Equine Colic Exam and Key Colics

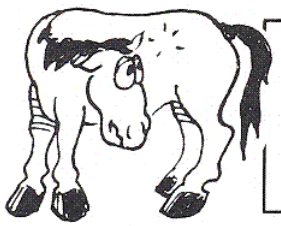
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Colic

54

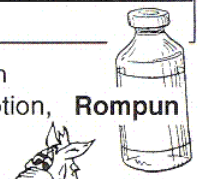
DIGESTIVE SYSTEM

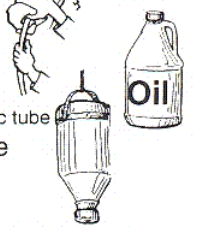
Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Colic M8k 165; Mk 168; IM 124, 680; I2M 749; EM&S 514; E 524; C4T 174; C3T 190; M 206; S 348; Pic 42	• **Manifestation of abd. pain** - **Visceral abdominal pain** (pushing on abdomen doesn't cause pain unless touching effected organ) - **Parietal abdominal pain**: peritonitis . External palpation elicits pain • **Basic causes** 1• Distention of gut w/ fluid, gas or ingesta 2• Pulling on root of mesentery 3• Ischemia or infarction • Horses: low threshold of pain, mild indigestion causes pain • **If severe - shock** - Infarctive diz (volvulus, torsion, thromboembolism) - Severe visceral distention (extreme flatulence, impaction or dilation) • **Severe, unrelenting pain potentially life threatening** • **90% uncomplicated & respond to analgesic Tx**	• **Signs of pain variable**, acute, chronic, or intermittent - Restlessness - Lying down & getting up - **Rolling** - **Sweating** - Kicking at abdomen - Sudden drop to ground in pain - **Flank watching** - Abnormal posturing • **Self inflicted trauma** • Anorexia & depression • ↑ HR w/ weak pulse • ↑ Capillary refill time • Cold extremities • Mucous membranes - Bright red (vasodilation) followed by dark red (vasoconstriction) if cardiovascular involvement • **Shock if severe**	• **History** (Hx) - **Insurance** • **10 P's** (see pg 56): - **Physical exam** (attitude, teeth, breath) - **Pain** - severity: continuous & progressive or intermittent - **Pulse: > 60 beats/min.;** pass nasogastric tube . Digital pulse - laminitis - **Perfusion** - mucous membranes, refill time, temp. extremities - **Peristalsis**: absent; ominous - **Percussion**: "ping" for gas - **Pass nasogastric tube** - **Palpation per rectum** - **Peritoneal tap** . Protein: normal < 2.5 g/dl . Cells: normal betw. 5-10,000 . Bact. in WBCs or free . Plant material w/ WBCs: rupture = euthanasia - **PCV & TPR** - PCV ≤ 45% PCV: > 85% survival > 60% PCV: 25% survival	**COLIC SURGERY OR MEDICINE?** approach depending on value of horse, if Sx not an option, treat medically or euthanize (insurance?) • **Medical Tx of Colic** - **Analgesia** - Xylazine DOC, Banamine® - **Decompression** - nasogastric tube - **Fluid** therapy, oral or IV, usually both - **Gallon of mineral oil**: need pump on nasogastric tube - NO phenothiazine tranquilizers, no atropine • **Colic Surgery** - **Do NOT do unnecessary laparotomies** - **Earlier** the decision for surgery, the better for recovery . Stabilize before surgery, pre-op fluids, ABs - Ampicillin DOC, Banamine® . Anesthesia: - Xylazine/ketamine comb. w/ glycerol glycolate - Isoflurane . Dors. recumbency, ventral midline incision - **Work through all of the intestinal tract** - **Decompress intestine** - **Correct problem** (Pelvic flexure enterotomy, Small intestine - resection & anastomosis) - Post op: . Incidence of infection high . Abdominal bandaging . Fast 24 hr post op, started back on small. amount of hay . Intestinal motility stimulators (drugs), metoclopramide

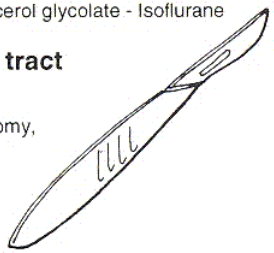


Abdominal pain
CS: Sequela - Shock
Dx: 10 P's
Sx or Rx Tx?
90% Respond to analgesics

CS requiring surgery
- Severe abd. pain poorly or nonresponsive to analgesics
- Discolored peritoneal fluid w/ ↑ prot., RBCs & WBCs
- Rectal exam: obstruction &/or displacement of viscera
- Progressive deterioration of cardiovascular status w/ abd. pain & uncertain Dx
- Significant gastric reflux
- Recurrent abdominal pain w/ uncertain cause







Prognosis:
- **Colic: excellent, 90% respond to analgesics**
- **Surgery: Guarded to poor**
  - 50% recovery from colic surgery
  - HR of 100, survival about 30%
  - PCV > 60%, 25% survival

Equine Colic Exam and Key Colics

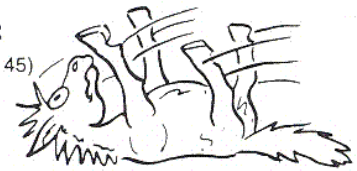
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

CAUSES - COLIC

pg 337 or IM 127, 128

COMMON CAUSES:

- **GI - common causes**
  - Gas distention of intest., cecum or colon (pg 63)
  - Hypermotility & intestinal spasms (pg 63)
  - Feed impaction, constipation (pg 77, 78)
  - Meconium impaction (newborn) (pg 83)
  - Gastric ulcers (foal) (pg 26)
- **Extra - GI**
  - Mesenteric abscess (pg 65)
  - Ovarian tumor, abscess, or hematoma (pg 188)
  - Parturition (pg 224)
  - Acute hepatitis or hepatic lipidosis (pg 88)
  - Diaphragmatic hernia (pg 71)
  - Ruptured bladder (foal) (pg 155)
  - Urinary tract, urolithiasis (pg 152)
  - Uterine torsions (pg 232)
- **TOXIC CAUSES:**
  - Blister beetle (pg 45)
  - Warfarin (pg 143)
  - Herbicides
  - Lead (pg 269)
  - Phenylbutazone or other NSAIDs (pg 27)
  - Poisonous plants (pg 313-332)



LESS & UNCOMMON CAUSES

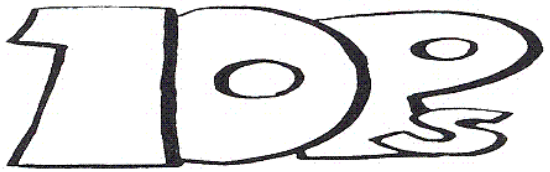
(See pg 336 or IM 127, 128)

From *Large Animal Internal Medicine*, B.P. Smith, Mosby Co., pg. 127-128

DIAGNOSIS (expanded)

History (Hx)

- **Nature & duration** (continuous, severe colic worse than intermittent mild colic)
- **Progression of pain**
- **Medication** (given by owner or another vet that could mask pain)
  - Evaluate cardiovascular status before giving any drug
- **Initiating factors**: changes in diet, water consumption, exercise or weather; but m/ have no apparent initiating factors
- Deworming history
- Past episodes of colic, history of colic on farm?
- Breeding hist. (uterine torsions [late gestation], colonic impaction [postpartum], scrotal or inguinal hernias [stud])
- Feces: when last passed?
- Value of horse to owner, esp. if surgery possible
- **Insurance:** notify insurance carrier if surgery is considered, need permission



10 P's: **P**hysical exam, **P**ain, **P**ulse, **P**erfusion, **P**eristalsis, **P**ercussion, **P**alp. per rectum, **P**ass nasogastric tube, **P**CV & TPR & **P**eritoneal tap

1• Physical exam

- Attitude of horse
  - . Fever &/or CNS depression rather than colic need medical Tx, not surgical usually
- Abrasions, rolling, or standing calmly
- Xylazine, better if not used (sometimes so painful, hard to examine w/o)
- **Sweating**
- **Abdominal distention**
  - . Adult - distended flank - lg. intest. disorder causing obstruction & distention
  - . Foal - distention w/ small or large intestinal lesions
- **TPR** - Rectal temp.
  - . Respiratory rate (rate & quality [eupnea, tachypnea, dyspnea])
- Check teeth for points (poor mastication m/ predispose to intestinal impaction)
- Foul breath - implies anorectic or spontaneously refluxing gastric contents (suspect a serious disorder)

2• Pain

- severity; continuous & progressive, or intermittent

3• Pulse

- Pulse (rate & quality [strong, fair, poor])
- Pulse rate > 52 beats/min of fair or poor quality = hypovolemia
- If pulse > 60 beats/min pass nasogastric tube immediately
- **Digital** - check at pasterns & monitor due to associated between abdominal disorder & laminitis, endotoxemia causing both

4• Perfusion

- Open mouth & check color of mucous membranes, capillary refill time
  - . Pink, pale (peripheral vasoconstriction)
  - . Light blue due to cyanosis
- Purple due to pre-capillary sphincter failure, pooling of deoxygenated blood, shock due to strangulation
- Feel temp. of extremities (ears & dist. limbs); Shock: ice cold

Hypovolemia &/or poor perfusion:

- Pulse rate > 52 beats/min of fair or poor quality
- Prolonged capillary refill time (> 2 sec)
- Poor skin turgor (dehydration)
- Cool extremities
- Need for fluid therapy

Equine Colic Exam and Key Colics

Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Colic - Diagnosis

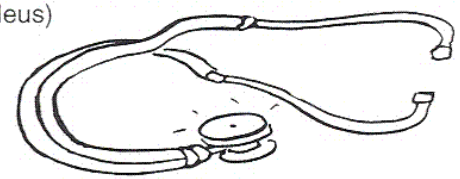
Colic

Mk 168; I2M 749; IM 680; EM&S 515; C3T 201; S 206, 348

Colic - diagnosis (cont.)

