Splenic Mastocytosis

By Norman Ende and Edward I. Cherniss

MAST CELL INFILTRATION of the spleen has seldom been reported. We have found in the literature three cases in which mast cells in the spleen were found associated with urticaria pigmentosa. Primary splenic mastocytosis has not been described.

Tissue mast cells were first differentiated from blood basophils by Ehrlich. Contemporary investigators have presented evidence which indicates that the mast cells produce heparin, histamine, hyaluronic acid and serotonin. Few studies of mast cell counts in normal human tissues are reported. Normally mast cells are found in small numbers in human connective tissue, especially along the blood vessels, in the synovial membrane, and in the bone marrow. In man their number increases in areas of chronic inflammation and in certain blood diseases, and particularly in the cutaneous lesions of urticaria pigmentosa. In urticaria pigmentosa they are considered essential to the clinical manifestations. Systemic mast cell disease was a term recently applied to the rare occasion in which urticaria pigmentosa is accompanied by dense mast cell infiltration in tissues other than skin. The skeletal system, lymph nodes, bone marrow, liver and spleen were sites principally involved. Associated findings included hepatomegaly, splenomegaly, anemia, bleeding tendency, cirrhosis, cachexia and gastrointestinal symptoms. Cutaneous lesions of urticaria pigmentosa were invariably present.

We have recently observed a patient without urticaria pigmentosa but with splenic mastocytosis. This was accompanied by hypersplenism, episodic flushing, hemorrhagic tendency and vomiting. Splenectomy led to complete remission of symptoms. This unique case will be presented as well as data from correlative studies. Its implication and position in the broadening spectrum of mast cell disease will be discussed.

CASE REPORT

The patient is a 35-year-old teacher who entered the hospital on April 4, 1957, complaining of bizarre flushing attacks and the presence of a left upper quadrant mass. Since adolescence he has had mild attacks of asthma and hay fever. For the past two years he has been subject to paroxysmal episodes of sudden onset characterized by blood shot eyes, pulse pounding rapidly in the ears, retrobulbar headache, nasal obstruction, rhinorrhea, wheezing, diaphoresis and nausea. The attacks usually lasted from 30 to 45 minutes and terminated either spontaneously or after drinking hot water. Upon blowing his nose at the end of an attack there was typically a small clot of blood in either nostril. At onset these
attacks occurred about once a month, but during the three weeks prior to admission, once daily. They came at any time of day and were associated with no environmental factor that the patient recognized. For three years he had been aware of a mass in his left upper quadrant which was non-tender and constant in size. In the past few months, however, the mass had enlarged markedly and the patient was conscious of a sensation of weight in that area. He denied a bleeding tendency, although during the past few months he had developed pyorrhea with bleeding gums after brushing his teeth. For the last three months his appetite had been markedly diminished and nausea after meals with a distended feeling in the epigastrium had been frequently noted. A 12-pound weight loss and severe fatigue were noticed in the three weeks prior to admission, the last five days of which were marked by frequent vomiting of a bitter yellow liquid. During this time there was no history of hematemesis, melena or diarrhea.

Past History: In addition to the usual childhood diseases the patient had a prolonged illness in high school which he described as a “sleeping sickness” and which he does not remember well. At the age of 14 he spent six months in a tuberculosis sanatorium because of a “clouding” in his lungs. He was told tuberculosis was ruled out. He contracted syphilis in 1945 and was treated with penicillin and Mapharsen. In 1938 he had an appendectomy and in 1948 a hemorrhoidectomy. He was accustomed to drinking a dozen cans of beer and a half-pint of whiskey on week ends.

Family History: No one in his family had had a similar illness. One sister, age 45, had a severe tremor of the extremities since an illness in childhood. His maternal grandmother had diabetes, the paternal grandmother tuberculosis and cancer. A paternal aunt had cancer.

