(16)

抗藥性細菌治療之新進展

Update of Treatment: Multi-Drug Resistant Organism

時　　間：115 年 6 月 27 日(星期六) 13:30~17:00
地　　點：臺北榮民總醫院 致德樓第 6、7 會議室
共同主辦：臺北榮民總醫院感染管制中心、臺北榮民總醫院內科部感染科、
國立陽明交通大學急重症醫學研究所

13:30-13:40	***Opening Remarks***	林邑璁教授 Yi-Tsung Lin
	座長：陳昕白 醫師 (Hsin-Pai Chen)	
13:40-14:20	三代頭孢黴素抗藥性腸內菌的治療新知 Update of Treatment of Third-Generation Cephalosporin-Resistant Enterobacterales	林邑璁教授 Yi-Tsung Lin
14:20-15:00	對碳青黴烯具抗藥性的革蘭氏陰性菌治療的新知 Update of Treatment of Carbapenem-Resistant Gram-Negative Bacilli	莊茜醫師 Chien Chuang
15:00-15:30	***Coffee Break***	
	座長：劉嘉仁 教授 (Chia-Jen Liu)	
15:30-16:10	金黃色葡萄球以及腸球菌的治療新知 Update of treatment of *Staphylococcus Aureus* and *Enterococcus spp.*	陳抱宇醫師 Pao-Yu Chen
16:10-16:40	人工智慧在感染管制的應用 Application of Artificial Intelligence in Infection Control	陳佳聘感管師 Chia-Ping Chen
16:40-17:10	人工智慧在抗生素管理的應用 Application of Artificial Intelligence in Antimicrobial Stewardship	許乃偉醫師 Nai-Wei Hsu
17:10-17:20	***Closing Remarks***	鄭玫枝教授 Mei-Jy Jeng

Update of treatment of third-generation cephalosporin-resistant Enterobacterales

三代頭孢黴素抗藥性腸內菌的治療新知

Yi-Tsung Lin

林邑璁

Center for Infection Control and Division of Infectious Diseases, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC

Institute of Emergency and Critical Care Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan, ROC

臺北榮民總醫院 感染管制中心 及 內科部 感染科

國立陽明交通大學 急重症醫學研究所

Third-generation cephalosporin-resistant Enterobacterales (3GCephRE) usually involves ESBL-producing Enterobacterales and Enterobacterales at moderate to high risk for clinically significant AmpC production. Routine EBSL testing is not performed by most clinical microbiology laboratories and non-susceptibility to ceftriaxone is often used as a proxy for ESBL production. However, Enterobacterales at moderate to high risk for clinically significant AmpC production receive less attention in the literature. ESBL are most prevalent in *Escherichia coli*, *Klebsiella pneumoniae*, *Klebsiella oxytoca*, and *Proteus mirabilis*. CTX-M enzymes, particularly CTX-M-15, are the most common ESBLs worldwide. ESBLs other than CTX-M with unique hydrolyzing abilities are variants of narrow-spectrum TEM and SHV β-lactamases with amino acid substitutions, but they have undergone less clinical investigation than CTX-M enzymes. AmpC β-lactamases are β-lactamase enzymes that are produced at basal levels by many Enterobacterales and increased AmpC enzyme production resulting from inducible *ampC* expression can increase MICs to certain antibiotics, most notably ceftriaxone, cefotaxime, and ceftazidime. *Enterobacter cloacae* complex, *Klebsiella aerogenes*, and *Citrobacter freundii* are the most common Enterobacterales at moderate to high risk for clinically significant AmpC production. Recently, IDSA guidance updated the treatment for ESBL-E and Enterobacterales with moderate to high risk for clinically significant AmpC production due to an inducible *ampC* gene. In this presentation, I will review the updated information for the treatment for 3GCephRE.

Update of treatment of carbapenem-resistant Gram-negative bacilli

對碳青黴烯具抗藥性的革蘭氏陰性菌治療的新知

Chien Chuang

莊　茜

Division of Infectious Diseases, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan ,ROC

臺北榮民總醫院 內科部 感染科

Carbapenems have traditionally served as the last-resort antibiotics for treating severe infections caused by multidrug-resistant Gram-negative bacilli. However, use of carbapenem leads to the emergence and dissemination of carbapenem-resistant Gram-negative bacilli (CRGNB), especially carbapenem-resistant *Enterobacterales*, carbapenem-resistant *Pseudomonas aeruginosa*, carbapenem-resistant *Acinetobacter baumannii*. As a result, alternative treatment strategies must be explored.

Managing CRGNB infections poses a major challenge for healthcare systems worldwide due to the limited therapeutic options and high mortality. In recent years, significant advancements have been made in the treatment of CRGNB, focusing on novel therapeutic approaches. This presentation will provide a comprehensive overview of the current strategies for managing CRGNB infections, highlighting recent developments and challenges in the field. These include the introduction of new β-lactam (cefiderocol), and new β-lactam/β-lactamase inhibitor combinations, such as ceftazidime/avibactam, ceftolozane/tazobactam, imipenem-cilastatin-relebactam, and aztreonam-avibactam, which have demonstrated promising clinical efficacy.

Effectively managing CRGNB infections requires a multifaceted approach, encompassing the development of novel antibiotics and the reconsideration of existing therapeutic strategies. This presentation will explore these aspects in detail, providing clinicians with up-to-date information to support informed decision-making in CRGNB management.