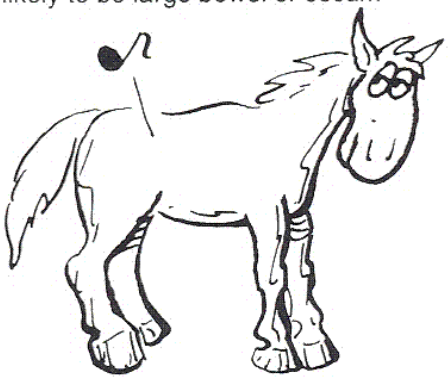
5• Peristalsis/auscultation: split the paralumbar fossa on each side into dorsal & ventral parts & listen for gurgling or silence

- **Borborygmi** (intestinal sounds)
  - . Present? a favorable sign (low-pitched progressive sounds in all 4 quadrants)
  - . **Absent? ominous**, suggests absence of motility (ileus)



6• Percussion: flick abdomen, detect gas distended organs ("ping")

- Small bowel distention unlikely to hear
- "Ping" likely to be large bowel or cecum



7• Passage of nasogastric tube

- Indicated for most, if not all colics
- If pulse > 60 beats/min pass immediately (can relieve pain & prevent stomach rupture)
- Stomach fluid (gastric reflux, siphoning)

. **Eval. for pH**

.. pH > 5 - alkaline, small intestinal contents (obstruction & back up)

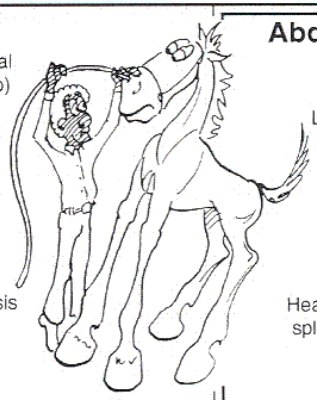
.. pH < 5 acid, stomach contents

. **Evaluate for color**

.. Dark brown or coffee grounds
- Suggests gastric or duodenal hemorrhage

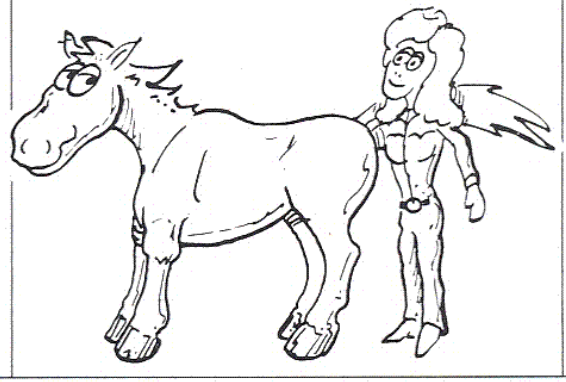
.. Brown & foul - often in prox. enteritis (duodenitis/jejunitis)

.. Foul odor - assoc. w/ presence of blood, bile, or prolonged stasis

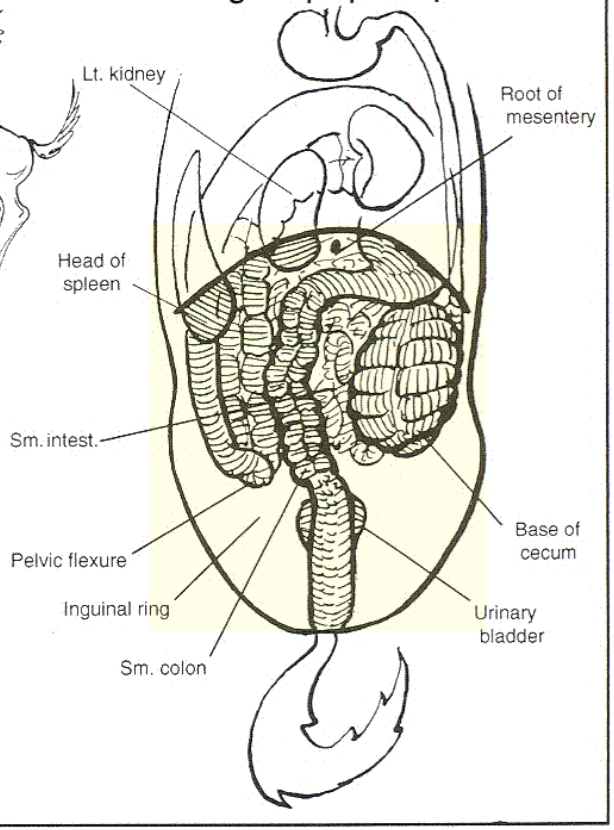


8• Palpation per rectum

- Used w/ PE & lab. to make presumptive Dx
- Only caudal abdominal accessible, 60% beyond reach
  - . Pelvic flexure impaction & nephrosplenic entrapment are among few that can be diagnosed rectally
- Easy to tear rectum (see box)
- **Feces** (hard & dry & mucous, or diarrhea)
  - . Look for sand (feces & water in rectal sleeve, sand settles out in fingers)
  - . Mucous & no feces suggests prolonged duration



Abdominal organs palpable per rectum



- **Systematic palpation** (ID of structures difficult in obstruction, but information can be obtained)
  - . Left kidney, then across to spleen & nephrosplenic ligament
  - . **Distended bowel**, large or small intestine? 1 or many loops?

Equine Colic Exam and Key Colics

Displaced? Impacted?
.. Distended loops always abnormal
.. Small colon (fecal balls & bands & sacculations)
.. Cecum (medial band) & ventral large colon (bands)
.. Try to find pelvic flexure (no bands felt, but has 1)

. **Gas or ingesta distention**
.. Gas & fluid: springs back following pressure
.. Ingesta: doughy & indents to pressure
.. Impacted - colon distended, heavy & hard to move

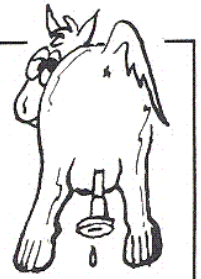
. Dehydration - colon contracted & sacculations distinct
. Palpate intestinal wall thickness, thickened indicates tissue edema (m/b strangulation needing Sx)
. Pain during palpation m/ help locate
. Inguinal rings
. Urinary bladder

9• **Peritoneal tap** - EDTA & Sterile tube
- **Color**: normally clear, straw-colored serous & doesn't coagulate
. Turbid: ↑ # of WBCs & protein
. Pink or red: free hemoglobin or hemorrhage
. Darker brown or green w/ fetid odor: bowel rupture suggested (do culture to confirm)
- **Protein: normal < 2.5 g/dl**

. > 2.5 g/dl: 1st sign of abnormality, inflammation or vascular occlusion & leakage of fluid & protein
- **Fibrinogen >10 mg/dl**: suggests acute inflammation or blood contamination
- **Cells** (WBCs)**: normal between 5-10,000**
. >10,000: progressive vascular damage & diapedesis into abdomen
. ↑ WBCs & protein w/o ↑ RBCs: abdominal abscesses or peritonitis
- **Differential WBC count**
. Acute infection.: ↑ neutrophils
. Chronic: ↑ total WBCs + hi # of mononuclear cells
- **Bacteria in WBCs or free**: indicates ischemia & release of bacteria & endotoxins (poor Px), need to differentiate peritoneal fluid from intestinal fluid (needle into intestine)
. Peritoneal fluid: phagocytized bacteria w/in PMNs
. Intestine: numerous mixed bacteria, plant material & **few WBCs**
- **Plant material w/ WBCs:** rupture = euthanasia

10• **PCV & TPP** (packed cell volume & total plasma protein)
- Hydration status (↑ PCV = dehydration)
. PCV ≤ 45% - 85% survival
> 60% - 25% survival
. Serial measurements useful for response to fluid therapy
- WBCs in blood helps detect nonsurgical conditions
- **Electrolyte changes**
. Happens quickly, usually not severe changes, metabolic alkalosis or lactic acidosis
. Fluid therapy usually corrects

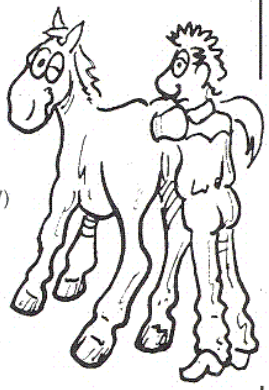
PROCEDURES:



• **PERITONEAL TAP:**
- Ventral midline, caudal to xiphoid & to right of midline (to avoid spleen), lowest point of abdomen
- Teat cannula through nick in skin or 18-g 1.5" needle
. Peritoneum tents so push cannula through
- **Anticoagulant tube (EDTA)** for cytologic exam
- **Sterile tube** (w/o anticoagulants) for visual inspection & culture
- Wait patiently, drops will eventually appear

• **PASSAGE OF NASOGASTRIC TUBE:**
- Indicated for most if not all colics
- If pulse > 60 beats/min pass immediately (can relieve pain & prevent stomach rupture)
- Check for stomach fluid (gastric reflux) by siphoning
- Large diameter tube, if trouble getting it in, use xylazine
- Not easy: must work to siphon off GI contents, add water, negative pressure & move around
- Grain in stomach will continue to plug tube, keep pumping in water & keep trying

• **PALPATION PER RECTUM:**
- Easy to tear rectum, so take necessary precautions
. Restraint (nose twitch, etc.)
. Tranquilize if necessary (Xylazine 0.3-0.5 mg/kg IV, can add butorphanol 0.01-0.02 mg/kg IV)
. Tenesmus - topical anesthetic into rectum (20 ml of lidocaine) or epidural
- **Lots of lubrication** on arm (many dehydrated), be gentle, don't fight peristaltic waves
- **Palpate backwards**: sigmoid loop (long mesocolon in front of pelvic inlet), so go in as far as possible initially & palpate backwards



Equine Colic Exam and Key Colics

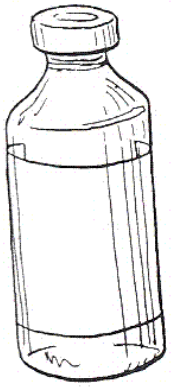
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Colic

Mk 168; IM 680; I2M 749; EM&S 515; C4T 179, 182; C3T 201

COLIC SURGERY OR MEDICINE?

- Approach depending on value of horse
  - If Sx not an option, treat medically or euthanize
  - Ask about insurance, must have permission to do Sx or to euthanize
- **Cardinal CS requiring surgery** (all m/ not be present)
  - Severe abdominal pain poorly or nonresponsive to analgesics
  - Discolored peritoneal fluid containing incr. prot., RBCs & WBCs
  - Rectal exam: obstruction &/or displacement of viscera
- **Other factors indicating surgery**
  - Progressive deterioration of cardiovascular status, w/ abdominal pain & uncertain Dx
  - Significant gastric reflux
  - Recurrent abdominal pain w/ uncertain etiology
- All cardinal signs m/not be present so make decision on a number of factors
  - History & signalment
    - . Duration & severity of abd. pain &/or sweating
      - .. Usually intest. tympany, spastic colic or gastric dilation improve in 2-4 hours
    - . If uncertain do serial peritoneal fluid taps as a diagnostic aid
- **Do NOT do unnecessary laparotomies**
- **Earlier the decision for surgery the better for recovery**
  - Perform before bowel necrosis & marked changes in peritoneal fluid
  - . Large intestine greater need for quick surgery than small because:
    - .. Peritoneal changes later than in small
    - .. Surgical resection harder
  - Often need to go to Sx before final Dx can be made
  - Many diagnoses not confirmed until exploratory laparotomy



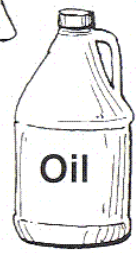
or

Medical Tx of Colic: 1) analgesia, 2) decompression 3) fluid therapy

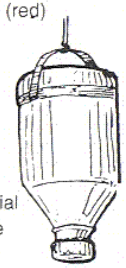
1• **Analgesia** as soon as clinical exam is finished
- **Xylazine (Rompun®) DOC** most potent
  - . Monitor, take away feed (muzzle), nasogastric tube
  - . 20-30 min before wears off, interferes a little w/ GI motility
  - Dosage typical for sedation 300 mg/1000 lb horse IV
- **Banamine® (NSAIDs)** - onset slower, duration much longer, TID or BID, as w/ phenylbutazone get in vein, longer acting & m/ cover up some CS, so diagnosis first
  - . Anti-endotoxic effect also

2• **Decompression**
- Nasogastric tube - stand to the side to do this!
- Decompress cecum w/ trochar, not very safe - only if going to surgery or if transporting 2-3 hours to hospital

3• **Fluids**: oral or IV, usually both
- **Oral fluids cheaper**, via nasogastric tube
  - . 1-2 gallons every hour
  - . **Not if refluxing**
- **Gallon of mineral oil** - need pump on nasogastric tube
  - . If get it on the skin, wash off as it will cause scalding



