DISEASES OF THE ALIMENTARY TRACT

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DIAGNOSES

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Note: Abstracts of Dr. Helwig's discussions will automatically be mailed to all registrants and/or recipients of slide sets within the next ten days or two weeks.
Case No. 1

Methodist Hospital, Indianapolis
Accession No. 5099-59

This 43 year old negro male experienced rather massive upper gastrointestinal hemorrhage on several occasions. He had also noted tarry stools, weakness, and lethargy. X-rays suggested an ulcerative lesion in the upper stomach. At surgery, an extensive soft tumor-like thickening of the fundic mucosa was noted. A subtotal gastrectomy was accomplished. On gross examination, markedly edematous, soft, thickened rugal patterns were noted in some areas appearing as tumefactions. No ulceration was noted. On cut section, some of these areas presented a honeycomb or cystic appearance in the submucosa.
Myo-epithelial Hamartoma of Stomach

I have no particular preference for this terminology which was introduced by Dr. B. E. Clarke in 1940. These lesions might better be referred to as heterotopic pancreas or aberrant pancreas. Sufficient sections will usually reveal pancreatic acini. Furthermore, some authors apparently are not aware of the many terms used by others, and some cases may not be included in reviews.

Heterotopic pancreas appears predominantly in the gastrointestinal tract. In a compilation of 370 cases from the literature, Faust and Mudgett noted 95 (25%) in the stomach, 105 (28%) in the duodenum and 65 (17%) in the jejunum. Usually the gastric lesions are located near the pylorus or in the antrum. In material which I have studied, there were approximately 123 lesions in the stomach, 130 in the duodenum, 75 in the jejunum, 12 in the ileum and 12 in Meckel's diverticula. Grossly, the lesions usually occur as irregular sessile nodules or intramural thickenings in the wall. The mucosa over the nodule may be umbilicated at the site of the entrance of an excretory duct. Most commonly, the nodules are submucosal. They also may be intramural, subserosal or may involve all three layers. The lesions average 1 to 2 cm. in diameter, but rarely reach 5 cm.

Microscopically the lesions are ill-defined and are composed of pancreatic acini and ducts, occasionally with a few islands of islet tissue. Many of the lesions include Brunner-like glands. The ducts are of varying size and may contain inspissated secretion. Irregularly shaped smooth muscle bundles along with fibrous tissue and inflammatory cells, usually lymphocytes, separate the ducts. Perhaps myomatous proliferation is secondary to duct obstruction since most of the lesions are inflamed.

Pancreatic tissue in the stomach is a congenital malformation which takes place during embryologic development. Zenker postulated an anomalous pancreatic anlage near the primitive pancreatic diverticulum which ultimately lodged in the stomach or intestinal wall. Taylor postulated an error in development in which epithelium of the primitive digestive tube appears in a heterotopic position.

Gastric pancreatic nodules may be associated with symptoms of pyloric obstruction, epigastric distress, pain, spasm, bleeding, and intermittent obstruction due to prolapse through the pylorus. I have never seen a transition of one of these lesions into carcinoma. However, there are reports in the literature of this occurrence.

References:

Clarke, B.E.: Myo-epithelial Hamartoma of the Gastrointestinal Tract, Arch. Path. 33:143, 1940.


The patient was a 22 year old woman who entered with symptoms of acute upper abdominal distress. On X-ray examination it was felt that she had a duodenal intussusception. The resected specimen included the stomach and duodenum. The duodenal segment of the specimen measured 28 cm. in length. On the mucosal surface there were numerous polyps. The polyps extended from just beyond the pyloric sphincter to the distal surgical margin of the specimen. These polyps varied in size from 2 cm. in diameter, up to about 8 cm. in diameter. The duodenum was greatly dilated measuring 12 cm. in circumference.
A 73 year old woman complained of persistent diarrhea and diffuse abdominal pain concentrated in the lower abdomen. The diarrhea had been present for seven years. Mucus had been present for one year. No blood or melena had been noted. A soft pendulous mass could be palpated on the anterior wall of the rectum. An anterior resection of the rectosigmoid was performed.
Adenomatous Hyperplasia of Brunner’s Glands of Duodenum

Adenomas of Brunner’s glands are uncommon. Furthermore, it is often difficult to decide whether a given lesion is a true adenoma or simply adenomatous hyperplasia. Even in the present specimen where one of the nodules measured 8 cm. in diameter, the picture is not clear-cut. In your section, the polyloid nodules are comprised of lobules of Brunner’s glands separated by connective tissue septa. The covering mucosa is atrophic and hemorrhagic. The Brunner’s glands are lined by cells with copious pale cytoplasm and small compressed basilar nuclei. A few lobules show the cells lining the glands to have decreased cytoplasm and larger nuclei with an increase of the separating stroma. This is apparently a reactive and inflammatory change. Occasional groups of inflammatory cells, mostly lymphocytes, are noted. Histiocytic cells are found in areas of degeneration. These should not be confused with signet ring mucus cells of neoplastic origin.

Normally, the number of Brunner’s glands varies greatly. In some duodenums, only a few groups of glands are scattered in the submucosa. In contrast, the duodenal submucosa may be thickened due to hyperplasia of the glands. The glands are seldom found beyond the ampulla of Vater. Feyrter classified the hyperplasia into three types: (1) Diffuse and nodular hyperplasia of the duodenal (Brunner) glands throughout the duodenum, (2) Circumscribed nodular hyperplasia of the duodenal glands involving chiefly the superior portions of the duodenum, (3) Adenoma of the duodenal glands, of which he had 3 specimens, each containing a single nodule. He believed these represented the extremes of nodular hyperplasia.

Occasionally there is stasis of secretion with the formation of a large cyst or cysts filled with mucus. Occasionally, obstruction may be caused by the solid lesions, but only rarely by the cystic ones.

Carcinoma of Brunner’s gland origin is extremely rare. The adenomas and adenomatous hyperplasias rarely undergo transition to carcinoma.

Mucosal ulceration and hemorrhage may occur as the adenomas or nodules of hyperplasia become large. Other clinical symptoms are pain and partial obstruction.

References:


Papillary Adenoma of the Rectum

This tumor is also known as villous papilloma, villous tumor, and villous adenoma. The name is derived from its gross and microscopic papillary appearance and the histologic structure of an adenoma. It is a tumor occurring predominantly in the rectum and recto-sigmoid of older adults. It is usually single, broad and sessile and, when first discovered, almost always large. The first symptoms are often blood and mucus, sometimes associated with loose watery stools.