Physical Examination: Physical examination revealed a well developed, tall, thin, 35-year-old white male appearing chronically ill. His height was 6 feet, 2 inches, weight 172 pounds, temperature 99, pulse 72, blood pressure 128/72. The skin had no pigmented macules, nodules or bullae. There were no intra-oral lesions or petechiae. The gums showed moderate gingivitis but did not bleed when traumatized. The tongue was red and fissured. The heart was normal. The liver edge, firm and smooth, was palpable 6 cm. below the right costal margin. The spleen was firm, descending 14 cm. below the left costal margin and 2 cm. to the right of the midline. Lymph nodes were normal to palpation and the remainder of the physical examination was negative.

Laboratory: Hemoglobin was 11.2 Gm. %, hematocrit 37%, sedimentation rate 36 mm. per hour, WBC 3,500/cu. mm. with 8 bands, 52 neutrophils, 36 lymphocytes, 1 monocyte and 3 eosinophils. Subsequent white counts were as low as 2,400/cu. mm. with similar differential determinations. No abnormal white cells were noted in the peripheral blood. The platelet count varied from 112,000 to 156,000/cu. mm. Red cell osmotic fragility was normal. The reticulocyte count was 0.3%. Bone marrow aspirated from the posterior iliac crest had a slight decrease in cellularity. The myeloid, erythroid, lymphoid ratio was 2:1.5:1. There was evidence of maturation of all elements. Megakaryocytes were numerous and an occasional plasma cell and reticuloendothelial cells were noted. The marrow was considered essentially normal. VDRL and Mazzini tests were reactive; Kolmer was 4 plus to a 1:16 dilution. Urine was normal. One 24-hour and two random urine specimens were negative for 5 hydroxyindolacetic acid. The prothrombin time was 100%, total proteins 7.8 Gm. %, albumin 5.8 Gm. %, globulin 1.8 Gm. %. There was 5% retention of BSP in 45 minutes. PBI was 5.1 micrograms %. In one hour 28% of injected Congo red dye had disappeared from the serum. Blood showed no growth on culture. Electrocardiogram was within normal limits. Bleeding time was 1 1/2 minutes, coagulation time 14 minutes. Chest x-ray showed no evidence of significant pulmonary or cardiac pathology. Radiographic bone survey showed no lesions. Intravenous pyelogram demonstrated a normal right collecting system and reduplication of the left kidney pelvis. Upper G.I. series showed the stomach to be displaced medically and anteriorly by a large spleen. Needle biopsy of the liver revealed focal necrosis and portal fibrosis.

Six hours after admission the patient came to the nurse to have her observe a typical paroxysm of his symptoms. His face was extremely flushed, the ears red and then blue. The pulse was 180 per minute. The eyes were described as “red and weepy,” the nose congested, respiration rapid and difficult. The episode lasted 10 minutes and was relieved
after drinking hot water and vomiting. Following the attack he complained of retro-orbital pain. A similar attack occurred the following afternoon and lasted 10 minutes. Conjunctivae were injected, the face slightly flushed, no rales were heard in the chest. A third, somewhat abortive, attack was observed two weeks later. His blood pressure at the time of this attack was found to be 120/72. His nausea and vomiting subsided, presumably in response to symptomatic therapy and a bland diet. On April 26, 1957, his bleeding time was 1½ minutes, coagulation time 14 minutes. On this date a needle aspiration of the spleen was performed from an abdominal approach. The specimen showed a few normoblasts. Of 2,000 nucleated cells counted, 2.6% were identified as mast cells. On April 27th and 28th he complained of abdominal pain, nausea and vomiting. The hemoglobin fell to 9.3 Gm. %, the hematocrit to 28%, the white count rose to 6,650/cu. mm. Bleeding time was 1½ minutes and coagulation was incomplete after one-half hour.

On the afternoon of April 28th he had his fourth hospital attack of conjunctivitis, tachycardia and flushing, with blood pressure 130/0. That evening an emergency splenectomy was performed. About 1,000 cc. of blood were encountered in the peritoneal cavity. The liver was large, firm and smooth. The spleen was enlarged and indurated. The puncture site consisted of three needle holes in the lower pole which were still bleeding. The spleen and several adjacent lymph nodes at its pedicle were excised. Five pints of blood were transfused.

