Affection of intestine

5th stage surgery

Small Intestinal

Intestinal obstruction is one of the most important problem that need surgical intervention. Intestinal obstruction has two main types:-

1. Simple obstruction:- It is an obstruction of small intestinal lumen without vascular compromise.

2. Strangulating obstruction:- Characterized by interference of intestinal blood supply and blockage of intestinal lumen. Because vascular compromise of the intestine is present at the onset of the condition, the pathological changes associated with this problem are more acute and severe than those associated with simple obstruction.

Aquired Intestinal Lesions

1-Intestinal foreign body:-

It is mostly reported in dogs and cats. Common foreign bodies includes stones, children's toys, plastic pecking, and household fabrics. Many of these objects pass through the GIT without problems, others require surgical intervention. Medical treatment is seldom curative. Most foreign bodies can be removed by enterotomy

2-Intussusception:-

It is invagination (telescoping) of a segment of intestine (intussusceptum) and its mesentery into the adjacent distal segment of bowel (intussuscipiens) and usually cause bowel obstruction. Occasionally an intussusception occurs at multiple sites. Puppies and kittens and young horses are most commonly affected. The most common sites of intussusception are jejunum, ileum or

terminal ileum (ileo-cecal area).

The exact cause of this disorder is unknown, but it is probably due to abnormalities of peristalsis. Any factors that alter intestinal motility could therefore lead to the development of the condition. These factors include heavy ascarid infection, sudden dietary changes, enteritis (canine distemper) mesenteric arteritis, simple obstruction

3-Strangulation:-

A loop of small intestine herniated through an abdominal wall defect or internal herniation, and when associated with vascular occlusion it is known as strangulation. This phenomenon is most commonly seen with inguinal hernia and traumatic ventral hernias. Umbilical hernias rarely cause bowel obstruction.

4-Traumatic injuries:-

Penetrating abdominal wounds and blunt abdominal trauma commonly injure the intestine or the mesentery and associated vasculature.

Penetrating wounds, such as gunshots wounds of the abdomen should be explored immediately and the entire bowel should be examined.

5-Intestinal neoplasms:-

The intestine is occasionally the site of Neoplasia in small animals. Adenocarcinoma, Leiomyoma, and lymphosarcoma are the most common neoplasm. Clinical sings are commonly those of partial obstruction. Metastasis often occurs to regional lymph nodes, liver, spleen, and peritoneum. Early diagnosis, followed by wide resection of the affected bowel and histopathlogic conformation should be performed.

6- Volvulus:-

It is produced by a 180 degree or greater rotation of a segment of jejunum or

ileum about the long axis of the mesentery. Volvulus is uncommon in the small animals because of the short mesenteric attachments.

Volvulus may occur as a primary displacement or may be secondary to a preexisting lesion such as incarceration in mesentery, epiploic foramen, gastrosplenic ligament, Meckel's diverticulum, and adhesions.

Embryonic Anomalies of Small Intestine

1-**Meckel's Diverticulum**:-

This results from persistence of a portion of the omphalo-mesenteric (vitel line) duct, which is usually obliterated and disappears. It is presented as a finger like 2 cm in diameter and 4-6 cm long projecting from the antimesenteric surface of the ileum with a fibrous band, connecting the diverticulum to the abdominal wall in the area of the umbilicus. The lumen of the diverticulum communicates with the lumen of the ileum. It cause Volvulus to the small intestine.

2-Mesodiverticular bands:-

It is formed by persistence of a distal segment of a vitilline artery. The band extends from one side of the small intestinal mesentery to the antimesenteric surface of the intestine (usually jejunum). A triangular hiatus is formed between the mesodiverticular band, jejunal mesentery, and jejunum. Entrapment of intestine in the hiatus can cause herniation of intestine through jejunal mesentery and secondary Volvulus.

Clinical Sings of Intestinal Lesions

Clinical sings depend upon the location of the intestinal lesion and wither the lesion has totally or partially obstruct the lumen. Both total and partial obstruction have the sings of : nausea, anorexia, restlessness, depression, abdominal pain and abdominal distension.

