Use of Antibiotics Drives Resistance, Study Shows

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Contributing Writer

The use of azithromycin and clarithromycin clearly raises the proportion of macrolide-resistant organisms in the oral flora for a period of at least 6 months, reported Surbhi Malhotra-Kumar, Ph.D., of the University of Antwerp, Belgium, and associates.

This finding establishes that "macrolide use is the single most important driver of the emergence of macrolide resistance in human beings," the researchers said.

Many studies in the past have demonstrated a clear relation between antibiotic use and resistance, but to date none of those studies have shown a definite causal effect.

Neither have any studies linked antibiotic exposure within an individual to later resistance in that individual.

Dr. Malhotra-Kumar and associates used subjects' oral commensal streptococcal flora, which harbors the same macrolide resistance genes as pathogenic strep organisms do, as a model to study the effects of azithromycin and clarithromycin exposure on antibiotic resistance.

In their double-blind trial, 224 healthy volunteers were randomly assigned to receive once daily azithromycin for 3 days, twice daily clarithromycin for 7 days, or placebo.

Samples of oral strep flora were then taken from the subjects' tonsils and posterior pharyngeal wall before treatment and on several occasions afterward for up to 180 days.

Immediately after treatment, the mean proportion of macrolide-resistant streptococci dramatically increased in both active treatment groups. This effect was not seen in the placebo group.

Resistance peaked at the fourth day for azithromycin and the eighth day for clarithromycin, the investigators said (Lancet 2007;369:482-90).

The proportion of resistant streptococci remained increased for both drugs through the final follow-up at 6 months, "which emphasises that the commensal flora could serve as a reservoir of resistance for potentially pathogenic bacteria," they noted.

Although the study was able to reach definitive results after 6 months, a longer follow-up period "would have enabled us to define the time needed for the resistant oral flora to revert to baseline levels," Dr. Malhotra-Kumar and associates said.

"In view of the consequences of antibiotic use seen here, physicians should take into account the striking ecological side-effects of antibiotics when prescribing such drugs to their patients," the researchers added. ■

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These viruses are diversifying at an amazing rate."

If a pandemic similar to the 1918 pandemic were to occur today, it would cause an estimated 62 million deaths worldwide (Lancet 2006:369:2211-8). Health care resources in the United States would be quickly overwhelmed, according to data from the Center for Biosecurity at the University of Pittsburgh. Researchers estimated an influenza pandemic similar to 1918 would take 191% of the beds in the United States.

Response to an influenza pandemic should be tailored to the extent of the outbreak—whether it is widespread as in 1918 or more mild, as in 1968, experts said. The Centers for Disease Control and Prevention is releasing a strategy to categorize pandemic outbreaks on a 1 to 5 severity scale, similar to what is used to rate hurricane intensity.

"The distinction between a category 4 or 5 and a smaller pandemic is key," said Dr. Arnold Monto, a researcher at the University of Michigan School of Public Health in Ann Arbor. "What we can take away from the 1918 pandemic in terms of school closings and social distancing—which occasionally occur if there is a big seasonal outbreak—is that they usually occur late after the outbreak has taken off. It could be catastrophic if these measures are not taken in advance."

The CDC initiative will address the utility of many of these nonpharmacologic means for control of a future influenza pandemic.

The Seasonal & Pandemic Influenza 2007 meeting was endorsed by the AAP, IDSA, CDC, NIAID, and the Society for Healthcare Epidemiology of America. ■