Tissue Examination: After the removal of the spleen, splenic imprints were made immediately. It was then immersed in normal saline and placed in the operating room refrigerator at 10 C. On examination the following morning it weighed 1586 Gm. and measured 26 x 15 x 6 cm. The capsule was slightly wrinkled and there were a few white plaques on its surface. The three needle point wounds were again noted and there was no evidence of clot formation in this area. Several enlarged gray-white lymph nodes, the largest measuring 2 x 1 x 1 cm., were present at the hilum. The spleen was firm and cut with resistance. No significant vessels were noted in the region of the puncture site.

Twelve hours after splenectomy the spleen was cut in half. One portion was frozen at —9 C., the other was preserved in formalin. The imprints were treated with Wright, Giemsa, and polychrome methylene blue stains. Formalin-fixed tissue was stained with hematoxylin and eosin and Luna’s stain as modified by the Armed Forces Institute of Pathology.14 Sections of the frozen portion were thawed, fixed in absolute methyl alcohol, then stained with polychrome methylene blue. Examination of the splenic imprints, counting 5,000 cells, showed 8% of all nucleated cells to be mast cells (figs. 1 and 2).

Examination of hematoxylin- and eosin-stained sections of the formalin-fixed tissues showed conspicuous fibrous elements in red pulp. The sinusoids were enlarged. The Malpighian corpuscles were widely separated but otherwise normal in appearance. Occasional normoblasts were noted, but no megakaryocytes. A section through the puncture wound showed a few inflammatory cells, but no evidence of thrombus formation. The wound entered the red pulp. No mast cells could be identified. On polychrome methylene blue and Luna’s stain of the tissue, however, mast cells were found scattered in both the walls and lumina of the sinusoids. They were also found in the outer periphery of the Malpighian corpuscles, but there were none in the central portions. A rare mast cell was seen in the fibrous trabeculae. Mast cell counts of the red pulp varied from 10 to 60 mast cells per oil immersion field.

The lymph nodes on hematoxylin and eosin stain showed hyperplasia of the reticuloendothelial elements. The fibrous component was increased. The sinuses were spacious and contained erythrocytes, many lymphocytes, neutrophils, mononuclear cells and some large macrophages containing brown-pigmented granules. On modified Luna’s stain, mast cells were numerous throughout, but most conspicuous in the sinusoids and least in the lymphoid elements.

Course: Postoperative course was complicated briefly by a pneumonitis. The white count rose to 20,450/cu. mm. with 5 bands, 62 neutrophils, 28 lymphocytes, 4 monocytes and 1 eosinophil. The hemoglobin rose to 13.2 Gm. %, platelets to 1,406,000/cu. mm. Following surgery the bleeding and coagulation times were repeatedly normal. The patient thereafter enjoyed an uneventful recovery, felt quite well and noted none of his previous complaints.
Fig. 1.—Mast cells in splenic imprint. Wright's stain x 900.

Fig. 2.—Mast cells in splenic imprint. Polychrome methylene blue stain x 900.

On June 20, 1957, the white count was 11,900 cu. mm. with 41 neutrophils, 46 lymphocytes and 10 eosinophils. Postsplenectomy bone marrow was considered essentially normal with slight proliferation of the granulocytic series and relative eosinophilia. Mast cells numbered 1% of nucleated elements.

After discharge the patient was seen at regular intervals for follow-up. He has continued
to feel well and has had no further attacks. Nine months after splenectomy his appetite is excellent and he is gaining weight. The gingivitis has subsided under conservative therapy. Four months postoperatively the WBC was 8,350/cu. mm., with 42 neutrophils, 53 lymphocytes, and 5 monocytes. Other determinations included hemoglobin 13.8 Gm. %, platelets 534,750/cu. mm., bleeding time 1 minute and coagulation time 10 minutes.