- **DSS** (dioctyl sodium sulfosuccinate) - osmotically active surface acting agent) pulls fluid into impaction, 5% solution, 8 ounces in 4-6 L of water
  - . **Need a hydrated patient**
- **IV fluids** - use 14 gauge or larger catheter at least 4 inches, can secure w/ super glue
  - . Fastest way to soften impaction is IV fluids if $$$ is no problem
  - . **Lactated Ringer's** (Fluid of Choice), but saline is OK if that is only one available
    - .. Give at least distilled water, tap water will lyse RBCs - massive hemoglobinuria (red)
    - .. Needs to be put in sterilely
    - .. Cover w/ Betadyne® ointment
    - .. Bandage
    - .. Change every couple of days, must care for jugular veins or will get thromboembolism
    - .. Attach extension tubing so you don't have to handle the catheter
    - .. Use large 5 liter bags of fluids



- **Avoid peripheral vasodilators**: vasoconstriction in shock maintains atrial pressure to vital organs. Vasodilatation m/ cause catastrophic fall in blood pressure
  - . NO phenothiazine tranquilizers

Equine Colic Exam and Key Colics

Prognosis EM&S 517; C3T 206

- Based on degree of pain, rectal exam findings, presence of gastric reflux & peritoneal fluid tap
- **50% recover from colic surgery**
  - **Resection & anastomosis, 75% die**
    . Must tell owners what chance this animal has to survive
- **Duration**: continuous uncontrollable pain negative prognosis
- **Guarded to poor prognosis if:**
  - Systolic blood pressure < 100 mm Hg or weak to impalpable pulse
  - HR > 80 bpm
    . HR of 100, survival about 30%
    . HR 120, purple mucous membranes, colons distended
    - Euthanize (waste of money to do Sx)
  - Cyanotic membranes bad sign
  - **PCV > 60% - bad**
  - Profound leukopenia
  - Blood lactate conc. > 8 mmol/L
  - Elev. BUN > 42 mg/dl
  - Blood pH < 7.28 concern
    . < 7.00 death eminent (normal 7.32 -7.44)
- **↓Survival rates associated w/:**
  - ↑Fibrin degradation products > 20 µg/ml
  - Prolonged PTT > 1.25
  - ↓antithrombin III < 85% control
  - ↓platelets < 100,000 µl
- **Bad rectal findings**
  - Distended small intestine (strangulation most common, so resection)
  - Large bowel: severe gas distension is negative sign (probably twisted & obstruction)
    . Grittiness or crepitation - bad sign (ruptured)

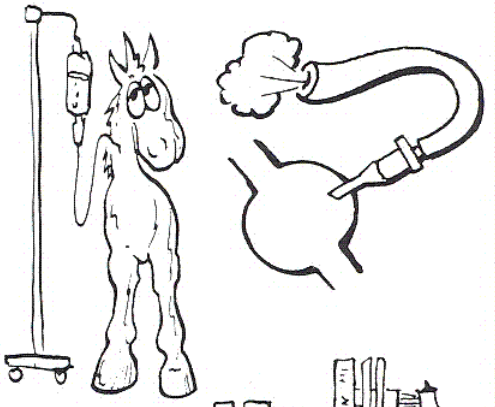
Bad Px
- HR > 80 bpm
- PCV > 60%
- Uncontrollable pain

Colic Surgery

EM&S 518; CT 201; S 355, 210; LAS 437

- Surgery for colic, the earlier the better
- **Decompress intestine**
- **Correct problem**

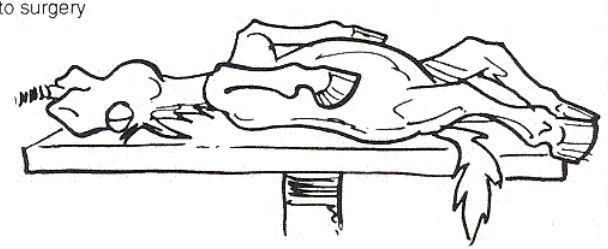
Stabilize before surgery



- Anesthesia major concern because m/b in shock
- **Do not waste excessive time**, many instances surgery before completely stabilized
- **Pre-op fluids** - hydration & acid/base balance & electrolyte imbalances corrected
- **Antibiotics - Ampicillin DOC** (pen gets anaerobes, except *Bacteroides fragilis*, not gram neg.)
  - Metronidazole (Flagyl®) for anaerobes, gentamicin - nephrotoxic
  - Sx will be clean-contaminated or contaminated if spillage
  - **Banamine®** (flunixin meglumine) for endotoxins released by worms & opening blockage

Anesthesia - ability to ventilate a horse a must in colic Sx

- **Xylazine/ketamine combined w/ glycerol glycolate** (centrally acting neuromuscular blocker) pre op. Then:
- **Isoflurane** (excreted through lungs 75% & least cardiovascular depressing)
  - Halothane more likely to potentiate arrhythmias due to epinephrine release & direct affect on arterial blood press. & depth of anesthesia
- **Clipping** done prior to induction
- **Intubate** in sternal recumbency (before going to surgery
  - Often has full stomach, may get reflux)
- Surgery can be fairly long: 3-4 hours
  - **Complication of myositis** - paralysis of limb, looking like radial n. paralysis - positioning & weight
  - Fast surgery to minimize anesthetic signs
  - Keep light (keep blood pressure up)
  - Support w/ fluids, well padded or floating on air bags
- **Dorsal recumbency**



Equine Colic Exam and Key Colics

Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Colic Surgery

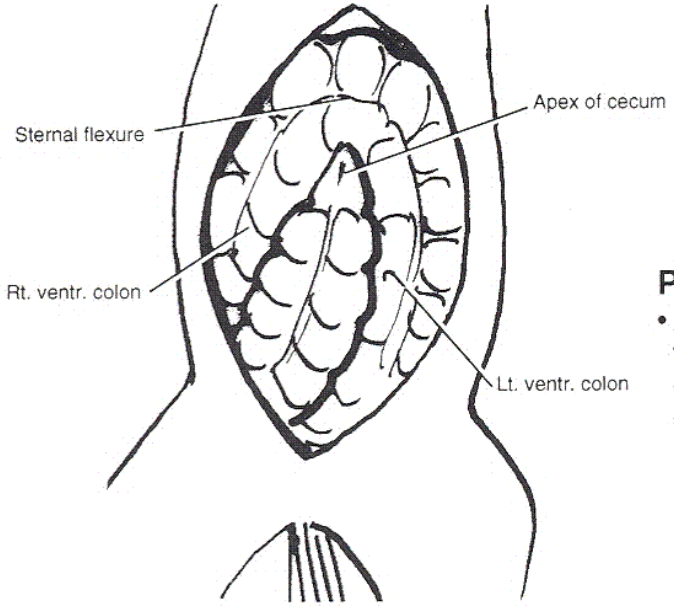
DIGESTIVE SYSTEM

Exploratory laparotomy S 356

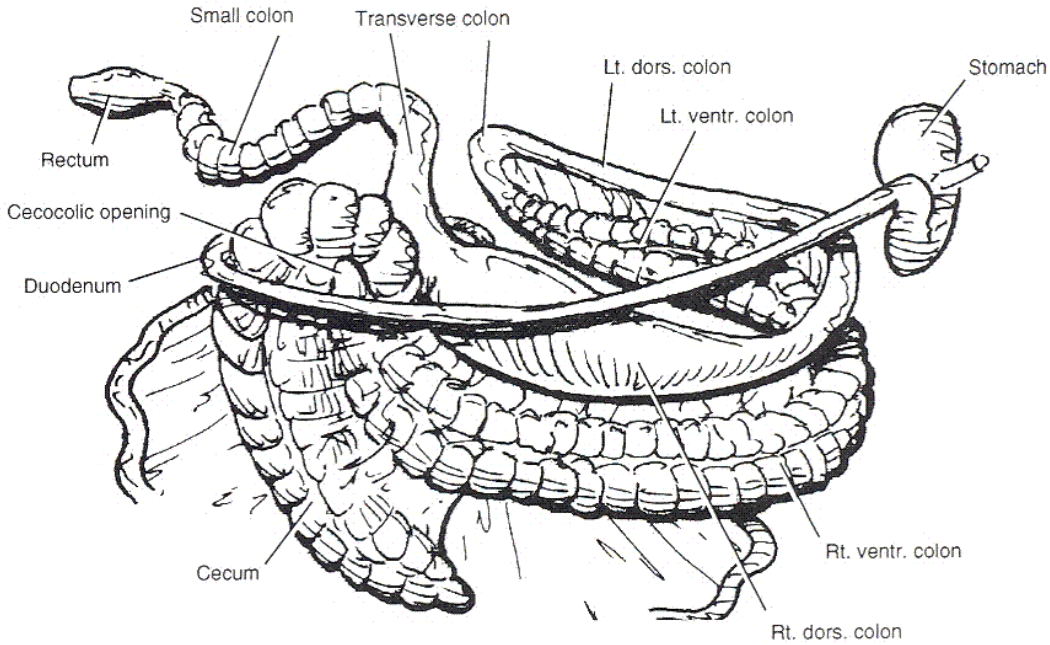
Ventral midline incision: less hemorrhagic, umbilicus to xiphoid cartilage

Open abdomen & note what you see

- **Apex of cecum** on ventral midline
- **Ventral colon** surrounds the apex
- **Abdominal cavity**:
  - Look for ingesta (bad Px)
  - Distended loops of intestine ballooning out incision,
    - Decompress w/ needle & tubing to continue exploration



Ventral Incision - Structures seen



Preliminary exploration:

- Gently explore abdomen by gently sweeping viscera w/ hand
  - Cause of colic m/b immediately apparent
  - Look for:
    1. Turgid loops of bowl
    2. Hard masses
    3. Tight mesenteric bands
    4. Roughened peritoneal surfaces & fibrin adhesions
    5. Root of mesentery & connection of cecum & colon for volvulus

Deeper exploration: cecum is reference point

- If cause not apparent, systematically explore abdomen
- **Apex of cecum**: on ventral midline
- **Ventral colon** surrounds the apex (right ventral, sternal flexure, left ventral)
  - Note 4 bands & sacculations of ventral colon & cecum
  - Locate cecocolic lig. between lateral band of cecum & right ventral colon

