Emergence of quinolone resistance and cephalosporin MIC creep in Neisseria gonorrhoeae isolates from a cohort of young men in Kisumu, Kenya, 2002 to 2009.

Abstract:

We evaluated antimicrobial resistance in Neisseria gonorrhoeae isolated from men enrolled in a randomized trial of male circumcision to prevent HIV. Urethral specimens from men with discharge were cultured for N. gonorrhoeae. MICs were determined by agar dilution. Clinical and Laboratory Standards Institute (CLSI) criteria defined resistance: penicillin, tetracycline, and azithromycin MICs of ≥2.0 μg/ml; a ciprofloxacin MIC of ≥1.0 μg/ml; and a spectinomycin MIC of ≥128.0 μg/ml. Susceptibility to ceftriaxone and cefixime was shown by an MIC of ≤0.25 μg/ml. Additionally, PCR amplification identified mutations in parC and gyrA genes in selected isolates. From 2002 to 2009, 168 N. gonorrhoeae isolates were obtained from 142 men. Plasmid-mediated penicillin resistance was found in 65%, plasmid-mediated tetracycline resistance in 97%, and 11% were ciprofloxacin resistant (quinolone-resistant N. gonorrhoeae [QRNG]). QRNG appeared in November 2007, increasing from 9.5% in 2007 to 50% in 2009. Resistance was not detected for spectinomycin, cefixime, ceftriaxone, or azithromycin, but MICs of cefixime ($P = 0.018$), ceftriaxone ($P < 0.001$), and azithromycin ($P = 0.097$) increased over time. In a random sample of 51 men, gentamicin MICs were as follows: 4 μg/ml (n = 1), 8 μg/ml (n = 49), and 16 μg/ml (n = 1). QRNG increased rapidly and alternative regimens are required for N. gonorrhoeae treatment in this area. Amid emerging multidrug-resistant N. gonorrhoeae, antimicrobial resistance surveillance is essential for effective drug choice. High levels of plasmid-mediated resistance and increasing MICs for cephalosporins suggest that selective pressure from antibiotic use is a strong driver of resistance emergence.