Microscopically the tumor is composed of papillary processes supported by loose fibrous stroma and covered by columnar epithelial cells which are tall and
This 5 year old boy was hospitalized for neurologic studies of convulsive seizures. He had noted some rectal bleeding. A 2 cm. rounded reddish polyp was removed from the rectal mucosa 10 cm. above the pectinate line.
thin and have elongated hyperchromatic nuclei. These cells usually contain less mucus than do normal mucosal cells. The base of the papillary adenoma is broad and composed of many villous projections. These papillary processes may be situated directly upon the normally positioned muscularis mucosa or project outward from a short pedicle of muscularis mucosa. Many such pedicles occur in the larger tumors, and may produce a lobulated or polypoid appearance. Then, the true nature of the lesion is evident only on microscopic examination. In contrast to the polypoid adenomas, the papillary adenomas rarely show normal mucosa over the pedicle.

It is possible that the absence of pedunculation of the papillary adenoma is due to decreased peristaltic action. It has also been proposed that this type of adenoma mimics surface rather than glandular epithelium, although many observers believe the papillary adenomas and the polypoid adenomas are basically similar in origin.

These tumors tend to recur. Multiple recurrences take place in the mucosa contiguous to the resected tumor.

By far the most common site of occurrence is the rectum. Most tumors when first seen are 4 to 6 cm. in diameter but may measure up to 12 or 15 cm. When the tumor is large, it is difficult to determine whether or not there is a focus of carcinoma present. This requires meticulous gross examination and extensive microscopic study. Some authors divide the tumors on the basis of cellular atypism into groups presumably showing increasing degrees of malignancy. I use the same criteria for interpreting malignant change that I use with the polypoid adenomas. If the tumor shows intraglandular budding and bridging and anaplasia, but without invasion of the stroma, I call it carcinoma in situ in a papillary adenoma. If there is invasion of the stroma, then I call it carcinoma and would treat it as a carcinoma.

About one third of the papillary adenomas are associated with other adenomas or carcinomas of the large intestine.

If there is no invasive carcinoma, adequate local excision should effect a cure. The absence of invasion must be based upon a careful and extensive microscopic examination. If there is invasive carcinoma, there should be no temporization in regards to therapy.

References:
Wheat, M.W., and Ackerman, L.V.: Villous Adenomas of the Large Intestine, Ann. of Surg., Vol. 147, No. 4, Apr. 58.
Case No. 5

Methodist Hospital, Indianapolis
Accession No. 3748-59

A 61 year old woman was hospitalized on an emergency basis because of massive rectal bleeding. Five years previously she had palpated tissue in the anorectal area which she interpreted as hemorrhoids. Frequent spotting and rectal bleeding had occurred for one year. An anal skin tag and rectal fistula were noted on the right, posteriorly, with a 4 cm. mass. This was non-tender but bled on touch. The anal sphincter did not appear to be involved. Her hemoglobin was 12.5 gms. and hematocrit 35.
The pattern of most adenomatous polyps in children is fairly characteristic and can be differentiated from the pattern in most adenomatous polyps in adults. A short or long pedicle covered by normal mucosa is present. At the tip of the pedicle is a mass comprised of glands surrounded by or embedded in a relatively large amount of stroma. The glands are not suspended on delicate fronds as usually observed in the polyps in adults. The glands appear embedded in the stroma and this appearance should not be mistaken for invasion. Although the glands may be irregular in size and shape, they are lined by columnar epithelium with a general basal arrangement of the nuclei and a well-defined basement membrane. Some of the glands may be distended by mucus. Others may contain inflammatory cells.

In over 100 polyps of this type which we are now reviewing the most common complaint was bleeding from the rectum. Some low-down polyps protruded from the anus. Other symptoms were diarrhea, mucus in stool and pain. About 75% of the polyps are observed in the recto-sigmoid area. In about one tenth of the cases, the polyps were multiple. Usually no more than two or three were present. In a few instances, the polyp was spontaneously expelled. Initially, I believed this type of polyp was confined to children. In the last several years, I have seen similar polyps occurring particularly in the latter part of the 2nd decade and the 3rd decade and later. These polyps follow a benign course.

References:


Horrilleno, Emilio G., M.D., Eckert, Charles, M.D., and Ackerman, Lauren V., M.D., Polyps of the Rectum and Colon in Children, CANCER, Vol.10, No.6, Nov-Dec. 57

Kern, William H., Capt., MG, AUS, and White, William C., M.D., Adenocarcinoma of the Colon in a 9-Month-Old Infant, CANCER, Vol. 11, No. 4, July-August 58

Case No. 5

Cloacogenic Transitional Carcinoma of Anus

In 1880, Herrmann and Desfosses noted that the mucosa of the inferior portion of the rectum is not directly continuous with the skin. At the level of the columns of Morgagni they observed a circular zone, 0.6 to 1.2 cm. in width, that represents a persistent remnant of the cloaca of the embryo. Furthermore, they noted that this cloacal region is covered by a special mucosa limiting the rectum above and joining the skin below. In another paper, Herrmann discussed in detail this junctional area and the anal ducts which arise from it. In 1935, Tucker and Helwig called attention to the insufficient textbook emphasis of the fact that the rectal mucosa does not join directly with the epidermis.

Dr. Grinvalsky and I examined the anorectal junction in 25 abdominoperineal resection specimens and verified the presence of a cloacogenic membranous zone in each. This zone is covered by transitional epithelium similar to that of the urinary bladder neck and prostatic urethra and by stratified columnar epithelium similar to the mucosa of the membranous urethra.
A 33 year old white female was thought to have endometriosis and had manifested a severe progressive dysmenorrhea since menarche at age 13. During a period of 4 months she developed a mass in the left lower quadrant.
Case No. 5 (continued)

Some of the cells produce mucus as do the aberrant glands and anal ducts arising from this zone. The varied character of the epithelium in this zone explains the patterns of carcinomas arising here. These tumors have been called basal cell carcinoma, epidermoid carcinoma, baso-squamous epithelioma, cylindroma, mucoepidermoid carcinoma, adeno-acanthoma, and atypical adenocarcinoma. The term "cloacogenic transitional carcinoma" is proposed for these tumors.

Carcinoma may arise from the transitional zone of the anus or from the ducts. When it arises from a duct it may do so at some distance from the anus and compress the lumen by a mass outside the rectal mucosa. More commonly it forms broad based polypoid masses extending into the lumen.

