COLLEGE OF VETERINARY MEDICINE

UNIVERSITY OF AGRICULTURE

ABEOKUTA

LECTURE NOTES

COURSE TITLE: SOFT TISSUE SURGERY AND LAMENESS

COURSE CODE: VCS 503 **COURSE UNIT: 3**

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ABDOMINAL SURGERY

- **SURGICAL CONDITION OF THE RUMINANT**
  STOMACH RUMINANT TYMPANY
  ABOMASAL DISLACEMENT
  ABOMASAL TORSION
  TRAUMATIC RETICULITIS

- **SURGERY OF THE RUMINANT STOMACH**
  RUMENOTOMY/RUMENOSTOMY
  ABOMASOPEXY

- **SURGICAL CONDITION OF THE INTESTINE**
  MECHANICAL OBSTRUCTION
    FOREIGN BODIES
    TUMUORS
    TRAUMA
  ANATOMICAL/FUNCTIONAL OBSTRUCTION
    VAGOTONIA
    INTUSSUSCEPTION/VOLVULUS
    STRANGULATION

- **SURGERY OF THE INTESTINE**
  ENTEROTOMY
  RESECTION AND ANASTOMOSIS

- **COLIC IN HORSES**

LECTURE 17: SURGICAL CONDITION OF THE RUMINANT STOMACH [RUMINANT TYMPANY AND ABOMASAL DISLACEMENT]

INTRODUCTION

- Surgical conditions of the ruminant stomach usually manifest as distended abdomen which result into pain and general discomfort to the animal
- There could be reduced or absence of ruminal movement and rumination
- In ruminal tympany, there is distention of the rumen with gas of fermentation (bloat). The abdomen assumes a drum/barrel-like condition and mechanical obstruction of the esophagus or intestine and constipation could result into this.
- Abomasal displacement could be to the left i.e Left displacement of abomasums (LDA) or right i.e Right dilatation and displacement (RDA)

AETIOLOGY

- Ruminant tympany could be acute or chronic:
  Acute ruminal tympany could result from:
  i. Mechanical esophageal obstruction (choke) by foreign bodies e.g potatoes, mango, apple fruits
  ii. Sudden access to grains or very lush pasture

  Chronic ruminal tympany could result from:
  i Chronic reticulitis, commonly with adhension formation, with signs reflecting poor ruminal movement subsequent to vagal nerve injury.
  ii. Esophageal cancer (e.g alimentary lymphosarcoma)
  iii. Mediastinal lymph node enlargement; nodes resting dorsal to esophagus and effectively preventing eructation due to chronic systemic lymphadenopathy e.g pneumonia or actinobacillosis.

- Displacement of abomasum could result from:
  Abomasal hypomotility and hypotonicity resulting in delay emptying due to
  i Diet: high concentrate intake, often with high fat and or protein with relatively low fibre
  ii. Overeating or sudden change in feed
  iii Re-arrangement of viscera associated with stress/force of parturition

  Abomasal tortion in which the mechanical movement involved are not well understood.

HISTORY, CLINICAL SIGNS AND DIAGNOSIS

- History may reveal sudden onset of partial or complete anorexia, dullness and slightly apprehensive appearance.
- There could be severe drop in milk yields in dairy cattle

- The back is hunched and the abdomen assume a barrel-like condition with stiff gait
- Salivation becomes excessive while the head and neck are extended, raised and lowered frequently.
- There may be frequent coughing due to excessive salivation in the pharyngeal region
- There may also be mild constipation initially and later some diarrhea (especially in LDA)
- Diagnosis is based on presenting history and clinical signs.
- Auscultation of left flank gives pathognomonic high piched metallic tinkling sounds(over middle area bounded by ribs 10-13) in LDA
- Corresponding area of resonance is detected by applying stethoscope and by flicking fore finger against rib cage; echo-like sound heard in LDA is quite different from dull noise heard with rumen closely applied to left body wall.

