

## The Sensitivity of Tubercle Bacilli from Ceylonese Patients with Pulmonary Tuberculosis to Kanamycin, Viomycin and Capreomycin

by

M. R. M. PINTO, S. N. ARSECULERATNE, C. G. URAGODA AND C. NAVARATNAM

Department of Bacteriology, University of Sri Lanka and the Chest Clinic,  
General Hospital, Kandy, Sri Lanka.

**SUMMARY** A study of drug sensitivity of *Myco. tuberculosis* from patients with pulmonary tuberculosis in Sri Lanka to kanamycin, viomycin and capreomycin is reported. It was found that there is no significant incidence of drug resistance to these drugs among strains isolated in this country.

### INTRODUCTION

Kanamycin, viomycin and capreomycin are antibiotics which though not in routine use in antituberculosis therapy are drugs with antituberculous actions. Viomycin and kanamycin were used in Sri Lanka for a short period as reserve drugs in special situations. Capreomycin, however, has never been used in this country. No surveys of sensitivity of Ceylonese strains of tubercle bacilli to these drugs have been reported.

### MATERIALS AND METHODS

The patients studied, the bacteriological methods of isolation and identification, the inoculum and the method of drug sensitivity testing used were all similar to those reported in the preceding paper.

The pure drug solutions were prepared in sterile distilled water (or sterilised using membrane filtration where necessary) and added to the Lowenstein-Jensen medium before inspissation using a double dilution technique. The drug concentrations used were as follows :

Kanamycin (sulphate)	..	2.5	5	10	20	40	
	..	80	160	320	640	1280	µg/ml.
Viomycin (sulphate)	..	6.25	12.5	25	50	100	
	..	200	400	800	1600	3200	µg/ml.
Capreomycin (disulphate)	..	5	10	20	40	80	
	..	160	320	640	1280	2560	µg/ml.

In the first instance on initial sensitivity testing of a strain only the upper row of drug concentrations was used. If a satisfactory result could not be obtained, retesting was done using the entire range of drug concentrations.

The criterion of resistance used too, was the RR method as described in the preceding paper.

## RESULTS

The pattern of drug sensitivity and resistance with the three drugs is presented in the table. There appears to be no significant incidence of drug resistance to the three drugs studied and the pattern of resistance seen appears to resemble more or less that of strains previously never exposed to these drugs. Since these drugs show cross-resistance with streptomycin the occurrence of resistance in strains resistant to streptomycin—a drug commonly used in Sri Lanka was evaluated, but the number of strains tested showing resistance to these drugs was too small to permit definite conclusions.

## DISCUSSION

Kanamycin and viomycin though used in Sri Lanka in antituberculosis therapy about a decade ago have now been abandoned in favour of newer drugs. In other countries too these drugs have lost ground and are hardly used as antituberculosis agents. The *in vitro* resistance of tubercle bacilli isolated in Sri Lanka, to these drugs is negligible. Hence they may still have a place in the management of tuberculosis in Sri Lanka in the rare situations, where the more effective and safer drug regimens cannot be used.

Capreomycin, however is a recently introduced drug currently being evaluated in special situations in some countries. It is suggested to be more potent than kanamycin or viomycin (Zierski & Bek, 1969). *In vitro* resistance to capreomycin in strains of *Mycobacterium tuberculosis* isolated in this country is negligible, and hence the drug may be of use in retreatment situations.

## ACKNOWLEDGEMENTS

We acknowledge with thanks the gifts of the drugs used in this study : kanamycin by M/s. Meiji Seika Kaisha Ltd., Tokyo, Japan ; viomycin by M/s. Ciba Laboratories of Horsham, U. K., and M/s. Pfizer Ltd., Sandwich, U. K. ; capreomycin by M/s. Eli Lilly S. A., Puerto Rico Branch, San Juan, Puerto Rico.

We are also grateful to Messrs. P. Dasan, J. B. Karalliadde and M. M. Guneratne of the Department of Bacteriology, Faculty of Medicine, University of Sri Lanka, Peradeniya for laboratory assistance.

## REFERENCES

- ZIERSKI, M. and BEK, E. (1969) Capreomycin and other drugs in the treatment of pulmonary tuberculosis *Tubercle Lond.* 50, Suppl. 37-39.

TABLE

Pattern of Drug sensitivity of Myco. tuberculosis in Sri Lanka to Kanamycin, Viomycin &amp; Capreomycin

Category of Patient (Strain) (Number tested in each group is given within brackets)	Approximate Percentage Patients					
	Kanamycin		Viomycin		Capreomycin	
	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant
with no past Total (K*-163; V-**173; C-***171)	100	0	97	3	97	3
history of antituberculosis therapy	Strains with sensitivity test results to first line drugs available					
	Sensitive to all three : (K - 120; V - 110; C - 117.)					
	100	0	97	3	98	2
	Resistant to streptomycin: (K - 16; V - 16; C - 14)					
	100	0	94	6	93	7
with a past Total (K - 95; V - 100; C - 94)	99	1	96	4	99	1
history of antituberculosis therapy	Strains with sensitivity test results to first line drugs available					
	Sensitive to all three : (K - 33; V - 31; C - 33.)					
	100	0	97	3	100	0
	Resistant to Streptomycin : (K - 32; V - 32; C - 33)					
	97	3	97	3	97	3
Total (all strains) (K - 258; V - 264; C - 265.)	100	<1	96	4	98	2

- \* K - kanamycin  
 \*\* V - viomycin  
 \*\*\* C - capreomycin