Although histologically these tumors usually show a transitional cell pattern, some part or all of a tumor may be squamous or glandular. At least a few cells contain mucus almost always. The tumors having a pure transitional pattern should not be mistaken for basal cell carcinoma since the prognosis is entirely different.

These tumors metastasize commonly to the regional lymph nodes, abdominal lymph nodes, lungs, and liver, and less frequently to other organs. Fifteen per cent metastasize to the inguinal lymph nodes. At the time of death the pelvic tissues and organs are usually infiltrated by carcinoma.

References:
Grinvalsky and Helwig: Cloacogenic Transitional Carcinoma of the Anus: To be published.

Case No. 6

Endometriosis of Colon with Enovid Effect

Additional history is available. This patient had a biopsy of the sigmoid which showed endometrial tissue. A laparotomy disclosed endometriosis involving and binding together the left broad ligament, left ovary and tube, uterus, and sigmoid colon. She was placed on enovid (50 mgm) daily and was told to appear each month but failed to do so for four months. At this time, there was a 6 cm. mass in the left adnexal region and numerous cul-de-sac nodules. A laparotomy disclosed adhesions between the pelvic organs and bowel. A 6 inch segment of sigmoid colon containing two masses was resected.

Your section of sigmoid colon shows marked thickening of the wall to between 2 and 3 centimeters. The mucosa is distorted and in places absent. However, even in the distorted mucosal glands the epithelium appears essentially normal. The stroma at the base of the ulcerated areas, between the mucosal glands and between the smooth muscle bundles of the intestinal wall is greatly increased and contains extremely large cells suggesting decidual cells. The cytoplasm is abundant, pink, and homogeneous or sometimes vacuolated. The nuclei are large, usually round or oval and vary from vesicular to hyperchromatic with prominent nucleoli. Scattered throughout the stroma are occasional endometrial glands, often narrow or slit-like, and lined by small cuboidal cells with basophilic uniform nuclei. Some of these glands contain inflammatory cells including lymphocytes, histiocytes, and polymorphonuclear leukocytes. Many of the capillaries are dilated and hyperemic. The
This 66 year old white woman was admitted complaining of chills, fever, nausea, vomiting, and light colored stools. The present illness extended over a 6 months' period. The patient had had approximately five or six episodes of awakening at night with chills, fever, nausea, and vomiting followed by substernal pain lasting up to two or three days. There had been no abdominal pain or soreness. No changes were noted in bowel habits until the last attack during which she had four stools, normally formed, but the last was acholic. No jaundice, anorexia, or weight loss were noted. On exploratory laparotomy, a cholecystectomy, appendectomy, and drainage of the common duct were performed. Subsequently, tissue was removed from the drainage tube which was reported as malignant.

The patient was referred to this hospital for a Whipple resection. The resection included the distal portion of the stomach, pylorus, duodenum, and the head of the pancreas. In the region of the ampulla of Vater, there was a small raised, papillary mass which measured 1 cm. in diameter and partially obstructed the opening of the common bile duct. The portion of the common bile duct which was attached to the specimen was dilated to 2 cm. in circumference.
This 54 year old white man noted dysphagia for about six months. With a barium swallow, a mass was demonstrated in the lower third of the esophagus. At surgery this mass was found to be pedunculated. It measured 6 x 3 x 2.3 cm. and was pale tan intermingled with white. The tissue was very firm. On section, small cystic foci 1 to 4 mm. in diameter were noted.
Case No. 6 (continued)

smooth muscle of the intestine is sandwiched in between the cells and does not appear unusual. The connective tissue stroma as well as the decidual stroma is infiltrated with scattered small collections of inflammatory cells, mostly lymphocytes. There are fairly large foci of necrosis of the decidual stroma accompanied by infiltration of inflammatory cells, chiefly leukocytes.

The case is a good example of the effect of prolonged administration of one of the new synthetic progestins (enovid). There is a decidual-like reaction as well as necrosis and leukocytic infiltration. The decidual reaction should not be mistaken for neoplasia.

References:


Case No. 7

Adenocarcinoma of Ampulla of Vater

Carcinoma arising in the peri-ampullary region may arise from the ampulla, the duodenal mucosa, duct of Wirsung, common bile duct, and possibly from misplaced pancreas or Brunner's glands. Many times it is impossible to identify the exact tissue of origin. The carcinomas may be papillary or infiltrating and ulcerated. Jaundice is one of the first signs of carcinoma of the ampulla and also of carcinoma of the common bile duct. Since ulceration may occur with carcinoma of the ampulla the jaundice may be fluctuating.

The section in your set shows a papillary glandular proliferation but also an infiltrating adenocarcinoma which is in part mucinous. A portion of a large duct is present at one margin. The lining mucosa is partly ulcerated and the wall mildly infiltrated with inflammatory cells. These changes are secondary.

Clinically it has been observed that dilatation of the gallbladder is frequent with malignant tumors of the periampullary region but is uncommon in association with benign obstructive lesions.

The present lesion points to the possibility of error when only a small portion of tissue (frozen section biopsy) is examined. This specimen shows areas of benign papillary proliferation and other areas of carcinoma.

References:


Case No. 8

Carcinosarcoma

A few neoplasms of the esophagus composed of carcinoma and sarcoma have been
A white woman, age 50, complained of burning and itching in the perianal area. The area was pale red, eczematous, slightly indurated, and fairly sharply defined. The lesion had been present for at least several months and seemed to be enlarging. The patient had noticed a small amount of rectal bleeding. Several large hemorrhoids were present.
Case No. 8 (continued)

reported. Many of these tumors are polypoid and pedunculated, similar to the example in your set. This tumor could easily be demonstrated by roentgenogram with a barium swallow. Microscopically the tumor shows malignant keratinizing squamous epithelial masses and foci of sarcoma composed of spindle-shaped cells. Among the spindle-shaped cells are irregular shaped cells with multiple and bizarre shaped nuclei. In no place do the epithelial cells blend with the sarcomatous cells but rather they appear as two separate elements. The exact nature of the sarcoma cells is not apparent. Stout suggested without proof that the cells in his case were rhabdomyomasous. The epithelium covering these tumors may show the changes of carcinoma in situ. Stout divided the collected cases from the literature into two groups. In one group he placed the polypoid tumors. These had malignant epithelial elements at the base and sarcomatous elements throughout. No epithelial elements were present in the 3 cases which metastasized. In the second group the lesions were infiltrating and nonpolypoid with the carcinomatous and sarcomatous elements intermingled.