MANAGEMENT

- Rumenotomy (e.g with trocar and cannular) can easily relieve a case of acute ruminal tympany
- Iodides and or antibiotics may be indicated in chronic systemic lymphadenopathy due to actinobacillosis or pneumonia.
- Abomasal replacement by rolling from right side to left
- Rumenotomy to correct ruminal impaction and abomasopexy as adjunct to abomasal replacement in LDA/RDA
- Increase exercise by turning animal to graze or yard
- Maintain access to bulk folder as high priority.

TRAUMATIC RETICULITIS (HARDWARE DISEASE)

- The incidence is higher in dairy cattle and animals grazing in areas near construction sites.
- Most foreign bodies ingested by cattles such as nails, rusting fencing wire, brooms, bristles e.t.c are pushed forwards by ruminal contractions into the honey comb reticulum which contract and the foreign body may penetrate into the mucosa while some such as small stones may fail to penetrate the rumino-reticular wall and remain in the rumen.
- The common site for entrapment is the cranial and ventral reticular wall.
- Penetration of 5-7mm depth results in perforation of visceral peritoneum and traumatizing of opposing parietal peritoneum, diaphragm and occasionally the abdominal wall and liver.

CLINICAL SIGNS AND DIAGNOSIS

- In the acute stage; there is sudden onset of anorexia, dullness, severe drop in milk yield, stiff gait, slightly hunched back and mild ruminal tymmpany.
- Some pneumoperitoneum, slight expiratory grunt, hard f

LECTURE 18: SURGERY OF THE RUMINANT STOMACH [RUMENOTOMY/RUMENOSTOMY AND ABOMASOPEXY]

I RUMENOTOMY/RUMENOSTOMY

INDICATION

- Removal of foreign body in traumatic reticulitis or traumatic reticuloperitonitis
- Gross severe rumen overload (grain overload) involving acidosis following sudden ingestion of large volume of concentrates (e.g corn, barly,wheat e.t.c)
- Exploratory purpose e.g in chronic intermittent ruminal tympany
- Experimental fistulation for study/reseach purpose.
- Ruminal impaction

ANAESTHESIA REQUIREMENT

- Local infilteration in inverted "L" or paravertebral analgesia [T13-L2] with 2% lignocaine having premedicated (sedated) with xylazine Hcl

SURGICAL TECHNIQUE

Make a left flank laparotomy incision as follows:

Clip/shave generously and scrub a wide area of left flank

- Drape with sterile green clothes or rubber drape with appropriate window
- Make a full skin incision in single scalpel movement to exposed abdominal wall musculature (the paracostal incision should be about 15cm long, about 5cm behind the last rib and starting 10cm below lumbar transverse processes.
- Using a myoscissors, bluntly dissect the abdominal muscles and expose the underlying transverse facia which is transect to reveal the parietal peritoneum
- Pick up the parietal peritoneum with rat-tooth forceps and make a small vertical incision wuth scissors and extend it to correspond with length and direction of skin incision. (air rushes audibly into the abdominal cavity at this point creating pneumoperitoneum, and contact suface of ruminal wall drops away as abdominal wall moves laterally).
- To make an incision on he rumen (i.e rumenotomy) or create a "hole or window" on the rumen (i.e rumenostomy)
- Exteriorize the rumen using a Weingart frame or stay stuture and place sterile clothe or rubber drapes completely around the exteriorized rumen between the frame and abdominal wall to minimize or prevent contamination
- Make a stab ruminal incision with scalpel tip and extend it to the desired length.
- Siphon off any excessive fluid and remove any solid material causing obstruction.
- Pass arm cranially and vertically over U- shaped ruminoreticular pillar and explore reticulum methodically (evidence of adhesions already palpated during intra-abdominal exploration may lead hand to a particular area).