Update of treatment of *Staphylococcus aureus* and *Enterococcus spp.*

金黃色葡萄球菌以及腸球菌的治療新知

Yu-Pao Chen

陳抱宇

Division of Infectious Diseases, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan , ROC

臺大醫院 內科部 感染科

Background: Methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci (VRE) are leading causes of severe, health care-associated infections. Effective management requires a multifaceted approach involving rigorous infection control, optimized pharmacokinetics/pharmacodynamics (PK/PD), and targeted antimicrobial selection.

Preferred Drugs and PK/PD: Vancomycin and daptomycin remain the foundational therapies for MRSA bacteremia. To optimize efficacy and minimize nephrotoxicity, vancomycin necessitates area under the curve (AUC)-guided dosing. For daptomycin, clinicians increasingly favor higher doses (8–10 mg/kg daily) for MRSA due to its concentration-dependent killing. In VRE (*Enterococcus faecium*) infections, linezolid and daptomycin are the primary therapeutic options. However, daptomycin requires even higher dosing regimens of 10 to 12 mg/kg/day to achieve pharmacologic targets and suppress treatment-emergent resistance mediated by the LiaFSR stress response pathway.

Monotherapy vs. Combination Therapy: The role of upfront combination therapy differs markedly between the two pathogens. In MRSA bacteremia, clinical trials (e.g., CAMERA-2) have shown that combinations such as vancomycin or daptomycin with an anti-staphylococcal beta-lactam successfully reduced the duration of bacteremia, but they did not improve mortality and were associated with significantly higher rates of acute kidney injury. Consequently, upfront combination therapy is currently not recommended for MRSA. Conversely, for VRE, combining high-dose daptomycin with a beta-lactam or fosfomycin may enhance bactericidal activity improve patient outcomes.

Early Oral Switch: The transition from intravenous to oral antibiotics has gained traction to reduce hospital length of stay and central line-associated complications. The POET and SABATO trials demonstrated that early oral switch is safe and effective for carefully selected patients with low-risk *S. aureus* bacteremia and stabilized endocarditis. However, as MRSA cases were heavily underrepresented in these trials, generalized application for MRSA requires further validation.

New Drugs and Therapeutics: The therapeutic armamentarium continues to expand. Ceftobiprole, a novel cephalosporin, recently received FDA regulatory approval for MRSA bacteremia after demonstrating noninferiority to daptomycin. Long-acting lipoglycopeptides like dalbavancin (evaluated in the DOTS trial) and oritavancin (for VRE) offer promising alternatives for step-down consolidation therapy, facilitating early hospital discharge. Furthermore, novel non-pharmacologic modalities, such as bacteriophage therapies, are under active investigation as adjunctive treatments to address recalcitrant infections.

This presentation will deliver an in-depth update on advancements in the management of MRSA and VRE, emphasizing recent clinical data and innovative therapeutic approaches designed to optimize patient care amid rising antimicrobial resistance.

Application of artificial intelligence in infection control

人工智慧在感染管制的應用

Chia-Ping Chen
陳佳聘
Center for Infection control, Taipei Veterans General Hospital, Taipei, Taiwan, ROC
臺北榮民總醫院 感染管制中心

Driven by the rapid advancement of healthcare digitalization and artificial intelligence (AI), healthcare systems are undergoing a digital transformation from retrospective analysis toward real-time proactive intervention. This course reviews global AI trends in infection prevention and control (IPC) over the past three years, encompassing predictive analytics for healthcare-associated infections (HAIs), automated hand hygiene monitoring, and intelligent outbreak surveillance. It highlights how these technologies enhance the efficiency of data extraction and clinical decision support.

The practical segment focuses on the implementation of digital visualization dashboards for IPC monitoring. By integrating Laboratory Information System (LIS) data, these real-time surveillance platforms for respiratory pathogens—such as Influenza and COVID-19—enable rapid trend analysis and situational awareness through visualization. Furthermore, the session discusses the integration of multidrug-resistant organisms (MDRO) monitoring systems to optimize the timing and precision of preventive interventions. By leveraging AI-driven insights and visualization tools, healthcare organizations can effectively implement evidence-based, data-centric precision prevention strategies.

Application of artificial intelligence in antimicrobial stewardship

人工智慧在抗生素管理的應用

Nai-Wei Hsu
許乃偉
Division of Infectious Diseases, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC
臺北榮民總醫院 內科部 感染科

Timely initiation of appropriate empiric antibiotics in patients with sepsis is critical, as delays are strongly associated with increased mortality; however, clinicians frequently face substantial uncertainty when selecting empiric therapy in the setting of evolving antimicrobial resistance. Current antimicrobial stewardship programs (ASPs) rely on static antibiograms and retrospective audit-and-feedback strategies, which are often insufficient for real-time, patient-specific decision-making. Moreover, despite increasing interest in artificial intelligence (AI), no formal guideline currently exists to direct its implementation in antimicrobial stewardship. AI offers a framework for real-time, data-driven antimicrobial decision support, including prediction of resistant pathogens to guide empiric therapy selection, dynamic surveillance through real-time antibiograms, and automated audit-and-feedback systems to identify inappropriate prescriptions and prioritize high-risk patients. Nevertheless, the effectiveness of AI systems is highly dependent on data quality, completeness, and integration into clinical workflows, as inaccurate or fragmented data may lead to unreliable outputs and limit clinical adoption. Existing stewardship frameworks emphasize structured interventions, monitoring, and clinician accountability, which provide a foundation for AI integration. AI should therefore be positioned as a tool to augment—rather than replace—infectious disease specialists, with the potential to improve the timeliness, precision, and safety of empiric antibiotic therapy in critically ill patients.