THE SMALL INTESTINE

The small intestine extends from the pylorus to the ileocolic junction. It occupies the ventral portion of the abdomen, caudal to the stomach and liver. It measures approximately three and a half times the length of the body in the living animal.

Normal Appearance

On plain radiographs, the serosal surface of the intestine can be seen in animals that have sufficient intraabdominal fat to provide contrast. The diameter of the intestine is variable. It has been suggested that in dogs it may be up to twice the width of a rib and should not exceed the height of the central portion of the second lumbar vertebral body, or the ratio of the maximum diameter of the intestine to the height of the midbody of the fifth lumbar vertebra should not exceed 1:1.6. In cats, the small intestine diameter should be less than twice the height of the body of the fourth lumbar vertebra or less than 12 mm. The small intestine is distributed evenly throughout the midventral abdomen, filling space not occupied by other organs.

Abnormalities

In studies of the small intestine, plain radiographs often give some indication of abnormality, and they should be studied routinely before contrast studies are done. Opposing lateral studies are useful Ileus. Ileus, or failure of intestinal contents to pass along the intestine, may have a number of causes Mechanical (or obstructive) ileus is caused by some physical impediment to the passage of material along the bowel. Mechanical obstruction may be attributable to any of the following causes: foreign body.

The features of a mechanical **ileus** are as:

follows:

a) A sentinel loop is present.

b) The diameter of the intestinal lumen is greater

than normal.

c) A gas and fluid mixture is present.

(d) The problem is localized.

Radiologic Signs

1- Moderate or severe dilation is seen of a loop or loops of bowel filled with gas or a combination of gas and fluid.
2- A radiopaque foreign body, if present, will be seen radiographically.
3- Dilated loops of bowel often lie parallel to one another, creating a "layering" of the bowel.
4- A standing lateral view often shows gas-capped fluid levels within the intestine
5- On barium examination, there is delayed gastric emptying and slow passage of contrast medium along the intestine. A radiolucent foreign body may be outlined by barium. Fluid present in the bowel dilutes the barium.

Foreign Body.

Foreign bodies may be radiopaque or radiolucent. They may cause partial or complete obstruction of the intestine.

Radiologic Signs

1- If the foreign body causes a complete obstruction, the radiologic signs will be those described for obstruction. However, dilated loops of intestine are not always seen with an obstructing foreign body, even when the obstruction appears complete. Dilation is more marked, with obstructions in the distal intestine.
2- Radiopaque foreign bodies are seen on plain radiographs. Radiolucent objects may be outlined by gas within the intestine. Some soft tissue opacity foreign bodies have a characteristic appearance.
3- Barium may be required to demonstrate a radiolucent foreign body. If the obstruction is not complete, the foreign body is often more clearly seen after the main column of barium has passed.

4- If a foreign body is long and pliable, such as a piece of string, the intestine tends to push together on itself along the foreign body.
5- Most foreign bodies are found in the jejunum

Intussusception

is an invagination of a portion of the intestine into the distal segment adjacent to it. It is most commonly seen in young dogs

Pneumocolon

negative (air/gas) contrast study—may be useful to determine the position of the colon and diagnose intussusception. A pneumocolon is relatively easy to perform and can provide useful information in cases of suspected obstruction, especially intussusception.

Radiologic Signs

1- If there is complete obstruction, radiologic signs will be evident. Dilated gas- and fluid-filled loops of bowel are seen proximal to the intussusception. The distal intestine may be empty.
2- The mass of the intussusception may be dense enough to cast a soft tissue mass shadow in the central abdomen.
3- Thin lines of gas may be seen outlining the intussusceptum. The gas lies between the intussuscipiens and the intussusceptum.
4- A barium enema will outline the intraluminal mass. Barium will fill the rectum and distal colon normally but will be prevented from filling the proximal colon by the advancing intussusceptum.
5- Barium percolates between the intussuscipiens and the intussusceptum, outlining circular mucosal folds in the intussuscipiens—the “coiled spring” pattern.

Enteritis (Inflammatory Bowel Disease)

Enteritis or inflammatory bowel disease is often difficult to diagnose on radiographic evidence alone, because the signs are not specific.

