

# THE BLOOD PATTERN IN PRE-SYMPTOMATIC MALIGNANCY OF THE GASTROINTESTINAL TRACT

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**G**ASTROINTESTINAL malignancy in the pre-symptomatic or latent stage presents a confusing problem in diagnosis, even after a careful clinical evaluation of the patient (1, 2). This is true of malignancy at any site which remains symptomless, but gastric or intestinal cancer has a tendency to remain hidden until wide invasion has occurred, so that by the time the tumor is discovered it is incurable. Welch and Allen (3) deplore the delay before treatment and assert that "theoretically, if all patients were subjected to resection as soon as carcinoma of the stomach developed, all would be cured. . . . The most fruitful method now available to increase the number of cures of cancer of the stomach is to reduce the delay from onset of symptoms to surgical intervention."

An editorial which appeared in 1946 (4) contains some pertinent observations regarding the problem of diagnosis in pre-symptomatic cancer:

"These methods attack the problem of symptomatic cancer—they leave untouched the important field of presymptomatic cancer, or cancer which is as yet symptomless, silent, latent or preclinical. Apparently some cancers are asymptomatic until they are incurable by methods of treatment now available."

"Among the commoner types of cancer that may be silent until they are incurable are some of those that arise in the stomach. . . . Some simple test with which the entire population could be periodically screened is highly desirable. Such tests for detecting tumors should be as simple as those for syphilis. . . . It is not unreasonable to believe that a simple method for detecting presymptomatic cancer cases will yet be discovered by an intensified and concerted effort."

The magnitude of the problem is a challenge to investigators and any laboratory test which will furnish a clue to discovering potential cancer bearers is of major interest to both internist and surgeon (5).

Many of the tests for cancer have been unsatisfactory because of the intricate chemical or serologic technics involved and the wide margin of error (6, 7). Moreover, nothing characteristic has been found in the blood picture of persons suffering from this disease. Sometimes an anemia of the hypochromic type is present which varies in different individuals. According to Rankin and Graham (8),

"So often does this picture of anemia occur that we are of the opinion that no patient should receive a diagnosis of primary or secondary anemia until a thorough examination of the entire colon has precluded the possibility of malignancy in its right half. Also it is axiomatic among clinicians that pernicious anemia should always be differentiated from gastric malignancy (or cancer of the right half of the colon)."

In April, 1945, these authors made the startling statement that almost a year elapses before the average

patient with cancer of the colon or rectum has an accurate diagnosis made on him (9). It is indeed easy to confuse a severe type of carcinoma with pernicious anemia, but one is more apt to find a lower hemoglobin count when a neoplasm is present (10).

Variation in the size and shape of the red blood cells has been noted by Gruner and others (11) manifested by poikilocytosis and an unusual degree of polychromatophilia. The finding of nucleated red cells is not common. Changes in the leukocytes are not remarkable except in cases in which ulceration has taken place. In many instances the blood picture remains normal.

Many theories have been proposed to explain the conversion of normal into malignant cells (12). Both the malignant and the non-malignant cell elicit a reaction in the connective tissue. With the non-malignant cell this leads eventually to destruction and removal of the implanted cells, whereas the malignant cell is able to dominate the reaction so as to compel the formation of a stroma which enables the implanted cells to live (13).

The multiplicity of theories regarding the etiology of cancer is reflected in the publications of the American Association for the Advancement of Science which record the present status of cancer research and discuss the virus approach, carcinogenesis, enzymes, diets, and chemotherapy (14). But while we await the solution of the cause of cancer, much may be done to institute proper therapy if early or pre-symptomatic cancer can be discovered lurking in the body.

## METHOD

Thus, impelled by the need of finding a simple test for cancer which could be done at the office or at the bedside, and impressed by the simplicity of Goldberger's method of measuring the blood sedimentation rate (15), the author evolved a simple blood test (16). Blood obtained by puncturing the fleshy portion of the patient's finger-tip is allowed to dry in the form of three droplets on a glass slide. In this procedure the finger-tip is held with light but uniformly constant pressure and allowed to touch the under-side of the glass slide lightly three times. The first drop may be too thick or too heavily rimmed or slightly smeared; the second and third drops should form a definite clear pattern if allowed to dry undisturbed on the righted slide in the horizontal position. It is wise to prepare two such slides in case one becomes lost or broken.

The pattern when observed microscopically shows definite characteristics, providing a sensitive indicator of the presence or absence of cancer. The appearance of normal blood is shown in Fig. 2. Note the well defined mosaic appearance or weblike pattern. Much fibrin is present, leukocytes are scarce, and the red blood cells

are tightly packed with rouleau formation and no variation is seen in the size or shape of the corpuscles.