Equine Colic Exam and Key Colics

Find small intestine

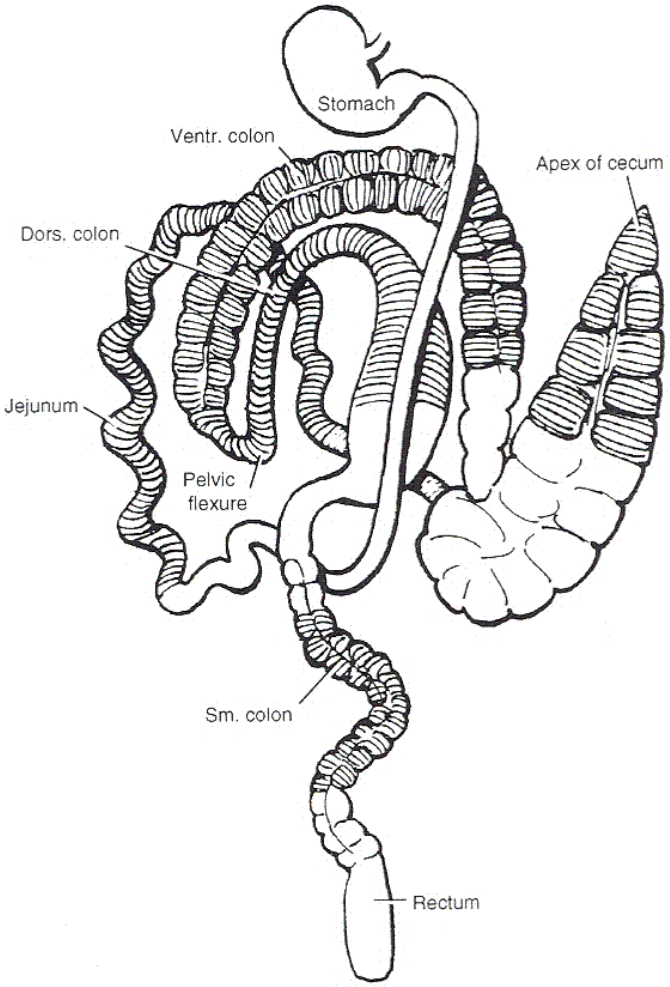
- **Ileocecal ligament**: pull apex of cecum up & locate the ligament connected to its dorsal band
- **Ileum** - follow ileocecal fold from cecum to ileum, or reach down left side of base of cecum to blindly find
- **Jejunum**: trace small intestine forward (pull out & replace, go along entire length, point thumb in direction your going to keep track)
  - Ascending duodenum becomes jejunum at duodenojejunal flexure
- **Ascending duodenum** located by its connection to small colon, duodenocolic ligament on left side of cecum (can't be exteriorized)
  - Duodenocolic ligament: connects ascending duodenum to the small colon
- **Descending duodenum:** reach between the base of the cecum and the right body wall dorsally (only tubular structure located here) (can't be exteriorized)
- **Pylorus**: found by following descending duodenum cranially (can't be exteriorized)
- **Liver**: located against right body wall & touching base of cecum
- **Right kidney**: nestled in the renal impression of the caudate lobe of the liver dorsally
- **Epiploic foramen** (opening between peritoneal cavity & omental bursa)
  - Pass your hand between the descending duodenum & right body wall to the liver & right kidney
  - If no bowel in this area, no need to check epiploic foramen
  - To enter epiploic foramen: pass finger under the caudate lobe of liver forward into epiploic foramen between portal vein (ventrally) & caudal vena cava (dorsally)

Find large intestine by returning to cecum

- **Cecum:** palpate up body to base in right paralumbar fossa
- **Body of cecum**: along right abdominal wall from base to apex (can be partially exteriorized)
- **Base of cecum** in right paralumbar fossa anchored to dorsal abdomen (can't be exteriorized)
- **Ventral colon**: around apex & body of cecum (4 bands)
- **Cecocolic lig.** pull up cecum & see connection between lateral band & right ventral colon
  - **Pelvic flexure**: found on left side near pelvic inlet, junction between ventral & dorsal colon

Pull out pelvic flexure very carefully or may tear, place on drape between horse's thighs or on a special table

- **Dorsal colon** (ID left dorsal, diaphragmatic flexure & right dorsal parts)
  - Left dorsal colon is small w/ 1 band in mesentery
  - Note right dorsal colon's stomach-like expansion (3 bands, but no noticeable sacculations)
- **Mesocolon** connects ventral & dorsal colon
  - Contains blood supply (colic branch to ventral colon & right colic artery to dorsal colon)
  - Connects to dorsal abdomen at root of mesentery
- **Small colon** (descending colon): located to left of base of cecum heading into pelvic cavity (2 bands, sacculations & **fecal balls**) (part can be exteriorized)
- **Transverse colon:** connects right dorsal colon w/ small colon
  - Transverses abdomen from right to left in front of cranial mesenteric artery
- **Spleen**: on left side attached to right kidney & against right body wall
- **Nephrosplenic ligament**: palpated in dorsal left side (find spleen & follow to ligament dorsally)



Structures that can be exteriorized through a ventral midline incision (shaded)

Equine Colic Exam and Key Colics

Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

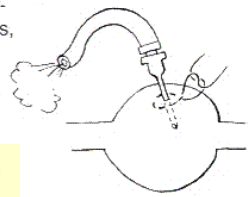
Abdominal Surgeries

Surgical team of several surgeons preferred, as colic surgery is very tiring

Surgeries (T&W-A 268, 383; LAS 443)

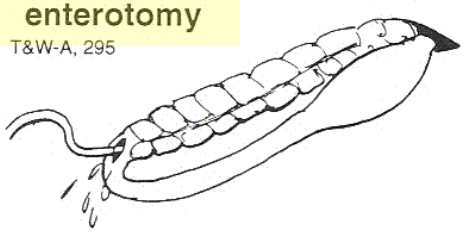
Decompression surgery

- Distended bowel (jejunum, cecum or large colon)
- Punctured w/ needle through purse string suture, tie as remove needle
  - 12-14-gauge needle attached to rubber tubing (through strong bands of large intestine)
- Don't do multiple enterotomies to decompress, end up w/ adhesions
- Do decompression in sections & milk to one opening



Pelvic flexure enterotomy

T&W-A, 295

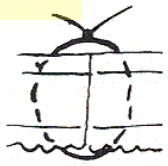


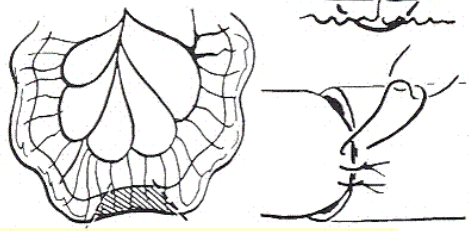
- Opened to empty out large colons (dirty, special table used))
- Incision toward ventral or dorsal colon, not in pelvic flexure
- Empty colon: **Garden hose** up enterotomy. May take up to hour of flushing (sand) to get all out. If enteroliths, must milk down to incision site. Closure of colon by direct apposition
- Wash & put GI back in correct position
- Other enterotomies also done: jejunum, cecum, large & small colons

End to end anastomosis

T&W-A 306; S 337

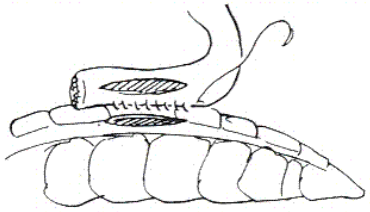
- Jejunum to jejunum
- Jejunum to small colon
- Large ventral colon





Small intestine - resection & anastomosis T&W-A 298

- M/ remove roughly half of small intestine in horse
  - If ≥60% get small bowel syndrome
  - About 50-60 feet of small intestine
- **Check viability**
  - Responds to pinch w/ peristalsis
  - Pink color indicates viability
  - Inject w/ fluorescein & see if fluoresces (not as reliable in horse as dog)
  - Dopplers used, oxygen tension, etc.
- **Procedure** - resection & anastomosis
  - **Occlude lumen** by making tiny hole in mesentery & tying a penrose drain tight enough to occlude (3-4" back from proposed cut)
  - **Angle cut across bowel**
    . Antimesenteric side of necrotic piece longer than mesenteric side so all remaining bowel retains blood supply
    . Angle important so large opening to help prevent constriction of lumen when healing
  - **Direct appositional closure** (can't invert or evert bowel as it shrinks lumen)
    . **Take full thickness**, but coming out at edge of mucosa (simple continuous, adhesions at knot of suturing)
  - **Close mesentery** (prevent internal hernias)



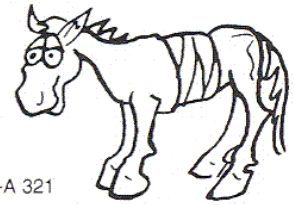
Side to side anastomosis

T&W-A 318; S 337

- Used to unite unequal sizes of bowel (adjacent segments of lg. colon w/ short mesocolon, jejunocecostomy, cecocolostomy, colocolostomy)
- Parker-Kerr oversew stumps
- 2 layer hand suturing technique usually
- **Jejunocecal anastomosis** (jejunocecostomy)
  - If ileum must be resected (can't anastomose jejunum to ileum because get tremendous thickening & blockage)
  - **Cut off ileum, leaving 6-8" blind stump** due to inability to exteriorize (connected to base of cecum)
  - Closed w/ a Parker-Kerr
  - **Anastomose end to side jejunum to dorsal band** of cecum as far towards base as possible

Closure of abdomen

- Large suture material, #2 Vicryl
- Near far/far near suture pattern (knot in near bites)
- Sometimes do simple interrupted
  - Speed is of essence
  - Important to lavage between layers
  - Then SQ & skin closure

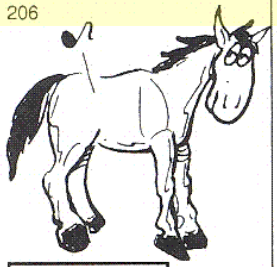
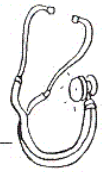
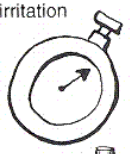
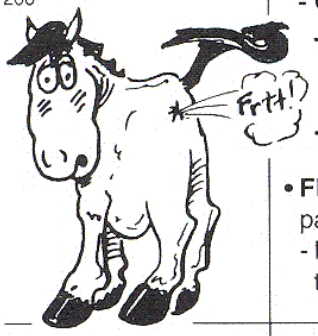
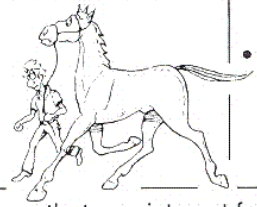
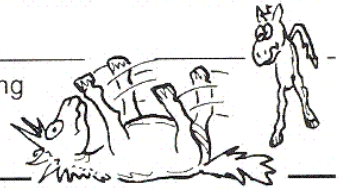


Postop T&W-A 321

- **Incidence of infection high**, present w/ temp. elev. after a few days, then may have diarrhea
  - Look closely at incision for pus (drain)
- **Abdominal bandaging** (Elasticon® right on skin, w/ sterile pad on incision, otherwise get lot of edema)
- Often need at least a week of intensive care to get them through, ileus, diarrhea, etc.
- Monitored by auscultation
- **Fast 24 hr post op**, depending on motility
  - **Started back on sm. amounts of hay**, no grain, or let graze for a bit, monitor, IV fluids 3-4 days, follow 10 P's
- Intestinal motility stimulators (drugs)
  - **Metoclopramide** better drug, if given too quickly causes CNS side effects, ataxic, excitable. Usually added to IV & given slowly
  - Neostigmine - parasympathomimetic
  - Rule out K & Ca problems 1st, make sure electrolytes normal
  - These drugs can be dangerous as they make the bowel contract
    . If enterolith, will contract over it, causing damage

