Vomiting and diarrhea are two of the most common medical presentations to the emergency room. The gastrointestinal (GI) signs can be caused by pathology initiated within the GI tract (primary) or caused by systemic problems (secondary). Catastrophic problems related to vomiting and diarrhea include: cardiac arrest (vasovagal reflex bradycardia), upper airway obstruction, aspiration pneumonia, profound hemorrhage, severe hypovolemic, distributive and/or septic shock, and ischemia of GI organs. The animal must be rapidly stabilized and causes requiring surgical correction rapidly investigated.

Vomiting is a reflex expulsion of gastric contents. Vomiting can be active with GI contractions or passive. It is important to understand the mechanisms of vomiting center stimulation to identify the cause and best therapeutic approach (see Figure 1). The color of the vomitus will locate the origin. Clear vomitus is swallowed saliva from stomach,; yellow reflects refluxed digested bile from stomach.; green suggests undigested bile from the upper duodenum due to obstruction or ileus; and brown fluid with a fetid odor is from the small intestines suggesting total obstruction or generalized ileus. Blood in the vomitus from primary GI causes typically appears as red colored fluid or as “coffee grounds”. This “hematemesis” suggests a serious underlying pathology. Streaks of blood within the clear or yellow vomitus is from gastric irritation due to vomiting and is not indicative of specific pathology.

There are four mechanisms of diarrhea that can occur in any combination: osmotic diarrhea; secretory diarrhea; increased intestinal permeability; and abnormal gastrointestinal motility. Bacterial endotoxins can inhibit the ion pumps in GI epithelium resulting in secretory diarrhea. Any cause of GI mucosal erosions (eg severe shock, toxins, hyperthermia, foreign body) or blunting of GI epithelium (e.g. viral or baterial agents) can cause diarrhea by any or all mechanisms listed above: osmotic due to cellular debris in the intestinal lumen; secretary due to bacterial endotoxins or other pump inhibitors; motility due to ileus; and increased permeability. The presence of blood [melena (digested) or hematochezia(fresh)] indicates that the intestinal barrier is damaged and increased protein loss and bacterial translocation anticipated. Small intestinal diarrhea typically results in greater fluid, electrolyte, protein, and acid-base abnormalities than large intestinal diarrhea and is characterized by liquid projectile feces. Large bowel diarrhea generally has a “pudding” consistency with mucous or fresh blood.

The systemic inflammatory response syndrome (SIRS) can be associated any cause of vomiting and/or diarrhea. The increase in capillary permeability can lead to third spacing of fluid and electrolytes into the intestinal tract. Vomiting associated with gastric outflow or upper duodenal obstruction (mechanical or physiologic) can cause hypochloremic metabolic alkalosis. Other causes usually result in metabolic acidosis depending upon the perfusion status of the animal.

**Resuscitation:** Hypovolemia should be rapidly resuscitated with a combination of isotonic replacement crystalloids and synthetic colloids. Isotonic balanced buffered crystalloids (0.9% saline if metabolic acidosis) (10-20 mls/kg IV) are administered with hetastarch or dextran-70 (5-20 ml/kg dogs; 5 ml/kg cats) titrated to supranormal end-points. When abdominal hemorrhage or brain pathology is suspected, fluids are titrated using small volume resuscitation techniques to hypotensive resuscitation end-points. Analgesia is provided using narcotic injections: 0.4 mg/kg butorphanol, 0.2 mg/kg hydromorphone IV, 0.05-0.1 mg/kg, or oxymorphone IV, with or without a sedative.

Measures necessary to prevent vomiting and aspiration are used to include antiemetic (see Figure 1) and/or pro-
motility agents and nasogastric tube suctioning. When vom-
iting is associated with an unobstructive ileus or stimulation of
the vomiting center or CRTZ zone, antiemetics are indi-
cated alone or in combination: metoclopramide 0.2-0.4
mg/kg SQ q6-8h or followed by a 1.0-2.0 mg/kg/24h IV by
constant rate infusion; ondansetron 0.1-0.2 mg SQ q 8h, or
0.5 mg IV load followed by 0.5 mg/kg/h IV by constant rate
infusion; chlorpromazine 0.05 mg/kg IV, 0.01-0.025 mg/kg
IV (cats) q 4-6h if cardiovascularly stable; ranitidine 2
mg/kg IV q 12 h. When an unobstructive ileus is occurring,
administration of promotility agents is indicated, such as
metoclopramide or cisapride (dog: 0.1-0.5 mg/kg PO q8-
12h, cat: 0.5-1 mg/kg PO q 8h). When esophageal or gastric
ulceration is suspected, sucralfate (0.5-1 gram q 4-8h) and
one of the H2-antagonists or hydrogen pump inhibitors are
indicated: ranitidine (2-2.5 mg/kg q 12 h); or cimetadine (4
mg/kg IV q 6-8h); or omeprazole (0.7 mg/kg, up to 20mg
PO q 24h). Intestinal motility suppressants are not recom-
manded for routine use. Most anti-diarrheal medications
decrease peristalsis which may lead to severe intestinal bac-
terial overgrowth and translocation.