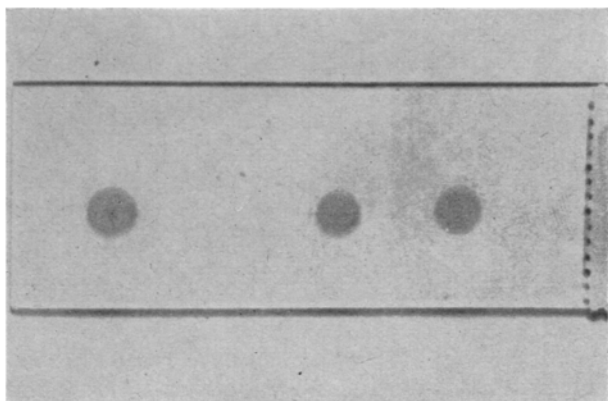


Fig. 1: Macroscopic

After preparing and studying several thousand of these blood slides it became possible to recognize a pattern which appeared to indicate transition or an early breaking down of the normal pattern, as seen in Fig. 3. Fibrin is breaking down in several areas. There are still many red and white cells present in

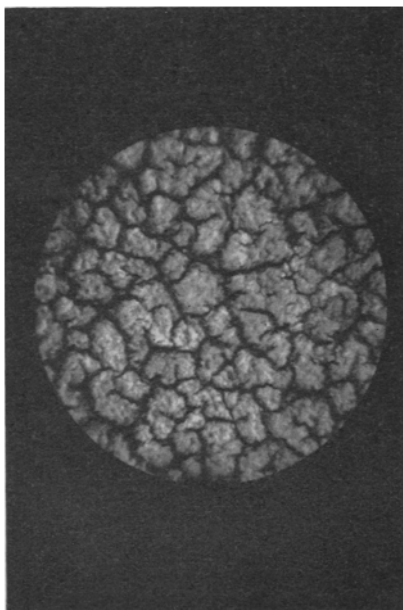


Fig. 2: Negative Pattern

the aggregate and some agglutination with small lacunae and a number of granules. The final stage of full bloom cancer is shown in Fig. 4. Now very few fibrin threads are visible and large amounts of clear interspace or lacunae are seen. Through agglutination, cells are clumped together in masses and the reticular network has entirely disappeared.

These blood patterns have been studied along with clinical and laboratory data and have been found correlative and informative. When cures were obtained by surgery, radium implantation, irradiation, or by a combination of these methods, the pattern changed from positive to negative with a short period of from six to

eight weeks. In some instances this blood droplet test pointed to the presence of early carcinoma before there was any clinical or roentgenological evidence. Slides made on ulcer patients some with severe hematemesis, all showed a normal pattern. Likewise, it was negative in other conditions of the gastrointestinal

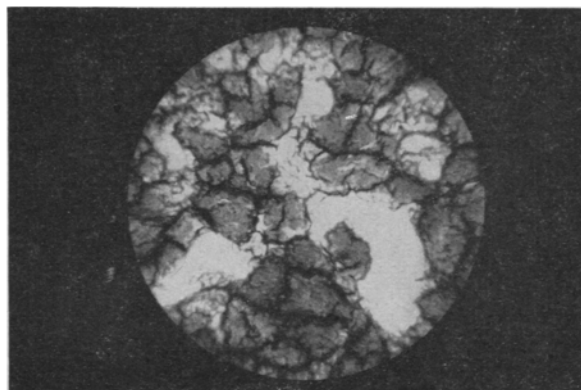


Fig. 3: Early Cancer

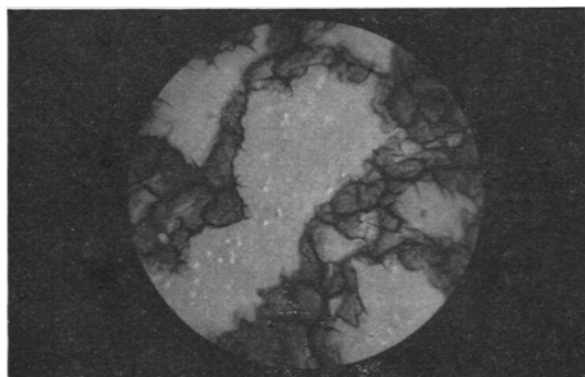


Fig. 4: Full-bloom Cancer

tract, such as regional ileitis, colitis, gastritis, diverticulum, visceroptosis, pylorospasm, and irritable colon.

A few cases are reported in brief to demonstrate the working applicability of this simple test. It is regrettable that it was not always given more credence in the search for the correct diagnosis.

#### CASE I

E. K., male, age 60, was admitted to a local hospital for dizziness, pains in the knees, weakness of the legs. The diagnosis made at this time was primary anemia, combined sclerosis, and chronic myocardial disease. He left the hospital against advice May 7, 1934, four days after admission.

