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Case Reports

INDEX

PAGE

I. CASE REPORTS

1. CARCINOMA OF CECUM	308 - 310
2. ACUTE AND CHRONIC ENDOCARDITIS. LEUKEMOID REACTION	310 - 313

II. ANNOUNCEMENTS

1. MINNEAPOLIS SURGICAL SOCIETY	314
2. SENIOR LECTURE	314
3. RADIOLOGY SEMINAR	314

I. CASE REPORTS

1. CARCINOMA OF CECUM

Case is of white female, 62 years of age, admitted to University of Minnesota Hospitals 11-24-33 and expired 12-31-33 (68 days).

10-20-33 - Developed severe pain in upper part of abdomen about 2 hours after eating meal consisting of pork. Pain was colicky in nature, severe enough to make patient double up. Vomited after taking soda. Soon after development of pain, swelling in upper part of abdomen appeared. Pain persisted one week.

11-1-33 - Pain continuous, moderately severe, now present in lower left abdomen. Swelling developed in lower abdomen.

11-24-33 - Pain continued in left side of abdomen; no vomiting; diarrhea present daily but has been taking cathartics; has been on soft diet. Gradual enlargement of abdomen for past 3 weeks but especially marked in last 40 hours. Admitted. Physical examination: Patient markedly obese. Abdominal wall hangs down over pubis. Maceration of skin. Tenderness in all areas below umbilicus without rigidity. Loud borborygmi heard over abdomen. In left lower quadrant below umbilicus, there is a bulging, indurated area which is tender. Rectal - negative.

Laboratory

Urine - trace of albumen. Blood - Hb. 59%, wbc's 20,350, pmn's 94%. Blood Wassermann - negative. N.P.N. - 34.8 mgs.

Diagnosis

Incarcerated umbilical hernia with gangrene of contents. Incision made through skin and a large abscess, apparently within abdominal wall, found.

Post-operative Course

And convalescence unsatisfactory. Course continuously downhill without development of localizing findings indicating nature of abscess within abdominal wall. Throughout this period of time, temperature essentially normal. Pulse showed decided elevation, ranging from 60 to 130. Physical examination during this period revealed no new find-

ings. X-ray examinations of abdomen - unsatisfactory because of the extreme obesity. Late in course, developed edema and rapidly spreading decubitus ulcers. Transfusion performed in hope of reducing edema. Abdominal incision enlarged to increase drainage. Course progressively downhill.

Expired

12-31-33 - Clinical impressions: Abscess of anterior abdominal wall, probably due to gangrenous omentum in umbilical hernia; edema on bases of toxic nephritis.

Autopsy

Body is markedly obese, white female, 62 years old, measuring 168 cm. in length and weighing about 275 lbs. Rigor present. Hypostasis purplish and posterior. No jaundice or cyanosis. 2+ edema of legs. Irregular incision in left lower quadrant, has smooth wall, appears to be a chronic draining sinus. Second small stabwound below this with same characteristics. Little purulent material draining. Two deep decubitus ulcers over buttocks filled with stringy, foul, necrotic material. Skin of abdomen is folded down over pubis due to marked obesity.

General Peritoneal Cavity contains no excess fluid. Serous surfaces smooth except as will be described. No generalized peritonitis. Throughout abdomen, web-like strands of adhesions between coils of bowel. In upper part of abdomen, there is fusion of first part of duodenum and gall-bladder by light plastic exudate. This is stripped away and reveals perforation in superior border of duodenum which measures 1 cm. in diameter. On corresponding surface of gall-bladder, small shallow ulceration is present which does not extend through full thickness of gall-bladder. No localized peritonitis beyond rim of fibrin which walls off perforation. In midportion of small bowel, coils of bowel are plastered to anterior abdominal wall on left side. Spaces between these coils of bowel and anterior abdominal wall form smooth walled empty cavities. Two incisions present through abdominal wall and peritoneum into these cavities. The incisions, apparently, have been through

full thickness of abdominal wall into peritoneal cavity. No frank abscesses. Drainage complete. Cavities lined with smooth granulation tissue.

