



Surgery



Tikrit University  
College of Veterinary Medicine

# Digestive System

## Small Intestinal

Subject name: Surgery

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# Small Intestinal Surgery

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

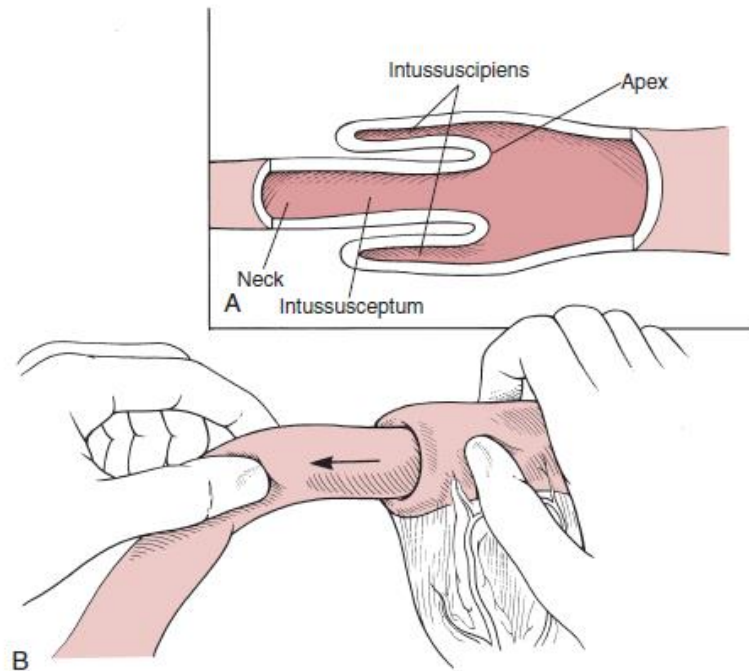
### 1-Intestinal foreign body:-

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 (intussusciens) 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).

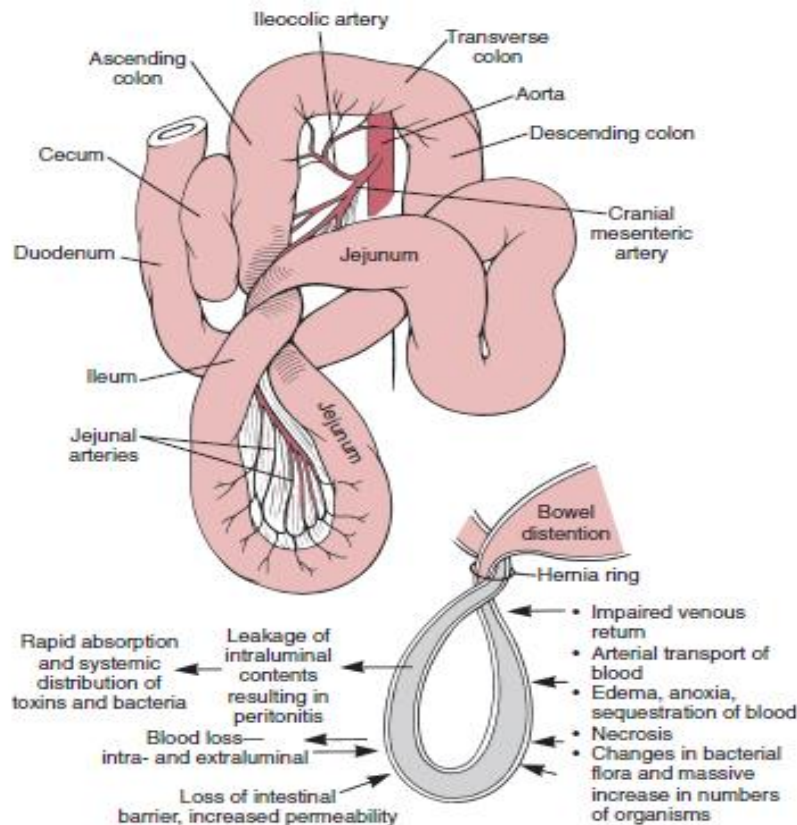
The exact cause of this disorder is unknown, but it is probably due to abnormalities of peristalsis. Any factors that alter intestinal motility could therefore lead to the development of the condition. These factors include heavy ascarid infection, sudden dietary changes, enteritis (canine distemper)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



**FIG 20-116.** **A**, Configuration of an intussusception: neck, intussusceptum, apex, intussuscipiens. **B**, To reduce an intussusception, place traction on the neck as you milk the apex out of the intussuscipiens.

