly emerging epidemics, disaster medicine often operates in an environment of uncertainty, where the causative pathogens and their resistance patterns are initially unknown. Accurate diagnosis and pathogen characterization require extensive microbiological testing to guide appropriate therapy. Reliance solely on international guidelines or empiric treatment is insufficient.

Conclusion:

Antimicrobial resistance is not created by disasters it is revealed by them. Lessons learned from our field hospital deployments highlight the importance of early microbiological diagnosis, therapeutic flexibility, and diagnostic innovation in managing severe infections in disaster settings.