Generalized weakness due to loss of body fluids and electrolytes. Severe vomiting usually results in a metabolic alkalosis because of the loss of gastric fluids.

The sings of incomplete obstruction are variable and chronic. Feces are usually present and may appear normal, or may they contain blood and excessive mucus.

The clinical sings also depend on either it is a proximal or distal obstruction:

Distal obstruction

1. The onset of the obvious clinical sings may be delayed for several days.
2. Vomiting is late in disease process.
3. Abdominal distension is less noticeable because the fluids have been absorbed proximal to the obstruction.
4. The vomits is more likely to be fetid with distal obstruction because of increased breakdown and bacterial action.
5. May take the form of chronic disease.

Proximal obstruction

1- cause vomiting earlierin the disease process.

2- More acute and life threatening.

Diagnosis of Intestinal Lesions:-

1. Abdominal pain and distension may present, with accurate palpation foreign bodies and tumor masses are often palpable.
2. Through physical examination.
3. An intussusception has the feel of an elongated sausage in the abdomen.
4. Strangulated intestine may be palpable as distended painful gas and fluid filled loops of bowel leading to a hernia ring.

5. Dehydration, dry mucous membranes, elevated pcv and total plasma protein is commonly observed. Leukocytosis and elevation of the blood urea nitrogen.

6. Radiographs is a useful method for diagnosis, especially of foreign objects and soft tissue masses.

7. Exploratory laparotomy is one of the most useful diagnostic technique. Exploration should not postponed because mortality rates increase rapidly with time.

Enterotomy and Intestinal Resection and Anastomoses

Enterotomy:-

The primary indication for performing enterotomy is the ingestion of the foreign body.

Operative procedure:- Using of barbiturates and inhalation with methoxyflurine or halothane are favored for general anesthesia.

1. The abdomen is prepared for a midline incision of adequate length to explore the entire GIT.

2. The incision edges are draped with saline moistened laparotomy sponges .

3. The entire abdominal cavity must be explored, beginning at the stomach and working down the intestinal tract.

4. The abdominal viscera must be always be handled gently to prevent shock and postoperative ileus.

5. The affected bowel segment is isolated and brought outside the abdominal incision.

6. The intestinal contents are gently milked out both proximal and distal to

the obstruction.

7. An assistant's fingers or intestinal clamps are applied on either side of the foreign body to aid in manipulation of the bowel and to keep the intestinal contents out of the surgical field.

8. An incision is made on the antimesenteric border in healthy tissue, a longitudinal or transverse incision may be used.

9. The foreign body is then milked out the enterotomy site.

10. The enterotomy incision may be closed with a simple appositional or inverting technique.

11. Perforating wound could be closed by purse-string suture.

Intestinal resection and Anastomosis

Principles of intestinal anastomosis:-

1. Incorporate the sub mucosal layer in the anastomoses.

2. Anastomose to provide serosa to serosa contact.

3. Minimize trauma and contamination.

4. Maintain adequate blood supply.

5. Avoid tension across the anastomoses.

Indications of intestinal resection:-

1. Injury to the intestinal wall, or tears in the mesentery along the intestinomesenteric border.

2. Obstruction.

3. Irreducible intussusception.

4. Neoplasms and scars resulting from vascular accidents or trauma to the intestine.

5. Intestinal infarction associated with arterial thrombosis.

Intestinal resection and Anastomosis

A. Occlude the segment with intestinal forceps and fingers, then ligate the mesenteric vessels that supply the diseased segment to be resected, then transect the intestine and mesentery as indicated by the dashed lines.

B. Apply the first suture at the mesenteric border and the second at antimesenteric border.

C. Anastomosis is continued by simple interrupted sutures or any other inverting techniques.

Types of intestinal Anastomosis:-

There are 3 main types of intestinal anastomoses:-

1. End- to- end anastomosis which the most commonly used technique.
2. End-to- side anastomoses, mostly used for anastomosis between ileum and cecum and between duodenum and the stomach.
3. Side-to-side anastomosis which has very limited use because it lead to a pouch formation by the blind end of the bowel in which the ingesta is accumulated causing digestion disturbance and abdominal pain.