Region of cecum shows dense mass made up of tumor within cecum, abscess cavity and heavy plastic and fibrinous adhesions. Mass involves terminal ileum, appendix and cecum. As cecum is lifted from its bed, abscess exposed which burrows under peritoneum over psoas muscle and behind cecum. Contains about 2 oz. black material which is sticky and probably made up of blood in addition to intestinal contents. (Patient given iron shortly before death.) Abscess continuous with ragged perforation in lateral wall of cecum.

In pelvis, as pelvic colon is lifted out, another extensive abscess opened, which is filled with sticky, black material. It is separated from the general peritoneal cavity by bowel and its upper border is immediately adjacent to but not connected with old abscess cavity described in left side of abdominal cavity. Abscess fills entire pelvic cavity and there is a perforation along the mesenteric border of sigmoid colon near junction with rectum. Perforation about 1 cm. in diameter. Edges of perforation soft and not indurated. Outline of perforation smooth.

Pleural Cavities free of adhesions on both sides. Excess fluid on both sides. No evidence of infection; fluid is clear. Pericardial Sac contains an excess of fluid which likewise is clear.

Heart weighs 450 grams. Definite hypertrophy of left ventricle without dilatation. Mural endocardium and valves normal. No fibrosis, softening or infarction of heart muscle. Root of Aorta shows few atheromatous plaques. Coronaries: occasional plaque in main vessels but no significant diminution in caliber of lumen.

Lungs generally well expanded. Few areas of atelectasis, particularly in bases and posterior portions. Bronchi puffy and mucosa appears inflamed. Parenchyma, grossly, does not show any nodules or infiltration which may be bronchopneumonic in nature.

Spleen weighs 225 grams, is soft and has abundant pulp.

Liver weighs 2100 grams, is soft, has rounded edges, appears swollen, has yellowish color; no abscesses or tumors present.

Gall-bladder contains several large and small stones, largest measuring about 2 cm. in diameter. Wall only slightly thickened. Ducts not dilated or fibrous. Outer surface ulcerated over perforation in duodenum.

Gastro-Intestinal Tract: Esophagus and stomach show no significant change. No ulceration, polyps or tumors. In first part of duodenum on superior border, there is a round, clean-cut perforation without induration or thickening around edges of defect. Remainder of duodenum shows no change. Entire small bowel, colon and rectum are opened throughout full length. Folds of small bowel are somewhat hyperplastic. Here and there, small, reddish streaks and petechial hemorrhages seen. No enlargement of Peyer's patches, no ulcers.

About cecum there is the large mass made up of tumor, abscess and adhesions which have been described above. Tumor is an encircling ulcerating lesion with a heaped-up, irregular border, appears grossly to be carcinoma. Central portion deeply ulcerated. Ulceration extends through wall into pericecal fat. Edges necrotic, polypoid, covered with blood clot. Remainder of ascending, transverse and descending colon show no significant change. Mucosa generally smooth without many mucosal folds. No lymphoid hyperplasia or ulcers. Here and there, are petechial or streaked hemorrhages in mucosa. In about mid-point of sigmoid, there is one round, blanched area measuring a little more than 1 cm. in diameter in which there is no ulceration. Area not indurated and shows no perforation. At junction of sigmoid and rectum there is a defect in wall of bowel near mesenteric attachment. Defect like one in duodenum and shows no induration or fibrosis. Edges smooth and clean-cut. Remainder of rectum shows no other tumors or ulcers. Mucosa smooth and pale.

Pancreas somewhat swollen. No abscesses, tumors or cysts.

Adrenals well-developed on both sides. Numerous cortical adenomas. No hemorrhages.

Kidneys soft, appear swollen, each weigh 175 grams. Capsules strip easily. Surface smooth. Cortices appear swollen, pale and cloudy. Pelvic fat not increased in amount. No dilatation of pelvis or infection. No tumors. Ureters not dilated.

Bladder: External surface bathed in pelvic abscess. Shows extensive cystitis.

Entire uterus and pelvic organs bathed in same material. Examination difficult. No cysts present in ovaries. Uterus large for age of patient (62). Endometrium heavy, polypoid and soft. Cervix smooth.