Reference:

Extramammary Paget's Disease

Extramammary Paget's disease is a controversial subject. The disease process is characterized by the presence of nests of vacuolated cells within the epidermis. The debate as to the source of these cells has not been settled. Common views are: (1) The Paget cell is an altered epidermal cell either degenerated (regressive change) or dedifferentiated (progressive change); (2) The Paget cell is a cancer cell originating in an underlying sweat gland or ductal carcinoma and invading the epidermis. At least one authority claims that extramammary Paget's disease doesn't exist and that so-called extramammary Paget's disease is a junction nevus.

On the basis of a recent study of 39 cases of extramammary Paget's disease by Dr. James Graham and myself, we believe there is without question such a specific lesion. We do not believe the Paget's cell invades the epidermis from an underlying carcinoma but rather that the causative agent acts on the epidermis to produce the cell. The agent may also act on some adjacent glandular structure to produce a carcinoma. But not all lesions of the skin are associated with an underlying carcinoma. According to our data, it is a disease much more common in the 50-80 age group and rare under age 40. Most lesions occur in the vicinity of the anus and vulva. About one-half are not associated with an underlying carcinoma. The most common clinical appearance is a red or gray elevated lesion which may be ulcerated, crusted, scaly, oozing, weeping or occasionally bleeding. It may itch or occasionally be painful. The only treatment is surgical excision. Irradiation therapy always fails.

References:


Case No. 10

This 52 year old white man was admitted for a third time for persistent diarrhea with some bleeding. Ten to fifteen bowel movements daily were associated with anorexia and inanition. Emaciation and weakness were marked. The readmission diagnosis was 'non-tropical sprue'. A previous glucose tolerance curve showed: fasting - 98 mgs.%; 1 hour - 145 mgs.%; 2 hour - 165 mgs.%; 3 hour - 178 mgs.% The hemoglobin on admission was 11 gms.; RBC - 3.89 million; WBC - 7,800 with 72 neutrophils and 27 lymphocytes.
Whipple's Disease

In 1907 G. H. Whipple proposed the name "intestinal lipodystrophy" for a disease characterized by deposits of fat and fatty acids in the intestinal and mesenteric lymphatic tissues. The clinical features of Whipple's disease are not distinctive, and for many years the diagnosis was made only at autopsy and more recently by histologic examination of biopsy material.

Although for many years the fatty changes were considered the essential alteration, it is now known that the macrophages contain a nonlipid material. Black-Shaffer considered this probably to be a glycoprotein. Dr. Enzinger and I feel that it is a polysaccharide-lipid on the basis of histochemical studies. The material is Periodic-Acid-Schiff positive and also positive with various lipid stains.

Histologically there are histiocytes containing lipid and PAS positive material. Extracellular deposits of lipid are also present. Although the PAS positive material in the histiocytes has been described as sickle-shaped by Sieracki, we have not observed this shape in either light or electron microscopic studies. The particles are irregular in shape. The cytoplasm never appears homogeneous (in contrast to the PAS positive cytoplasm of plasma cells).

We have studied 13 patients whose ages ranged from 24 to 75. All of the patients had a loss of weight, abdominal pain, diarrhea, and abdominal distention. Ninety-two percent had steatorrhea and arthralgia and eighty-three percent, lymphadenopathy. The serum lipid values in mg.% were as follows: total lipid 532; total cholesterol 125; cholesterol esters 82; and fatty acids 274.

The changes of Whipple's disease are not localized to the intestine and lymph nodes but may be found in most of the viscera including heart, lungs, liver, spleen, pancreas, adrenal, and in the central nervous system. The villi of the small intestine are club-shaped. The lamina propria is filled with histiocytes and clear spaces in the hematoxylin and eosin preparation. The mesenteric lymph nodes appear similar (grossly they appear spongy).

In our 13 patients, peripheral lymph nodes were originally interpreted 9 times as reactive hyperplasia, once each as sarcoid and granulomatous inflammation and twice with no diagnosis. All of these nodes, when re-examined, contained PAS positive histiocytes. In general, the farther the lymph node is from the gastrointestinal tract, the fewer the histiocytes. Nevertheless, peripheral lymph node biopsy with a PAS preparation is a worthwhile diagnostic procedure.

Autopsy studies of 12 of our patients disclosed: pleuritis, 92%; pericarditis, 83%; valvular endocarditis, 50%; peritonitis, 42%; and ascites, 33%.

References:

Case No. 11

AFIP Accession No. 831683

In 1951, a 29 year old white woman noted recurrent epigastric distress with nausea and vomiting. Although she thought she was pregnant, her symptoms cleared until 1956, when, during a 6 months' period, she was hospitalized 4 times for nausea and vomiting. Several X-ray examinations of the upper gastrointestinal tract showed findings consistent with chronic gastritis. The X-ray appearance of her stomach did not change during this time. During the previous 12 months she had lost 28 lbs. In October, 1957, she was admitted to the hospital for vomiting and right upper quadrant tenderness. Repeat X-rays revealed a barium shadow suggestive of a gastric antral diaphragm. The WBC was 9,450, with 63% polys. The hemoglobin was 10.9 gms. with an hematocrit of 34 per cent. Vomitus gave a positive guaiac test and a positive benzidine test. On 30 October, 1957, the stomach was resected.
Pseudolymphoma of Stomach

During recent years an increasing number of patients with the diagnosis of gastric lymphoma have survived for long periods of time. This, together with the observation that the histologic distinction between malignant lymphoma and reactive lymphoid hyperplasia is often difficult, has raised the question of the nature of the lesions diagnosed gastric lymphoma. Several workers have noted the favorable prognosis of lymphosarcoma localized to the stomach. These data usually have been based on only a few cases. Furthermore, there is considerable variation when all of the statistics are considered.

Recently Dr. Leslie Smith and I have studied 131 patients who were diagnosed as gastric lymphoma and 42 patients diagnosed as lymphoid hyperplasia of the stomach. The diagnoses of malignant lymphoma included reticulum cell sarcoma, lymphosarcoma (lymphoblastic and lymphocytic), and Hodgkin's disease.

The gastric lymphomas were divided into five groups according to the extent of the disease.

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<th>Group</th>
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<td>I</td>
<td>Stomach only</td>
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<tr>
<td>II</td>
<td>Stomach + direct extension to adjacent tissue</td>
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<tr>
<td>III</td>
<td>Stomach and regional lymph nodes</td>
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<tr>
<td>IV</td>
<td>Stomach + direct extension + regional lymph nodes</td>
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<td>V</td>
<td>Generalized lymphoma with involvement of stomach</td>
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From this study it appears that patients with resected gastric "lymphomas" localized to the stomach, with or without postoperative irradiation usually survive without recurrence. Patients with gastric lymphoma as a part of a systemic disease usually die within two years. Postoperative irradiation does not appear to alter the course in any of the groups.