### 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.



**FIG 20-122.** Pathophysiologic events associated with strangulating intestinal obstructions.

#### 4-Traumatic injuries:-

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

Penetrating wounds, such as gunshot 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 signs 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 histopathologic confirmation should be performed.

#### 6- Volvulus:-

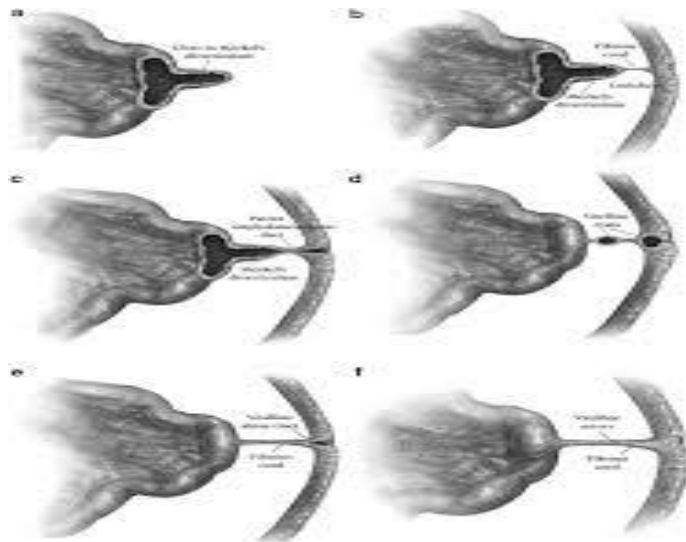
It is produced by a 180 degree or greater rotation of a segment of jejunum or ileum about the long axis of the mesentery. Volvulus is uncommon in the small animals because of the short mesenteric attachments.

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

## Embryonic Anomalies of Small Intestine

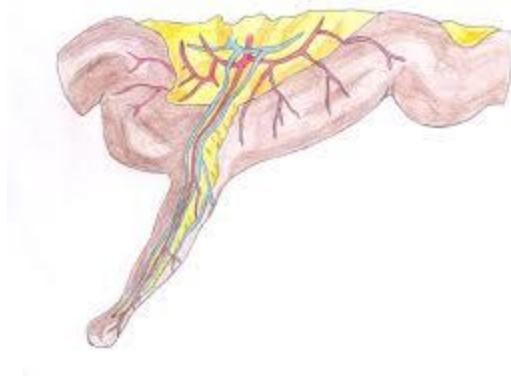
### 1-Meckel's Diverticulum:-

This results from persistence of a portion of the omphalo-mesenteric (vitelline) 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 causes Volvulus to the small intestine.



### 2-Mesodiverticular bands:-

It is formed by persistence of a distal segment of a vitelline 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 Signs of Intestinal Lesions

Clinical signs depend upon the location of the intestinal lesion and whether the lesion has totally or partially obstructed the lumen. Both total and partial obstruction have the signs 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 signs 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 signs also depend on whether it is a proximal or distal obstruction:

### Distal obstruction

1. The onset of the obvious clinical signs 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 are 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 earlier in 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.

