

A functional colonic obstruction: Cannon's point

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A patient presented with a large bowel obstruction after laparoscopic hernia repair converted to open inguinal hernia repair. A contrast enema examination revealed an area of narrowing in the midtransverse colon, consistent with Cannon's point. This represents a physiologic sphincter with focal narrowing of the colon lumen.

Case report

The patient is a 74-year-old African-American male with a longstanding history of a recurrent left inguinal hernia after an open-suture repair in the remote past. At the clinic, he complained of increasing size and discomfort from his hernia.

His past medical history was significant for hypertension, coronary-artery disease, deep vein thrombosis, pulmonary thromboembolism, hyperlipidemia, and gout. His surgical history included coronary-artery bypass grafting, colonoscopic polypectomy, and open inguinal hernia repair. A review of systems was positive only for a ten-pound weight gain in the past year. He had no changes in his bowel habits and a recent normal colonoscopy.

On physical examination, his abdomen was soft and nondistended, with a large reducible left inguinal hernia that extended into the scrotum.

After receiving the appropriate cardiac clearance, the patient was taken to the operating room and underwent a laparoscopic (totally extraperitoneal) converted to open left inguinal hernia repair. Initial exploration revealed a large, indirect, sliding hernia containing sigmoid colon. We were unable to adequately reduce the sac from the internal ring, prompting conversion to open repair. Once open, the hernia was completely reduced, the hernia sac ligated, and the

defect repaired using a plug-and-patch mesh technique. After completion of this procedure, the patient was admitted to the surgical floor for observation.

The patient's postoperative course was complicated by persistent abdominal distention, absence of bowel function, and emesis beginning on postoperative day two. A nasogastric tube was placed, and serial abdominal films revealed distention of the small bowel and proximal colon. On postoperative day three, a CT scan of the abdomen revealed dilated small and large bowel, with a transition point in the midtransverse colon, consistent with a high-grade obstruction (Fig. 1).

Subsequent to this scan, a water-soluble contrast enema showed a focal area of narrowing in the transverse colon with minimal passage of contrast into the proximal colon (Fig. 2).

After a period of time and increased contrast administration, the area did ultimately dilate, but not to the same diameter as the adjacent colon.

Colonoscopy showed normal colonic mucosa and no area of stricture or focal narrowing, as demonstrated on the CT and contrast enema studies. The patient did ultimately require exploration by a limited midline laparotomy on postoperative day nine, due to his persistent proximal colonic distention and absence of bowel function. At the time of operation, the proximal colon was dilated, but no stricture or mass was appreciated at the point of transition. No surgical resection was performed.

The remaining hospitalization was remarkable for a slow return of bowel function and resolution of abdominal distention. On clinic followup, he was tolerating a diet, with regular bowel function, and no recurrence of his inguinal hernia.

In conclusion, with no intra-abdominal pathology causing obstruction, and with the imaging findings, we attributed this pseudo-obstruction to a physiologic narrowing at Cannon's point.

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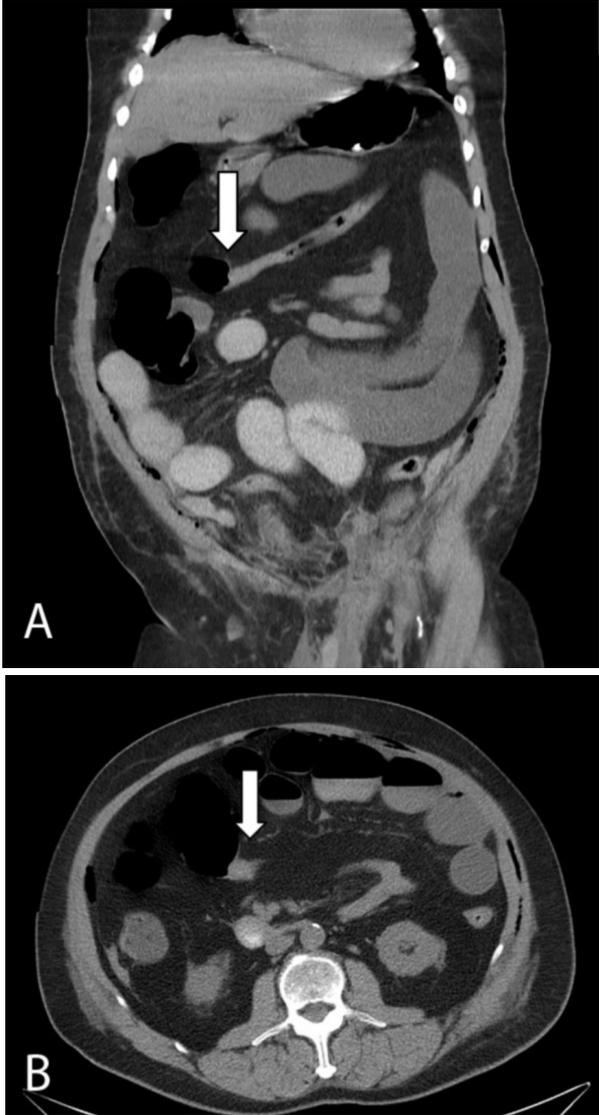


Figure 1. Coronal (A) and axial (B) CT scans of the abdomen show dilated small and large bowel with a transition point (white arrows) in the midtransverse colon, consistent with a high-grade obstruction.