Lymphoid hyperplasia (pseudolymphoma) of the stomach may simulate malignant lymphoma both grossly and microscopically.

Those lesions showing mature lymphocytes and reticulum cells with a recognizable follicular pattern associated with a mixed inflammatory cell infiltrate (away from the ulcerated areas) and a fibroblastic response fall into the group of pseudolymphomas. Naturally, patients with this type of lesion have a favorable prognosis.

References:
Malignant Lymphoma and Pseudolymphoma of the Stomach, Leslie Smith and Elson Helwig: To be published.
Case No. 12
AFIP Accession No. 339618

In January, 1951, a 21 year old white man first noted sharp crampy, periumbilical pain which was worse in the mornings and after eating. There were no complaints of nausea, vomiting, diarrhea, or change in bowel habits. On May 10, 1951, he vomited. The white count was 16,900 with 73% polys. A diagnosis of appendicitis was made and the appendix removed. On 13 May he again vomited. On 16 May, a flat plate of the abdomen revealed changes interpreted as partial obstruction of the small bowel. At laparotomy, small and large (3 cm.) nodules were present in much of the small intestine to within 24 inches of the cecum. This segment of intestine was resected.
A 70 year old white man complained of vague abdominal pain for three years with associated fecal incontinence and diarrhea. X-ray examination disclosed a large redundant sigmoid colon.
Case No. 11 (continued)


Thorbjarnarson, B., Beal, J.M., & Pearce, J.M.: Primary Malignant Lymphoid Tumors of the Stomach, CANCER, Vol 9, No. 4, July-Aug 1956


Case No. 12

Lymphosarcoma of the small intestine may present as a single tumor or as multiple masses. Usually the lesion is either polypoid or diffusely infiltrating. Only rarely is it annular and constricting. Complete obstruction, as a rule, indicates a complication of intussusception. Your section shows a sessile polypoid mass projecting into the lumen. The history indicates there were multiple areas of involvement. X-ray study showed partial obstruction of the small bowel by these nodules. The mucosa over the tumor is ulcerated and tumor cells extend through to the serosa. There is no difficulty, in this instance, in making a diagnosis of lymphosarcoma. The essential cell can be recognized as an atypical lymphocyte. The cytologic picture is pleomorphic, but not polymorphic as would be expected in a reactive process. As the cells infiltrate, there is little or no stimulation of connective tissue proliferation as would be expected in an inflammatory process. Of course, Hodgkin's disease would have both a polymorphous infiltrate and a fibrous reaction, but Dorothy Reed cells must be present for this diagnosis. One should be suspicious of malignant lymphoma when there is a pleomorphic infiltrate of atypical lymphocytes unassociated with other types of cells and unattended by appreciable fibroblastic proliferation. Since lymphomatous lesions are often over diagnosed, it is difficult to evaluate the claim of cure by this method or combination of methods. Extensive surgical excision is the treatment of choice. It is doubtful that a true malignant lymphoma of the intestine is cured by irradiation.

References:

Ullman, A., and Abeshouse, B.S.: Lymphosarcoma of the Small and Large Intestines, From the Surgical Service of the Sinai Hospital, Baltimore, Maryland, pp. 878-915


Case No. 13

Pneumatosis Cystoides Intestinalis

The intestine shows numerous gas filled cysts located mostly in the submucosa and often elevating the mucosa to form small blebs. The cysts of pneumatosis cystoides intestinalis in adults are more frequently subserosal than submucosal as seen in this case. When subserosal, they appear singly or in groups, usually sessile, and may range in diameter from a few millimeters to several centimeters. When submucosal they are not visible externally but impart a sponge-like sensation when palpated through the bowel wall.

The cysts are filled with a gas under pressure of unknown composition. (There is a low oxygen content).

Sections of the intestine in your case show numerous cysts in the submucosa causing a thickening of the wall. A few cysts are present in the muscularis, but these are usually minute. The mucosa over the cysts is sometimes thin but not
A 45 year old white man developed diarrhea with mucus and blood accompanied by abdominal cramps over a period of 10 weeks. No amebae were noted on stool examination. The patient was treated with steroids for 4 weeks which reduced bowel movements from 25 to 10 daily.
Case No. 13 (continued)

ulcerated.

The cysts are lined by poorly outlined flattened to cuboidal cells with a pale acidophilic cytoplasm. Usually one, but occasionally more than one cell layer lines the cyst. Interspersed among the lining cells are fairly frequent multinucleated cells with small uniform nuclei. The cysts within the muscularis are small and narrow and appear sandwiched between muscle bundles. Some have a lining suggestive of endothelium, but most show numerous giant cells along the margin and within the lumen. These giant cells have a homogeneous, often copious, acidophilic cytoplasm. Furthermore, many of the intramural cysts are surrounded by edema, and a few lymphocytes, monocytes, and rarely a polymorphonuclear leukocyte. The large submucosal cysts are separated by compressed fibrous stroma containing at the most a few lymphocytes, monocytes, plasma cells, and rare leukocytes. In other cases the stroma shows more inflammatory infiltrate.

In a group of 14 cases which I have reviewed, 5 were in children ranging in age from 6 mos. to 2½ yrs. Most of these lesions were submucosal. The cysts were rarely associated with a prominent lining cell or giant cell formation. The nine adults ranged in age from 37 to 70. Most of these lesions were subserosal. Occasionally they also involved the mesentery. Five of the 9 patients also had a pyloric or duodenal ulcer, usually associated with stenosis. This association has been noted by others. In one child, as proved by laparotomy, the cysts disappeared spontaneously. The cause of the cysts is not known, but has been variously attributed to bacteria (bacteria usually not identified), or to mechanical factors (gas pushed in under pressure), or local production of gas by chemical reaction. The patients described by Doub and Shea, recently had an allergy or asthma.

References:


Case No. 14

Ulcerative Colitis

This is a typical example of idiopathic ulcerative colitis. A network of ulcers extends among islands of intact mucosa. The ulcers vary in size, configuration, and distribution. In typical ulcerative colitis, there may be only a few punctate ulcers filled with pus in a hyperemic mucosa, or there may remain only a few patches of congested mucosa among extensively exposed gray or red ulcers. In practically all instances, there are 3 or 4 longitudinal furrows of ulcers which only sometimes overlie the muscular taeniae. There is a tendency for the edematous, congested intact mucosa to bulge over and conceal the ulcers. If the process is particularly active, the ulcers may penetrate to the serosa.

