Simple Fecal Tests of Absorption

A Prospective Study and Critique

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A prospective study in which the value of four stool screening tests of malabsorption was assessed demonstrated that the Sudan stain for fat, with or without heat and acid, microscopic search for meat fibers and radiotriolein excretion, but not the gelatin film tests, was accurate in 69–79% of studies. Accuracy was lowest in mild steatorrhea and because of this, screening tests were least helpful in patients in whom these tests might have realized their greatest potential value for clinical diagnosis. With high meat intake, stool meal fibers proved as good as, or better than, the other methods for testing for nonspecific malabsorption. The gelatin film test, stool meal fibers and the differential results of the Sudan test before and after heat and acid were of no specific value in distinguishing patients with pancreatic insufficiency from those with other causes of malabsorption; their use for this purpose should be abandoned.

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tion (1–9). This often leads to misuse, misinterpretation, or even the abandonment of simple tests in favor of an ever-increasing number of new screening methods. Many new tests are more complex and expensive than are the fecal tests, and many are based on the tolerance test design with all of its failings (10, 11). Investigative groups generally use neither type of screening test, but rely upon chemical analysis of fecal fat content as a definitive method for the quantitation of fat absorption.

A prospective investigation was undertaken to assess the value, if any, of the simple fecal tests in patients with normal and abnormal absorption. The tests studied were the Sudan stain for fat before and after acidification and heating, examination for undigested meat fibers, the gelatin film test for trypsin-like activity, and the radioactivity found in stool after an oral dose of isotope-labeled fat.

METHODS

Patients. Forty-two studies were performed in 39 ambulatory hospitalized patients. A control group of 24 subjects, ranging in age from 17 to 76 years, harbored no disease, symptoms or laboratory findings associated with malabsorption. The diagnoses in the control group included psychoneurosis (7), duodenal ulcer (5) and single cases of gallstone, arthritis, dermatitis, pericarditis, pulmonary tuberculosis, thalassemia minor, epilepsy, diabetes, gout, unexplained resolved diarrhea, obesity; there was 1 in whom no diagnosis was established. In the abnormal group of 15 subjects, diagnoses were established as follows: postgastrectomy dumping syndrome by typical history and positive response to blinded provocative testing with intragastric infusion of hypertonic glucose; chronic pancreatitis by three or more findings of typical history, pancreatic calcification, steatorrhea, pseudocyst, diabetes mellitus, deficient pancreatic response to intravenous secretin, and abnormal provocative serum enzyme response to intravenous secretin. One patient with steatorrhea after enterectomy had had 105 cm of jejunum removed surgically for mesenteric thrombosis; 1 with small bowel fistula had had repeated abscesses, perforations, fistulas and megaloblastic anemia after a ruptured appendix; 1 with sprue had the typical small bowel biopsy and a previous response to a gluten-free diet; and 1 with malabsorption of unknown etiology had diabetes mellitus, marked edematous thickening of the small intestine, and extreme atony of the intestine, resulting in repeated bouts of pseudo-obstruction, resembling the case reported by McClelland et al (12).

Patient study. Each subject received a calculated 100-g fat diet for 3 days prior to and during study, except HS, who ingested 200 g daily. Fat content of uneaten food was calculated after each meal to correct the daily intake. The diet was accepted by all except DC who averaged a daily intake of 40 g of fat. Each patient received at least two meals containing meat each day. After the equilibration period, the subjects received 10 drops of Lugol’s iodine solution in the morning. With lunch, a carmine marker and a blended mixture of 40 mCi of triolein, labeled with radioactive iodine (°I), in orange juice were administered. Each stool was collected in plastic bags on a portable commode, taking care to exclude urine. Each bag was individually canned in size No. 2.5 cans with a home canning apparatus and labeled. Four days after the initial marker, a second marker was administered. Each canned stool was monitored for radioactivity; every stool, from the appearance of the first marker through its disappearance and up to but not including the appearance of the second marker, was collected and frozen.

Chemical fat determination. The number and weight of each stool were recorded (Table 1). For study, the stools were thawed, pooled and homogenized in a Waring Blender, and chemical fat analysis was performed by the method Van de Kamer et al (13). Results were expressed in grams per day and as the coefficient of fat absorption, which was calculated as follows:

$$CA = \left( \frac{\text{gram fat intake} - \text{gram fat in stool}}{\text{gram fat intake}} \right) \times 100$$

Sudan stain. Small pieces of frozen stool were chipped from random specimens, prior to thawing, pooling and homogenization, for chemical fat analy-