**DISCUSSION**

The finding of mast cells in the splenic aspirate was entirely unanticipated, but led us to more exhaustive examination of the tissue sections than they would routinely have been accorded. Splenic imprints were made fortuitously for an unrelated study. The discovery of mast cells left us frankly bewildered. The literature had little to offer on what should be considered a normal mast cell count. This led us to studies of normal spleen with experimentation in methods of handling and stainings. After establishing to our satisfaction that mast cells were definitely increased in this case, it became intriguing to consider the major clinical findings as expressions of mast cell function.

Studies were made using Giemsa’s stain, Wolbach’s modification, toluidine blue, Dominici’s toluidine blue, Terry’s polychrome methylene blue, modified Luna’s, hematoxylin and eosin, and Wright’s stain. Of all methods we used in an effort to demonstrate mast cells, the most satisfactory results were obtained by Wright’s stain and polychrome methylene blue on splenic imprints, and polychrome methylene blue and modified Luna’s stain on tissues.

A distinguishing characteristic of mast cell granules is their tendency to stain metachromatically with a variety of preparations—the blue dyes give them a reddish tone, the red dyes a yellowish tone. The marked fragility of mast cells and their susceptibility to destruction by ordinary technics of handling has been well noted, and they are said to undergo postmortem plasmolysis faster than any other cell.

It has been advised that tissue studied for mast cells should always be fixed in absolute methyl alcohol because of the solubility of the mast cell granules in water. In general we have found this to be true. Using the Luna’s stain, however, we were able to find them readily in formalin-fixed tissue.

Mast cell granules are fragile and easily scattered by the microtome knife. In many of our sections we found that the cells fragmented and granules scattered in the interstitial tissue. Because of this, in some polychrome methylene blue stains on thawed tissue fixed in alcohol, red smudged halos were seen on low-powered field examination where intact mast cells were not actually distinguishable. On imprints of thawed frozen tissues the number of mast cells was greatly reduced, but isolated granules were found scattered throughout.

Our finding of mast cells concentrated in the red pulp corresponds to Ellis’ case of urticaria pigmentosa wherein mast cell findings were limited to the splenic pulp.

In an effort to quantitate normal splenic mast cell counts the first available eight spleens were examined (table 1). Surgical specimens were examined immediately; postmortem specimens within three hours of death. In tissue sections the number of mast cells in each oil immersion field was recorded. Mast
Table 1.—Mast cell counts on eight unselected fresh spleens. These spleens were normal unless indicated otherwise.

<table>
<thead>
<tr>
<th>Number</th>
<th>Diagnosis</th>
<th>Imprints: Mast Cells per 100 Nucleated Cells</th>
<th>Sections: Mast Cells per Oil Immersion Field</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wright's Stain</td>
<td>Polychrome Methylene Blue</td>
</tr>
<tr>
<td>57-A-50</td>
<td>Adenocarcinoma of stomach.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>57-A-51</td>
<td>Malignant nephrosclerosis.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>57-A-48</td>
<td>Progressive spinal muscular atrophy.</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>57-S-607</td>
<td>Carcinoma of the colon.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>57-A-72</td>
<td>Encephalomalacia (Pernicious splenitis chronic).</td>
<td>less than 0.25</td>
<td>less than 0.25</td>
</tr>
<tr>
<td>57-S-731</td>
<td>Adenocarcinoma of stomach.</td>
<td>less than 0.25</td>
<td>less than 0.25</td>
</tr>
<tr>
<td>S-2771</td>
<td>Thrombocytopenic purpura.</td>
<td>less than 0.25</td>
<td>0</td>
</tr>
<tr>
<td>57-A-89</td>
<td>Encephalomalacia.</td>
<td>less than 0.25</td>
<td>less than 0.25</td>
</tr>
</tbody>
</table>

Cell counts of splenic imprints were determined by counting 500 nucleated cells and recording the percentage of mast cells.