Equine Colic Exam and Key Colics

Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Spastic colic Mk 168; IM 680; EM&S 541; M 206  **#1 Colic ? Spasms**	• Spasm & hypermotility of intest. tract • **Probably most common cause of colic** • **Pain caused by spasms** of gut • Hyperexcitable horses predisposed • Causes unknown, implicated: - Autonomic nervous system imbalances - Irritation of gut by parasites, enteritis & moldy feed - *S. vulgaris* • **Rarely life threatening** • **Spontaneous recovery common**	• **Loud gassy intestinal sounds** (m/b heard standing next to horse) • **Intermittent abdominal pain** - Acute onset, lasting several minutes - Patchy sweating on neck • **No systemic deterioration** • Frequent passage of feces • Spontaneous recovery common • Diarrhea suggests onset of enteritis 	• Clinical signs • **Auscultation**: loud rumbling borborygmi (frequently) • Pulse rate elevated • Rectal exam - normal 	• **Many spontaneously recover in 10-60 min** • If don't spontaneously recover - Dipyrone (antispasmotic, since spasms cause pain) - Rompun® (Xylazine) suppresses intestinal motility & an analgesic - **No atropine** as antispasmotic because m/ cause adynamic ileus - **Mineral oil** (helpful if irritation of bowel is the cause)  
Intestinal tympany & Flatulent colic Mk 168; IM 696; EM&S 542; M 206  	• **Accumulation of gas** in large colon or cecum • 1° **tympany** - **Microbial fermentation of lush grass, grains or pelleted feeds** • 2° **tympany** - **Obstruction** of colon or cecum . Mechanical: .. Fecoliths or enteroliths in sm. colon .. Large colon displacement . Functional .. Adynamic ileus • **Flatulent colic**: tympanic horse that passes large amount of gas - No obstruction - synonymous w/ 1° tympany	• 1° **tympany** - Moderate to severe abd. pain . Usually intermittent - Bloat - **Flatulence** - Little systemic deterioration early • 2° **tympany** - Severe distention of cecum & large colon - **Dyspnea** (pressure on diaphragm) - **Severe bloat** - **Systemic deterioration** **1° OK - 2° not**	• **Must DDx 1° from 2°** • 1° **tympany** - **Flatulence** - Auscultation: gas sounds & loud borborygmi - Rectal: distended colon & cecum - Little systemic deterioration • 2° **tympany** - No feces passed - **Systemic deterioration** 	• **DDx 1° from 2° tympany** • 1° **tympany** - **Analgesics**: dipyrone, Banamine® (flunixin meglumine), Rompun® (xylazine), butorphanol - **Mineral oil** via nasogastric tube . Not if gastric distention (gas, fluid or ingesta) - Antifermentative Rx (questionable efficacy) - **Walking to promote flatus** - No need for trocharization if flatulence • 2° **tympany** - **Usually require surgery, see cecal & colonic causes of colic**  
Postpartum colic E 1361	• **See REPRO pg. 240**; Common, normal postpartum pain caused by uterine contractions that persist past foaling • DDx from severe colic: Inversion of tip of uterine horn, rupture of vessel in broad ligament, trauma to large colon, uterine rupture			

Equine Colic Exam and Key Colics

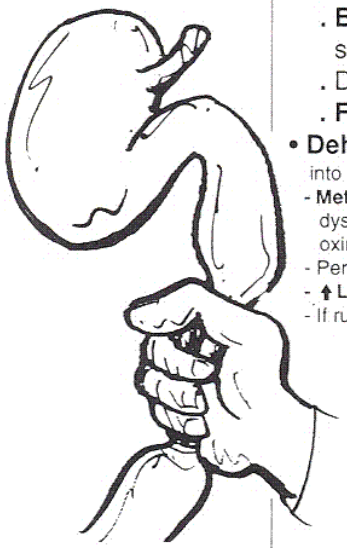
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

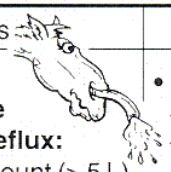
Strangulation Obstructions

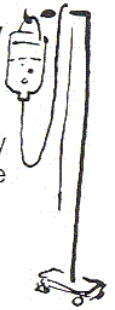
68

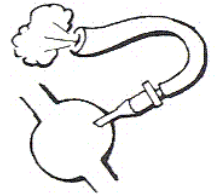
DIGESTIVE SYSTEM

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Strangulation /Obstructions - Small intestine IM 688; I2M2 758; EM&S 606; C3T 214; M 229; S 370; Pic 57, 42, 48	• **Long mesentery** allows # of ways to strangulate • Pathophysiology: - **Venous return stopped** - **Area swells** as arterial still pumps (stronger walls not closed initially) - Arterial supply then shut off - **Ischemia & necrosis** - **Loss of mucosal barrier** . **Bacteria & endotoxin** absorption systemic &/or peritoneal . Distention proximally . **Fluids & electrolytes** • **Dehydration** & hemoconcentration (fluid into intestine + lack of intake) - **Metabolic acidosis** & severe cardiopulmonary dysfunction (due to loss of electrolytes & endotoxin shock) - Peripheral perfusion markedly ↓ - ↑ **Lactate** formation - If rupture -> peritonitis	• **Clinical course - acute rapid & severe** • **Severe unrelenting pain** - Lay down, roll from side to side - Maintain dorsal recumbency to ease pain • Initially feces passed, then not • ↑ **HR** > 60 bpm • **Sweating** • ↑ **RR** (pain, distention, endotoxemia &/or metabolic acidosis) • **Dehydration** • No abdominal distention in adults, abdominal distention in foals	• **Clinical signs** • **Nasogastric tube** - **Enterogastric reflux:** relieves large amount (> 5 L) • Prolonged capillary refill time • **Dehydration** & hemoconcentration (fluid into intestine + lack of intake) - **PCV > 55%** grave Px, do not delay Sx more than 4 **hrs** • **Dark red conjunctiva** indicates complete obstruction • Auscultation - Initially peristaltic sounds - Later stops & only splashing sounds - **Silent abdomen ominous** • Lab: **Metabolic acidosis** • Rectal exam: - **Distended small intestinal loops** - Thickened intest walls (edema) • **Abdominocentesis**: rapid change - **Cloudy to serosanguinous & turbid** (normally clear yellow) - **TP > 3 g/dl** - ↑ **cell count** (norm. < 5,000) > 5000 - 100,000 - **Free bacteria & plant material** indicates intestine rupture & grave Px	• **Stabilize before surgery** - Intense fluid therapy - Correct Acid/base & electrolyte imbalances - **Don't waste time**, many instances surgery before completely balanced • **Surgery:** - **Decompress intestine** - **Correct problem** . Resection & anastomosis of nonviable sections









Vascular cut off - Necrosis
CS: Colic
Dx: Gastric reflux, dehydration
Tx: Stabilize - Surgery

Different types of strangulation
- Volvulus (pg 69)
- Strangulating lipomas (pg 69)
- External hernias (pg 70)
- Internal hernias (pg 73)
- Intussusception (pg 74)
- Meckel's diverticulum

Surgery
- Linea alba incision
- Handle distended loops w/ extreme care
- Decompress w/ purse string suture & needle
- Correct problem
- Close

Prognosis:
- Varies depends on extent of damage
- Guarded if resection required (89% died in 1 study, sounds grave to me)

Equine Colic Exam and Key Colics

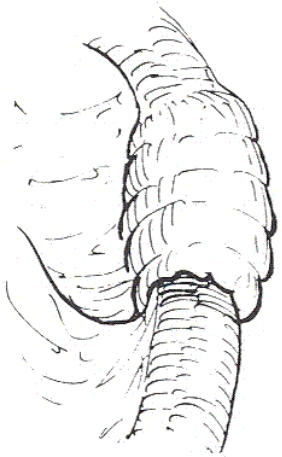
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Strangulation

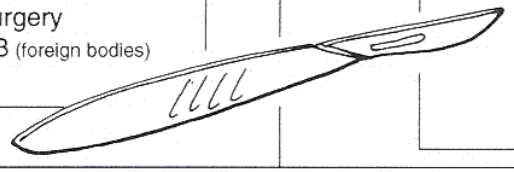
74

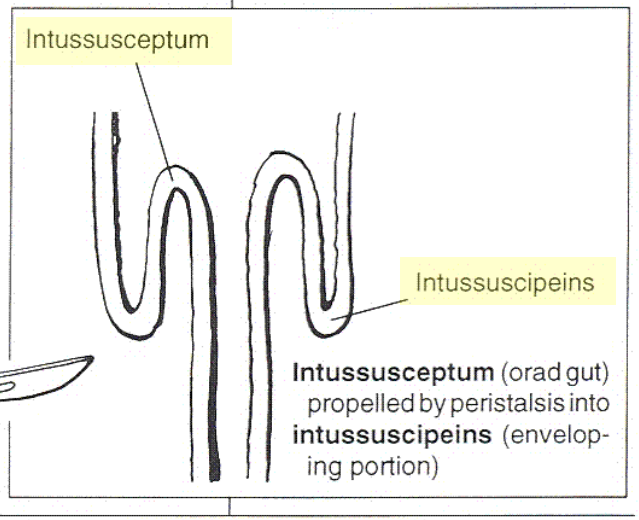
DIGESTIVE SYSTEM

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Intussusception M8k 175; IM 692; I2M 762; EM&S 613; E 574; M 229; S 369; T&W-A 271; Pic 55	• **Telescoping** of a piece of bowel into an adjacent segment • **Frequent** in < 3-yr-olds (less in adults) • **Ileum** or **ileocecal junction** most common - **2-3 ft** usual length - **Ileal-ileal: partial obstruction** - **Jejunal-jejunal** or **ileocecal: complete obstruction** • Cause: change **in intestinal motility** (see box) • **No classical CS or strangulation,** blood supply to inside piece strangulated - **Minimal systemic absorption of bacteria & endotoxins** • **Obstruction** - **Distends proximally** - **Empties distally** • Pathophysiology of strangulation: - Venous return stopped - Swells as arteries still pumps - Arterial supply then shut off - Ischemia & necrosis . If rupture = peritonitis	• **Ileal-ileal** (partial obstruction) - **Chronic abdominal pain** • **Jejunal or ileocecal** (complete obstruction) - **Acute** - **Colic** (kicking) - Depression, anorexia - Gradually shocky & dehydrated - Fever if peritonitis develops	• **Hx, CS** • **Peritoneal tap** - M/b normal because damaged intestinal isolated - ↑ RBC, WBC & protein - Bacteria if rupture • **Rectal exam** Dx 50% of intussusceptions - **Distended loops** - M/ palpate intussusception . Painful & firm - Ileocecal: m/ feel firm, turgid intestine w/in cecum • **Exploratory**	• **Stabilize before surgery** - Intense fluid therapy - Correct acid/base & electrolyte imbalances • **Don't waste excessive time,** many instances Sx before completely balanced • **Surgery** - **Decompress intestine** - **Surgical resection & anastomosis** (never reducible) - Necrotic bowel **Prognosis:** • Depends on duration, damage & intestine involved • **Ileal-ileal better** than jejunal or ileocecal



Causes - change in motility
- Enteritis
- Intestinal polyps
- Diet changes
- Heavy ascarid load
- Tapeworm (*A. perfoliata*)
- Parasite migration
- Anthelmintic treatment
- Intestinal surgery
- Intestinal FB (foreign bodies)





Obstruction & strangulation, ileocecal
CS: No classic CS
Dx: Hx, CS, Tap, Rectal
Tx: Surgical resection & Anastomosis

