Diagnostic Imaging: Gastrointestinal Emergencies

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The accurate and rapid diagnosis of gastrointestinal emergencies is essential to optimizing patient care, performing timely surgical intervention, reducing peri-operative morbidity, hospitalization costs, and avoiding unnecessary surgery. However, accurate diagnosis of these relatively common emergency presentations can be elusive, sometimes requires multiple imaging modalities or examinations and always requires an integrative approach to problem-solving.

There are many conditions that cause an "acute abdomen" however, there are a select few that require immediate surgical intervention. These include:

I. Small-intestinal obstruction
   a. Foreign body
      1) Linear
      2) Non-linear
   b. Neoplasia
   c. Adhesions
   d. Stricture

II. Gastrointestinal perforation and septic abdomen

III. Gastric dilatation and volvulus

1. Small-intestinal obstruction: Presented with a vomiting patient the most important question to answer is "to cut or not to cut?" Is this patient obstructed? Radiography is the first line of diagnostic investigation. Orthogonal radiographs should include a left lateral and ventrodorsal view, with a right-lateral view obtained if there is a questionable "obstructive pattern". A left lateral view aids in assessment of pyloric obstructions as the intraluminal gas will accumulate in the non-dependent pylorus and contrast with any intraluminal structure/mass or foreign body. Radiographic characteristics of small-intestinal obstruction are summed up in one sentence: Moderate to severe segmental enlargement of the small-intestine. This enlargement may be due to gas, fluid or the offending foreign material. Focusing on gas-filled intestinal segments will lead you to miss the enlarged fluid-filled loops and an incorrect conclusion. Radiography is approximately 70% accurate in the diagnosis of small-intestinal obstruction. It has a higher false negative result in cases of linear foreign body obstruction. Ultrasonography performed by experienced and skilled radiologists is more accurate (97%), and results in a high degree of confidence for negative and positive results in the diagnosis of small-intestinal obstruction due to any cause.
2. Gastric dilatation and volvulus: A single right lateral radiograph is usually sufficient to diagnose a GDV. The pylorus is displaced dorsal and cranial to the gastric fundus. Various descriptors have been used including "double bubble", "smurf's hat", "popeye's arm". The smaller bubble is the pylorus. The pylorus is normally located in the right cranial abdomen and is fluid-filled. In cases of a GDV, the pylorus becomes displaced leftward, cranial and dorsal, thus filling with gas on a right lateral view. Additionally the spleen may be enlarged. The gastric distention is often associated with gaseous distention of the esophagus, small-intestine and caudal displacement of the intestinal tract.
3. Pneumohydroperitoneum: The presence of gas and fluid in the peritoneal space is an indication of emergency surgery. Usually a septic peritonitis secondary to perforation or rupture of a gastrointestinal viscus is the culprit. Tiny gas pockets that cannot be convincingly located in intestine should raise the concern of a septic process. Horizontal beam radiography either in left lateral recumbency (view is a VD view) or sternal recumbency (lateral view) will permit detection of gas accumulation in the non-dependent portion of the abdomen, often contrasting with the caudal margin of the diaphragm or fluid interface. Abdominal ultrasonography is more sensitive for detecting small volumes of fluid and gas.

References

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