

Comment

## The gastric insulin test: is it reliable?

It is unfortunate that many workers are still using the original technique and criteria of the so-called 'Hollander test' in assessing postoperative gastric acid secretion of cephalic origin. Such uncritical acceptance of his test has persisted in spite of the fact that Hollander's group published a report<sup>1</sup> disclaiming its clinical reliability.

Reference is made to a report in *Gut* by Spencer *et al*<sup>2</sup> on 'Differences between males and females in the Hollander insulin test' which suggests that Hollander criteria be modified for use in female patients.

Since preoperative gastric acid values are generally conceded to be lower in female than in male duodenal ulcer patients, it is not unexpected that this pattern would be carried over to postvagotomy patients, assuming that surgeons would have approximately the same incidence of incomplete vagotomy in each sex group. I am not aware that any surgeons have raised an issue of technical difficulty to perform vagotomy on a sex basis.

Since the authors quote this writer on his insulin test criteria, it would have been interesting to score the same patients by these criteria also. (For the benefit of *Gut* readers our criteria are given in Table I.) It is my prediction the sex differences would not be significant.

In our vagotomy experience since 1947, it took about 10 years of clinical application to realize the marked limitations of the Hollander test and gradually to modify it and refine it by continuous clinical correlation.

The insulin test<sup>3</sup> which we now perform has proved to be very reliable, assuming good technique. One important point is the matter of insulin dosage. It is noted that the

authors used either 20 units or a 0.25 units/kg dosage. This is a needlessly high dosage, not only because it is hazardous but also because in our experience some post-vagotomy patients may show more acid inhibition with higher dosages. We have found 10 units adequate, but we measure out 11 units in order to compensate for any loss in transfer from vial to vein.

Similar criteria obtain for the tolbutamide test<sup>4</sup> which has proved useful in the aged and patients with serious disease contraindicating the use of insulin. The only additional precaution for interpretation is that on rare occasion a borderline positive tolbutamide test may be associated with recurrent peptic ulcer disease. In the opinions of this writer a truly complete vagotomy induces a state of basal anacidity with no response to insulin or tolbutamide for a duration of four hours. Whether this happens after total antrectomy without vagotomy is still open to question, but our clinical experience seems to indicate this.

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REFERENCES

- <sup>1</sup>Weinstein, V. A., Hollander, F., Lauber, F. U., and Colp, R. (1950). Correlation of insulin test studies and clinical results in a series of peptic ulcer cases treated by vagotomy. *Gastroenterology*, 14, 214.
- <sup>2</sup>Spencer, J., Burns, G. P., Cheng, F. C. Y., Cox, A. G., and Welbourn, R. B. (1969). Differences between males and females in the Hollander insulin test. *Gut*, 10, 307-310.
- <sup>3</sup>Stempien, S. J., Lee, E. R., and Dagradi, A. E. (1968). Clinical appraisal of insulin gastric analysis. *Amer. J. dig. Dis.*, 13, 21.
- <sup>4</sup>\_\_\_\_\_, \_\_\_\_\_. (1968). Tolbutamide gastric analysis. *Ibid*, 13, 643.

DR SPENCER and his colleagues reply

We are grateful for Dr Stempien's comments on the insulin test but disagree with him on several issues. It is certainly not surprising that sex differences in the secretory response to insulin should be retained after vagotomy but we believe that this has so far remained unreported. The purpose of our recent paper<sup>1</sup> was to show that such differences do exist and to discuss their relevance to the interpretation of the Hollander test.

We are aware that Weinstein *et al* (1950)<sup>2</sup> doubted the prognostic value of the Hollander test after vagotomy. There is, however, good correlation between the results of this test and the reduction in the augmented histamine response produced by vagotomy (Ross and Kay, 1964)<sup>3</sup>; more recent reports show good correlation with clinical response, recurrent ulceration being rare in subjects with a negative Hollander test (Johnston *et al*, 1967)<sup>4</sup>. The test is used clinically to determine which patients are at greatest risk from the danger of recurrent ulceration. The vast literature on this subject suggests that Dr Stempien is wrong in claiming that there is uncritical acceptance of the insulin test.

We are not aware of any published studies in man which would indicate the optimal dose of insulin to promote maximal secretion. Preliminary studies in our own laboratory (Baron, 1969)<sup>5</sup> suggest that maximal

TABLE I

CRITERIA FOR INTERPRETATION OF INSULIN TEST (HOURLY)

Response	Basal (HCl m-equiv/hr)	Postinsulin (HCl m-equiv/hr any hr)	Postinsulin pH Change	Clinical Rating of Vagotomy or Antrectomy
Positive responses	Any value	Rise above 0.25	Below 2.0	Incomplete, inadequate
	Above 0.25	Any rise	Below 2.0	Incomplete, inadequate
Borderline positive	Below 0.25	Rise of 0.05-0.25	Below 2.5	Borderline incomplete, probably adequate
False-negative	Above 0.05	Below basal	Above basal	Equivocal, inadequate if basal HCl above 0.25 m-equiv
Negative responses	Below 0.05	Below 0.05	Above 2.5	Borderline complete, adequate
	Below 0.001	Below 0.001	Above 3.5	Complete, adequate