Lymph Nodes: Extremely large amount of fat in retroperitoneal area and in mesentery in combination with thick, black, sticky material spread around abdominal cavity from abscesses described above makes dissection of retroperitoneal area and mesentery difficult. Superficial search fails to reveal any enlarged lymph nodes.

Head and Neck: not examined.

Diagnoses

1. Carcinoma of cecum.
2. Perforated duodenal ulcer.
3. Perforation of carcinoma of cecum.
4. Acute ulcerative colitis (?) with perforation of sigmoid.
5. Pelvic, peri-appendiceal abscesses and abscess of abdominal wall.
6. Pulmonary atelectasis.
7. Splenitis.
8. Cloudy swelling and fatty change of liver.
9. Cloudy swelling of kidney.
10. Secondary cystitis, ovaritis, salpingitis.
11. Hyperplastic endometrium.
12. Cardiac hypertrophy.
13. Probably hypertension.
14. Old cerebral injury (clinical).
15. Chronic arthritis (clinical).

MICROSCOPIC SECTIONS:

Tumor of Cecum - shows typical carcinoma.

Colon - several blocks of various parts show diffuse infiltration with leucocytes in the mucosa and submucosa. Around perforation in rectum and also in ulcer, there is a greater number of these leucocytes. No other change observed. No amebae present.

Duodenum - Walls of perforation show necrosis particularly in submucosa and in muscularis. Very little cellular infiltration present.

Liver - Cells are markedly replaced by fat. At first glance, this tissue appears to be a lipoma. Isolated liver cells present around portal spaces.

Ovary - Many new and old corpus lutei present.

Lungs - Show chiefly atelectasis. Occasional patches of infected alveoli present.

Kidneys - Marked swelling and cloudy change with swollen cellular glomerulae; no abscesses.

Spleen - Hyperplastic.

Adrenals - Show no change.

Biopsy consisting of tissue and pus presented at time of operation shows only necrotic tissue. No amebae found.

Comment

The reconstruction of the course of events in this case cannot be definitely established. Roughly, there are four stages in the clinical picture: First, the acute onset with pain in the epigastrium severe enough to cause the patient to "double-up". The pain in the

pylorium persisted for about a week. Second, the stage of dull continuous pain in the left lower quadrant, associated with diarrhea and development of a mass. This stage ended with the surgical drainage of an abscess in the area. Third, the postoperative period of ill-health with a progressively downhill course. Finally, there was the terminal or fourth stage manifested by edema.

A review of the autopsy with these clinical features allows two interpretations: one may assume that the symptoms are primarily from the tumor of the cecum. Acute ulceration of the bowel may occur with a carcinoma of the colon. In the past two years, we have had three examples of this condition. Rankin, Barger and Muir (Colon, Rectum and Anus, W. B. Saunders 1931) cite several cases of acute ulcerative colitis. Several of these occurred in postoperative patients. In our own experience, the ulceration has occurred above the tumor and our impression has been that the distension and stasis has predisposed the bowel to infection. Perforation has occurred in some of these cases.

In the case discussed today, it is conceivable that the perforations of the bowel are the results of some similar process. This interpretation is not entirely acceptable for the following reasons: It is difficult to associate a perforation of the duodenum with a carcinoma of the cecum; the colon shows no evidence of an ulcerative process and finally the two abscesses in the lower part of the abdomen have the appearance of abscesses residual from a peritonitis.

The following interpretation follows the clinical course and explains the autopsy findings much better. The acute sudden onset correlates very well with the autopsy finding of a perforated ulcer. The subsequent peritonitis is evidenced by the generalized peritoneal adhesions. The abscesses in the left side of the abdomen probably represent the residue of the peritoneal infection and this is supported by the history of a mass and dull pain developing in this area a week after the first acute pain. The diarrhea may have been due to the irritation of the colon, but this point is confused because

the patient took cathartics at this time. The perforation of the sigmoid in the absence of a diffuse ulceration of the colon most likely is due to rupture of the abscess into the bowel. Recently, we have seen an abscess secondary to an appendicitis which ruptured into the duodenum.