Ulcerative colitis involves the sigmoid colon and adjacent rectum most frequently, followed by the descending colon and lastly the cecum. Involvement of the contiguous ileum occurs in approximately one-third of the cases, and of the appendix, in about one-fifth. The margins of the process are seldom so sharp or
Case No. 14 (continued)

Segmental as seen in cicatrizizing enteritis. In the prolonged chronic cases, the colon tends to become scarred, shortened, and narrowed.

Histologically in ulcerative colitis, multiple ulcers extend through the mucosa to the submucosa. The base of the ulcer is usually covered by exudate rich in polymorphonuclear leukocytes. Beneath this layer is a zone of well vascularized granulation tissue infiltrated with plasma cells, lymphocytes, histiocytes, and leukocytes, sometimes eosinophilic. Similar cells are located in the connective tissue septa and particularly about blood vessels in the muscularis and serosa. Warren and Sommers described two different types of ulcerative colitis microscopically: Type A (vasculitis) and Type B (crypt abscess). Your case falls into the crypt abscess type. Scattered mucosal crypts are filled with leukocytes and a few are distended by both mucus and leukocytes.

Ultimately, the abscess within the crypt extends into the submucosa and dissect beneath the contiguous epithelium which then sloughs. Large ulcers with overhanging mucosal margins and mucosal bridges are formed in this manner. Similarly, pseudopolyps are formed. In Type A (vasculitis), the blood vessels show inflammation, necrosis, and thrombosis associated with sloughing of the overlying mucosa and sometimes necrosis of the bowel wall with perforation. In 50 percent of the cases of Warren and Sommers, the microscopic picture was indeterminate. Often, I also have found it difficult to place the lesion in either one of these two categories and believe there must be much overlapping.

The cause of idiopathic ulcerative colitis is not known. Speculation has ranged from a specific bacterium to psychogenic factors.

Occasionally, ulcerative colitis and cicatrizizing enteritis must be differentiated, which most always is a problem. Cicatrizizing enteritis often shows a granulomatous (sarcoid-like) reaction both in the intestine and the lymph nodes and does not often exhibit crypt abscesses or vasculitis.

Carcinoma with multiple sites of origin is frequent in people with prolonged chronic ulcerative colitis. However, the pseudopolyps are not true tumors. Neoplasia may arise in coexisting adenomatous polyps or at the site of repeated mucosal regeneration.

### Cicatrizizing enteritis

- Ileum, jejunum, appendix, occas. colon
- Segmental
- Edema, fibrosis of all layers, stenosis
- Fistula formation
- Granulomatous (Sarcoid-like) inflammation
- Lymph nodes - granuloma

### Idiopathic ulcerative colitis

- Sigmoid, descending colon, cecum, occas. ileum
- Non-segmental
- Fibrosis in chronic phase limited to submucosa
- Thin wall and perforation
- Mixed inflammatory infiltrate, cryptitis, vasculitis
- Lymph nodes - hyperplasia

References:

A 3 year old white male had marked constipation requiring enemata since birth. X-ray examination revealed a constricted area in the rectosigmoid region and an apparently dilated rectal ampulla.

Case No. 15

AFIP Accession No. 943933
Hirschsprung's Disease

Hirschprung's disease is one of the more common causes of acute intestinal obstruction in newborn infants, probably accounting for 15-20 per cent of all cases. Many of these infants must survive an unnecessary exploratory laparotomy which could have been avoided by accurate diagnosis. The similarity of the signs and symptoms of mechanical and neurogenic obstruction causes confused clinical impressions.

Furthermore, the radiographic examination does not always reveal an accurate picture. In plain roentgenograms in infants, it may be difficult to distinguish between dilated large intestine and dilated small intestine and to determine the cause of the intestinal obstruction. Even with barium enema studies, the pattern may give a false impression. If the colon has been deactivated for several months, the characteristic pattern of a dilated colon with a narrow distal segment may not be present. In most instances of Hirschsprung's disease, the colon does not become dilated and hypertrophied for several months. If the whole colon is a-ganglionic, symptoms of obstruction may develop shortly after birth and yet the barium enema pattern does not show obstruction. When the lesion is low and short, the narrow segment in the recto-sigmoid may not be demonstrated.

A diagnosis of Hirschprung's disease in the newborn infant, or when the roentgenographic pattern is equivocal, should be made only after a rectal biopsy has shown an absence of ganglion cells.

Normally, the intestine, including the rectum, shows groups of nerve cells and bundles of nerve fibers in the space between the circular and longitudinal layers of the muscularis (myenteric plexus of Auerbach) and in the submucosa (submucous plexus of Meissner). The intrinsic nervous mechanism of the bowel wall is formed by these plexuses. The ganglia of the myenteric plexus appear as large, angular or star shaped collections of nerve cells and of the submucous plexus as thin collections of closely grouped cells. They are connected by nonmyelinated fibers.

Your slide contains two different segments of intestine. In one taken from the constricted distal intestine, nerve fibers are present but ganglion cells are absent. A biopsy from this area showing an absence of ganglionic cells indicates that the patient has Hirschsprung's disease. In the proximal dilated colon, ganglion cells are present.

Both sections show perivascular collections of leukocytes particularly in the serosa. This change is probably secondary to the operation.
Case No. 16

Methodist Hospital, Indianapolis
Accession No. 867-57

A 62 year old white woman who was an inspector of veterinary diethyl stilbesterol tablets at a pharmaceutical company complained of periods of sickness associated with vomiting, diarrhea, right lower quadrant cramps, dizziness, and pain in the right leg. These occurred in episodes, approximately four times in the past five years. On occasion she complained of an urticarial rash of the extensor surfaces of her extremities. An appendectomy in 1913, X-ray induction of menopause in 1943-44, a panhysterectomy with radium therapy in 1954, and an auto accident in 1952 were the only relevant historical data. The patient was obese. An indefinite mass was present in the right lower quadrant. At exploration, a right hemicolecctomy along with the terminal ileum was performed.
References:


