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Absorption of Penicillin Through the Human Vagina.

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Several routes of administration for penicillin have been thoroughly evaluated. While the investigation of the value of penicillin in cocoa base suppositories for vaginal infections was underway 2 reports by Roch, Barker, and Bacon¹ and Goldberger, Walter and Lapid² indicated somewhat comparable absorption rates. According to our results the absorption of penicillin from the vagina was not as reliable, regular, nor as complete as indicated by these 2 groups of workers.

In preliminary tests 100,000 units of penicillin in a single cocoa base suppository was inserted into the vagina approximately 12 hours before the collection of blood for the determination of blood level. Because of the consistently low levels tests were made in a subsequent series within 4 hours and the dosage was increased to 200,000 units twice daily with a few exceptions. As these were all out-patient cases the blood samples were collected thereafter about the third hour. The level of penicillin in the blood was determined by the test tube dilution method of Kolmer.³ The tests were run in duplicate except when there was insufficient serum. The Oxford strain *Staphylococcus aureus* H. was used as the test organism. Tests with known dilutions were made at the same time to assure stability of the test bacteria.

The patients were all under treatment for

vaginal trichomoniasis except patient 14. This patient had an undetermined type of vaginitis. The patients were supplied with cocoa base vaginal suppositories each containing 100,000 units. These suppositories were stored at ordinary refrigerator temperature. The patients were instructed thoroughly on the storage and care of the medication. Four patients, 2 pregnant and 2 non-pregnant received but 100,000 units daily, whereas the remaining 12 had 200,000 units applied twice daily. The duration of the gestation varied from 6 to 31 weeks. There was no difference noted in one patient between the 13th and 24th weeks. In the non-pregnant, only one patient, 13, revealed any marked difference in blood levels for different phases of the menstrual cycle.

Table I lists the details.

Complete bacteriologic studies were not undertaken during this survey period. However the routine smears did not reveal a conversion to the normal type I vaginal flora. No attempt has been made to correlate inhibitory action of bacteria in the vagina upon the penicillin.

Six (3 pregnant, 3 nonpregnant) patients did have symptomatic and clinical improvement but in not one instance was a cure accomplished. No additional therapy as douches was allowed. Thirty tests were completed. The highest readings were 1 unit once, 0.256 unit twice and 0.128 unit once.

Conclusions. According to the condition of this experiment cocoa base suppositories containing penicillin were not a satisfactory procedure for the treatment of vaginal trichomoniasis.

The blood levels attained under the condition of the experiment, would have been

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¹ Rock, J., Baker, R. H., and Bacon, W. B., *Science*, 1947, **105**, 13.

² Goldberger, M. A., Walter, R. I., and Lapid, L. I., *Am. J. Obst. and Gynec.*, 1947, **53**, 529.

³ Kolmer, J. A., and Boerner, F., *Approved Laboratory Technic*, 4th Edition, Appleton Century, New York, 1945.

TABLE I.
Absorption of Penicillin from Cocoa Base Suppositories Through the Human Vaginal Mucosa.
All but One of these Patients Had Vaginal Trichomoniasis.

Patient No.	Age	Weeks pregnant	Penicillin		Clinical result	Blood level
			Units	Time in vagina		
Obstetric Patients.						
			× 100,000			
1.	26	6	2	4	improved	.032
2.	21	12	1	3	"	.032
3.	23	13	1	3	unimproved	.008
		24		2		.008
4.	26	31	2	3	improved	.128
Gynecologic Patients.						
		Day of cycle				
5.	25	Postpartum 3 mo.	2	3	failure	.008
6.	28	6	2	2	improved	1.
7.	33	21	2	3	failure	.008
8.	29	28	1	2	improved	.256
9.	37	28	2	3	failure	.008
10.	23	7	2	3	improved	.008
		14		3		.016
		21		3		.008
11.	30	12	2	4	unimproved	.008
		19		3		.016
		26		3		.016
		5		3		.016
12.	33	24	2	4	"	.008
		3		4		.008
		10		4		.016
		17		2		.008
13.	37	27	2	3	failure	.032
		6		4		.008
		13		3		.256
		20		3		.008
14.	25		1	2	improved	.064
15.	30		2	3	unimproved	.008
16.	30	Surgical menopause	2	3	failure	.008
				3		.008
				4		.008

inadequate therapeutically in most instances. The rate of penicillin absorption through the vaginal mucosa is unpredictable. Therefore penicillin should be used in the vagina only

for local conditions but these conditions have not yet been established.

We thank the Schenley Laboratories for their generous supply of penicillin suppositories.