- Identify and examine the cardia and esophageal groove areas as well as the medial wall and examine the reticular floor and the cranial wall.
- Remove loose reticular foreign bodies and search for pointed longitudinal foreign bodies lodged in secondary reticular cells.
- If penetrating foreign body is found, note the depth and direction of penetration to consider the likely structures damaged at this time to aid prognosis.
- To clode the ruminal incision, remove the small ruminal clips of the Weingart frame or stay suture and clean the peritoneal surface before and after ;lacing the two suture layers (a continuous Cushing inversion suture of 4.0 chromic catgut and continuous Lembert inversion suture of similat material).
- Clean the rumen again with sterile saline and release the large forceps to permit the rumen to drop baack into the abdominal cavity.
- Close the laparotomy incision routinely

POST OPERATIVE CARE

- Give systemic antibiotics for 3 days
- Put animal in clean pen with fresh bedding
- Feed little quantity of forage for few days
- Apply antibiotic wound spray on the incision wound
- Remove skin suture after 8-10days post operation.

POSSIBLE COMPLICATION AND MANAGEMENT

- Wound dehiscence (control infection with antibiotics & ensure that sutures are appropriately placed).
- Peritonitis (treat systematically with antibiotics & minimize spillage/contamination during surgery).

II. ABOMASOPEXY

INTRODUCTION

- Fixation of a replaced abomasums, after correction of a displacement by suturing the abomasal wall or it attached omentum to the abdominal wall.
- The abomasums normally lies on the abdominal floor slightly to the right of the midline and it greater curvature gives attachment to the superficial part of the great omentum which arises from the left groove of the rumen.
- In LDA, the abomasums becomes trapped between the left side of the rumen and the rumen and the left abdominal wall; this in turn leads to a change in position of the omasum and a downward displacement of the duodenum mediated through the omental attachment between the lesser curvature of the abomasums and the duodenum.

INDICATION

- As adjunct to correction of LDA, RDA and abomasal tortion.

SURGICAL TECHNIQUE

- Left flank approach (Utrecht Method of fixation) shall be discussed because its more simpler and effective than other methods.
- Make deft paracostal incision as for exploratory laparotomy
- Evacuate gas from abomasum and push it down to midline.
- Suture the wall of abomasums through the greater omentum to the abdominal midline, midway between xiphisternum and umbilicus with 2cm apart using non-absorbable suture material (polyamide polymer).
- Ensure that there is no interposition of jejunal loops while suturing.
- Close abdominal flank incision routinely.

POST OPERATIVE, COMPLICATION & MANAGEMENT

- As for rumenotomy/rumenostomy.

LECTURE 20: SURGICAL CONDITION OF THE INTESTINE [FOREIGN BODY, MECHANICAL & ANATOMICAL/FUNCTION OBSTRUCTION]

INTRODUCTION

- Intestinal obstruction (IO)is a blockage of the flow of intestinal contents (chyme)
- It can be complete or partial; mechanical or functional.
- Complete obstruction causes significant and early clinical signs while partial obstruction causes few or no signs (and signs may arise later).
- The most important initial physiologic effect (clinical signs) of complete acute bowed obstruction is fluid and electrolyte imbalance due to vomiting and progressive dehydration
- Vomiting and dehydration leads to hypovolemia, poor tissue perfusion and eventual circulatory collapse
- A mechanical obstruction can be due to an extensive intramural or intraluminal causes e.g a foreign body (bone,ball or toy) or tumor
- Functional obstruction is often due to hypo-dynamic state such as illus and strangulation of the blood supply to the loop of bowel
- Also Vagotonia (disruption of vagus nerve) can lead to vagal indigestion which is a type of functional obstruction.
- Some conditions that could lead to IO (i.e differential diagnosis) include:
    - Foreign bodies
    - Tumors(e.g Adenocarcinomas, Leiomyomas & Lymphosarcomas)
    - Intussusception (entrapment into inguinal, diaphragmatic, umbilical or

peritoneal hernias OR through a rent in the intestinal mesentery).

