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Influence of Catharsis and Diarrhea on Gastrointestinal Absorption of Ascorbic Acid in Infants.

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Since the development of a method for the determination of ascorbic acid in feces by Chinn and Farmer,¹ it has been possible to study the normal and abnormal absorption of ascorbic acid from the intestinal tract. Abt and Farmer² have emphasized the possibility that under certain pathologic conditions absorption of vitamin C from the intestinal tract must be definitely abnormal. This hypothesis has been experimentally confirmed in the adult.¹ Meyer and Robinson,³ in studying infants with diarrhea, noted that the blood plasma values for ascorbic acid remained low, and the urinary excretion was diminished, even though these patients were given large daily oral doses of vitamin C. When these infants recovered, the blood plasma levels and urinary excretion returned to normal. When ascorbic acid was administered parenterally, a rise in blood plasma levels and urinary excretion was noted, in contradistinction to the lack of response obtained on oral administration.

A normal 10-months-old infant was placed on a metabolism frame for 3- to 4-day periods and blood plasma level,⁴ urinary excretion and fecal excretion¹ of ascorbic acid were determined. As will be noted in Table I, even with the oral administration of large amounts of vitamin C supplement,* the daily excretion of vitamin C in the stools was under 4 mg. During this control period the infant averaged from one to 2 stools daily, and these were of a formed character. The administration of 4 g of magnesium sulphate dissolved in water and orally administered was followed by semi-liquid stools and a ten-fold increase in the fecal excretion of ascorbic acid.

A number of infants suffering with acute, non-specific diarrhea

¹ Chinn, Herman, and Farmer, Chester J., *PROC. SOC. EXP. BIOL. AND MED.*, 1939, **41**, 561.

² Abt, Arthur F., and Farmer, Chester J., *J. A. M. A.*, 1938, **111**, 1555.

³ Meyer, L. F., and Robinson, P., *Ann. Pædiat.*, 1939, **152**, 283.

⁴ Farmer, C. J., and Abt, A. F., *PROC. SOC. EXP. BIOL. AND MED.*, 1936, **34**, 146.

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TABLE I.
Normal Blood Plasma Levels, Urinary and Fecal Excretions and Effect of Catharsis
After Oral Ingestion of Ascorbic Acid.
Subject: E. B., age 1 yr, normal infant.

Date	Additional supplement, mg ascorbic acid*	Plasma ascorbic acid, mg %	Urinary excretion ascorbic acid, mg	Fecal excretion		No. of stools daily
				Moist wt, g	Ascorbic acid, mg	
7- 9	300					
10	300					
11	300	1.12	41.58	35	1.43	1
12	300	1.68	74.66	12	2.00	2
13	300	1.33	58.24	33	2.41	2

18	300	0.67	15.16	14	0.31	1
19	300	0.71	25.63	19	2.38	2
20	300	1.26	32.88	20	2.55	2
21	0	1.75	67.68	17	3.76	2

23	300					
24	300	1.22	lost	43	3.70	1
25	300	2.04	61.26	19	1.64	2
26	300	2.37	247.76	24	3.92	1
27	0	2.31	192.07	18	3.90	1

8- 1	300	1.13	60.03	16	2.56	1
2	0	1.07	lost	12	2.02	1
3	300					
4	plus 4 g MgSO ₄	1.02	lost	56	1.98	2
	0	1.33	70.00	107	22.27	2
****						liquid
11	0	0.75	lost	32.5	1.62	1

* The infant was on a mixed dietary containing approximately 50 mg ascorbic acid daily.

**** Periods off metabolism frame. No supplement of ascorbic acid.

were placed upon a metabolism frame and blood plasma level, urinary excretion and fecal excretion of ascorbic acid were studied. The oral administration of large amounts of vitamin C was followed by a

TABLE II.
Influence of Diarrhea on Orally Ingested Ascorbic Acid, Blood Plasma Level and Fecal Excretions.
Subject: M. S., age 2½ months, severe diarrhea and dehydration.

Date	Additional supplement, mg ascorbic acid*	Plasma ascorbic acid, mg %	Urinary excretion ascorbic acid, mg	Fecal excretion		Type of stools daily
				Moist wt, g	Ascorbic acid, mg	
9- 8	0	.23	0.84	204	1.76	liquid
9	200	.24	0.89	196	1.64	"
10	200	.26	1.10	410	28.25	"
11	200	.29	2.92	297	52.40	"
12	0	.26	1.89	285	34.35	semi-formed

* Dietary consisted of protein milk formula.

greatly increased fecal excretion in these infants suffering with diarrhea; Table II is an example of a 2½-month-old infant with a severe diarrhea and dehydration. Blood plasma levels and urinary excretion remained low, as noted by Meyer and Robinson.³

Summary. Ascorbic acid is excreted in small amounts in the stools of the normal infant studied. Large amounts of orally administered ascorbic acid are excreted in the stools of infants following catharsis and during acute diarrhea. The increased fecal excretion of orally administered ascorbic acid during acute diarrhea in the infant points to its failure of absorption in the intestinal tract, and explains the low blood plasma values and low urinary excretion.

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Does Alcohol Stimulate Gastric Secretion by Liberating Histamine?

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The stimulation of gastric secretion by alcohol is similar to the stimulation by histamine in a number of ways. They both stimulate the secretion of a juice that is highly acid but relatively low in peptic power.¹ The stimulating effect of alcohol, like that of histamine, is much more resistant to the inhibitory effect of atropine than is the usual meal stimulus.^{2, 3} Similarly the stimulating effect of alcohol, like that of histamine, is more resistant to the inhibitory effect of fat feeding than is the usual meal stimulus.³ Such similarities suggest the possibility that these two substances, alcohol and histamine, act upon the stomach by a similar mechanism. There is no known reason to suppose that histamine acts through the mediation of alcohol, while there are some reasons to suppose that alcohol may act through the mediation of histamine. In the first place the general nature of the pharmacological action of alcohol is that of a depressant, so that a bona fide stimulation of gastric secretion is not consistent with its usual effects. In the second place a large variety of

¹ Kreuger, L., and MacIntosh, F. C., *Am. J. Dig. Dis.*, 1937, 4, 104.

² Gray, J. S., *Am. J. Physiol.*, 1937, 120, 657.

³ Gray, J. S., and Bachrach, W. H., *PROG. SOC. EXP. BIOL. AND MED.*, in press.