ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, Feb. 1976, p. 350-351 Vol. 9, No. 2
 Printed in U.S.A.

Rosamicin: In Vitro Activity Against Anaerobes and Comparison with Erythromycin

VERA L. SUTTER* AND SYDNEY M. FINEGOLD

Research and Medical Services, Wadsworth Hospital Center, Veterans Administration, and Department of Medicine, University of California, Los Angeles, California 90073*

Received for publication 15 October 1975

The in vitro activity of rosamicin was determined against 231 strains of anaerobic bacteria and compared with the activity of erythromycin against the same strains. Rosamicin and erythromycin had similar activity against strains of *Peptostreptococcus* and gram-positive nonsporeforming bacilli. Rosamicin was somewhat more active against strains of *Peptococcus*, *Clostridium*, and gram-negative anaerobes. All strains of *Bacteroides fragilis* tested were inhibited by 4 μg of rosamicin or less per ml, whereas only 76% of them were inhibited by this concentration of erythromycin. Rosamicin was distinctly more active against *Fusobacterium nucleatum*. Because of its in vitro activity, further investigation of the pharmacology of this drug is warranted.

Rosamicin, a macrolide antibiotic produced by *Micromonospora rosaria* (3), is chemically similar to erythromycin. It is reported to have activity equal or superior to erythromycin against gram-positive bacteria and improved activity against gram-negative bacteria (3, 4). Previous studies comparing in vitro activity of rosamicin and erythromycin have been done with aerobic and facultative bacteria (1). The purpose of the present study was to determine the activity of rosamicin against a variety of anaerobic bacteria and compare this with the activity of erythromycin against these same bacteria.

A total of 231 strains of anaerobic bacteria was tested. Most of these had been isolated from clinical material obtained between September 1972 and December 1974. Nine of the strains of *Bacteroides melaninogenicus* were type or reference strains and seven of them were oral or fecal strains from healthy individuals. All organisms were isolated and identified as outlined in the *Wadsworth Anaerobic Bacteriology Manual* (2).

Rosamicin was supplied by Schering Corp., Bloomfield, N.J., and erythromycin estolate was supplied by Eli Lilly and Co., Indianapolis, Ind. Stock solutions containing 1,280 μg/ml were made by first dissolving each antibiotic in 95% ethyl alcohol and then adding water to obtain a final concentration of 9.5% alcohol. Further dilutions of each antibiotic were made in water.

Agar dilution susceptibility tests were performed as previously described (2).

The activity of rosamicin and erythromycin against gram-positive anaerobic bacteria is shown in Table 1. With the *Peptostreptococcus* species and gram-positive nonsporeforming bacilli, the activity of the two antibiotics was essentially the same. With the majority of *Peptococcus* species, *Clostridium perfringens* and most other strains of *Clostridium* species, rosamicin was approximately fourfold more active than erythromycin. Organisms which were resistant to 8 μg of rosamicin or more per ml were two strains of *Peptococcus variabilis*, one strain each of *P. magnus* and *P. prevotii*, and two strains of *Clostridium innocuum*. These same strains were resistant to 128 μg of erythromycin or more per ml. Additionally, one strain of *P. prevotii* had a minimal inhibitory concentration of 4 μg of rosamicin per ml but was resistant to 128 μg of erythromycin or more per ml.

The activity of the two antibiotics against gram-negative anaerobes is shown in Table 2. Rosamicin was distinctly more active than erythromycin against *Fusobacterium nucleatum*, with all strains being inhibited by 0.5 μg or less per ml. It was somewhat more active than erythromycin against other gram-negative anaerobes. All strains of *Bacteroides fragilis* were inhibited by 4 μg or less per ml, whereas only 76% of them were inhibited by 4 μg of erythromycin or less per ml. One *Bacteroides* species required 8 μg of rosamicin per ml for inhibition and two strains of *Fusobacterium* species required 8 μg or more of rosamicin per ml for inhibition. These same

TABLE 1. *Activity of rosamicin and erythromycin against gram-positive anaerobic bacteria*

Organism	No. of strains tested	Antibiotic	Cumulative percentage of strains susceptible (concn [μg/ml])										
			≤0.1	0.5	1.0	2.0	4.0	8.0	16	32	64	128	>128
Peptococcus sp.	14	Rosamicin		64			71	79			93		100
		Erythromycin		29	43	64							100
Peptostreptococcus sp.	12	Rosamicin	75	92	100								
		Erythromycin	92	100									
Gram-positive nonsporeforming bacilli[a]	36	Rosamicin	42	97		100							
		Erythromycin	69	89	94	100							
Clostridium perfringens	7	Rosamicin		100									
		Erythromycin			29	100							
Other *Clostridium* sp.	23	Rosamicin	44	91									100
		Erythromycin	4	39	83	91							100

[a] These included *Eubacterium*, seven strains; *Arachnia*, two strains; *Propionibacterium*, four strains; *Actinomyces*, 16 strains; and *Lactobacillus*, seven strains.

TABLE 2. *Activity of rosamicin and erythromycin against gram-negative anaerobic bacteria*

Organism	No. of strains tested	Antibiotic	Cumulative percentage of strains susceptible (concn [μg/ml])										
			≤0.1	0.5	1.0	2.0	4.0	8.0	16	32	64	128	>128
Bacteroides fragilis	37	Rosamicin	8	60	81	92	100						
		Erythromycin		16	24	54	76	92	100				
B. melaninogenicus	60	Rosamicin	95	100									
		Erythromycin	67	95	100								
Other *Bacteroides* sp.	19	Rosamicin	26	79	90		95	100					
		Erythromycin	5	42	68	84	89		95			100	
Fusobacterium nucleatum	7	Rosamicin	14	100									
		Erythromycin		14	29			43	86			100	
Other *Fusobacterium* sp.	10	Rosamicin	20	60		70	80	90	100				
		Erythromycin			10			30	40		50	60	100
Gram-negative cocci	6	Rosamicin	16	66	100								
		Erythromycin			50	67	83	100					

strains required 128 μg or more of erythromycin per ml for inhibition.

The results of this study indicate that rosamicin has in vitro activity against anaerobic bacteria similar to that already demonstrated with aerobic and facultative bacteria (1). Its activity against gram-positive anaerobes is equal to or better than that exhibited by erythromycin. It is generally more active against gram-negative anaerobes and inhibited all strains of *B. fragilis* at 4 μg or less per ml.

These data suggest that rosamicin may be an effective antimicrobial agent in anaerobic infections and may be particularly useful with infections in which *B. fragilis* is involved. Its possible utility in vivo depends upon absorption, distribution, and excretion. Further investigation of the pharmacology of this drug is warranted.

This study was supported by the Schering Corp., Bloomfield, N.J.

We thank Y. Y. Kwok and Lubna Afzal Kureshi for their technical assistance.

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