The greatest number of mast cells found in a “normal” spleen was 0.25% in a patient who had progressive muscular atrophy. The majority of spleens contained far less mast cells. Ellis, in a control study, found no mast cells in a normal spleen. Riley observed that tissue mast cells are rare in the spleen of any species, including man. In our case, counts through the red pulp showed mast cells as frequent as 60 per oil immersion field, averaging 31 per oil immersion field. Ellis' case showed 10 to 25 mast cells per oil immersion field. From splenic aspiration Hissard reported 51.36%; Degos 70%. These last three cases had urticaria pigmentosa. Our splenic aspiration showed 2.6% mast cells. In our case the mast cell count of splenic imprints varied from 6 to 10%. The imprints in the control spleens varied from 0 to 0.25%. Undoubtedly there was some dilution of the aspiration specimen with peripheral blood to account for the discrepancy between this and the imprint and tissue counts.

This indicates that splenic aspiration is a satisfactory method of diagnosing splenic mastocytosis, though not dependable for true mast cell estimates. Counts of 2.5% or even less should warrant further investigation.

The mast cells in urticaria pigmentosa usually can be identified with relative accuracy with hematoxylin and eosin stains of skin sections. Special preparations are generally used for confirmation. In this case, however, even on reviewing hematoxylin- and eosin-stained specimens carefully, the mast cells were not distinguishable. Had they not appeared on Wright's stain of the splenic aspiration and spleen imprints they might have been missed entirely. This suggests to us the possibility that many other cases routinely fixed in formalin and stained with hematoxylin and eosin could have contained significant numbers of mast cells and have been missed. This failure of mast cells to visualize in routine tissue preparations is to us of great significance. We believe that all cases of “primary” hypersplenism should be considered and investigated for splenic mastocytosis.

Hypersplenism. Our patient had evidence of hypersplenism manifested by a large spleen, leukopenia, mild anemia and thrombocytopenia with a compatible bone marrow. Although hypersplenism in systemic mast cell disease is not specifically discussed, a scattered number of cases with urticaria pig-
mentosa have shown enlarged spleens. Of these at least one has shown findings of hypersplenism, although mast cells were not present on aspiration of the spleen. As often seen in hypersplenism, removal of the spleen in our case corrected the hematologic abnormality and produced a remission of the clinical symptoms.

Bone Marrow. Mast cells in small numbers have been shown to be normal constituents of the human marrow. We examined eight marrows in various conditions (table 2) using Wright's stain and polychrome methylene blue on smears as a control, and found that mast cell counts varied from 0 to 1% of the nucleated elements. In the case presented we found that 1% of nucleated elements were mast cells and the marrow appeared essentially normal. Ellis found 50 to 60 mast cells per oil immersion field in his case. Others have found considerable numbers of mast cells in the marrow in cases of urticaria pigmentosa.

Liver. Hepatomegaly has been found in urticaria pigmentosa with and without histologic evidence of associated systemic mast cell disease. Some have found periportal proliferation of fibrous tissue associated with mast cell infiltration. Others found no signs of cirrhosis on biopsy, but fibrillar strands of connective tissue were observed only in the immediate vicinity of the hepatic vessels. Livers of dogs with mast cell tumors have shown degeneration with periportal fibrosis and solitary and nodular collections of mast cells. Needle biopsy of the liver in our case on hematoxylin and eosin stain showed a moderate degree of periportal fibrosis, but no mast cells. Re-examination with modified Luna's stain showed a few aggregates of three to eight mast cells in the fibrous component. Since mast cells may normally be found in small numbers in fibrous tissue, their significance here is difficult to assess. We feel, however, that their number is increased in this case. Alcoholic excess may have been an important factor in our patient in producing hepatic fibrosis. It is noteworthy that liver function tests appeared to be normal.

