Short Communication

ASSESSMENT OF VAGOTOMY BY POST-PRANDIAL ALKALINE TIDE

Col SK VERMA*

(Army Hospital, Delhi Cantt.)

ABSTRACT

The effect of vagotomy on the post-prandial alkaline tide was assessed by measuring the fasting and post-prandial urinary pH before and after vagotomy in 50 cases of chronic duodenal ulcer treated by posterior truncal vagotomy or gastrojejunostomy or pyloroplasty. Results showed that post-prandial urinary pH fell after vagotomy confirming the completeness of vagotomy. This test is safe, reliable, noninvasive and a simpler bedside procedure as compared to the conventional Hollander's insulin test.

MJAFI 1996; 52 : 113-115

KEY WORDS : Vagotomy; Alkaline tide.

Introduction

The corner stone of surgical treatment of chronic duodenal ulcer is vagotomy [1] whether truncal, selective, or highly selective. The assessment of the completeness of vagotomy is essential to evaluate the success of operation. The commonly used Hollander's insulin test [2-4] and its modifications have serious complications like hypoglycaemia and increase of serum gastrin levels [5]. Correlation between insulin dose, blood sugar levels and gastrin secretion levels are unsatisfactory and collection of gastric juice is difficult.

The post-prandial alkaline tide is the observed alkalinity of urine following a meal. It is a normal physiological phenomenon which is due to excretion of bicarbonate ions from the dissociation of carbonic acid. The amount of bicarbonate ion produced during gastric activity is directly proportional to the quantity of acid produced. Therefore post-prandial alkalinity of urine would be reduced by vagotomy.

Material and Methods

Fifty cases of chronic duodenal ulcer and 10 healthy individuals were included in the study. Urinary pH was measured by a digital pH meter with temperature compensation. Three days before

any urinary pH measurement or surgery all drugs were withdrawn. The Hollander's insulin test was also done pre-and post-operatively in all the 50 patients.

On the night before the test the patient was given a standard diet and nothing thereafter till 1200 hours the next day. On the day of the test, the morning urine voided by the patient was discarded as its pH could have been influenced by the post-prandial pH changes induced by the previous night's dinner. Just before the standard meal at 1200 hours, the patient was again asked to void urine and this sample was used for measurement of pH. Two hours after the standard meal another sample of urine was collected and its pH measured.

Surgery consisted of either posterior truncal vagotomy with anterior lesser curve sero-myotomy or truncal vagotomy with gastrojejunostomy or pyloroplasty. On 12th post-operative day urinary pH was assessed using the same procedure as above using the same standard meal.

Results

Table 1 shows the mean pre-operative fasting and post-prandial urinary pH values in 50 cases of chronic duodenal ulcer. All patients before vagotomy demonstrated a post-prandial alkaline tide

* Senior Adviser in Surgery, Army Hospital, Delhi Cantt.

with a difference of 3.1 units between mean fasting and mean post-prandial pH. This was not different from the post-prandial alkaline tide observed in the 10 healthy controls.

TABLE 1
pH Values before vagotomy

	No of patient	Mean Fasting urinary pH	Mean post-prandial urinary pH	Difference
Chronic duodenal ulcer	50	4.7 (4.5 - 4.81)	7.8 (7.5 - 7.95)	3.1
Healthy	10	4.6 (4.4 - 4.85)	7.6 (7.3 - 7.9)	3.0

Following vagotomy the alkalinity of post-prandial urine was reduced and the mean pH difference was only 0.8 units in 49 out of 50 cases (Table 2). In one patient the pH of post-prandial urine was 2.5 units more alkaline than the preprandial sample even after vagotomy suggesting incomplete vagotomy. This was corroborated by Hollander's insulin test and after repeat surgery (vagotomy) the pH difference came to 0.7 suggesting successful vagotomy.

TABLE 2
pH Values after vagotomy

	No of Patients	Mean fasting urinary pH	Mean post-prandial urinary pH	Difference	Hollander's insulin test
Chronic duodenal ulcer	49	4.7 (4.53 - 4.8)	5.5 (5.3 - 5.62)	0.8	Vagotomy complete
	1	4.7	7.2	2.5	Vagotomy incomplete
		4.8	5.5	0.7	Re-vagotomy complete

TABLE 3
Hollander's insulin test showing reduction of acidity

No of cases	Mean Pre-operative value (mEq/h)		Mean post-operative value (mEq/h)		Mean percentage of reduction by 2 wks	
	B A O	M A O	B A O	M A O	B A O	M A O
50	6.5 (4.8 - 7.4)	35.3 (24 - 42.8)	2.4 (1.3 - 3.2)	11.7 (7.6 - 16.6)	65.5 (53.1 - 73.6)	67.6 (60.6 - 71.3)

B A O = Basal acid output; M A O = Maximum acid output.

The results of Hollander's insulin test in all 50 cases of duodenal ulcers are depicted in Table 3.

Discussion

This method is simple and safe as it does not expose the patient to hypoglycaemia and it can be performed even in patients with diabetes mellitus and heart disease. It is not associated with any of the side effects of histamine and pentagastrin tests. It has no practical limitations. This method avoids gastric intubation which is necessary in 'chew and spit' method of sham feeding. It does not employ gastric suction to assess gastric secretory response which is unreliable in patients after gastric surgery. Similar studies were carried out by Ahmed et al [6] and mean pH difference was 0.7 in their series.

The specific composition of the diet is immaterial provided the same meal is served to the patient before and after vagotomy. This must be ensured to eliminate diet related changes in urinary pH values. Individual variations in the urinary pH due to other factors may also occur but these are not important with the reference to this test as the pre- and post-vagotomy pH values of the same patient are compared.

Post-prandial alkaline tide as a test for completeness of vagotomy is therefore a safe, simple,

reliable and non-invasive bed side test and has none of the limitations of Hollander's insulin test.

REFERENCES

1. Baron JH, William JA, Allogowar M, Mullar C, Spencer J. Vagotomy in Modern Surgical Practice. 1st Edn. London; Butterworths 1982; 6-9.
 2. Baron JH. Clinical Tests of Gastric Secretion. 1st Ed. London; MacMillan. 1978; 186-211.
 3. Hollander F. Laboratory procedures in the study of vagotomy with particular reference to insulin test. Gastroenterology 1948; 45 : 419-25.
 4. Ross B, Key AW. The insulin test after vagotomy. Gastroenterology 1964; 45 : 379-86.
 5. Stadil F. Effect of vagotomy on gastrin release during insulin hypoglycaemia in ulcer patients. Scand J Gastroenterol 1972; 7 : 225-31.
 6. Ahmed A. Abolition of postprandial alkaline tide after vagotomy and its use as a screening test in the assessment of vagotomy. Brit J Surg 1986; 73 : 917-19.
-