Clinically, the abscess was interpreted as being in the abdominal wall. Perforation of an intraperitoneal collection of pus through the anterior abdominal wall is a rare condition. In our experience, we have had two cases of abdominal wall abscesses. In one, the gall-bladder was fused to the abdominal wall and extension of the infection produced an abscess of the parietal wall. In the other case an infected carcinoma of the cecum with infiltration of the anterior abdominal wall set up a subcutaneous abscess. Actinomycotic infections differ in this respect.

The terminal edema is not an uncommon condition. At least two factors may contribute toward its production. Terminal subclinical glomerulonephritis is very common. In some cases, there is a definite retention of nitrogen (Bell). The lesion in the kidney is variable and may resemble either that of nephrosis or that of mild glomerulonephritis.

There is another type of edema frequently seen in debilitated or postoperative patients, i.e. nutritional edema. Our best example is Dr. Peyton's case of duodenal fistula. This patient had marked edema which melted away immediately after the leakage from the fistula was replaced through an enterostomy lower in the bowel. This type of edema is due to lowered blood proteins. It is improved immediately by feeding or by blood transfusions and is aggravated by high sodium chloride intake. In postoperative patients, the withdrawal of food and the numerous subcutaneous or intravenous injections of saline may produce edema in a short time. (Jones, C. M. and Eaton, F. B. Postoperative nutritional edema. Arch. Surg. 27: 159-177, (July) '33).

In this case in the absence of both pre-mortem and post-mortem blood protein

and nitrogen retention studies, the cause of the edema remains problematical. The histological appearance of the glomeruli suggests most a nutritional basis.

The extremely fatty liver is difficult to interpret. In the alcoholic fatty metamorphosis of the liver, death may occur very suddenly with very few warning signs. In routine autopsies, these fatty livers may be incidental findings and at other times they seem to be the only contributory cause of death. Their significance might be estimated by liver function tests.

The final analysis of this case is as follows:

1. Perforated duodenal ulcer.
2. Generalized peritoneal adhesions.
3. Residual peritoneal abscesses.
4. Partial drainage of abscesses.
5. Infected carcinoma of cecum with local abscess.
6. Nutritional edema.
7. Fatty metamorphosis of liver.
8. Germinal glomerulitis.

2. ACUTE AND CHRONIC ENDOCARDITIS. LEUKEMOID REACTION.

Case is of white female, 23 years old, admitted to University of Minnesota Hospitals 8-17-33 and expired 8-20-33 (3 days).

1924 - (age 14) - Has "inflammatory rheumatism." In bed 4 weeks. Following this, physician said she had "weak heart."

2- -33 - Another attack of rheumatism. At this time, symptoms consisted of stiffness of ankles and knee joints.

5- -33 - Diagnosis of anemia made. Findings which lead to this diagnosis not stated. Received treatment from this time on for anemia.

8- 1-33 (about) - Began having attacks of dyspnea. Developed edema of face and ankles with enlargement of abdomen.

8-15-33 - In automobile accident. Sustained abrasions about both knees and over right eye. In evening became somewhat stuporous.

8-17-33 - Admitted. Past illnesses in addition to rheumatism consist of whooping cough, mumps, chickenpox and measles. In addition to dyspnea and edema, patient had occasional chills and some fever. No further essential history. Physical examination: No cyanosis. Generalized edema with marked puffiness of eyelids. Lungs - few rales, posteriorly. Heart - blood pressure 133/98, no murmurs. Abdomen - markedly distended, liver and spleen not palpable. Medical consultation: only other findings in addition to those noted above are considerable pain in abdomen on pressure, rapid heart rate, no other cardiac findings.

Laboratory

Urine - cloud of albumen, many wbc's, few rbc's, some granular casts. Larson and Kahn Blood Wassermann - negative. Blood - Hb. 36%, rbc's 2,140,000, wbc's 76,500, Pmn's 73%, L 5%, E 1%, Metamyelo. 9%, Myelo. 10%, Stem cells 2%, marked hyperchromasia, moderate poikilocytosis. Wbc's very toxic, 2 normoblasts 13 fields. Repeated: total wbc's 91,000, mature pmn's 35%, Band form 24%, metamyelo. 7%, neutrophilic myelo. 10%, basophilic myelo. 1%, promyelo. 8%, leucoblasts 9%, stem cells 2%, Lympho. 4%, many toxic forms present and several nucleated rbc's.

