CONFERENCE SCENE

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Australasian Society for Infectious Diseases 2015 conference report: one health, one world

Ravindra Dotel^{*,1}, Caitlin L Keighley^{*,1}, Dominic E Dwyer^{1,2,3} & Jen Kok^{1,2,3}

The 28th Annual Scientific Meeting of the Australasian Society for Infectious Diseases, Auckland, New Zealand, 18–21 March 2015.

The opening Māori pōwhiri welcoming ceremony highlighted the purpose of scientific conferences – fostering relationships through sharing and dissemination of knowledge. The scientific program successfully conceptualized the notion of one health and one world, and provided opportunities for interaction between physicians, microbiologists, epidemiologists, researchers, veterinarians and humanitarians in Oceania.

Ebola virus

• The virus behind the disease

Dominic Dwyer outlined the basic virology, epidemiology diagnostic testing and potential treatments of Ebola virus (EBOV). EBOV has variable length of 970–14,000 nm [1]. Smaller virions may be more infectious, while larger virions may consist of defective interfering particles that can affect interpretation of infectious viral load. Although first recognized in 1976, the cell receptor for EBOV and its lifecycle outside the human host remains uncertain. Surveillance of nonhuman primates may predict human outbreaks. Molecular analyses date the current outbreak strain to the Central African (Zairian) lineage from 2004 [2]. Old age and high viral loads (particularly in the first few days after symptom onset) predict poor outcome, although children and pregnant mothers are also at risk for developing severe disease. Nucleic acid testing performed in mobile or specialized reference laboratories is the test of choice, although antigen detection assays are being developed to facilitate point of care testing. Treatment and vaccine challenges previously described with RNA viruses may also occur with EBOV.

KEYWORDS

• Dengue • Ebola virus
• hepatitis B • hepatitis C
• influenza • Oceania

¹Centre for Infectious Diseases & Microbiology Laboratory Services, Institute of Clinical Pathology & Medical Research, Pathology West, Westmead Hospital, Westmead, New South Wales, Australia

²Marie Bashir Institute for Infectious Diseases & Biosecurity, University of Sydney, Westmead Hospital, Westmead, New South Wales, Australia

³Centre for Research Excellence in Critical Infections, University of Sydney, Westmead Hospital, Westmead, New South Wales, Australia

*Author for correspondence: Tel.: +61 298456255; Fax: +61 298938659; r_dotel@yahoo.com

[†]Authors contributed equally

• Getting back to zero

Dale Fisher discussed his recent experience in Liberia working with the WHO Global Outbreak Alert and Response Network. Ebola virus disease (EVD) outbreaks in Central Africa annually or biannually, usually controlled with simple infection control measures alone. The current epidemic of 24,666 cases [3] in West Africa well surpasses the previous largest Ugandan outbreak of 425 cases in 2000, and was augmented by the lack of infrastructure and poverty in the early affected areas of Guéckédou, Guinea. Professor Fisher has worked in Liberia since April 2014 and described the difficulties in engaging three different countries with separate political systems, languages and tribal leaders. Disbelief and mistrust was dispelled through educational workshops and engaging chiefs. Important steps included creating a unified manual agreed upon by the CDC, WHO and UNICEF for healthcare workers (HCW) – the ‘Keep Safe, Keep Serving’ modules. Community engagement, interconnect-edness (between and within countries), coordinated health efforts and improvement in infection control measures are essential steps in reducing EBOV transmission.

• Lessons from the field

Nicole Gilroy presented her experience from the Hastings Airfield Ebola Treatment Centre (ETC) in Sierra Leone. The number of cases in Sierra Leone surpassed Liberia in December 2014. At the Hastings ETC, the majority of patients reported contact with a known case of EVD, and 30% of cases belonged to five family clusters. Average length of stay for discharged patients and time from admission to death in those that succumbed were 11 and 8 days, respectively. Supportive treatment included intravenous fluids, proton pump inhibitors and nutritional support. Many people witnessed the death of a loved one and psychosocial support was important. Dr Gilroy also highlighted that ETCs established in West Africa are semipermanent, and their role as the outbreak recedes is undetermined.

• Ebola preparedness & infection control issues

Jen Kok discussed hospital and laboratory preparedness for EVD at Westmead Hospital, the designated isolation hospital in New South Wales, Australia. Testing for EBOV is also conducted at the physical containment level-4 laboratory colocated at the same facility. Preparedness

encompasses many different aspects, including infrastructure, intra- and interhospital communication, training of clinical and laboratory staff, clinical governance and administration. A striking feature of the current epidemic is the number of HCW that have been infected and/or have died from EBOV. In the absence of specific antiviral therapy, infection control measures were successful in preventing further transmission of disease in hospitals in Conakry, Guinea, in contrast to the difficulty in implementing such measures in the community [4]. The importance of a ‘buddy’ when donning and doffing personal protective equipment and the ongoing assessment of competency in infection control procedures was highlighted to prevent transmission of EBOV.