End to end anastomosis can be accomplished by several methods, which can classified into:-

1. Inverting technique:- In this technique the edges of the incision was rolled inside the lumen leading to serosa to serosa contact. This technique can be accomplished by single row of continuous Connell suture pattern, if there is a leak from the anastomosis site appear, a second row of cushing suture is applied. This technique always associated with stenosis of the bowel at the site of the anastomoses, but adhesion was rarely accompanied with the inverted technique.

2. Everting technique:- In this technique the edges of the incision was projecting outside the lumen leading to mucosa to mucosa contact. This technique can accomplished by inserting interrupted horizontal mattress pattern. In this technique there is a chance leakage, and more likely associated with adhesion.

3- Apposition technique:- In this technique the 4 layers of the intestine in one side of the incision will be nearly in apposition with the same 4 layers of the apposite side of the incision. This technique can be accomplished by using either, a simple interrupted pattern, crushing pattern, and Gambee suture pattern. Apposition technique maintain normal intestinal diameter at the site of anastomosis particularly when Gambee suture technique is used.

Anastomosis of intestinal segments of varying diameters:-

Dilation of the proximal segment necessitates joining intestine of unequal diameters.

The problems can be overcome by one of the following methods:-

1- Increasing the diameter of the narrow segment by using oblique or angled incision.

2- Tapering technique used on the dilated segment by removing a triangular flap from the antimesenteric border and suturing it this will lead to tapering or narrowing of the dilated end.

Complications of intestinal anastomoses:-

1.leakage: escape of intestinal contents to the abdominal cavity due to a defect in performing Anastomosis, it could lead to peritonitis and septicemia.

2. Adhesions: it is always associated with everted anastomosis technique due to projection of mucosa which is already has large numbers of microorganisms

and mucous secretions which causing irritation and adhesion formation, and also the presence of blood will aids the development of adhesion.

3. Anastomosis dehiscence: it is the slipping of the Anastomosis site and separation of the intestinal segments from each other in few days after operation. It is an uncommon problem in animals, the exact cause of this condition is not well understood, in human it was reported in older patients with hepatic diseases and in patients having hypoproteinemia as well as in pregnant patients.

4. Stenosis: mostly associated with inverted anastomosis technique in which a two rows of suturing are applied. It not cause a severe problem in the small intestine, but it is serious when occurs in large intestine because of the nature of the content in large intestine is solid that may lead to blockage of the intestinal lumen at the site of stenosis

5. Ileus: it is the most important and serious complication following intestinal surgery, characterized by of peristaltic movement of the intestine (paralysis of intestine) due to sympathetic inhibition of the gut.

Clinical sings of ileus:-

1. Intestinal atony.
2. Distention and gas formation.
3. Loss of body fluids and electrolytes into the lumen of the dilated intestine.
4. Increased thirst.
5. Failure to defecate.
6. General depression.

Treatment of ileus:-

1. Correction of electrolytes and fluid imbalances.

2. Given of parasympathomimetic drugs, such as eserine, but it has limited effect when ileus is exists.

Large Intestinal Surgery

Congenital Abnormalities

Congenital abnormalities of rectum and anal canal are common in pigs, goats, sheep, cattle, and less common in horses, and it is also reported in human.

These abnormalities includes:

1- Atresia ani.
2- Atresia recti.
3- Recto-vaginal fistula.

Atresia ani:- in Atresia ani the anal membrane persist and not ruptured. In uncomplicated cases of Atresia ani there usually a depression where the anus should be and the sphincter is normal.

Clinical sings:-

1. The animal with Atresia ani whine and exhibits tenesmus.
2. The anus is absent.
3. Bulging of the perineum due to accumulation of feces.

Surgical treatment:-

1. The operation is performed under local infiltration.
2. A circular or cruciate incision applied on the bulge where the anus should be, and by careful blunt dissection the blind end of the rectum is exposed.
3. This is grasped gently with a forceps to pull it caudally to the newly created anal orifice.
4. The blind end of the rectum is then opened, and a series of sutures are inserted around the periphery of the skin and mucous membrane.