8-18-33 - Information from attending physician obtained as follows: Patient has been on treatment for severe secondary anemia. Hb. 50% in June 1933, wbc's 8,000. No evidence of leukemic change. Thought to have pulmonary tuberculosis because of infiltration of hiluses of lungs. Negative sputum on numerous occasions. Guinea pig inoculation done but not yet reported. Spleen and liver slightly palpable on last examination. Urine contained 1+ albumen on numerous occasions. Blood pressure ranged 150/92.

8-19-33 - Blood transfusion 500 cc.

stronger and brighter since transfusion. Marked irritability on slight pressure over entire body. Gums ulcerated and streaked with blood. Edema increased. Neurological examination: Semi-comatose state. Pupils equal and constricted, react sluggishly to light. Extra-ocular movements cannot be tested. Right optic disc visualized and appears normal. Deep reflexes within normal limits. Babinski test - normal. No direct evidence of intra-cranial injury.

8-20-33 - Temperature previously subnormal, has risen to 102.4. Pulse rapid and irregular. Deeper stupor. Breathing labored. Signs of consolidation in both bases. Expecterating large amounts of frothy material. Throughout day, pulse weaker. 6 P.M. - Expired. Clinical impression: myelogenous leukemia, possible intra-cranial hemorrhage.

Autopsy

Body is of white female of slight type of development and good nourishment, 23 years of age, measuring about 157 cm. in length and weighing between 90 and 100 lbs. Rigor just beginning. Hypostasis beginning, purplish and posterior. Edema of slight degree over extremities, being somewhat more marked over upper thighs and quite definite about face and neck. No cyanosis or jaundice present. Pupils equal, each measuring about 3 mm. in diameter. Numerous petechiae about neck, shoulders and arms. Transverse cut under knee cap on each side, one on left measuring 7 cm., on right 1.5 cm. Cuts closed by skin clips. Triangular superficial cut at outer canthus of right eye with some ecchymosis of upper eyelid. Cervical, axillary and inguinal lymph nodes palpable. Subcutaneous fat abundant. Muscles quite edematous.

Peritoneal Cavity contains slight excess of slightly blood-tinged fluid. Appendix present and hangs free.

Pleural Cavities contain slight amount of turbid fluid. Pericardial Sac contains about 150 cc. yellowish fluid.

Heart weighs 400 grams, very definitely dilated and hypertrophied. Hypertrophy principally of left ventricle. Musculature shows no areas of infarction or softening.

Mural endocardium smooth except in left auricle (to be described later). Aortic, tricuspid and pulmonary valves appear normal. Mitral valve shows thickening and shortening of cauda tendinii. Some shortening of valve itself with thickening at edge. In addition to this rather old process, acute new vegetative process on both leaflets present. Vegetations very rough and large, hang free from edge of valve. On one leaflet, vegetations extend full-length of valve and extend onto wall of left auricle. Plaque measures 4 cm. in length and 3 cm. in breadth. Vegetation is greenish-gray color. No recent thrombosis over it. Root of Aorta of good size. No evidence of syphilis. Coronaries soft and patent throughout.

Right Lung weighs 875 grams, Left 715. Confluent extensive bronchopneumonia on both sides involving bases and posterior part of right upper lobe. Pneumonia is gray, very wet and a large amount of purulent material can be scraped from cut surface. Edges of consolidation are nodular. Appearance appears to be that of bronchopneumonia rather than lobar. Nodes at hilus of both lungs large and soft, largest measuring about 2 cm.

Spleen weighs 525 grams. Spleen divided into 2 parts by deep cleft. Cleft formed from 2 old infarcts. Diaphragm and omentum attached to cleft. One infarct appears healed into fibrous tissue, still showing yellowish, necrotic material in center. In addition to these, several other infarcts present, measuring up to 2 cm. in diameter, distributed irregularly through substance of spleen. Substance of spleen is very firm. Practically no splenic pulp can be scraped away. Appears to be a fleshy type of spleen.

