strings were found in 21 (36%) of all the cases in this group.

Leucocytes in stool smears in any considerable number which is an indication of inflammation, or the presence of protein in feces which is an indication of bleeding or ulceration of the colon, were not found in any of the cases of either group.

In none of the cases of this study did we find any considerable gross mucus, either in loose form or as ribbons or strands; although a number of the out-clinic patients dated their symptoms over a long period of time.

Increased mucous secretion values were typical findings in certain individuals, and one may assume that they express a state of hypersecretion or a disposition to it. A constant and typical relation of the findings to constipation, although often present, could however, not be proved. A relation between the findings of mucomembranous particles shown by microscopic examination and abnormal bowel movements was, however, quite obvious, and here low bulk plays a considerable part.

A careful study convinces us that there is a tendency to low bulk in a comparatively large number of supposedly normal individuals. Since none of them consciously used a particularly low residue food, one may assume that it is a constitutional sign in these individuals. It may seem remarkable that bran effected an increase in stool weights in these cases more often than it did in cases with normal bulk. As to the observation of signs of irritation our experience gives us the impression that they occur in these individuals secondary to the abnormal bowel movement. In the group with abdominal and general complaints, low bulk cases were seen in about the same percentage as in the normal group. A bulk producing effect of bran was observed less often in the group with abdominal complaints. Signs of irritation were found in individuals of both groups in a comparatively high percentage. They were almost exclusively observed in certain individuals who showed this finding also in the preliminary examination and on various days during a longer observation period, though not constantly. It seems, however, of interest that the percentage of individuals who showed these signs was not lower in the normal than in the group with abdominal symptoms.

SUMMARY

The bowel movement of 45 normal and 58 individuals with abdominal complaints were studied. Stools were examined for the effect of bran on the bowel movements, and for signs of colon irritation.

Constant low stool weight (tendency to low bulk) was observed in 33 per cent of the normal and in 40 per cent of the individuals with abdominal complaints. A bulk increasing effect of bran among individuals with constant low stool weights was seen in 13 out of 15 subjects (86%) of the normal group, and in 14 out of 23 (61%) of those of the group with abdominal symptoms. Of the 30 cases with average normal stool weights, there was a bulk increasing effect of bran in 16 cases (53%) of the normal group. In the group with abdominal symptoms, 35 had normal average weights; of these 20 (57%) had increased bulk after bran.

Increased mucous secretion or abnormal microscopic mucous findings were found in 15 of 45 cases (33%) of the normal subjects and in 21 of 58 cases (36%) of those who had abdominal complaints. Comparing the cases with low bulk, we found increased mucous secretion or microscopic abnormal findings in 8 of 15 cases (53%) in the normal group and in 9 of 23 (39%) in the group who had abdominal symptoms.

REFERENCES

7. Herregron, St.: Studien über den nahrungsphysiologischen Wer der Weizensiele unter besonderer Berücksichtigung der Bedeu-

Serum Diastase Determinations During Artificially Produced Intra-Duodenal Pressure Against the Head of the Pancreas*

Preliminary Report

By
S. G. CASTIGLIANO, M.D.
PHILADELPHIA, PENNSYLVANIA

SERUM DIASTASE

The development of more accurate methods for the microestimation of the diastase level in blood and urine has led to its use in the diagnosis of pancreatic disease. Serum and urine diastase determinations are of greatest value in differentiating acute pancreatitis from other acute abdominal episodes. It has been established that obstruction of the pancreatic ducts or any disturbance which causes a passage of pancreatic enzymes into the blood and lymph results in a marked rise in serum diastase (1). The rise of serum diastase in acute pancreatitis is thus explained. This rise usually takes 2 to 3 days to attain a maximum height; the diastase level then gradually returns to normal in from 10 to 14 days (2). The value of this diagnostic procedure is limited by the transient elevation followed by a rapid return to normal.

Obviously, diastatic determinations are of little or
no aid in determining pancreatic dysfunction in certain conditions, such as chronic pancreatitis, neoplasms, or even acute pancreatitis when seen some days after the onset.

