Abdominal Radiology: Making the Call on GI Mechanical Obstructions
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OBJECTIVE:

The purpose of this lecture is to illustrate the variable, subtle and not-so-subtle, radiographic manifestations of gastrointestinal mechanical obstructions in dogs and cats. We will first review the rules-of-thumb used to diagnose this surgical emergency. We will focus the rest of the lecture on multiple, rapid-fire radiographic examples of confirmed obstructions.

KEY POINTS:

- In DOGS, consider an obstruction when the maximum small intestinal serosa-to-serosa diameter exceeds 1.5-2.0 times the height of a lumbar vertebral body.
- In CATS, consider an obstruction when the maximum small intestinal serosa-to-serosa diameter exceeds 2.0-2.5 times the height of a lumbar vertebral body.
- If one population of small intestine is greater in diameter than other populations, this should raise concern for obstruction, regardless of the actual ratio to a vertebra.
- Shape of the small intestinal serosa-to-serosa margin is more important than diameter for linear foreign bodies in dogs and cats.
- The stomach is an important predictor of intestinal obstruction, even if the obstruction is not in the stomach.

OVERVIEW:

An enormous amount of information can be obtained from an abdominal radiograph, especially in emergency/critical care situations. The increased availability of abdominal ultrasound has perhaps led to an under-appreciation of the abdominal radiograph. This lecture will review the interpretative steps used to diagnose a mechanical obstruction in an emergency setting.

Radiography vs Ultrasound:

- Several peer-reviewed articles have recently compared radiography and ultrasound in the diagnosis of a mechanical obstruction. It is generally accepted that when the two technologies are used together, there is a greater confidence in the decision for surgery. While this may be true, availability and sonographer experience will detract from the usefulness of ultrasound in an emergency situation. Radiography and physical exam findings remain the primary deciding factors in diagnosing a mechanical obstruction at the Animal Medical Center.

The Rules-of-Thumb:

- 1.5-2.0 times the height of a lumbar vertebral body in dogs is highly suspicious for obstruction in dogs.
- 2.0-2.5 times the height of a lumbar vertebral body in cats is highly suspicious for obstruction in cats.
- Linear foreign body obstructions do not overly distend the intestines and do not follow this rule. Instead, the margin of the intestines changes shape (becomes plicated).

Beware of the Radiologist with a Ruler!

- Rather than comparing intestinal diameter to a vertebral body, there is nothing like comparing a segment of small intestine to other loops on the same radiograph!
- Two differing populations of small intestinal diameter should raise suspicion of a segmental obstruction, regardless of the actual ratio comparison to the vertebral body.
- The pitfall of seeing two different populations of small intestinal distension exists when the obstruction is aboral, or near the ileum. In this case, all of the intestines will appear distended. This can also be seen with functional obstructions (functional ileus).

**Partial Obstructions:**
- Partial obstructions can be a diagnostic challenge. A history of previous intestinal resection and anastomosis surgery in the face of intermittent vomiting is a common presentation for stricture (partial obstruction) of a loop of small intestine. A “gravel sign” is the presence of small mineral opacities aggregating in one segment of mildly distended small intestine. This should raise suspicion for partial obstruction. Mineral fragments (whether due to particles from the floor or maybe cat litter) will evenly disperse throughout the stomach and intestines. These heavier particles tend to settle in front of a partial obstruction, as fluid and less dense particles move beyond the obstruction.

**Linear Foreign Body Obstructions:**
- The unique aspect of a linear foreign body obstruction is that the size of the small intestines is NOT as important of a sign as the SHAPE. Plicated intestines may not become distended. Instead, the serosal margin becomes undulating and bunched. These plicated intestines can be gas-filled, fluid-filled, or a mixture of both. This applies primarily to cats.
- Dogs do not ingest thin linear foreign bodies so the appearance of the obstruction differs slightly. Look for the “too many cecums” sign in dogs to diagnose the pantyhose, shag carpeting, or cloth linear foreign body in a dog. Examples of this will be illustrated.

**The Stomach as a Predictor of Intestinal Obstruction:**
- Often times, the stomach will begin to fill with fluid and/or gas as the intestinal obstruction persists.
- Dogs and cats will generally not drink a large volume of water immediate before being radiographed. Identifying a large volume of fluid distending the stomach should raise concern that now the obstruction is causing fluid translocation into the gastric lumen.

**REFERENCES:**


Vander Hart D, Berry CR. Initial influence of right versus left lateral recumbancy on the radiographic finding of duodenal gas on subsequent survey ventrodorsal projections of the canine abdomen. *Vet Radiol Ultrasond* 2015, 56:12-17.