- Volvulus
- Strangulation
- Vagotonia

HISTORY, CLINICAL SIGNS AND DIAGNOSIS

- Animals with intestinal obstruction are often presented with a history of vomition, and general malaise.
- Vomiting is often first noticed post pradial but eventually becomes independent of food intake.
- Anorexia ensures and the general physical status may worsen rapidly. Diarrhea may also be noticed if the obstruction is due to intussusception.
- The most obvious clinical signs are general discomfort, vomition, and diarrhea which may sometimes be bloody especially if the cause is due to intussusception
- Foreign bodies with sharp edges such as bone rarely cause complete bowel obstruction but tend to perforate the intestinal wall. This results into recting and vomition, dehydration and depression.
- Obstruction caused by tumours are usually malignant and it affects middle-aged to older animals. Chronic diarrhea abdominal effusion are suggestive of neoplasia. A palpable abdominal mass may or may not be felt.
- In intussusceptions and volvulus obstruction, affected patient have diarrhea usually fetid and bloody and abdominal pain, while vomition may be an inconsitent clinical and signs.
- DIAGNOSIS: of intestinal obstruction are based on the combination of history, clinical signs and physical examination
- Survey radiography, which is perhaps the most useful aid in diagnosing bowel obstruction often reveals presence of segmented dilated loops of bowel
- Gas filled loops of bowel in the thorax indicates diaphragmatic hernia; groin(inguinal hernia): ventral abdominal subcutaneous tissues (umbilical hernia) are diagnostic.
- Peritonitis resulting from rupture or impending rupture of the bowel is represented by loss of regional detail.
- The actual foreign body may or may not be identifiable on the plain radiograph, in which case , contrast medium like barium sulphate (if perforation is not anticipated) or a water soluble media like diatrizoate meglumine is introduced
- Loss of abdominal detail coupled with dilated loops of bowel and free gas in the peritoneum is associated with peritonitis.

MANAGEMENT

- Since most animals presented with surgical disorders of the intestine are often physiologically compromised to some extent correcting fluid and electrolyte imbalances before surgery is often desirable whenever feasible.

- Enterotomy
- Resection and anastomosis

LECTURE 21: SURGERY OF THE INTESTINE [ENTEROTOMY, RESECTION AND ANASTOMOSIS]

ENTEROTOMY

Definition : incision into the intestine.

INDICATION

- Intraluminal intestine foreign body obstruction
- Exploratory examination of intestinal lumen for evidence of mucosal ulceration, stricture or neoplasia

ANAESTHETIC REQUIREMENT

General anaesthesia with Xylazine/ketamine or O_2 / halothane

SURGICAL TECHIQUE

- Make a ventral midline laparotomy incision from the xiphoid to the pubis.
- Applied an abdominal retractor (preferably self retaining) with moistened laparotomy sponges to the incision wound edges.
- Isolate the affected bowel segment from the other visceral with saline soaked with sponges (the intestine proximal to the obstruction is often distended with fluid and has a congested or cyanotic appearance).
- Locate the obstruction, milk the ingesta away from the foreign body and apply bowel the site of obstruction in order to avoid the spillage of the intestinal content when the bowel wall is opened.
- With a No 15 scalpel blade, make a full thickness longitudinal incision on the anti-mesenteric border of the intestine in the viable tissue immediately distal to the foreign body (the length of the enterotomy should approximates the diameter of the foreign body).
- Gently manipulate the foreign body through the enterotomy taking care not to tear the incision margin.
- Aspirate any intestinal content and close the incision with an inverted suture(mattress) which penetrates the full thickness of the intestinal wall using an a-traumatic needle on 3-0 chromic catgut, poly-glycolic acid, poly-dioxanone or polyglyctin.
- In chronically ill/debilitated patient that is hypoproteineamic,where enterotomy leakage is more likely to occur,a continuous inverting Cushing pattern gives good serosa-serosa apposition and luminal bursting strength that exceed those of the interrupted pattern.
- Test for leakage by putting normal saline in 5ml syringe and inject into the intestine. Correct leakage by placing more sutures
- Close abdominal wall routinely

POST OPERATIVE CARE

- Continue replacement intravenous fluid and electrolyte therapy until dehydration, acid-base imbalances and electrolyte abnormalities are resolved.
- Parenteral prophylactic antibiotics therapy
- Provide bland diet 24-48 hours after surgery in the absence of vomition.