Radiologic Signs

1- Abnormal amounts of gas are seen widely distributed throughout the intestine but not dilating it.
2- A mixture of gas and fluid in the intestine may have a bubbly appearance.
3- Rapid passage of barium through the intestine indicates hypermotility and may be associated with enteritis.
4- Barium may fail to fill the lumen of the intestine because of exudation.
5- Irregularities in mucosal pattern, including ulceration and uneven distribution of barium, may be seen.

Intestinal Neoplasia

appears to be more common than gastric neoplasia, although both are relatively rare in the dog and more common in the cat.

Radiologic Signs

1- Plain radiographs may show signs of intestinal obstruction
2- On barium studies, irregularities within the intestine such as ulceration, obstruction, or constriction can be seen.
3- Adenocarcinomas in the wall of the intestine tend to produce annular constricting lesions, narrowing the intestinal lumen.
4- Annular bowel neoplasms often produce an “apple core” or “napkin ring” appearance on contrast studies.
5- Intraluminal masses produce constant filling defects on barium examination
6- Lesions of lymphosarcoma are more diffuse, affecting longer segments of the intestinal wall.

THE LARGE INTESTINE

Radiography

The large intestine is usually seen on plain radiographs because of feces and gas within it. Detailed studies require a barium enema. Before a barium enema is performed, the animal should be fasted for 18 to 24 hours. A mild cathartic is given 12 hours before the procedure. Generalanesthesia or deep sedation is usually required to eliminate straining. The colon should first be thoroughly washed out with saline at a temperature somewhat below body temperature.

Fecal Retention (Constipation)

Fecal retention is evidenced by the persistent presence of fecal material in the colon and rectum. The feces may be very dense, approaching the opacity of bone. Fecal impaction may result. One should be slow to make a diagnosis of constipation purely on radiographic evidence. Dogs and cats may void hard feces. Constipation is not present until the stimulus to defecate has been entirely lost.

Megacolon

Megacolon is a condition in which there is gross dilation of the colon. Part of or the entire organ may be affected. Congenital megacolon (Hirschsprung's disease) results from the absence of myenteric ganglion cells in the segment of colon just distal to the dilated portion.

Radiologic Signs

1- Masses of radiopaque feces or fecal pellets are seen in a dilated colon.
2- The dilation ends abruptly at the aganglionic segment if aganglionosis is the cause.
3- The aganglionic segment and the rectum are usually empty, which helps distinguish the condition from simple fecal impaction, in which feces are often seen in the rectum.
4- In mechanical megacolon, dilation ends at the point of obstruction.
5- A barium enema will indicate the point of obstruction or confirm the presence of a terminal aganglionic contracted segment.

Colitis

an inflammation of the colon, may be acute or chronic, ulcerative or granulomatous. The principal clinical signs are straining (tenesmus), diarrhea)often blood stained), and the frequent passage of small amounts of feces with or without mucus.

Radiologic Signs

1- Thickened mucosal folds
2- Narrowing of the colonic lumen
3- Spasm of segments of the colon
4- Dilation of segments of the colon
5- Mucosal serrations; that is, an irregular, serrated appearance of the colon

Foreign Body.

Foreign bodies in the colon and rectum are seldom of clinical significance because they are usually passed or are easily removed.

Radiology

Radiography can be used to identify its position with accuracy. At least two views at right angles to one another are necessary. On occasion sharp pieces of bone or pointed foreign objects become lodged in the colon or rectum.

Intussusception

has been discussed in connection with the small intestine. If the colon is involved, the lesion is best demonstrated by a barium enema, in which case the mass of the intussusception will be seen within the colon.

Neoplasia

large intestine is not common in dogs or cats. Adenocarcinoma, carcinoma, and lymphosarcoma are occasionally encountered. Benign adenomatous polyps in the colon and rectum.

The Rectum.

The rectum may be the seat of a number of abnormalities such as diverticulum, neoplasia, and displacement.

Rectal diverticulum

is often associated with perineal hernia, although it may occur as a separate entity. The diverticulum is of the pulsion type . Accumulated feces in the diverticulum are often seen on plain radiographs, particularly on the ventrodorsal view.

Rectal displacement

intrapelvic masses such as an enlarged prostate, vaginal masses, pelvic or soft tissue neoplasms, traumatic lesions, or intrapelvic abscessation.