Atresia recti (Atresia ani et recti):-

when the blind end of the rectum is situated too far cranially, it has the same clinical sings of atresia ani, but there is no bulging of the anal site by the tenesmus of the animal or when pressure was applied on the abdomen

Surgical treatment:-

The blind end of the rectum must be identified and isolated through the abdomen.

1. After the rectum is mobilized, a tunnel is made bluntly through the

pelvic canal.
2. The rectum is then drawn through the tunnel and secured, incised, and sutured as in case of atresia ani.

There is another method for treatment of atresia recti by **colostomy**, it is accomplished by laparotomy and the blind end of the colon is brought out through the laparotomy incision and fixed with the skin or through another small skin incision away from the laparotomy incision, then the blind end of the colon is opened and fixed with the skin incision.

The prognosis of this condition always not good.

Rectovaginal Fistula:- Presence of duct communicate between the rectum and vagina.

This is seen in female, rarely in males , a rectourethral fistula may be present.

Clinical signs:-

1. Feces may be passed from the vagina.
2. In those rare cases of rectourethral fistula in the male, feces stained urine will be passed.

Surgical treatment:-

After making a perineal midline incision, the communicating tract between rectum and vagina is identified by dissection. The two structures are then separated, and the roof of the vagina is closed in a linear fashion.

Rectal prolapse:-

This refers to eversion of the caudal portion of the rectum through the anus, it most commonly occurs in young ages.

Causes of rectal prolapse:-

1. Heavily parasitized animals, parasites irritating the intestine which cause diarrhea, tenesmus, and subsequent prolapse.

2. Rectal prolapse may accompany intestinal foreign bodies or Neoplasia.
3. Rectal prolapse may occur during or following parturition or as a complication of prostatic disease.
4. Congenital weakness of the perineum.

Clinical sings:-

1. A cylindrical mass of varying length protrudes from the anus.
2. The exposed rectal mucosa may be ulcerated or necrotic if the prolapse has been present for some time.
3. The protruding mass often seems to be insensitive, and its manipulation causes no discomfort.
4. True rectal prolapse can be **differentiated** from an intussusception of small

intestine, colon or cranial portion of rectum that has passed through the anus by gently inserting a probe between the prolapsed anus and anal sphincter. The probe can be passed if an intussusception has occurred, but not if a prolapse is present

Treatment:-

1. The initiating lesion must be corrected to provide permanent relief.
2. When the prolapse is small, the tissues may be replaced following application of 5% alum or a saturated solution of sugar.
3. A purse-string suture around the anus may be sufficient to prevent recurrence. The suture must be loosened periodically for defecation.
4. If the operation is performed under epidural anesthesia, straining following reduction of the prolapse will be avoided for several hours.
5. The periodic application of a local anesthetic ointment further reduces the stimulus to strain

Amputation of rectal prolapse:-

When the prolapse has been longstanding and the tissues become necrotic, the prolapsed portion of the rectum should be amputated.

Surgical procedure:-

1. The operation can be performed under general or epidural anesthesia.
2. The patient should be positioned in ventral recumbency with the hind legs over the end of the table and the tail secured over the back.
3. A probe is inserted into the rectal lumen to serves as a guide.
4. Apply 3 horizontal mattress stay sutures (at 12 o'clock, 5 o'clock, and 8 o'clock position) through all layers of the prolapse just cranial to the proposed transaction site. These suture should enter the rectal lumen with the needle being deflected by the probe before being passed through the rectal tissue again.
5. Transect the traumatized tissue in stages caudal to the stay sutures.
6. After each stage of the resection, anatomically appose the transected edges with simple interrupted sutures (using 3/0 or 4/0 absorbable suture material). Space the sutures approximately 2mm apart and 2mm from the cut edge.
7. Remove the sutures and gently replace the anastomotic site in the pelvic or anal canal.
8. Apply purse-string suture around the anus if postoperative tenesmus is expected.

Anal sac infection and impaction:-

Anal sac impaction is an abnormal accumulation of anal sac secretions secondary to inflammation (anal saculitis), infection (anal sac abscess), or obstruction of the duct.