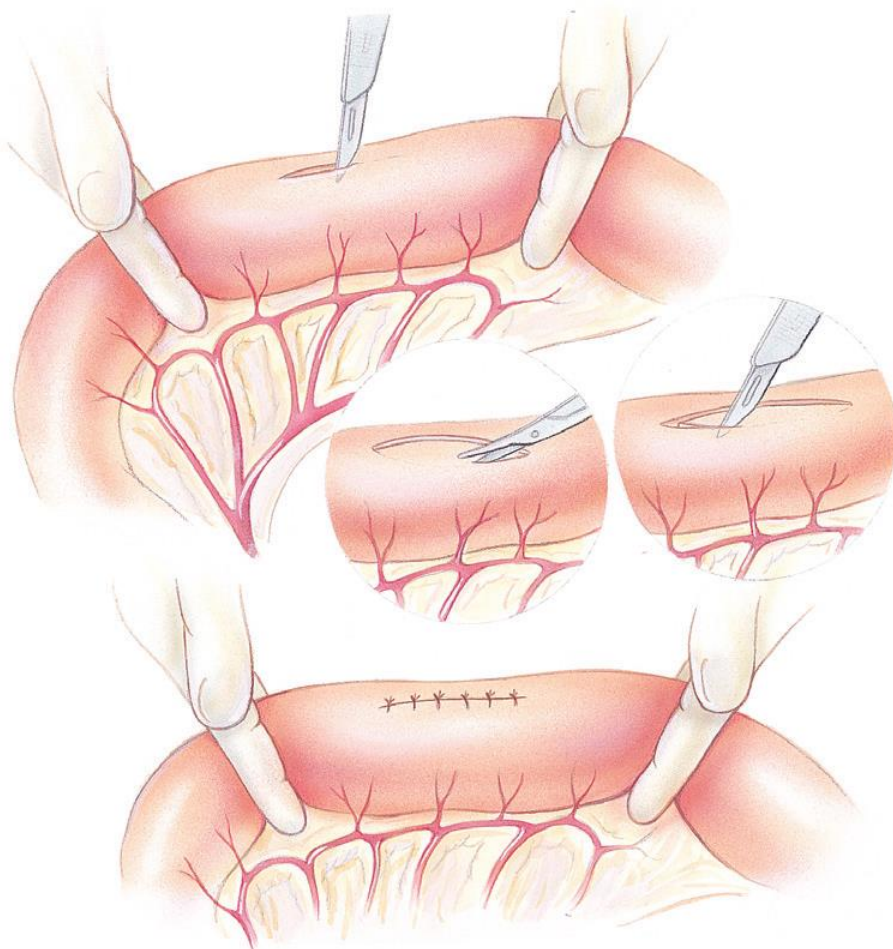
**Enterotomy and Intestinal Resection and Anastomoses****Enterotomy:-**

**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.

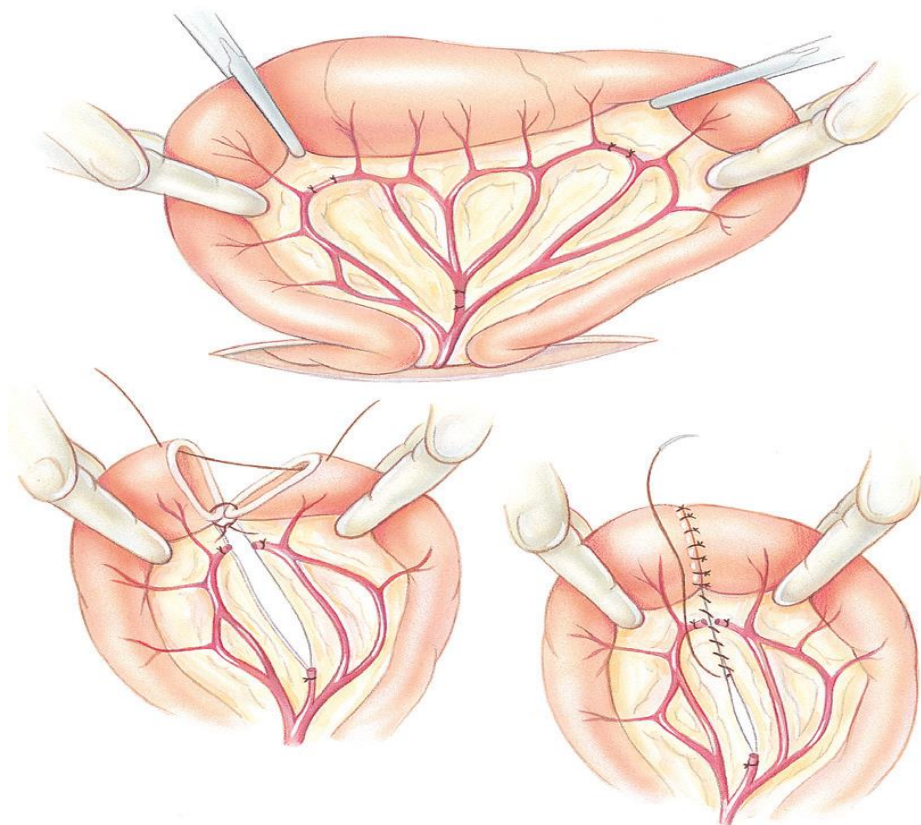
### **Indications of intestinal resection:-**