**Diagnoses:** Laboratory samples are collected, prior to
fluids when possible, for an immediate database (PCV, TS,
Glucose, labstack BUN, electrolytes, venous blood gas), and
samples to be run for a CBC, serum chemistry, urinalysis,
cougation profile, Parvo test, and ethylene glycol as indicat-
culated. Culture the feces for *Salmonella* and *Campylobacter*
if contagious cause of diarrhea is suspected. Free T4 levels
(feline) and ACTH stimulation (canine) are run if endocrine
causese are suspected.

The mental status and cranial nerves are evaluated for
abnormalities, and the cervical neck palpated for pain,
which may indicate CNS pathology and/or meningoen-
cephalitis. This might indicate an etiology as well as require
that special care be taken to prevent aspiration of vomitus.
The oropharynx is examined for presence of a linear foreign
body around the base of the tongue. Auscult the abdomen
for gastric and bowel sounds. Absence of bowel sounds sug-
gests hypomotility, ileus, fluid accumulation, or diffuse
peritonitis. Palpation of the abdomen will evaluate the
abdominal organs; gastrointestinal distension, thickening,
or plication may indicate an obstruction from a foreign
body or mass. A tympanic cranial abdomen suggests a gas-
tic dilatation-volvulus Focal pain or retching/vomiting dur-
ing palpation suggests involvement of local structures.
Feces are evaluated for diarrhea, foreign objects and the
presence of blood. Dark blood (melena) is associated with
upper GI bleeding and frank hemorrhage is associated with
lower intestinal bleeding. Rectal temperature can reflect
possible inflammation or infection if elevated, or poor per-
fusion or toxins if low.

If gastric distension with gas is present, fluid resuscitation
and gastric decompression are performed prior to obtaining
radiographs. Radiographs and ultrasound of the abdomen
are evaluated for detail, presence of gas, organ enlargement,
organ displacement, and mineralized/calcified lesions. Gen-
eralized loss of intraabdominal detail is a sign of diffuse
peritoneal disease. Diffuse gas dilation of the stomach with a
“shelf” sign is diagnostic for gastric dilatation-volvulus.
Segmental gas dilation of the intestines with or without evi-
dence of a foreign object suggests obstruction. Intraabdomi-
nal gas is a sign of a gastrointestinal rupture or intraabdomi-
nal infection with a gas-producing bacteria. Mineralized
and calcified lesions of the urinary or biliary tract can indi-
cate possible inflammation or obstruction. Changes in organ
size and shape is a sign of organ dysfunction. Loss of detail
in the right upper quadrant and a duodenal loop sign can sug-
ject pancreatic inflammation. Ultrasound evaluation can be
used to evaluate for peritoneal fluid, Gi obstruction or int-
tussusception, detect subtle organ enlargement, mass
lesions, metastatic disease, vascular occlusion, urinary tract
obstruction, and pancreatitis. Aspiration of mass and cyto-
logic examination of fluid can be done with ultrasound.

**Continued support:** Intestinal fluid deficits and on-
going fluid losses are replaced using balanced isotonic
replacement crystalloids or 0.9% saline if there is hypochlo-
remic metabolic alkalosis. If it is expected that res-
olution of signs will take time, if SIRS is occurring, and/or
an on-going need for colloid support is anticipated, het-
astarch is administered (0.8 ml/kg/hr) in addition to crystal-
loid maintenance infusion to support intravascular colloid
osmotic pressure and volume. Administer antibiotics if sus-
pect bacterial translocation and/or bacterial etiology. First
generation cephalosporin (cefazolin 20 mg/kg IV q8h) and
metronidazole (10 mg/kg IV q8h) will provide broad spec-
trum coverage of aerobes and anaerobes.

On-going life-threatening gastric hemorrhage can be con-
trolled by placing a nasogastric tube and performing cold
water gastric lavage until bleeding subsides or the animal is
prepared for surgical intervention. Evaluate the need for
transfusion. Emergency surgical intervention is required for
uncontrolled hemorrhage, intestinal obstruction, perfora-
tion of the gastrointestinal tract, presence of intraabdominal
gas, septic peritonitis, bile peritonitis, intussusception, linear for-
ign bodies, ruptured tumors, torsion of the spleen, testicles,
uterus, or intestines, gastric dilatation-volvulus, mesenteric
volvulus, organ abscess, pyometra, or if unable to stabilize
with appropriate aggressive resuscitative measures.

**Monitoring:** Physical parameters, blood pressure and
central venous pressure are used to evaluate intravascular
volume and hydration status. Temperature body weight,
mentation, and frequency and characterization of the vomi-
tus and diarrhea are recorded. Frequent monitoring of
PCV/TP, albumin, glucose and electrolytes are necessary.
Follow the Rule of 20. Any sudden change in mentation
should prompt the nursing staff to suspect hypoglycemia.