Histamine. Evidence for histamine production by human and animal mast cells has recently been reviewed. The intermittent flushing, palpitation, headache, conjunctival injection, rhinorrhea and wheezing observed in our patient are certainly consistent with histamine effect. These phenomena could result from the periodic release of histamine from an organ rich in histamine-producing cells. Hissard presented a patient with urticaria pigmentosa in

<table>
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<tr>
<th>Number</th>
<th>Diagnosis on Bone Marrow</th>
<th>Mast Cells per 100 Nucleated Cells</th>
<th>Wright's Stain</th>
<th>Polychrome Methylene Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>598</td>
<td>Metastatic carcinoma to bone marrow</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>586</td>
<td>Erythroid hyperplasia.</td>
<td>less than 0.25</td>
<td>0.25</td>
<td></td>
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<tr>
<td>692</td>
<td>Essentially normal.</td>
<td>1.0</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>760</td>
<td>Hypoplasia.</td>
<td>0.3</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>759</td>
<td>Essentially normal.</td>
<td>0.5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>830</td>
<td>Essentially normal.</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>843</td>
<td>Hypochromic anemia.</td>
<td>0.25</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>923</td>
<td>Acute leukemia in remission.</td>
<td>0</td>
<td>less than 0.25</td>
<td></td>
</tr>
</tbody>
</table>
whom 51.3% mast cells were found on splenic aspiration, 1% in the peripheral blood. Following adrenalin-induced splenic contraction blood mast cells rose peripherally to 15% in 15 minutes then fell to normal in a few hours. Direct tissue assay of our patient’s spleen for histamine revealed 100 micrograms per gram of tissue, while six normal human spleens used as a control varied from 1.5 to 3.3 micrograms per gram. Canine mast cell tumors have shown as much as 315 micrograms per gram of tissue. One mastocytoma properly prepared showed 295 micrograms per gram of tissue. Histamine determination in a similar mastocytoma not placed in preservative for the first 12 hours showed only 103 micrograms per gram. This points out that histamine level may drop precipitously in unprepared tissue and is analogous to the handling of our patient’s spleen which was placed in the refrigerator in saline solution where it remained for 12 hours before preservation. It is suggested that the true histamine level may have been far in excess of 100 micrograms per gram.

**Clotting Defect.** Various clotting defects have been noted in association with urticaria pigmentosa. These include low prothrombin, diminished platelets, prolonged bleeding and clotting time and increased blood heparin. Since fibrosis of the liver has been observed repeatedly in urticaria pigmentosa it is suggested that the associated hepatic disease with deficient prothrombin formation might be an important factor in the bleeding and clotting anomalies. Enlarged spleen in some cases, with apparent hypersplenism in others, might explain instances of reduced platelets. Others have observed that heparin (vide infra) itself may depress bone marrow, leading to leukopenia and thrombocytopenia.

Our patient had normal prothrombin time, bleeding and clotting time. Platelets varied from 112,000 to 156,000/cu. mm. Clinically, prior to splenic aspiration, he showed no bleeding tendency. This was supported by an uncomplicated needle biopsy of the liver and numerous vena punctures without undue bleeding. Following splenic aspiration, however, distinct evidence of clotting defect was shown by prolonged coagulation time and continuous profuse bleeding from the aspiration site in the spleen. Sections through the splenic wound failed to show organized clot. Serum collected simultaneous to the hemorrhage curiously failed to show heparin abnormality by protamine titration.

**Heparin:** Heparin is accepted as a principal mast cell product. Chemical analysis of the splenic tissue for heparin in our case showed 57 micrograms per gram. Transient hyperheparinemia could account for the bleeding seen in this patient, but serum collected during the period of bleeding, titrated for heparin with protamine, failed to show elevated heparin levels. The determination, however, was performed five weeks after collection. Urbach was able to demonstrate evidence of mildly elevated blood heparin in urticaria pigmentosa. Berlin found evidence of heparin-like substance only in blood expressed from a mast-cell-infiltrated skin lesion. In another patient with urticaria pigmentosa and mast cell infiltration of the spleen, blood aspirated from the spleen showed prolonged clotting time. It is suggested that in our patient the presence of increased heparin was localized to the needle puncture...
site and that this localization may have accounted for failure of clot formation in that area.