Discussion

Gastrointestinal motility has been a subject of study for over 100 years. One of the best known early pioneers in motility research was Dr. Walter B. Cannon. Dr. Cannon contributed to the fields of physiology, endocrinology, and radiology, first using X-rays in 1896 to image the esophagus during swallowing (1). Dr. Cannon and others described the existence of small and large intestinal “sphincters,” or areas of physiologic narrowing.

The origin and function of the intestinal sphincters are sources of debate. Some describe the sphincters as “areas of spasm that are not due to organic disease but probably reflect localized neuromuscular imbalance”(2). One hypothe-

sis is that the sphincters are areas of “overlap of the superior and inferior mesenteric nerve plexuses”(3). Another theory is that they represent “zones of contraction.” Italian anatomist Aloj felt that “the mucosa (at the level of the sphincter) shows small folds producing a kind of rough internal surface, without having plicae semilunares. The musculature shows a conspicuous thickening.”(4)

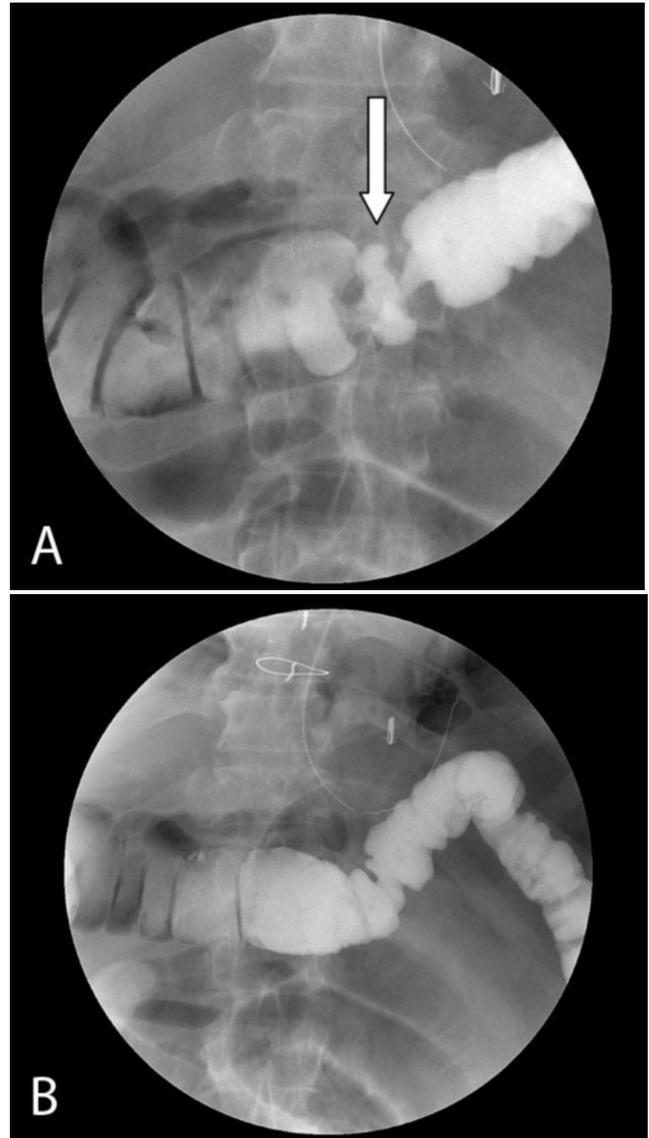


Figure 2. Water-soluble contrast enema shows a focal area of narrowing (white arrow) in the transverse colon with minimal passage of contrast into the proximal colon. (A) reveals an annular narrowing. After a period of time and increased contrast administration, the narrowing opened to a nearly normal caliber (B).

One such sphincter, bearing Dr. Cannon's name, is described along the distal transverse colon. The sphincter is found where the embryologic midgut transitions to the

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hindgut. Most evident on contrast enema, Cannon's sphincter (or Cannon's point) may be seen as a transient localized spasm. In contrast to an annular colon cancer, the narrowing associated with Cannon's point tends to have tapering margins, changes appearance in subsequent images, and may be relieved by intravenous glucagons (2). There is intact mucosa without ulceration. If the narrowing at Cannon's sphincter poses a clinically significant obstruction, lower endoscopy may be used to relieve it.

These sphincters differ from the better known functional or acute pseudo-obstructions of the intestine, such as Ogilvie syndrome. In Ogilvie syndrome, the colon becomes massively distended in the absence of a mechanically obstructing lesion, akin to a colonic ileus. The entire colon may appear dilated on x-ray. As with treatment of a functional obstruction from narrowing at an intestinal sphincter, colonoscopy may be employed to decompress the dilated colon of Ogilvie syndrome. In the appropriate patient, neostigmine may be employed to stimulate bowel motility.

References

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