Carcinoid of Distal Ileum

In this section of intestine, a carcinoid has replaced most of the mucosa and has extended through the entire wall. I cannot tell whether it is ileum or colon in my section. Histologically, it is fairly typical of carcinoid of the ileum with islands, nests, and columns of tumor cells. This is in contrast to the picture usually observed in carcinoids of the rectum and duodenum which usually exhibit ribbons and festoons of tumor cells. The typical cell is relatively small, with a round, moderately chromatic nucleus and granular pale acidophilic cytoplasm. Cell membranes tend to be indistinct. The peripheral cells of the nests may be palisaded. Sometimes cells surround spaces in rosette fashion. The cytoplasm is argentafilic. With the PAS preparations and diastase digestion, I have noted PAS positive material within the lumens surrounded by carcinoid cells, but not within the carcinoid cell. I believe this is a fairly reliable criterion on which to differentiate a mucin producing carcinoma from a carcinoid. In carcinoma, PAS positive material is present within the cytoplasm. In your present case, there is considerable multinucleation of cells (pleomorphism) and a few mitotic figures suggesting a more aggressive tumor. Otherwise, I don't know how to detect the more aggressive tumors. In a group of 267 carcinoids of the small intestine which Dr. Manion and I reviewed, 101 had invaded the muscularis and 52 had metastasized. Of 261 cases, 190 were single and 71 were multiple (up to 60 tumors). Of 265 cases, 199 were asymptomatic and incidental, 60 symptomatic, and 6 functioning. In those cases with metastases, the regional lymph nodes were involved in 45, the liver in 17, peritoneum and lungs in 3, the adrenal, vertebra, spleen, pancreas, kidney in 2 and other organs, one each.

Carcinoids of the small intestine may cause symptoms mechanically and functionally. Some carcinoids of the small intestine secrete 5-Hydroxytryptamine (serotonin) which may be abnormally elevated in the blood. An end metabolic product 5-hydroxyindoleacetic acid, is secreted in the urine. (This can be detected chemically.) People who have eaten bananas also give a positive test. In my experience, the functioning carcinoids have been primary in the small intestine and were accompanied by metastases to the liver. However, not all primary carcinoids of the small intestine with metastases to the liver are functioning. Functioning carcinoids produce both mechanical and functional effects - (1) gastrointestinal obstruction, diarrhea, large liver; (2) cutaneous vascular flushing (the skin capillaries may become permanently dilated); (3) cardiovascular - tricuspid and pulmonary valve deformities; (4) metabolic.
An anemia of unknown origin brought this 65 year old negress to the hospital for diagnosis and treatment. She was confused and disoriented at the time of admission. Her complaints included dizziness, "feeling bad", and black stools. The past history included removal of a "fibroid tumor" three years previously. Physical examination revealed a mild hepatomegaly and a large firm fixed mass superior to the cervix thought to be either a uterine tumor or rectal tumor. Jaundice developed while the patient was in the hospital. An exploratory laparotomy was performed with bowel resection. Stones were present in the gall-bladder. The uterus, tubes, and ovaries were absent.
References:

Helwig, E.B., and Manion, Wm.: Carcinoids of the Gastrointestinal Tract: To be published.


Leiomyosarcoma of the Ileum

Most tumors of the gastrointestinal tract composed of spindle-shaped cells are basically myomatous. Frequently, the big question is whether the tumor is a leiomyoma or a leiomyosarcoma. I have used three criteria in making the distinction: (1) degree of cellularity, (2) presence or absence of tumor giant cells and (3) presence or absence of mitotic figures. If the tumor is cellular and there are mitotic figures and tumor giant cells present, it is a leiomyosarcoma. On this basis the tumor in your set obviously qualifies as a leiomyosarcoma. Occasionally benign leiomyomas with degeneration show multinucleated cells. The nuclei in giant cells of this type are small and uniform and should not be mistaken for the pleomorphic nuclei present in tumor giant cells.

Apparently many of the leiomyosarcomas grow slowly, as judged by the length of the duration of symptoms of many patients. The present lesion was polypoid and ulcerated, and penetrated the muscularis. The ulcerated lesions are usually associated with chronic bleeding and anemia. Occasionally massive bleeding occurs. If the growth is intraluminal, obstruction or intussusception may occur. The subserosal tumors may become large irregular masses often measuring up to 10 centimeters or more in diameter. The larger tumors occasionally undergo cystic degeneration and central hemorrhage.

Metastases appear most commonly in the liver and peritoneum. In a few instances, metastases are widespread and may include lymph nodes, as in the present case, as well as lungs and bone.

In the literature, many of the tumors have been stated to have been identified as myomatous by use of the van Gieson and Masson preparations. It has been my experience that these stains are useful when the tumor is composed of fairly mature cells. However, when the tumors are undifferentiated, the special stains are of little or no assistance. Of course the tumor then can be identified in the hematoxylin and eosin preparation.

References:


Case No. 18

Methodist Hospital, Indianapolis
Accession No. 1667-59

In 1955 this 49 year old white male noted pain on defecation and bloody stools. His hemorrhoids were treated from that time until early 1959 when a sigmoidoscopic examination revealed a mass in the rectum at 14 inches. This was verified by X-ray examination. A polypectomy was performed at laparotomy.
A 31 year old white man had a radicular cyst removed from the maxillary bone three years previously. X-ray showed only slight bone regeneration.

He currently complained of protrusion of a mass on defecation, slight pain and irritation following defecation and blood spotting on the toilet tissue. Rectal examination disclosed a firm pedunculated mass 2 cm. in diameter just superior to the mucocutaneous line in the mid-line anteriorly. Laboratory work including serology, blood counts, and urinalysis was normal. An X-ray of the chest was normal except for the right first rib being somewhat under-developed.
Adenomatous Polyp with Invasive Carcinoma

The debate concerning the pathogenesis of carcinoma of the colon and rectum has not been settled. Many have observed an intimate relationship between adenomas (adenomatous polyps) and carcinoma. However, there is a divergence of opinion regarding the potential malignancy of adenomas. Spratt, Ackerman and Moyer have recently stated that the theory of the origin of adenocarcinoma of the colon within adenomatous polyps has little to support it. They believe that the observed frequencies of occurrence of minute carcinomas arising in non-polypoid mucosa is adequate to account for the annual incidence of carcinoma of the colon of 45 per 100,000. One has to balance this statistical data against the observation of carcinomatous change in adenomatous polyps. I believe that some carcinomas arise directly from the mucosa. I also believe that many carcinomas arise in adenomatous polyps. On the converse, most adenomatous polyps never become malignant.

Pathologists use many ingenious or perhaps devious phrases to say that they don't know whether or not carcinoma in situ is present, e.g. precancerous polyp, polyp with cellular atypia, polyp with malignant transformation, atypical hyperplastic polyp, or suggests possibility of malignant disease. I could name 15 more.

