

Anti-anaphylactic effect of vitamin C in the guinea-pig

SIR,—Hoffman (1942) reported the anti-anaphylactic effect of vitamin C in mice. Naranjo (1952) and Herxheimer (1955) found that vitamin C has no protective effect against histamine shock in the guinea-pig at the specified dose levels.

The effect of vitamin C in histamine shock and anaphylaxis is here reported.

Guinea-pigs, 375–425 g at the beginning of the experiment, received 50 mg vitamin C per day in the drinking water for 21 days. Each week the animals were subjected to histamine or antigen aerosol using the technique of Herxheimer (1952), and animals found suitable in this way were chosen for the test. The histamine aerosol, 0.25 mg base/ml, was sprayed into a glass box. The animal was allowed to remain in the box until the first sign of coughing or choking occurred, and the preconvulsion time was recorded in seconds. The intracardial injection of the vitamin was not used, because the severe stress to the animals might have interfered with the test. The preconvulsion times (sec) for the following conditions were: control (injected with saline), 130 (s.d. 9.84); 200 mg vitamin C i.p., 20 min before anaphylaxis, 293 (s.d. 26.16); 200 mg vitamin C i.m., 2 hr before anaphylaxis, 223 (s.d. 18.63). Each figure is an average of 5 animals.

A group of 5 animals was tested for histamine resistance as above and then put on a scorbutic diet for 21 days and tested again. The preconvulsion times (sec) were: normal, 118 (s.d. 9.08); 8–12 day scurvy, 77 (s.d. 6.1); 18–21 day scurvy, 297 (s.d. 11.5).

Anaphylactic shock in vivo. The guinea-pigs were sensitised to commercial egg albumen by the intraperitoneal injection of 100 mg as a 5% w/v solution in normal saline. Three weeks later the animals were exposed to an aerosol of 50 mg of the antigen 1% w/v. The end-point was fixed at 10 min after which the animal was taken out of the box. When 200 mg vitamin C was administered intraperitoneally 20 min before being shocked, 7 out of 16 survived. In the control guinea-pigs only 2 out of 16 survived. When the dose of the antigen which caused shock was given intracardially, all the animals died. The time before death, however, was delayed 3–4 times in animals given the vitamin, compared with the controls.

No protective effect of vitamin C was found with oral administration of the vitamin or after 6 hr from the injection. The finding of Naranjo and Herxheimer that low doses of the vitamin had no protective effect, was also confirmed.

It is concluded that vitamin C has an anti-anaphylactic effect in the guinea-pig with the doses and under the conditions specified. At the early stage of scurvy there is a significant drop in the resistance of the animal to histamine aerosol and a marked rise above normal at the late stage of scurvy.

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