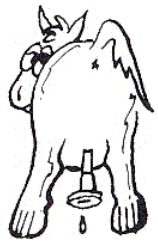
Equine Colic Exam and Key Colics

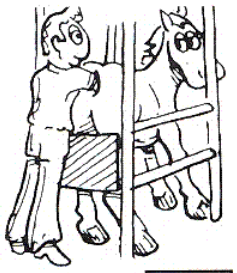
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

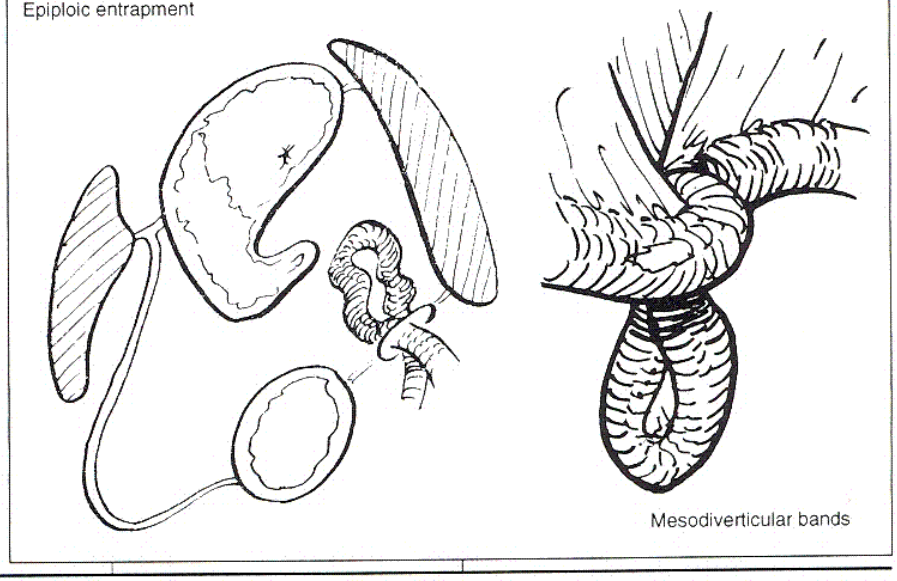
Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Internal hernias M8k 176; IM 689; I2M 759; E 569; M 229; S 421, 368, 373; Pic 48; T&W-A 274	• Displacement of intestine through a normal or pathologic foramen w/in abdominal cavity w/out presence of hernial sac • **Simple or strangulation obstruction** • Incarceration - intestine goes through hole & gets trapped • Types - **Mesenteric defects,** acquired or congenital (gastrosplenic, cecocolic, broad ligament) - Congenital fibrous bands or adhesions - Epiploic foramen	• Similar to other strangulations • **Clinical course - acute rapid & severe** • **Severe unrelenting pain** • ↑ **HR** > 60 bpm • Prolonged capillary refill time • ↑ **RR** (pain, distention, endotoxemia &/or metabolic acidosis) • **Dehydration** & hemoconcentration (fluid into intestine + lack of intake)	• **Hx, CS, PE** • **Nasogastric tube** - **Enterogastric reflux**: relieves large amount (> 5 L) • Rectal exam: - **Distended small intestinal loops** - Epiploic m/be too far cranial - Thick intestinal walls (edema) • Abdominocentesis: - **Cloudy to serosanguinous & turbid** (normally clear yellow) - **TP > 3 g/dl** - ↑ **cell count** (normal < 5,000) > 5000 - 100,000 - **Free bacteria & plant material** indicates intestinal rupture & poor Px	• **Stabilize before surgery** - Intense fluid therapy - Correct acid/base & electrolyte imbalances • **Don't waste excessive time**, many instances surgery before completely balanced • **Surgery:** - **Decompress intestine** - **Correct problem** - Resection & anastomoses of non-viable sections **Prognosis:** • Varies dep. on extent of damage • Guarded if resection required
• **Epiploic entrapment**	• Epiploic foramen (Foramen of Winslow) - Opening betw. peritoneal cavity & omental bursa • Location - rt. dorsal abdomen - Beneath caudate lobe of liver - Betw. caud. vena cava & portal vein • **Old horse more susceptible** - **Hepatic atrophy** ↑ size of foramen			
• **Gastrosplenic ligament entrapment**	• Gastrosplenic ligament: between left greater curvature of stomach & spleen • Distal jejunum & ileum most commonly incarcerated			
• **Mesodiverticular bands**	• Connective tissue that forms between mesentery & antimesenteric border of small intestine • Forms a passage for a possible internal hernia			

Strangulation
CS: Colic
Tx: Sx resection & anastomosis

Internal vs External
- **Internal** often causes **strangulation**/intestinal obstruction
- **External often doesn't** cause strangulation







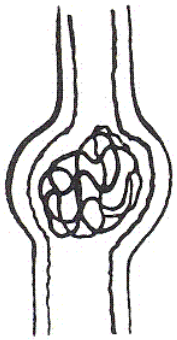
Equine Colic Exam and Key Colics

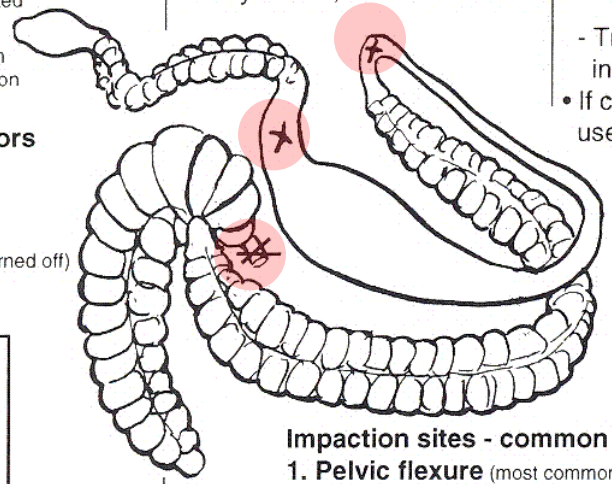
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

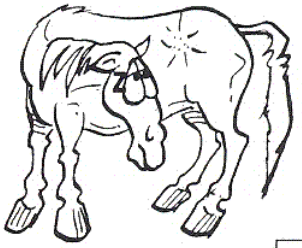
Large Colon

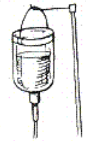
DIGESTIVE SYSTEM

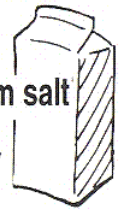
Condition	Facts/Cause	Presentation/SC	Diagnosis	Treatment
Impaction - large colon M8k 177; IM 698; I2M 768; E 561; C2T 53; M 230; S 390; T&W-A 283; Pic 61	• **#1 cause of colic** • **Simple obstruction** much more common than strangulation obstruction • **#1 Feed impaction** of large intestine due to decrease in diameter size at pelvic flexure & transverse colon. Cecum & small colon also become impacted • Ileocolic impaction due to hypertrophy of ilium or ileocecal intussusception • No reflux • **Predisposing factors** - Coarse feed - Poor dentition - Dehydration (common when water turned off) - Cold weather - ↓ Water intake	• **Mild to moderate pain** • **↓ Fecal output** • Feces hard, dry & often mucous covered • Progressive anorexia due to no dietary intake • Dehydration, if no water intake	• CS, History (Hx) • Rectal exam: **- Firm ingesta-filled colon** . Pelvic flexure (junction between sacculated ventral & nonsacculated dorsal colons) - M/not be able to find; usually just forward of pelvic inlet on left side of abdomen - Transverse colon rectal exam inconclusive • If can't make Dx by rectal exam use CS & rule out other causes	**CONSERVATIVE - aggressive** • **Fluid**, lots, 2 large bore catheters in both jugular veins - soften up - Oral fluids (if no reflux), IV • **Gallon of mineral oil** (laxative) by stomach tube every 12-24 hours • **DSS** (anionic surfactant) (hi doses & prolonged Tx results in diarrhea) • **Saline cathartics** (Mg sulfate or Epsom salts) retain water by osmotic properties, thus softening impaction - Need adequate hydration **SURGERY**: **often burst** when try surgery - Be aggressive in medical therapy **Prognosis:** • If reach early can shift quickly • If late, pelvic flexure will rot











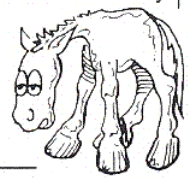
#1 Colic, Feed impaction
Sites: Pelvic flexure, Transverse colon, Ileocolic opening
CS: Colic, ↓ Feces
Dx: Hx, CS, Rectal
Tx: Aggressive Conservative Tx

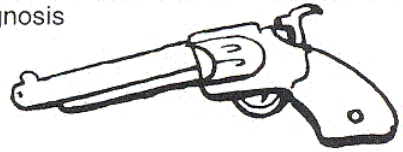
Impaction sites - common sites
1. **Pelvic flexure** (most common)
2. **Transverse colon** (junction w/ large right dorsal colon)
3. **Ileocecal opening** (hypertrophy, intussusception)

Surgical indication
- Unrelenting pain
- ↑ Peritoneal nucleated cells &/or protein
- Colonic displacement

White foal diz, Lethal white foal, **Ileocolonic aganglionosis (IA)** M8k 130; Pic 48	• **Completely white foal w/ blue eyes** • "Overo" paint sire & dam • Autosomal recessive trait • **Born dead or weak w/ colic**	• Appear normal at birth • Develop colic & die on 2nd day • **Acute abdominal pain** • M/ be recumbent • No meconium passed	• History: **Overo parents** • Signalment, CS • No meconium on rectal exam • PM: diffuse colonic hypoplasia • Histopath.: absence of submucosal & myenteric ganglia in terminal ileum, cecum & colon	• **No Tx: Euthanasia** • Check for any colored hair, may change prognosis

White Overo paint foal, GI defects, Euthanize





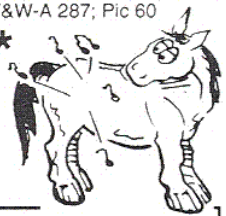
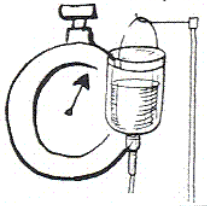
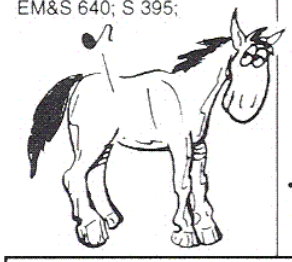
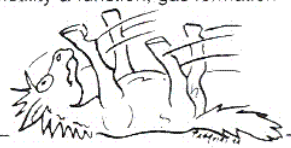
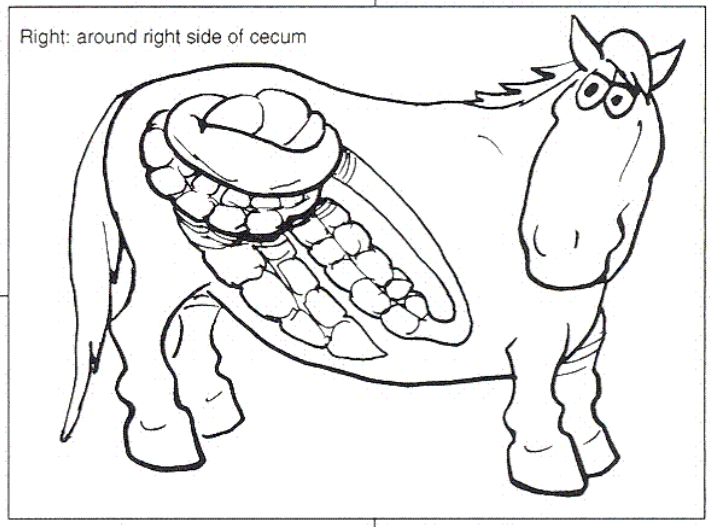
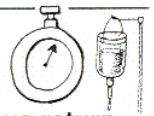
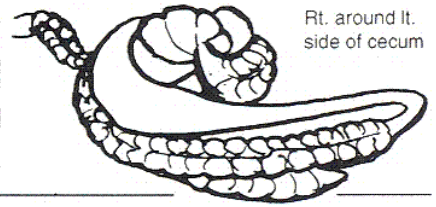
Equine Colic Exam and Key Colics

Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Sand impactions Mk 187; IM 698; I2M 768; E 547, 565; M 232; C2T 55; S 393; T&W-A 284; Pic 62	• **Sandy regions** (in environment & hay) - Florida, California • Some horses have a "sand tooth" • Fine sand accumulates in ventral colon • Course sand in dorsal colon, transverse colon & pelvic flexure • Fills right dorsal colon (dried out ingestion here so filters out) • Fluid & gas can flow through, present w/ soft feces	• Similar to ingesta impaction, but also: • **Diarrhea**	• Hx, CS • Rectal exam - Sand in colon (if in dist. rt. dors. or transverse colon, difficult to Dx) • **Feces in glove & fill w/ water** - Sand settle out in fingers (know normal amount of sand in horses of area)	• M/b able to shift medically **- Metamusil®** by nasogastric tube (see box) • **Surgical indications** - Unrelenting pain, Incr. peritoneal nucleated cells &/or protein, Colonic displacement **Prevention:** • In sandy areas monitor feeding - Feed off ground
Regional, Obstruction **Dx: Feces in glove** **Tx: Metamucil®**				**Metamucil®** (Psyllium hydrophilia mucilloid) by nasogastric tube • Lubricates & binds sand to move it out • Forms gel when mixed w/ water so have tube place in before mixing • After initial dose mix dry w/ feed (prolonged use)
Enteroliths/ Fecoliths Mk2 179; IM 699; I2M 769; E 564, C3T 223; C2T 68; S 392; T&W-A 285; Pic 63	• **California** (hay high in Mg) • **Arabians** more than others • **5-10 years** (rarely < 4 yr) • **Enteroliths**: magnesium ammonium (mineral concretions); starts from a nidus (broken tooth, stone, string, hair, FB, silicon dioxide [flint-like stone]); Calif. hay hi in Mg • Fecoliths: concretion of fecal material • Can get as big as a soccer ball • Single (smooth) or multiple (squared from rubbing, tetrahedral) • **Obstruction at junction of right dorsal & transverse colon** (diameter change). **Right dorsal colon > transverse colon, small colon** -Intermittent due to swelling & falling back eventually blocks	• Pain variable depending on extent of distention • **↓ Feces, scant liquid feces**, if partial obstruction	• History, CS, PE • Rectal exam: **- Distension of colons** - Back up to cecum, but all in normal position • Peritoneal tap normal until pressure necrosis of intestine	• **Conservative** - Apple cider vinegar • **Remove surgically** - If stuck in small colon remove from there - Otherwise move back to small colon to take out, watch for squared sides (multiple)
		Mineral concretions **Obstruction transverse colon** **CS: ↓ Feces** **Tx: Sx Remove**		**Obstruction** at junction of right dorsal & transverse colon (diameter change)
Foreign body (FB) obstruction IM 699; I2M 769; E 563; T&W-A 284; S 401	• **Similar to enterolith** • **Usually in small colon or transverse colon** • Young horses eating bedding, rope, fence material, rubber • Fecoliths			

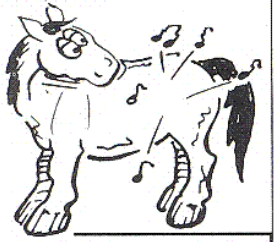
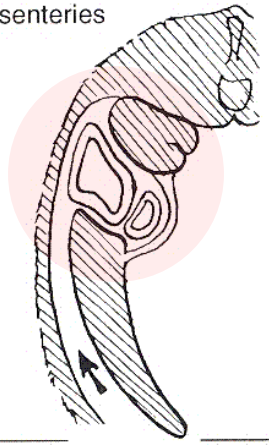
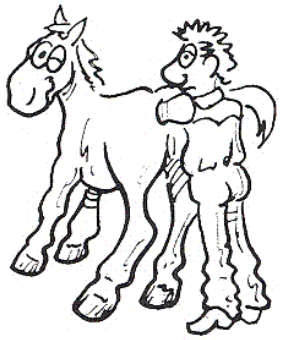
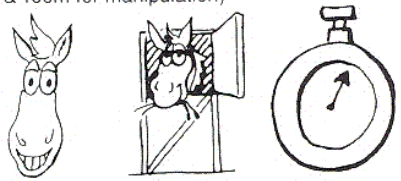
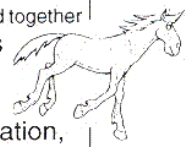
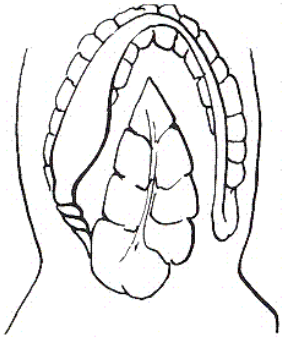
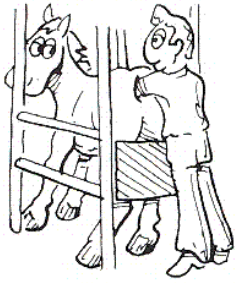
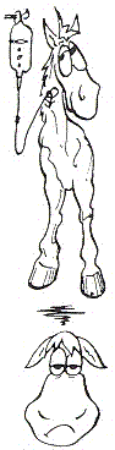
Equine Colic Exam and Key Colics

Displacement of Ascending Colon

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Displacement of ascending/ large colon M8k 179; IM 699; I2M 770; EM&S 637; E 566; C3T 218; C2T 60; M 234; T&W-A 287; Pic 60 ***  Obst./Strang. Gas distention Colic - "Pings"	• **Very common** • **Ascending colon** or large colon, 3-4 yds long, in a double "U" shape w/ only proximal & distal ends attached - Rest of "U" (w/ pelvic flexure at its center) free to move around • Other organs usually keep it in place • Alteration in motility or digestive mechanisms can flip or kink the large colon • **Resulting in obstruction** **- Colon & cecum fill w/ gas** **- Ileocecal junction efficient so no back up into small intestine**	• **CS of obstruction:** - **Colic**, ↑ HR & RR, sweating - **↓ Fecal output** • **Gas distention of colon & cecum**	• **CS** (clinical signs) • **Rectal: Colon out of place** - Normally: sacculations on bottom, smooth on top - If reversed, obstructed • **"Pings"** due to gas distension i • **Peritoneal tap**	• **Be ready for surgery** • Conservative attempted 1st in right & left displacement • Surgical for volvulus w/ strangulation **- Surgical indications** . Unrelenting pain . ↑ Peritoneal nucleated cells &/or protein . Colonic displacement  or 
• Right dorsal displacement M8k 179; IM 701; I2M 771; EM&S 640; S 395;  Colon around cecum CS: Obstruction Tx: Conservative or Sx	• **Twist** (180 - 360°) of large colon at mesentery - Large colon displaces between cecum & right body wall **- Pelvic flexure pointed cranially** - 2 possible ways to twist . Twist clockwise around cecum (viewed from above) (most common) . Twist counterclockwise around cecum • Cause unknown (idiopathic) - Nutrition, feeding practices, alteration in colonic motility & function, gas formation 	 Right: around right side of cecum • **CS of obstruction:** - **Colic**, ↑ HR & RR, sweating - **↓ Fecal output** • **Gas distention of colon & cecum** • No gastric reflux (ileocecal valve efficient)	• **CS** • **Rectal exam: large gas distended colon** - Can't find pelvic flexure - Cecum medial to colon (abnormal) • "Pings" • Peritoneal tap: usually normal unless compromised	• **Conservative** - **Fasting** - **Maintain hydration** - **Wait for spontaneous return**  • **Surgical** correction for severe displacement or if associated w/ volvulus  **Prognosis: Good** unless strangulating volvulus  Rt. around lt. side of cecum

Equine Colic Exam and Key Colics

Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
• **Nephrosplenic entrapment, Left dorsal displacement** M8k 179; IM 699; I2M 770; EM&S 641; S 396; T&W-A 289; Pic 60  **Obstruction** **No strangulation** **Tx: Roll or Sx**	• **Large colon caught in nephrosplenic (renosplenic) space** - Left side between dorsal spleen, nephrosplenic ligament, left kidney & left abdominal wall • Warmbloods & large Thoroughbreds more prone • Theories of etiology 1. Pelvic flexure migration to space & trapped 2. Gas causes the large colon to rise between left wall & spleen & over top of spleen - 180° twist at least (because ventral colon falls over dorsal side of spleen first, & then dorsal colon to switch places (w/ dorsal becoming ventral & ventral dorsal) • **Usually no strangulation**, but edema & congestion (vessels aren't cut off)	• **Similar to left displacement**-obstruction: ↑ HR & RR, sweating, ↓ Fecal output, distention of colon & cecum • ↑ **Pain & systemic shock** as more colon entrapped & ↑ pull on mesenteries 	• Clinical signs (CS) • Rectal exam - **Distended large colon** - **Spleen displaced away from body wall** (caudomed.) - M/b colon transversely over nephrosplenic lig. 	• **Conservative** - **Deny access to food** - **Allow to spontaneously return** • **Rolling**: if no response to conservative, let gas cause colon to rise & return to position - **Xylazine & ketamine** (short acting anesthetic) - **Put in right lateral recumbency** (spleen up) - **Hoist by legs** & held for 1 min. & shaken - **Return to dorsal recumbency** - Slowly turn to left lateral recumbency - 360° complete as horse stands • **Surgical correction** if conservative doesn't work or horse's condition deteriorates - **Ventral celiotomy** (better visualization & room for manipulation) 
• **Colonic volvulus** M8k 179; IM 702; I2M 772; EM&S 637; C2T 66; E 573; S 395, 397; T&W-A 291  **Strangulation** **CS: Obstruction, Shock** **Sx survival low**	• **Vascular occlusion** & severe colonic devitalization at > 270° twist • **Surgical survival low < 40%** • Sites of volvulus - **#1 base of colon** (proximal & distal ends attached) - #2 sternal & diaphragmatic flexures - Most dramatic cecum & colon twisted together • Adult horses & brood mares (1 wk postpartum due to extra room) - Summer • Twists 360°, lots of strangulation, endotoxemia, no venous return to thorax  	• **Severe colic** (usually) • **Bloat** (marked distention) • **Shock:** Dehydration - Cold extremities, weak pulse - Poor mucous membranes 	• CS - shock - ↑ Capillary refill time - ↑ HR & RR • Peritoneal fluid variable • "Pings" • Rectal exam: - **Large gas distention** - Edematous colonic wall 	• **Stabilize before surgery** - **Large volume of fluids** (2 large gauge [10-14 g] catheters in jugulars (dehydration & electrolyte imbalances) • **Analgesics for pain** • **Surgically untwist** - Colonic resection has been tried & if away from base m/ help survival rate  **Prognosis: poor** • If catch w/n 2 hours can surgically correct • If later than 4 hours poor • Px depends on amount of devitalization (watch to see if colonic vasculature, color & motility returns) 

Colonic intussusception (IM 773) • Rare

Equine Colic Exam and Key Colics

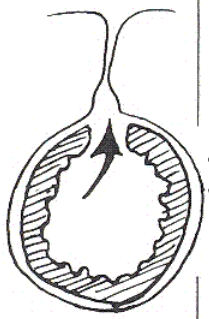
Guide to Equine Clinics, vol. 1 Pasquini, 3rd ed.