He was next seen at the office October 6, 1942 complaining of pain in the lower region. He stated that he had been taking liver parenterally and orally since 1934. At this time the blood pattern on the slide was negative. He returned February 12, 1944 with pain throughout the entire abdomen. He consulted a surgeon who did not feel sanguine about operation because of the patient's age and the primary anemia. The blood pattern at this time was positive. The patient consulted another surgeon who made a diagnosis of subacute appendicitis. February 26, laparotomy revealed an atrophic, retrocecal, fibrotic appendix embedded in adhesions. An annular mass in the transverse colon was removed. The pathological diagnosis was adenocarcinoma, undifferentiated and rapidly growing, invading all coats and involving the extraserosal tissue. This patient was discharged April 21. His

bowels moved three times a day through the colostomy and he had one movement via the rectum, but hard stools necessitated straining. He was readmitted July 25 for closure of the colostomy and discharged August 18. He was seen at the office on several occasions and the blood pattern on the slides remained positive. He died July 24, 1945 of carcinoma of the sigmoid colon with metastases to the inguinal lymph nodes.

### CASE II

M. B., male, age 59, was first seen at the office December 12, 1945 with the complaint of pain in the lower lumbar region. The blood pattern at this time showed early carcinoma. X-ray films made at the clinic showed only visceroptosis. A general physical examination disclosed no abnormalities. This patient was seen at the office February 15, 1946 and April 9, 1946 and the blood pattern was more distinctly positive. Symptoms persisted. By November 19 the blood pattern was that of full-bloom cancer. At this time stools were loose but contained no gross blood. He refused hospitalization, stating that the lower lumbar pain abated after defecation.

February 20, 1947 he consented to have a gastrointestinal series, and again films were negative. He was now passing three to eight stools a day. In the face of the persistently positive blood pattern a barium enema was done March 1. The radiologist reported no pathology except retention of a large amount of barium from the previous examination.

The following morning the patient was seen at home. He was in shock and was referred to the hospital. He was dehydrated, definitely undernourished. There were expiratory rumbles at the bases of both lungs. The heart was not enlarged. Blood pressure was 100/60. The abdomen was full, hard, almost boardlike, tender on pressure and uniformly spastic. No masses were made out. The impression of the examiner was intestinal obstruction, a perforated viscus in descending colon, stomach, or duodenum.

The patient was prepared for operation. Upon opening the peritoneal cavity free fluid was found with markedly distended loops of small bowel, ascending the transverse colon. Palpation of the rectosigmoid revealed a definite jelly-like mass lying in the hollow of the sacrum; it was movable and involved a segment of sigmoid just proximal to the rectum. Cecostomy was done and transfusions given and continuous oxygen, but the patient died at 11:00 a.m. the following day. Permission was obtained for a post-mortem examination.

The final diagnosis was carcinoma of the rectosigmoid colon with perforation and intestinal obstruction, generalized peritonitis, metastatic carcinoma of the lungs.

### CASE III

G. S., a white female, age 24, was admitted to the hospital March 21, 1951 with a history of episodes of acute pain in the upper abdomen, nausea, vomiting and two attacks of hematemesis. A posterior gastroenterostomy was done July 29, 1946 with some relief of symptoms. She had an acute exacerbation of symptoms May 22, 1950 and improved on medical treatment. The diagnosis was "non-functioning gastroenterostomy." She was next seen at the office October 21, 1950, and reported some pain and occasional attacks of vomiting, but no hematemesis or tarry stools. The blood pattern test at this time was positive. A thorough search was made for malignancy at some site but all examinations failed to reveal cancer.

February 25, 1951 another acute exacerbation sent her to the hospital. She was placed on a Sippy régime and discharged improved to return subsequently for further surgery. She returned March 21, 1951. She was thin and pale with a red blood count of 3,600,000 and 10.6 gm. hemoglobin. The blood pattern was positive. A partial gastric resection was still functioning, but it was rather high in the posterior wall and it was thought advisable to resect the pyloric end of the stomach to promote better functioning.

Pathological examination of the pyloric segment of the stomach showed no gross evidence of ulceration of neoplasm. Eight sections were examined microscopically and in one, an area of mucosa 3 to 4 mm. in diameter was seen to contain an early carcinoma *in situ*. The normal glandular pattern of the mucosa had been completely replaced by an atypical proliferation of cells and mitotic figures were frequent. In a few areas the cancer cells were mucin-secreting. Attempts to find any other cancerous tissue in numerous sections cut from the entire specimen were futile. The final diagnosis was

carcinoma *in situ* confined to a very small area of the stomach; gastritis involving chiefly the muscularis. Section of a lymph node was negative.