POSSIBLE COMPLICATION AND MANAGEMENT

Peritonitis is usually due to leakage from enterotomy

Abdominal paracentesis or diagnostic lavage should be perform

If a septic exudates is present, early exploration of the abdomen is indicated in which case resection and anastomosis may be carried out.

Haemoperitoneum

Haemorrhage

Adhension

Herniation

Ileus

II. RESECTION AND ANASTOMOSIS

DEFINITION

Excision of an unhealthy portion/segment of the intestine and repositioning of viable Tissues

INDICATION

- Ischemic necrosis
- Neoplasm
- Irreducible intussusception

ANESTHETIC REQUIREMENT

As for enterotomy

SURGICAL CONSIDERATION

- Make a standard ventral midline laparotomy incision from the Xiphoid to the pubis and shield the incision with moistened laparotomy sponges
- Exteriorize the segment to be removed and isolate it between the fingers of an assistant or clamped with intestinal forceps.
- Isolate and ligate the mesenteric blood supply to the devitalized area
- Severe the damaged section of bowel using a scalpel or very sharp scissors angled so that the mesenteric border is left longer than the anti-mesenteric border.(this allows adequate blood supply to the mesenteric border)
- After resection, there is often is often a marked difference in the lumen size of the two ends of the intestine. And the smaller piece can be trimmed off at an angle to reduce the sisparety
- Hhold the open ends of the intestine side ty side by bowel clamps and place stay sutures to minimize trauma. Anastomose(i.e suture/close) together by a simgle mattress stitches whiacccch are placed 3-5mm apart ; tie the knotswithin the lumen of the intestine.

- Closure is cattied out with a non traumatic needle on 3-0 chromic catgut, ploly glactin 91- or p;lyglycolic acid
- Test for the integrity of the anastomosis vy fillig the occluded segment with saline
- Close the mesenteric incision with 3-0 chromic catgut
- Close abdominal wall routinely

POST OPERATIVE CARE, COMMPLICATION AND MANAGEMENT
AS FOR eenterotomy.

LECTURE 22: COLIC IN HORSES

INTRODUCTION

- Colic is a term coined centuries ago for gastrointestinal diseases
- It is derived from the word 'colon' which is the presumed seat of the disorder
- The term colic have come to apply to all pathological states in which the animal exhibits behavior strongly indicative of pain or discomfort arising from the abdomen
- Colic is not a disease but a symptom of an undergoing disease/condition and it represent a challenge of differential diagnosis
- Colic may be a feature of the following disease groups (i.e differential diagnosis)
  Stomach & intestinal diseases
  Liver & biliary diseases
  Diseases of the uroginital organ

Locomator system (e.g back pain & laminitis)
Starvation or thirst

AETIIOLOGY AND PATHOGENESIS

- The actaual cause of colic is unknown but there is no question that the anatomic peculiarities of the eqione GIT plays an essential role as a predisposing factor for the condition
- The hhorse's relative inability to vomit makes emptying more difficult if the stomach becomes distended; which may resilts into gastriv rupture
- Impaction are the most common causes of colic in horses
- Some risk factors for colic inckude:
  Gastrointestinal parasites fe.g strongylus vulgaris parascaris equrum and anoplocephala perfoliata

Poor dentition, age or debility
Foreign bodies ingestion eg plastic sand wood etc acan lead to fecalith enteropathy and obstipation of the ascending colon
Restriction of water supply
Duet /feeding errirs
History of previous colic
Metereologic factors(weather changes, thunderstorms

- Typical pain of colic is caused by spasm in the intestinal wall and three conditions are distinguished as follows