Rectum

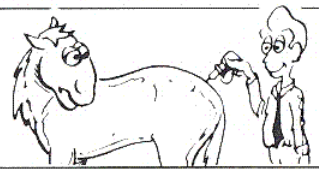
82

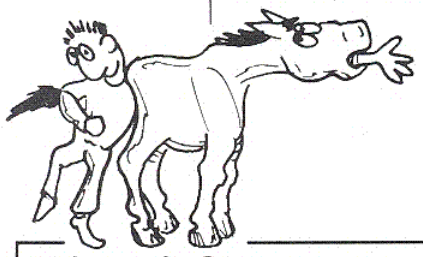
DIGESTIVE SYSTEM

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Rectal tears M8k 151; Mk 134, EM&S 664;C3T 232; C2T 75; M242; S 407 T&W-A 326; Pic 66	• **#1 reason for law suits (eq)** **- Iatrogenic: during rectal exam** - Males > females, Arabians • **Take precautions for rectals** - Good restraint . Stocks ideally . Hold against wall, if right handed - wall on left, stand at side . Nose twitches . Xylazine if necessary - Lots of lubrication - Take out feces & repeat lube - Don't fight peristaltic waves • **Peritoneal pouches** 8" from anus • Most tears at 12", so into peritoneal cavity (G4) (see box) or into dorsal mesorectum separated from peritoneal cavity by thin connecting peritoneum (**G3**) • Dorsal tears most common (splits over knuckle w/ peristaltic wave)	• **See blood on palpation hand** • If undetected when tears **- Sweat (horse & vet!)** **- Uncomfortable** **- Start straining** • Grade 4: rapidly progressive - Progressive elevated HR - Progressive colic - Endotoxemia/shock • Grade 3: similar to grade 4, but slower progression	• **Feel rectum tearing** when hand in rectum • Physically examine tear - Heavily sedate animal - Epidural - Access depth of tear using bare fingers • Peritoneal tap - Massive response, huge peritonitis - Grade 4 - feces	• **Grade 1: heal by 2° intention** - ABs - heal on their own. Swelling of 2°, may become Grade 3 tear • **Grade 4: cannot be treated, Px is terrible** • **Grade 3: Emergency** **- Tell owner immediately!!!** **- Prepare to ship to surgical facility** . Stop straining (see box) . Carefully evacuate rectum . Check tear (see Dx) . Pack rectum w/ Betadyne® (povidone iodine) soaked cotton . Start on broad spectrum ABs - Procaine penicillin G + gentamicin or m/b metronidazole (Flagyl®) . Banamine® to counteract toxemia **- Ship to surgical facility (refer)** • **Surgical facility - Various Tx** - Temporary colostomy - allows torn part to heal, stopping feces from entering tear • **Best to prevent them!**



Stop straining:
- Acepromazine, xylazine or detomide
- Propantheline bromide
- Lidocaine lubricant enema (25-50 ml of each mixed together)
- Epidural: Rompun® (xylazine) (longer lasting than lidocaine)





#1 Lawsuit, G3 (into mesorectum)
CS: Blood, Sweating
Dx: PE
Tx: Emerg., Refer for Sx

GRADES
- **Grade 1 (G1):** only through mucosa & submucosa
- Grade 2 (G2): muscle layers only, mucosa intact
- **Grade 3 (G3):** through mucosa, submucosa & muscle layers into space between layers of mesorectum, serosa only separation from peritoneal cavity **(most common tear)**, Fecal balls jammed up between layers of mesorectum
- **Grade 4 (G4)**: full thickness into peritoneal cavity

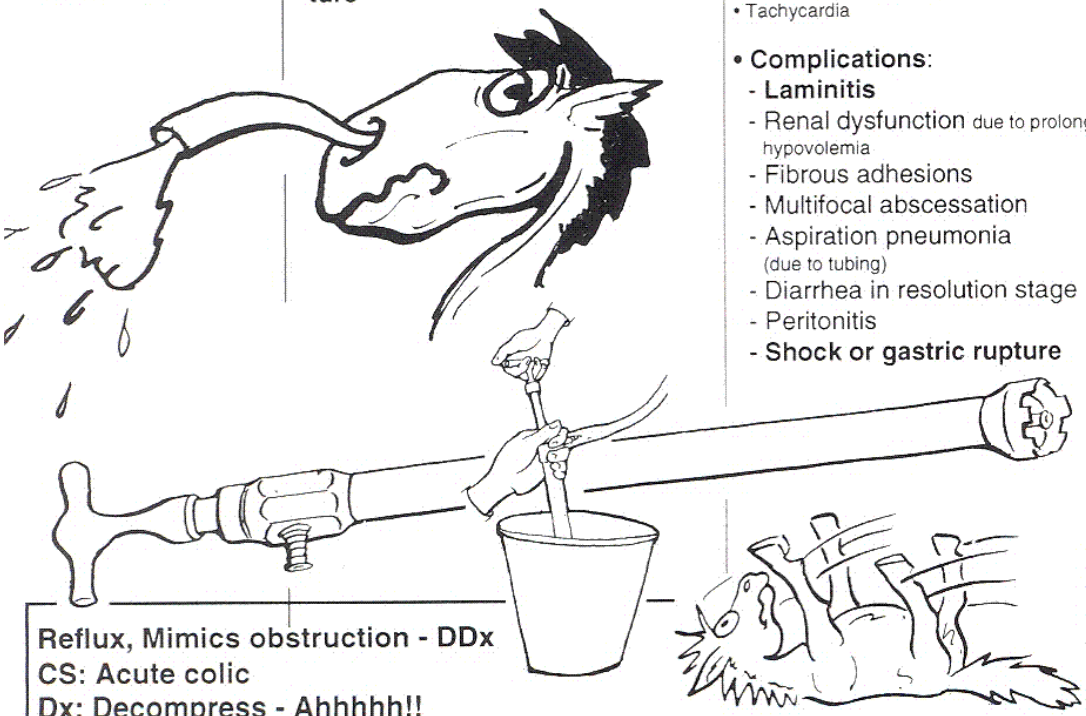
1. Temporary colostomy - allows torn part to heal, stopping feces from entering
- Sx through flank, not easy, lot narrower (18 ribs) than cow, smaller paralumbar fossa & thick body wall
- Exteriorize loop of small colon, cran. to tear
- Suture colon to muscle wall
- Open colon & suture cut to edge of skin
  - Fecal balls come out the side of animal
  - Disadvantage doesn't completely rest torn colon some feces pass

2. Cut small colon
- Bring 1 end out colostomy & suture to wall
- Close off the other distal end of colon
- Allowing distal end to rest from peristalsis
- Problem: distal portion becomes atrophied during healing period

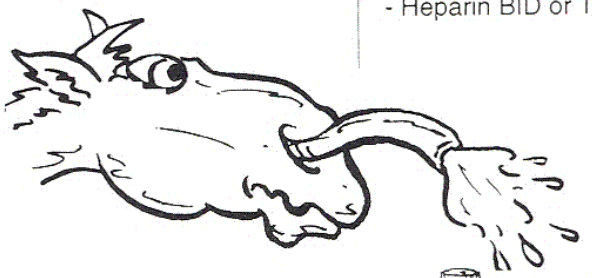
3. Piece of fenestrated plastic pushed into small colon proximal to tear, fenestrations used to suture sleeve to colon, hope fecal balls will go down tube

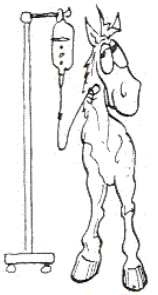
Equine Colic Exam and Key Colics

Condition	Facts/Cause	Presentation/CS	Diagnosis	Treatment
Anterior enteritis, "Duodenitis", **DPJ** **Duodenitis-proximal jejunitis** **Proximal enteritis** M8k 175; Mk 189; IM 655; I2M 719; EM&S 626; CT 211, C2T 44; M 228; Pic 70	• **DPJ** (Duodenitis-Proximal Jejunitis) • **Cause: unknown** • **Proximal** small intestine slows down, fluid & gas builds up, **refluxes into stomach** • **Adynamic ileus** • 1° in adult • **Mimics small intestinal obstruction so need to DDx right away** • **Untreated: shock or gastric rupture**	• **Acute onset moderate to severe colic** • **Gastric reflux**, enormous amounts • **Colic abates after decompression,** but horse remains depressed • ↑ Temperature, depressed • ± Toxemia • **Dehydrated**, injected oral membranes, increased HR • Begin w/ normal feces, but diarrhea m/b present in resolution stage • Tachycardia • **Complications**: - **Laminitis** - Renal dysfunction due to prolonged hypovolemia - Fibrous adhesions - Multifocal abscessation - Aspiration pneumonia (due to tubing) - Diarrhea in resolution stage - Peritonitis - **Shock or gastric rupture**	• **Decompression relieves colic** • ↓ Borborygma • Small intestine filled (not distended), palpable • Neutrophilia & toxic WBC, electrolyte abnormalities, hypochloremic, hypokalemic • ↑ PCV & TP (total protein), dehydration • **Metabolic acidosis** • **Abdominocentesis**: ↑ Protein, WBC normal/elevated • **Postmortem: definitive Dx** - Duodenum > jejunum - **Transmural hemorrhage**, mucosa to serosa, Necrosis of mucosa - **Thickened intestinal wall** - Moderate distention w/ reddish-brown fluid - Slough mucosal epithelium, 1° villi	• **Empirical** (since agent not known) • **Labor intensive, $$** • **Medical better Px than Sx** - **Continuous gastric decompression (indwelling nasogastric tube)** 3-7 days - Do not feed - **IV fluids** (m/b 40-60 L/d) for metabolic acidosis - **NSAIDs** (low dose flunixin meglumine) - **ABs** - penicillin, aminoglycosides - Analgesics m/b, xylazine (short-acting) - **Medical Tx usually enough**: • **Sx:** if over 7 days, excessive fluid loss or signs suggestive of intestinal obstruction • Laminitis prophylaxis - Analgesics (NSAIDs) - Heparin BID or TID



Reflux, Mimics obstruction - DDx
CS: Acute colic
Dx: Decompress - Ahhhhh!!
Tx: Med (continuous nasal tube) better than Sx





DDx:
- **Small intestinal obstruction** (pg 64)
- Gastric compression:
  - DPJ greatly relieved
  - Obstruction, continues to deteriorate
- Rectal palpation
  - DPJ - slightly distended
  - Obstruction - greatly distended

Prognosis:
- **Guarded**, aggressive Tx saves many
- Poor prognosis for Surgery