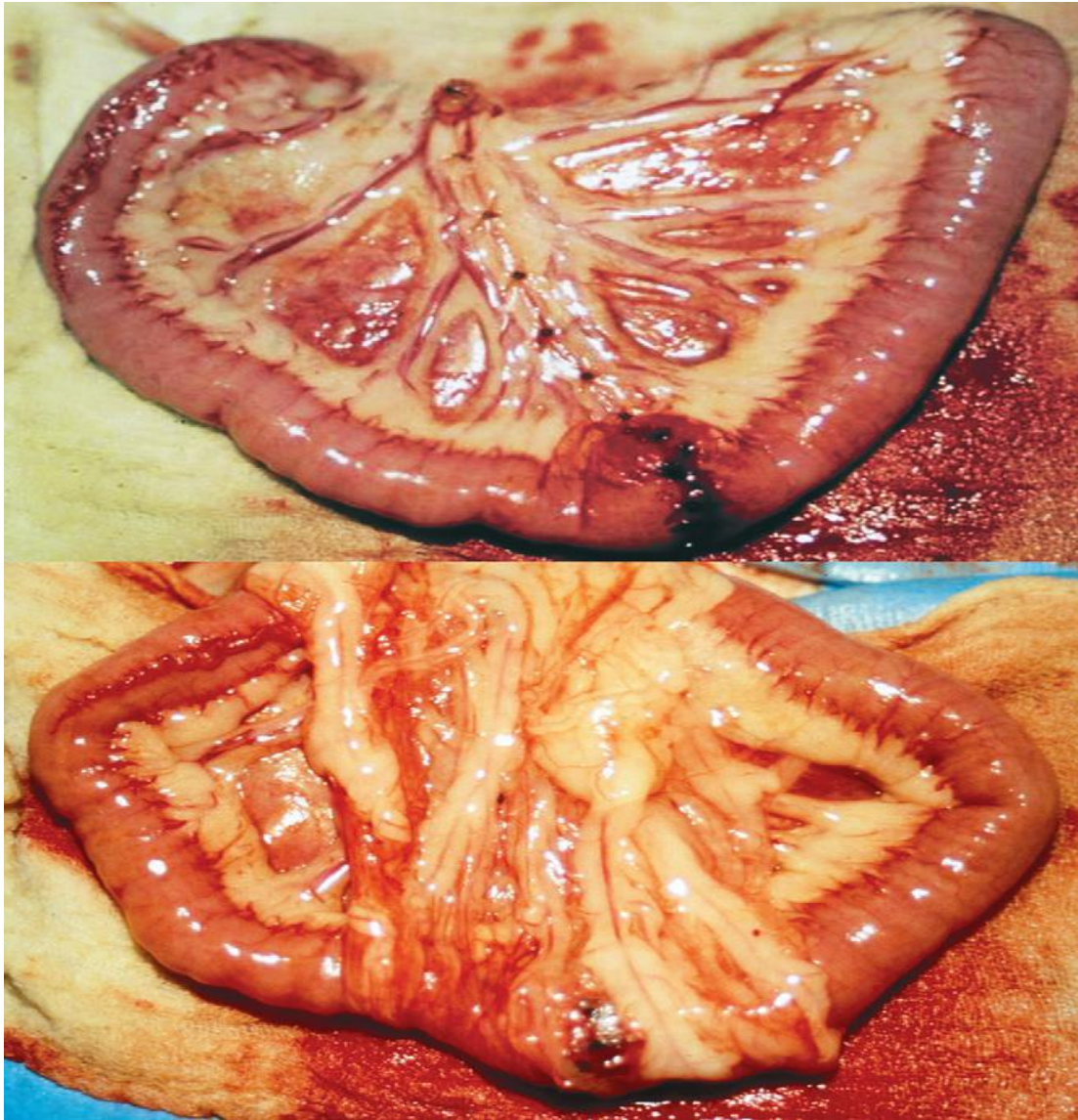
1. Injury to the intestinal wall, or tears in the mesentery along the intestinesenteric border.

