# URINARY ACID EXCRETION AFTER ORAL ASCORBIC ACID - A NEW TEST OF ACIDIFICATION?

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We have tested urinary acid excretion after oral ascorbic acid in 18 healthy volunteers (11 males 7 females) between 22 and 51 years of age (mean 35, SD 8).

A total dose of 9 g of ascorbic acid was given to each subject as follows: 2g at 0600, 0700 and 0800 hours, and 1 g at 0900, 1000 and 1100 hours. Timed urine collections were made every 30 minutes starting at 0830[1,2] and the following estimations were made in duplicate by the method of Chan[3] on a aliquots of each collection i. titrable acidity ii. ammonium iii. total acid excretion. A blood sample was obtained during the last 30 minutes for determination of creatinine clearance by the method of Brod and Sirota,[4] and Bonsnes and Taussky.[4]

The mean creatinine clearance was 88 ml/min/1.73 $m^2$ (SD 15.2, n = 17, one specimen haemolysed). The urinary acid excretion is given in Table 1. Table 2 gives the distribution of pH values of all samples.

Assessment of urinary acidifying power is an important test of renal function. The test employed worldwide is one which employs oral $NH_4Cl$ in a large dose (0.1 g/Kg)[5] and subjects having normal acidifying power should reduce the pH of at least one sample of urine to below 5.5, and enhance the titrable acidity and $NH_4$ excretion to at least 25 and 35 micromoles/minute respectively.[6]

$NH_4Cl$ has the following disadvantages: it has a prolonged acidifying action, tends to increase blood urea and is exceedingly nauseating[7]. We have found that ascorbic acid, which has none of these disadvantages is adequate for testing urine acidifying power.

Table 1

ACID EXCRETION IN HEALTHY SUBJECTS AFTER ORAL ASCORBIC ACID

| Collection Sequence | Mean Titrable Acid (μMole/Min) | Mean NH (μMole/Min) | Total Acid (μMole/Min) |
|---|---|---|---|
| 1 | 16 ( 8) | 34 (12) | 53 (20) |
| 2 | 27 (11) | 38 (11) | 65 (16) |
| 3 | 31 (14) | 38 (15) | 69 (20) |
| 4 | 33 (13) | 41 (10) | 74 (20) |
| 5 | 31 (10) | 45 (10) | 76 (11) |
| 6 | 30 (14) | 41 ( 9) | 71 (11) |
| 7 | 27 ( 8) | 37 ( 8) | 63 ( 6) |

NOTE: n = 18, Values uncorrected for body surface area.
SD given in parentheses

Table 2

Distribution of pH Values of all Urinary Samples (n = 118) Collected from 18 Healthy Subjects

| Range of pH | Number of Samples |
|---|---|
| 4.6 - 4.8 | 5 ( 4.2%) |
| 4.9 - 5.1 | 17 (14.4%) |
| 5.2 - 5.4 | 24 (20.3%) |
| 5.5 - 5.7 | 16 (13.5%) |
| 5.8 - 6.0 | 25 (21.2%) |
| 6.1 - 6.3 | 29 (24.6%) |
| 6.4 - 6.6 | 2 ( 1.7%) |
| Total | 118 |

References:


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