• Hepatitis B & hepatitis C viruses

Stephen Locarnini outlined new strategies to cure HBV. In most patients, none of the currently available therapies led to HBsAg loss or seroconversion, and covalently closed circular DNA persists in infected hepatocytes, making cure impossible. However, HBV covalently closed circular DNA and mRNA may serve as future treatment targets.

Unlike HBV, HCV infection is now curable, and Ed Gane explored current and future therapeutic options for treatment-naïve and treatment-experienced patients with or without cirrhosis. Until recently, therapy has relied on poorly tolerated IFN-based treatments. Novel inhibitors of HCV NS3/4A, NS5A and NS5B including ombitasvir/paritaprevir/ritonavir/dasabuvir and sofosbuvir/ledipasvir are approved for use in patients infected with genotype 1 HCV, but at significant financial costs. In certain subgroups, sustained virological response may be achieved with less than 6 weeks of oral therapy.

HCV vaccine development is hindered by HCV genotype specificity. Public health efforts are important in reducing and eradicating HCV, as less than a percent of infected individuals are currently treated [5]. HCV/HIV coinfecting patients should be targeted, and clinicians should consider potential drug interactions with antiretrovirals. Modeling demonstrates that increasing the number of treated patients by 5% alone would achieve substantial decreases in rates of HCV-related cirrhosis and hepatocellular carcinoma [6].

• Dengue

David Lye reviewed management of dengue virus infection. WHO established a new dengue

severity classification in 2009 to help in early identification of patients progressing from non-severe to severe dengue (characterized by the presence of plasma leakage, severe bleeding and/or severe organ impairment) [7]. Dr Lye presented a retrospective review of 1507 laboratory-confirmed dengue virus infections in patients admitted to a Singaporean tertiary referral hospital in 2004, 2007 and 2008. He reported that while the absence of warning signs was useful in ruling out severe dengue, individual warning signs in isolation had low positive predictive value for severe dengue infection [8]. He also highlighted the lack of efficacy in previously used or novel therapeutic options including balapiravir, celgosivir, corticosteroids, chloroquine, anti-D or intravenous immunoglobulin. Out of the five dengue serotypes, vaccination looks most promising for serotypes three and four [9].

Influenza

• Influenza vaccination among healthcare workers

Rhonda Stuart discussed issues relating to influenza vaccination among HCW, who are readily infected with and can transmit influenza virus [10]. A Canadian hospital report from 2006 to 2012 found that 20% of influenza infections were hospital-acquired, with infected patients having longer length of stays and higher mortality rates [11]. Isolation of symptomatic HCW infected with influenza virus alone is not necessarily effective in preventing transmission as viral shedding may occur in asymptomatic cases. HCW vaccination is not universal despite moral and ethical obligations. In a study examining incentive versus penalty-based approaches to improving vaccination compliance, a \$25 gift card improved vaccination rates by 4% above baseline, compared with 9% when unvaccinated staff were obliged to undergo an online education module, a counseling session and sign a noncompliance declaration [12]. In a separate study, the compulsory use of face masks for unvaccinated staff increased vaccination compliance from 52 to 93%.

• SHIVERS study

The SHIVERS program that spans from 2012 to 2016, capitalizes on New Zealand's unique public health structure and geography. Sue Huang explained that >98% of New Zealanders with well-defined ethnicity and socioeconomic status are registered with primary health practitioners.

Analyses of annual disease burden thus far has revealed that of 4.4 million people, there were 20,000 consultations for influenza, 1600 hospitalizations, 89 intensive care admissions and 20 deaths. As a result of this study, determination of the duration of infectivity has led to a change in WHO's definition of severe acute respiratory illness to include onset within 10 days as 7% of influenza-positive cases had symptom onset 8–9 days prior to admission. Pacific Islanders had the lowest proportion of consultations but the highest proportion of hospitalizations. This population-based study found overall influenza vaccine effectiveness of 63%. Further data from SHIVERS are awaited and will include vaccine effectiveness in pregnancy.

• MacFarlane Burnet oration

This year marked the first time a lady delivered the Macfarlane Burnet Oration, in honor of Nobel Prize winning Australian virologist Sir Frank Macfarlane Burnet. Dr Katherine O'Brien elaborated on the Pneumonia Etiology Research for Child Health (PERCH) project, a large multicountry case-control study of severe pneumonia in hospitalized children under five years of age. She explained that while respiratory syncytial virus accounted for 20–40% of cases, the detection of multiple pathogens in each patient made data analysis challenging. There appeared to be prolonged wheezing following respiratory syncytial virus bronchiolitis, although a link to the long-term development of asthma remains unproven.

Future perspective

The ongoing evolution and emergence of viruses will continue to provide fertile ground for discovery, not only in the field of human medicine, but also in veterinary and social medicine. Further understanding of the pathogenesis and host responses to viral infections will lead to the development of better therapies and vaccines.

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