Lessons From The Historical Emergence And Spread Of Ciprofloxacin Resistance In NG

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Background: Antimicrobial resistance (AMR) in *Neisseria gonorrhoeae* (NG) poses a serious global threat. Future treatment options are limited, and a better understanding of the impact of the importation and spread of AMR strains into populations is critical. Our previous studies of ciprofloxacin resistance (CIPR) in NG in the state of NSW (years 2012 and 2014) showed that predominant genotypes accounted for the majority of CIPR. Here, we investigated the historical emergence and spread of CIPR NG strains in NSW which first appeared in 1991 (5 strains, 0.9%), increasing to >5% resistance by 1997, and by 2012 accounted for 31.5% of all isolates in NSW.

Methods: The Agena MassARRAY iPLEX method was used to genotype all CIPR NG isolates from NSW over the 10 year period 1991-1999. Geographical source of infection, where available, was examined.

Results: There were 325 CIPR NG clinical strains identified from 1991-1999. Of these, 98% (320/325) were viable and successfully genotyped. There were 68 different genotypes observed, comprising 1 to 99 isolates each. 66% of genotyped isolates had information regarding the geographical source of infection recorded: 36% were locally acquired; and 30% associated with overseas contact or travel, predominantly the Philippines (10%) and China (6%). The first CIPR case in 1991 was associated with travel to Thailand. A rapid increase in incidence of CIPR in 1997 coincided with the appearance of a predominant genotype. However, genotype variability remained high throughout the study period, with the highest variability observed in 1998-1999 and associated with continued evidence of overseas contacts.

Conclusion: These data show that continued importation of multiple genotypes, rather than the expansion of a predominant genotype, was important in the initial establishment of CIPR NG in the population. Further, this study highlights the benefits of using genotyping in addition to culture to enhance NG AMR surveillance.