Is there a sex-related difference in intragastric acidity and plasma gastrin concentration?

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I write with respect to the paper by E. J. Prewett, J. T. L. Smith, C. U. Nwokolo, A. M. Sawyerr and R. E. Pounder published recently in Clinical Science (Clin. Sci. 1991; 80, 619-24) [1]. It is well known that there is an inverse relationship between gastric secretion of acid and gastrin secretion [2]. This paper demonstrates a low intragastric acidity in women compared with men, a finding that is entirely to be expected. Whether one's model of gastric acid secretion is two-component [3] or back diffusion [4], H+ concentration rises as secretion rate increases, and men have a higher maximal secretion than women [5]. This apparent sex difference is due to stature, not gender [5]. At the median weight of the female group (62 kg), maximal gastric secretion is expected to be 244 ml/h Vg (ideal gastric juice) and at that of the male group (74 kg) 290 ml/h Vg. The equation in [5] used to make these calculations was that in Table 2 (p. 558) no. 3. (In my calculation it was assumed that none of the subjects smoked. Smoking data were given by Prewett et al. [1] only for 23 female subjects, of whom only four smoked. It seems likely that a larger proportion of male subjects smoked and this, in the light of the known positive correlations between maximal gastric secretion and total dose of cigarettes smoked in the past, would have probably increased the male/female discrepancy.) Much of the time, secretion was basal rather than stimulated and the same considerations apply, but rather more forcefully because at low levels of secretion the alkalinizing effect of non-parietal secretion and errors, such as swallowed saliva and duodenogastric reflux, become proportionately greater. From the data in [6], it can be calculated that the H+ concentration for women in basal circumstances (approximately 10 mmol/l) represents a secretion rate of about 32 ml/h Vg, whereas the corresponding H+ concentration for men (approximately 15 mmol/l) represents a secretion rate of about 45 ml/h Vg. [The equation I used in [6] is Q/V = 0.134 - 1.04/V (obtained by dividing the equation at the top of p. 135 by V; Q = acid output in mmol of H+). I assumed no duodenogastric reflux, i.e. Phenol Red-corrected V = Vg.] These rates represent respectively 13% and 12% of the corresponding maximal rates and lend no support to the hypothesis put forward in this paper that women fail to respond to high concentrations of gastrin. They make less acid than men because of their smaller stature, and their gastric secretion has a smaller H+ concentration for that reason.

REFERENCES


Is there a sex-related difference in intragastric acidity and plasma gastrin concentration?: author's reply

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I was interested to read Professor Hobsley's complicated comments concerning our paper. We demonstrated that 35 healthy young women had a significantly lower 24 h integrated intragastric acidity than a group of 96 healthy young men [1]. We reported that, when weight was taken into account, females still had a significantly lower median 24 h intragastric acidity than males. We also found that there was no significant correlation between acidity and either the calculated fat-free body weight or the lean body mass.

Professor Hobsley used his own work [2] measuring maximal acid secretion to suggest that 'this apparent sex