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 be classified into:-**

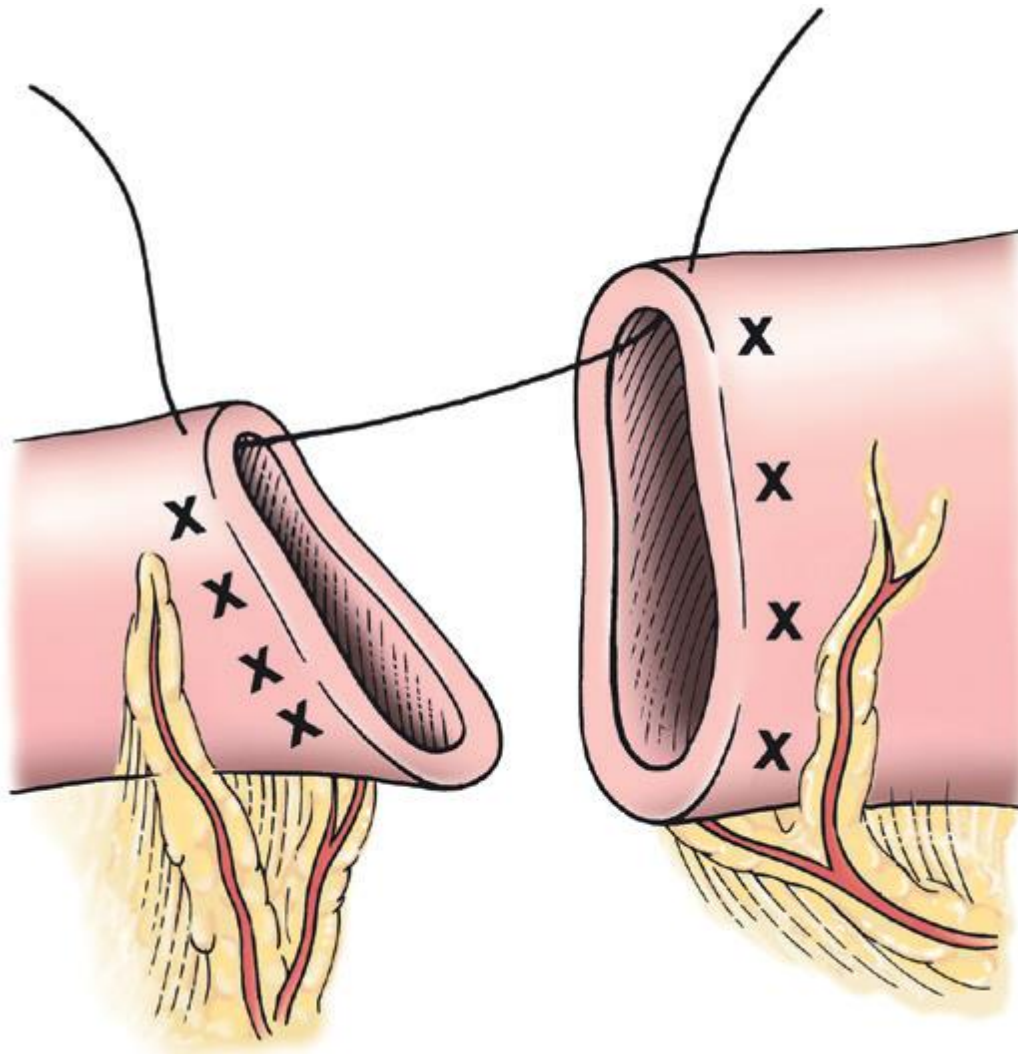
1. Inverting technique:- In this technique the edges of the incision was rolled inside the lumen leading to serosa to serosa contact. This technique can be accomplished by single row of continuous Connell suture pattern, if there is a leak from the anastomosis site appear, a second row of crushing suture 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 be 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.