Liver weighs 1700 grams, is large, edges rounded. Cut surface very prominently marked by exaggerations of central portions of lobules. Markings discolor surface of liver so if any leukemic infiltration is present it is not recognized grossly. Biliary radicals not dilated or fibrosed.

Gall-bladder has thin wall. Mucous membrane smooth and contains no stones.

Ducts not dilated.

Gastro-Intestinal Tract: Stomach mucosa covered with many petechiae. Mucous membranes of stomach are reddened. Serosa of small bowel shows several petechiae. Mucous membrane likewise shows petechiae in several areas. No areas of ulceration or tumor. No diverticulae in colon.

Pancreas is very hard. Lobules are well marked out. No pancreatitis or infiltration of pancreas by leukemia or tumor made out grossly. No appearance of inflammation around pancreas. Cause of extreme hardness of pancreas not determined from gross examination.

Adrenals well developed. Demarcation into cortex and medulla present. No tumor or leukemic infiltration observed grossly.

Right Kidney weighs 275 grams, Left 240. Capsules strip easily. Kidneys large and soft and have a yellowish-white color. Surface irregularly spread with mottled red color. Few fine, pinpoint petechial hemorrhages seen. On cut surface, kidney appears striated as though there was yellowish infiltration extending through cortex into pyramid. Pelves not dilated, no pyelitis. Ureters not dilated.

Bladder shows numerous petechiae of mucous membrane. Intense reddening of trigone.

Genital Organs: Ovaries contain no cysts or tumors. Tubes soft. No adhesions. Uterus small. Lumen smooth except for one small pedunculated polyp.

Mediastinal Lymph Nodes enlarged, as stated above. No appreciable enlargement of mesenteric or retroperitoneal lymph nodes of abdomen.

Head: Scalp shows no evidence of injury. Dura appears normal. Underneath arachnoid, covering entire surface of brain, between convolutions, there is a fine film of blood. No one collection of blood. Appearance suggests bloody coloring of normal cerebrospinal fluid underneath arachnoid. Brain is sectioned in

1 cm. sections. No localized collection of blood within brain substance or underneath arachnoid or in ventricle. Diffuse petechial hemorrhage present throughout all parts of brain. Left and right cerebrum contain approximately same number of hemorrhages. Greater number in basal ganglia and process most marked in region of pons. Several petechiae present in medulla. Base of skull shows no evidence of fracture. No hemorrhage beneath dura.

Bone Marrow of femur shows red color and hyperplasia.

Diagnoses:

1. Chronic rheumatic endocarditis.
2. Recent subacute bacterial endocarditis.
3. Cardiac hypertrophy and dilatation.
4. Chronic myelogenous leukemia (?)
5. Bilateral bronchopneumonia.
6. Edema.
7. Petechial hemorrhages of skin, bladder, gastro-intestinal tract, brain.

Microscopic

Lungs - extensive bronchopneumonia.

Heart muscle - no Aschoff bodies (one section).

Pancreas - adrenals - bladder - bowel - no change. No evidence of leukemic infiltration.

Liver - marked passive congestion ; no evidence of leukemia.

Kidneys - (H and E and azocarmine stain) Very marked focal embolic glomerulonephritis. Many tubules atrophic and others are filled with casts and precipitated material.

Brain - marked distention of the blood vessels. Only a few areas of actual hemorrhage. Apparently many of the areas seen in the gross specimen are congested vessels rather than hemorrhages.

Spleen - hyperplasia of reticulum; no

evidence of leukemia.

Comment:

This case presents an instance of sepsis (endocarditis) with an abnormal response of the hemopoietic system. Subacute bacterial endocarditis frequently induces a proliferation of the reticulo-endothelial system and many times cells actually become free and may be found in the blood stream. Often the findings of these cells is of diagnostic value. This reaction probably involves the reticulo-endothelial system in all parts of the body. In patients dying of sepsis, proliferation of the "littoral" cells of the spleen and lymph nodes and the Kupffer cells of the liver is a common finding.

In "normal" leucocytosis, the increase of cells and the appearance of young forms (shift to the left) is well-known. The Schilling hemogram is an estimation of the number of these young forms in the blood stream. The greatest outpouring of immature cells occurs in infections of large body areas, such as the peritoneum. The curve of the daily number of this type of leucocytes may prove to be of diagnostic value. (Carlson and Wilder, The Schilling count in appendicitis. To be published.)