The patient was discharged April 5, 1951. She is to report at frequent intervals for check-up examination. To date the blood pattern has remained negative and she is leading an active life as a nurse with no recurrence of gastric symptoms.

In dealing with these patients, the personal factor must be reckoned with. When a test is made at the office and the pattern of early malignancy appears, it is often difficult to impress upon the patient the gravity of the situation. He is reluctant to go to the hospital for a thorough examination since in many instances he is not ill, or thinks he is not. Then, when he becomes convinced that it is unwise, even dangerous, to procrastinate further, there is the obstacle of the surgeon who may not accept the evidence on the slide. The following cases were taken at random and show the unhappy result of failure to regard the positive blood pattern.

*Case IV.* M. S., female, 68 years old. Pain in lower quadrant. Constipation. Slight amount of green vomitus on several occasions. Weight loss of 20 pounds in four months. Blood pattern positive. Patient consented to operation six months later. Laparotomy revealed adenocarcinoma of the ascending colon. This patient died at home three and one-half months after discharge from the hospital.

*Case V.* W. B., male, 64 years old. Began to lose weight, but was able to eat and enjoy food. Felt tired all the time. Examination of the stomach by x-ray was negative. Rigidity of abdominal muscles. Skin somewhat dehydrated. Blood pattern positive. Operation four months later revealed adenocarcinoma of the stomach. This patient died on the fifth postoperative day.

*Case VI.* A. L., female, age 46. Complained of being anemic and came to office for iron pills. Loss of weight over a period of three months. Patient merely thought she had been working too hard. Slight swelling of abdomen, but no pain nor nausea. Blood pattern positive. Patient would not consent to operation until a year had lapsed. Laparotomy then revealed adenocarcinoma of the stomach with metastases to the kidney. This patient died at home eight months after operation.

*Case VII.* M. M., female, age 66. Patient stated that she had always been thin and that her stomach had felt upset during the early morning hours. She was able to sleep and eat fairly well. Loss of 22 pounds during the last six months. Positive blood pattern. Patient refused operation until 14 months had passed. Laparotomy revealed adenocarcinoma of the stomach. This patient died at home seven weeks after discharge from the hospital.

*Case VIII.* W. C., male, age 71. Complaint of vague abdominal discomfort which awakened him during the night. Condition present for five months. On two or three occasions he vomited a small amount of dark fluid. Muscles of abdomen rigid, but no tenderness or pain present on palpation. Blood pattern positive but patient refused operation until six months later. Laparotomy revealed adenocarcinoma of the stomach. He was discharged March 18, 1945 and died 10 months later.

In these and similar cases the blood pattern on the slide was definitely positive, but the patients refused surgery until too late for cure.

### DISCUSSION

The early detection of cancer remains a prime requisite in its control and more and more attention is being directed to determining the accuracy of various methods proposed to detect malignancy and to differentiate it from other conditions. The blood pattern test described above has proved itself remarkably correct in the author's experience over a period of ten

years. It is simple, inexpensive, and can be performed in the office during the course of a routine physical examination.

Girón (17), in 1943, reported his results with this test in 515 cases and found that in the cancerous patients the typical positive cancer pattern appeared in 90.4 per cent of the cases. Gruner (18) of Montreal finds it accurate in 98.4 per cent, and runs this test parallel with his own. Coltman (19), Huggins, Miller and Jensen (20), Finnegan and his coworkers (21), Whitney (22), Norman and Slicher (23), Black and Speer (24), Hawk, Inkley and Thoma (25, 26, 27), and Nickel, Berger, and Brickley (28) have reported results of their own tests for cancer or have made extension-studies of cancer tests already in use for more than a decade. Some have run several tests parallelwise in an effort to evaluate efficacy. The accuracy of the results when the author's test is used varies with the clarity of the pattern on the slide and the experience of the examiner.

Körbler and Frank (29) seem to be the first to employ this blood droplet test in animals along with Gruner's test (18) to discover changes taking place in mice subjected to tumor implantation. The very positive reaction in the blood droplet indicated a brief life expectancy in the animals and proved an excellent criterion in choosing mice for experimentation purposes.

#### CONCLUSIONS

A simple and reliable method of diagnosing normal and cancerous blood by observing a drop allowed to clot and dry on a glass slide is presented. It is suggested that disturbance in the plasma content is the factor which alters the compact pattern of normal blood.

Once the pattern of early cancer is recognized, every effort should be made to locate the malignant lesion and institute prompt therapy.

The test should be repeated at frequent intervals to ascertain results of therapy and to determine the prognosis.

It is hoped that the routine use of this simple method will furnish a clue to the presence of cancer, make possible earlier diagnosis, adequate therapeutics, and achieve a greater percentage of cures.

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