

Antibiotic susceptibility of *Escherichia coli* isolates from inpatients with urinary tract infections in hospitals in Addis Ababa and Stockholm

S. Ringertz,¹ B. Bellete,² I. Karlsson,³ G. Öhman,⁴ M. Gedebou,⁵ & G. Kronvall⁶

A high level of antimicrobial resistance of bacteria has been detected at the Tikur Anbessa Hospital (TAH), Addis Ababa, for many years. In contrast, at the Karolinska Hospital (KH), Stockholm, the level of resistance is low. Reported are the results of an investigation of the correlation between antibiotic usage and the antimicrobial resistance rates of Escherichia coli isolates from patients with urinary tract infections in these hospitals.

At TAH the strains of E. coli isolated were considerably more resistant to all seven antibiotics tested. The level of multiresistance was 63% at TAH and 7% at KH. There were no significant differences in the total amount of antibiotics used in the two hospitals, except for antituberculosis agents. The strain biotypes and antibiograms, together with the length of patients' hospitalization before a positive urine culture was obtained, suggest that the majority of the strains from TAH were of nosocomial origin.

Introduction

The antimicrobial resistance of bacteria is a problem of global concern (1). In 1983 the Fogarty International Center of the National Institutes of Health initiated a project to map the antimicrobial resistance patterns and the use of antibiotics worldwide, the results of which were published in 1987 (2). It was concluded that, although there is a correlation between antibiotic use and subsequent resistance, the level or pattern of usage or other factors that contribute to different levels of resistance are not known (3). Resistance is more prevalent in developing countries (4), but more data on the use of antimicrobial agents in such countries are required.

There have been several reports on the high level of antimicrobial resistance among isolates of

Escherichia coli from the Tikur Anbessa Hospital (TAH), Addis Ababa (5-8), and calls for a review of the antibacterial policy in the hospital have been made. There has, however, been no analysis of the kinds and quantities of antibiotics used. In contrast, at the Karolinska Hospital (KH), Stockholm, the level of resistance of *E. coli* isolates is low. The aim of the present study was to investigate the correlation between antibiotic use and resistance by comparing practices in the two hospitals. Establishment of a baseline in this way could make it possible to monitor the effects on resistance rates of guidelines on antibiotics policy and other measures. We therefore investigated the use of antibiotics in the two hospitals and the resistance pattern of *E. coli* isolates from patients with urinary tract infections over the same period. Our results are reported here.

Materials and methods

Clinical isolates of *E. coli*

Urine specimens from hospitalized adults were plated using a semiquantitative technique. Consecutive isolates of *E. coli* from specimens that contained $\geq 10^5$ colony-forming units (CFU) per ml were used in the study, and the strains were identified using the API 20E system.^a The study started simultaneously in April 1986 at TAH, Addis Ababa (62 strains collected over a 1-year period), and KH, Stockholm (61 strains collected in April and November 1986). Infor-

¹ Medical Officer, Department of Clinical Microbiology, Karolinska Institute, Karolinska Hospital, S-104 01 Stockholm, Sweden. Requests for reprints should be sent to Dr Ringertz at this address.

² Medical Officer, Department of Medical Microbiology and Parasitology, Tikur Anbessa Hospital, University of Addis Ababa, Addis Ababa, Ethiopia.

³ Technician, Department of Clinical Microbiology, Karolinska Institute, Karolinska Hospital, Stockholm, Sweden.

⁴ Pharmacist, Department of Pharmacy, Karolinska Hospital, Stockholm, Sweden.

⁵ Professor and Chairman, Department of Medical Microbiology and Parasitology, Tikur Anbessa Hospital, University of Addis Ababa, Addis Ababa, Ethiopia.

⁶ Professor and Chairman, Department of Clinical Microbiology, Karolinska Institute, Karolinska Hospital, Stockholm, Sweden.

Reprint No 5046

^a API System, F-38390 Montalieu-Vercieu, France