Anal sac diseases include impaction, infection, abscessation, and neoplasia. They are paired, lying between fibers of the anal sphincter. They serve as reservoirs of their secretions which is malodorous, pastelike consistency with dark brown color.

Clinical sings:-

1- Impaction causes the dog to lick or bite the area or slide the anus on the ground in an attempt to relieve the irritation and pain produced by inflammation and pressure. This will lead to trauma and excoriation of the skin and perhaps abscessation of the anal sacs.

2- The anal sacs are examined by introducing a lubricated gloved index finger into the anus slowly and gently. The distended sacs are readily felt below and on each side of the anus. They should be massaged gently and evacuated by squeezing the sacs gently between index finger and thumb.

3- When the wall of the anal sac is infected, the contents usually are purulent and may be blood-streaked.

4- Chronic infection of the anal sac caused the dog to lick the perineum frequently.

Treatment:-

Unless infection is present periodic evacuation of the sacs is sufficient. If infection appear to be present a sample of the contents should be cultured and a suitable antibiotics is instilled into them. If this fails, the sacs should be surgically removed.

There are 2 surgical techniques for removal of the sacs (sacculectomy)

A. Closed technique:-

1. Insert a small probe, hemostat, or balloon-tip catheter into the orifice of the anal sac duct. Advance the instrument or inflate the balloon with saline until the lateral extent of the sac is identified. Other alternatives are infusion of wax, plaster of paris, or insertion of cotton thread into the sacs.

2. Make a curve linear incision over the anal sac.
3. Dissecting directly against the anal sac, separate the internal and external anal sphincter muscle fibers from the sac with small scissors.
4. Avoid excising or traumatizing the muscles or the caudal rectal artery

medial to the duct.
5. Continue dissecting to free the sac and duct to its mucocutaneous junction at the anal canal.
6. Place a ligature around the duct at the mucocutaneous junction using 4/ 0 absorbable suture.
7. Excise the anal sac and duct, then inspect for completeness of removal.
8. Control hemorrhage with ligatures, electrocoagulation, or pressure.
9. Lavage the tissue thoroughly.
10. Appose the subcutaneous with 4/0 absorbable suture using interrupted pattern.
11. Appose the skin with 3/0 or 4/0 nonabsorbable suture.

B- Open technique:-

1. Place a scissors blade or groove director into the duct of the anal sac.
2. Apply medial traction on the duct while incising through the skin, subcutaneous tissue, external anal sphincter, duct and sac. Continue the incision to the lateral extent of the anal sac.
3. Elevate the cut edge of the sac and use small scissors to dissect the sac free of its attachment to muscle and surrounding tissue.
4. Complete the procedure the same as for a closed technique.

Postoperative care:-

1. Systemic analgesics should be given as necessary.
2. The perianal area should be kept clean, and an Elizabthan collar or similar restraint device should be used to prevent the animal from licking the sites.

3. Food and water may be offered 8-10 hours postoperatively if no vomiting has been noted.
4. A stool softener may be added to the food for 2 to 3 weeks.
5. The surgical site should be monitored for sings of infection or drainage, and the rectum and perianal area should be palpated for evidence of stricture when sutures are removed at 7 to 10 days.
6. Fecal continence may be impaired during the healing process, but usually returns to normal within several weeks.

Closed technique for anal sacculectomy

A. locate the anal sacs at the 4 o'clock to 5 o'clock and 7 o'clock to 8 o'clock positions between the internal and external anal sphincter

muscles, insert a small probe, hemostat, or balloon- tip catheter into the anal sac. Dashed lines indicates incision location.

B. Make an incision at the lateral aspect of the anal sac and carefully dissect the sac from the sphincter muscle fibers.

C. Ligate the duct near the orifice.

Open technique for anal sacculectomy

A. Insert the bleed of scissors into the sac and incise through the skin, subcutaneous tissue, external anal sphincter, and anal sac.

B. Elevate the cut edge of the sac, and dissect it from the anal sphincter.

C. Oppose the sphincter, subcutaneous tissue, and skin