Thus far a satisfactory test for pancreatic function is not known. Comfort, of the Mayo Clinic, in 1938 states that the serum lipase test has proved of greater value in the diagnosis of acute and subacute inflammation of the pancreas than any other procedure used. He recently re-emphasizes this point, and shows the serum lipase to be elevated in all the cases of chronic pancreatitis he studied. The enzyme concentration test performed by duodenal drainage in chronic pancreatitis has its advocates. It may be said, nevertheless, that a satisfactory functional test which can demonstrate relatively lower grades of pancreatic dysfunction is not known.

It has been predicted that some day a dye may be discovered which will be specifically eliminated by the pancreas. More than 100 dyes have been studied in Ivy’s laboratory and none was found practical. A feasible test which could show abnormal function in a chronically diseased pancreas would be of considerable clinical value.

Appreciating the limitations of the ordinary procedure of examining the serum diastase level, McCaughan has attempted an improvement of the test, whereby, disease of the pancreas might be determined following acute episodes and in the more silent diseases of the pancreas, such as interstitial pancreatitis, neoplasm, and so forth.

The principle of McCaughan’s test which I shall describe briefly is based on experiments performed on dogs.

A dog was anesthetized and the stomach surgically approached. A rubber balloon was introduced through an incision in the stomach wall and placed in the duodenum just beyond the pyloric ring. The balloon was distended with water to a pressure of 90 mm. Hg. Oxalated blood samples were taken at intervals and the diastase concentrations determined. In 2 experiments performed by McCaughan the diastase showed a rise of 250% in one animal and 350% in the other, the distended balloon having been left in situ for 1 hour and 1½ hours respectively. Controls showed no elevation with a collapsed balloon in the duodenum. Another control animal, in which the common duct had been ligated to exclude the possibility of coincident biliary obstruction, showed a rise of only 150% in 2 hours. The pancreatic ducts of a dog were then ligated as a preliminary procedure and time allowed for the development of atrophy and fibrosis in the gland. The experiment of occluding the pancreatic duct openings by means of the distended balloon was then repeated. No rise in serum diastase was noted.

McCaughan states that clinical application of these observations has not yet been made, but suggests that an index to pancreatic function could be obtained. A normal pancreas might be expected to show a certain rise in the serum diastase after temporary obstruction by the balloon, whereas, the serum diastase in cases of disease of the pancreas might remain unaltered.

I have had the opportunity of applying McCaughan’s procedure to a patient suffering with a gumma of the head of the pancreas, and, inasmuch as the tests have not previously been attempted on human subject, a description of my technique and results are given:

The patient, a jaundiced, poorly nourished, white female, aged 34, was referred to this clinic for roentgen therapy to the pancreas. A diagnosis of carcinoma of the head of the pancreas had been made elsewhere after a laparotomy revealed a large mass situated in the head of the pancreas. The tumor was biopsied.

Our studies suggested that the definitely palpable mass in the epigastrium might be a gumma. Dr. J. McFarland, after microscopic study of the biopsy specimen, made a diagnosis of chronic granuloma. The blood Wasserman reaction was 4 plus. The patient was given the benefit of a therapeutic test, consisting of low doses of arsphenamine and massive doses of saturated solution of potassium iodide. She rapidly improved. The tumor could no longer be palpated and roentgen studies showed that the previously noted indentation of the stomach had disappeared and the wide sweep of the duodenum had returned to normal. As a detailed case history is not necessary for the purpose of this paper, no further description will be given.

Preferably the test should have been done early during the course of the patient’s illness and repeated after the patient showed marked improvement. Ideal as such an approach would have been, the patient’s serious condition during her first admission precluded performing a strenuous experiment. The patient was discharged to the care of her home town physician and because of financial reasons failed to return as advised. On the patient’s return to the clinic, definite improvement was noted. The test was first performed at this time. (See Chart I). The test was repeated 9 weeks later when the patient appeared to be entirely well, had gained 16 pounds in weight and the epigastrium mass was no longer palpable. (See Chart II).

**THE TEST**

A diastase determination* was done before passage of tube. The tube (see Figs. 1-5) was introduced

---