
Abstract

**Background:** When vitamin C intake is from foods, fasting plasma concentrations do not exceed 80 μmol/L. We postulated that such tight control permits a paracrine function of vitamin C.

**Objective:** The purpose of this study was to determine whether paracrine secretion of vitamin C from the adrenal glands occurs.

**Design:** During diagnostic evaluation of 26 patients with hyperaldosteronism, we administered adrenocorticotropic hormone intravenously and measured vitamin C and cortisol in adrenal and peripheral veins.

**Results:** Adrenal vein vitamin C concentrations increased in all cases and reached a peak of 176 ± 71 μmol/L at 1–4 min, whereas the corresponding peripheral vein vitamin C concentrations were 35 ± 15 μmol/L (P < 0.0001). Mean adrenal vein vitamin C increased from 39 ± 15 μmol/L at 0 min, rose to 162 ± 101 μmol/L at 2 min, and returned to 55 ± 16 μmol/L at 15 min. Adrenal vein vitamin C release preceded the release of adrenal vein cortisol, which increased from 1923 ± 2806 nmol/L at 0 min to 2719 ± 1611 nmol/L at 15 min (P = 0.0001). Peripheral plasma cortisol increased from 250 ± 119 nmol/L at 0 min to 506 ± 189 nmol/L at 15 min (P < 0.0001).

**Conclusions:** Adrenocorticotropic hormone stimulation increases adrenal vein but not peripheral vein vitamin C concentrations. These data are the first in humans showing that hormone-regulated vitamin C secretion occurs and that adrenal vitamin C paracrine secretion is part of the stress response. Tight control of peripheral vitamin C concentration is permissive of higher local concentrations that may have paracrine functions.