Microscopically, carcinoma arising in an adenoma can be identified when there is anaplasia associated with intraglandular budding and bridging. I have examined 100 large intestines containing at least one adenoma with carcinoma. None of these intestines contained an obvious or manifest carcinoma so that the behavior of the adenoma alone could be judged. If the anaplastic glands maintained their relative position in the adenoma as a whole -- in other words, invasion of the stroma or core had not occurred -- then metastases were never present. If, however, invasion of the core or stalk was present, but none of the samples involved the base, 10% of these lesions showed metastases. The entire adenoma must be examined microscopically before a sound diagnosis can be rendered. An in situ carcinoma should be treated as a benign adenomatous polyp.

I had three sections of the lesion in the set for examination and noted invasion of the stalk by irregular glands showing intraglandular budding and bridging. I interpret this as carcinoma with invasion of the stalk and as a lesion which potentially could metastasize.

References:


Benign Lymphoid Polyp of Rectum

The benign lymphoid polyp is the most common lymphomatous lesion of the rectum and anus. In most instances, the distinction between a lymphoid polyp and a malignant lymphoma should be made by pathologists without difficulty.
Case No. 20

Indiana University
School of Medicine Accession No. 89508

This patient was a 60 year old woman who had carcinoma of the cervix. She was treated with X-ray and radium six months prior to her current admission. A large ulcerated area noted in the rectum was thought to be a recurrence of carcinoma. The rectum was excised together with the uterus, vagina, fallopian tubes, and ovaries. A 2.5 x 3 cm. ulcer was found 9 cm. above the squamocolumnar junction on the anterior wall of the rectum. The ulcer base was depressed with undermining of the edges. The base was covered by a gray-green necrotic membrane about 2 mm. in thickness. The remainder of the mucosa was intact but very thick and edematous. All of the tissues in this area were indurated.

(Note: No recurrent carcinoma was found.)
Case No. 19 (continued)

As a rule, the polyps are covered by a smooth gray or pink mucous membrane. Ulceration is infrequent, and, when present, usually not extensive.

The histologic diagnosis of lymphoid polyp should not be attempted on minute fragments. The slide preparations should be technically excellent. As seen in your section, the lymphoid polyp is usually comprised of lobules of lymphoid tissue with a pattern of follicle formation and reaction centers. The follicles may be large and irregular or even confluent. The reaction centers, as a rule, are easily distinguished but occasionally are obscure. The cells of the reaction centers show larger paler nuclei and a more abundant cytoplasm than do the surrounding smaller, more mature appearing lymphocytes. Occasionally the cells of the reaction centers seem to occupy nearly all of the follicle so that it is difficult to identify the follicle as such. One or more follicles comprise a lobule which is separated from the adjacent lobule by delicate connective tissue trabeculae. These trabeculae tend to be more prominent in the larger polyps.

A peripheral and central sinusoidal structure as seen in lymph nodes is absent. The lymphoid cells in ill defined usually small foci sometimes occur in the glandular mucosa, but do not diffusely replace it as in lymphosarcoma.

The polyps may contain foci of fibrosis. Rarely do the polyps contain eosinophilic leukocytes. Reed-Sternberg cells are not present. Often but not always, the reaction centers contain large phagocytic cells. The number of mitotic figures vary from polyp to polyp and are chiefly present in the reaction centers.

The benign lymphoid polyp differs both clinically and microscopically from malignant lymphoma of the follicular type. Most polyps are located within 2 to 4 cm. of the dentate line. They may be either single or multiple. Most lesions are less than 3 cm. in diameter. By the time lymphosarcoma involves the anus and rectum, there is practically always prior involvement of the lymph nodes. One should therefore be cautious in making a diagnosis of lymphosarcoma in the absence of lymph node involvement. Simple excision will cure the patient with lymphoid polyps. It is doubtful that radical excision or X-ray has cured many true lymphosarcomas of the rectum.

References:


Case No. 20

Irradiation Ulcer of the Rectum

This section shows the characteristic changes of an irradiation ulcer of the rectum. Clinically, it was suspected that the large ulcerated area was a recurrence of the carcinoma of the cervix. Sometimes ulceration occurs at the site of carcinomatous infiltration and is due to both irradiation reaction and carcinoma. No carcinoma is present in either the rectal or perirectal tissues in this case. A biopsy may be valuable in deciding what therapy to use.

Irradiation lesions of the intestine of the chronic type include ulcers, fistulae, strictures, and fibrosis with sclerosis and any combination of these changes.

The mucosa and muscularis are ulcerated and the depressed base rests upon
Case No. 20 (continued)

fibrous and fatty tissue. The base is composed of necrotic tissue beneath which there are inflammatory cells and tissue cells undergoing degeneration. Surrounding this the fibrous tissue is sclerotic and sometimes hyalinized. The hyaline may appear as precipitated protein or as an exudate of fibrin and as a homogeneous fibrillar substance in the collagen bundles. Usually the connective tissue shows edema. Scattered through the altered connective tissue are fibroblasts with large, sometimes multinucleated giant cells. The cells may have prominent nucleoli and should not be mistaken for neoplastic cells.

Irradiation changes in blood vessels are rather characteristic. Venous and lymphatic dilatation may be marked, but in my section the ectasia was minimal. Sclerosis of arteries and veins, especially the latter, usually are prominent features, and this is true of today's case. Other changes of fibrin deposition, fibrinoid necrosis, and thrombosis may occur.

The mucosa at the margin of the ulcer may exhibit regeneration, but this is not a specific change. In non-ulcerated lesions, atrophy may be prominent. Other changes of distorted glands and atypical lining epithelial cells may occur.

The muscle shows changes ranging from vacuolization to degeneration, atrophy, and fibrosis. In some instances atypical cells are present.

In reviewing 39 examples of irradiation change in the gastrointestinal tract it was noted that in several examples the ganglion cells were inconspicuous or degenerated. In those cases with stenosis this may be additional factor in the cause of obstruction. The irradiation was given for carcinoma of cervix and uterus 23; bladder 3; testes 7; colon 4; kidney 1; and anus 1. Among the 39 cases there were three examples of mesenteric thrombosis apparently induced by irradiation.

References:


Wilson, Stephen G., Jr.: Radiation-Induced Gastrointestinal Death in the Monkey: 59-77, Air University, School of Aviation Medicine, USAF, Randolph AFB, Texas, June 1959.