The leukemoid reactions illustrate a leucocytosis in which the shift to the left is so extreme that the youngest cells (stem cells) appear in the blood stream. Downey, Major and Noble (Folia Haemat. 41: 493-511, (July) '30); Naegeli's and other handbooks of hematology list cases in which there were 15 to 25% myelocytes or stem cells in the blood stream. The total white count may be only slightly elevated or, as in some of the cases reported, may be well over 100,000. Experimentally, Hoff produced a leucocytosis of 215,000 with 22% myelocytes.

In addition to the leukemoid blood picture, there may be other findings suggestive of true leukemia: petechiae, ulcerations about the mouth, enlarged nodes and anemia. At autopsy, usually no histological evidence of leukemia is present. The liver, kidneys and areolar tissue show no actual proliferation in

situ of white blood cells. In a case recently examined (carcinomatosis) there did occur tissue hematopoiesis. Since this is the only criteria for differentiating true leukemia from a leukemoid reaction, Dr. Downey feels that this last case is one of true leukemias associated with a generalized carcinomatosis. There was no crowding out of the bone marrow by tumor. Occasionally, as in osteosclerosis (Marble disease) or osteofibrosis, the visceral organs undergo a marked myeloid metaplasia but in such cases the blood picture usually remains normal.

The case presented today seems to represent a true leukemoid reaction in which there is no evidence of extra-osseous blood formation. The other case mentioned (not reported) probably represents a true leukemia with white blood cell formation in the viscera.

The cause of leukemoid reactions usually is sepsis. A few other causes have been recorded: irritation of bone marrow by tumors (possibly by mercury as in the cases studied by Downey, Major and Noble), severe anemias and during recovery from granulocytopenia.

The differentiation from true leukemia rests chiefly on the presence of a cause as in this case. In other cases, the outcome in complete recovery definitely proves the nature of the illness. It has been suggested that the absence of immature eosinophilic or basophilic cells may be of value in differentiation. This finding, however, is not constant.

In summary, it can be said that the blood picture in this case is not one associated with the systemic proliferation of the reticulo-endothelial system such as commonly occurs in subacute bacterial endocarditis. It is an abnormal form of leucocytosis with a marked shift to the left, in which the cells originate chiefly from the bone marrow without any proliferation within the body tissues.

I. ANNOUNCEMENTS

3. RADIOLOGY SEMINAR

1. MINNEAPOLIS SURGICAL SOCIETY

Program of the Minneapolis Surgical Society to be given on May 3, 1934, at 8:00 p.m. in Todd Amphitheater, University Hospital.

"Hypertrophic Pyloric Stenosis in Adults" by Dr. B. R. Kirklin of the Mayo Clinic, University hospital, X-ray department, room M-515, Friday, May 4 at 5 p.m. Anyone interested is welcome.

Papers read to be limited to ten minutes.

1. Dr. Herbert A. Carlson
The Treatment of Acute Emyema.
2. Dr. Wallace H. Cole
Treatment of Defects in the Long Bones following Subperiosteal Resection.
3. Dr. William T. Peyton
Mixed Tumors.
4. Dr. N. Logan Leven
The Results of Cholecystectomy in Typhoid Carriers.
5. Dr. Melville H. Manson
Dyspepsia Following Cholecystectomy.
6. Dr. C. Donald Creevy
Unusual Clinical Manifestations of Hypernephroma.
7. Dr. Ralph T. Knight
The Employment of Cyclopropane Anesthesia.
8. Dr. Charles E. Rea
An Experimental Study in the Prevention of Intra-peritoneal Adhesion Formation.
9. Dr. Owen H. Wangensteen
Personal Experiences with Splenectomy

Anyone interested is cordially invited.

2. SENIOR LECTURE

"Indications for X-ray Examination of the Gastro-intestinal Tract" by Dr. B. R. Kirklin of the Mayo Clinic in the Eustis Amphitheater on Friday, May 4 at 3 p.m. All seniors required to attend. Anyone else interested is welcome.