Serotonin. Serotonin has been found in the mast cells of some animal species. Its presence has not been established in human mast cells. Prior to splenectomy we were unable to find 5 hydroxyindolacetic acid in the urine of our patient and analysis of the spleen for serotonin showed extremely low values, (less than 0.3 micrograms per gram of tissue), comparable to that seen in six normal controls. It is noteworthy that the flushing syndrome initially suggested malignant carcinoid tumor in our patient.

Other Symptoms. Our patient had no arthralgia or bone pain. Bone survey failed to reveal solitary foci of increased density or radiolucent areas. The subject of bone lesions in urticaria pigmentosa has been recently reviewed. We are impressed with the frequency of gastrointestinal symptoms such as nausea, vomiting, diarrhea and anorexia, which have been prominent in reported cases of urticaria pigmentosa with systemic findings. Nausea and vomiting were our patient's chief complaint.

We again stress that signs and symptoms of urticaria pigmentosa were not present. Skin lesions were not found. We cannot, however, exclude the possibility that random biopsy of the skin may have shown mast cells.

Management: As the pathophysiology of mast cell disease seems related to an overabundance of the cells and their product, a logical approach to therapy would be directed against the mast cell. Cortisone and ACTH have been shown to have deleterious effect on mast cells, but the reports of their beneficial effect in man are conflicting. Hissard's case with mast cells in the spleen showed general improvement following x-radiation of the spleen. Fortunately in our patient the mast cell accumulation seemed limited predominately to one accessible and dispensable organ and he is now well nine months after splenectomy.

Classification. Urticaria pigmentosa is regarded by many as but one manifestation of a broad spectrum of systemic mast cell diseases. It has been recognized: (1) as primarily a dermatologic disease; (2) as a dermatologic disease with systemic changes and symptoms without histologic evidence of mast cell involvement of organs; (3) as a systemic mast cell disease with both visceral and cutaneous mast cell infiltration. We feel that our case is a variant of systemic mast cell disease in which mastocytosis was predominately confined to the spleen.

Summary
1. A patient with splenic mastocytosis who had hypersplenism, periodic flushing and clotting defects is presented.
2. A correlation is shown between mastocytosis and elevated histamine and heparin levels in the spleen.
3. The patient is well nine months after splenectomy.
4. Wright's stain or polychrome methylene blue stain of splenic tissue imprints is recommended as a method of demonstrating mast cells in the spleen.
5. Mast cell counts of normal spleen showed 0 to 0.25% of nucleated cells on imprint.
6. Splenic aspiration stained with Wright’s stain is satisfactory for demonstrating mastocytosis, though not dependable for true mast cell counts.
7. Cases of primary hypersplenism should routinely be reviewed for splenic mastocytosis.
8. Splenic mastocytosis is a variant of systemic mast cell disease in which involvement is predominately confined to the spleen.

**Summario in Interlingua**

1. Es presentate le caso de un patiente con mastocytosis splenic qui habeva hypersplenismo, rubescentia periodic, e defectos de coagulation.
2. Es monstrate un correlation inter mastocytosis e elevate nivellos de histamina e heparina in le splen.
3. Le patiente se trova ben, 9 menses post splenectomia.
4. Pro demonstrar le presentia de mastocytos in le splen, le metodo hic recommendate es le coloration secundo Wright o per blau methvlenic polychrome de impressiones de histo splenic.
5. Le numeration de mastocytos in splen normal revelava le presentia de 0 a 0,2% de cellulas nucleate in le impression.
6. Aspiraciones splenic, colorate secundo Wright, es adequate pro le demonstration de mastocytosis sed non pro un precise numeration del mastocytos.
7. Casos de hypersplenismo primari deberea esser examinate routinarimente pro le presentia de mastocytosis splenic.
8. Mastocytosis splenic es un variante de systemic morbo mastocytic, distinguite per le restriction predominante del affection al splen.

**REFERENCES**

Splenic Mastocytosis

NORMAN ENDE and EDWARD I. CHERNISS