Cecal Volvulus: Retrospective Analysis of CT Evaluation in The Emergency Teleradiology Setting with Pictorial Review of The Salient Features

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AIMS AND OBJECTIVES

To evaluate salient imaging features, complications, and unusual findings of Cecal Volvulus on CT abdomen and pelvis images.

INTRODUCTION

- Cecal volvulus is a torsion of the cecum around it's own mesentery
- Can only occur in the small percentage (11-25%) of the population
- Predisposed by developmental failure of peritoneal fixation, allowing the proximal colon to be free and mobile.
- Second requirement is restriction of the bowel at a fixed point within the abdomen that serves as a fulcrum for rotation, such as an adhesion, abdominal mass, or scarring.







TYPES OF CECAL VOLVULUS

Type 1. Cecum twists in the axial plane, rotating clockwise and counterclockwise in long axis and appearing in the RLQ

Type 2. Loop type, twisting or torsion of a portion of the cecum and a portion of the terminal ileum, cecum gets displaced to an ectopic location (typically left upper quadrant) and is relocated in an inverted orientation, commonly counterclockwise twist.

Type 3. Cecal bascule: cecum folds anteriorly or posteriorly without any torsion, seen as dilated loop in the mid abdomen









Image: CT of Cecal Volvulus: Unraveling the Image Colyn J. Moore, Frank M. Corl, Elliot K. Fishman AJR Am J Roentgenol. 2001 Jul;177(1):95

MATERIALS AND METHODS

Data extraction of studies with a diagnosis of cecal volvulus on the teleradiology report conveyed by our institution. 80 CT Abdomen and pelvis studies acquired in the emergency radiology setting with diagnosis of Cecal volvulus were retrospectively evaluated.

Study images were analysed by four expert radiologists to document various imaging features of cecal volvulus.

Findings assessed included position of cecum, Whirl sign, cecal diameter, beak sign, small bowel obstruction, mesenteric edema, pneumatosis & distal colon decompression

The results were analysed and pictorial presentation compiled









A 66 year old male patient with history of abdominal pain, nausea, vomiting, suspected bowel obstruction; Coronal non contrast CT images demonstrate a typical cecal volvulus with it's apex in LUQ(*) dilated cecum, mesenteric edema.

CASE 1











49 year old female patient with history of diffuse abdominal pain and vomiting, axial and coronal CECT demonstrates a cecal volvulus with apex in LUQ, whirl sign (arrow) in the midline lower abdomen, and adjacent beak sign(*).

The cecum is dilated, there is associated small bowel dilatation and obstruction(*). There is bowel malrotation indicated by the presence of small bowel loops in the right mid and lower abdomen. Mechanism of volvulus as explained in the inset image (Type 2).









A 44 year old female with history of abdominal pain, worse in the right lower abdomen, Oral and IV Contrast CT abdomen and pelvis, sequential coronal and axial images demonstrate, with distal ileum, ascending colon and cecal volvulus, uncomplicated, Underlying Small bowel malrotation (arrow).







Bascule means Rocker or Seesaw. Cecal bascule is a large dilated cecum folding over the ascending colon. Often causes recurrent volvulus.







(c) Type III: cecal bascule

81 year old male patient with history of left lower abdominal pain, CECT abdomen and pelvis demonstrates

- Cecal Bascule (arrow), posteriorly folded dilated cecum
- Proximal ascending colon and cecal dilatation
- Whirl sign (*) in the right mid abdomen
- Distal Colon Decompression (*)
- Diffuse mesenteric edema and small free fluid, small bowel wall thickening(*)



A 60 year old female patient with history of abdominal pain, CECT abdomen and pelvis demonstrates, Cecum at LUQ, Whirl sign (*) in the mid abdomen, distal colon decompression, cecal wall thickening(*) at the site of twist, mesenteric edema, Pneumatosis(*) in small bowel wall Very Subtle pneumatosis, easily missed, Need to track carefully



















A 31 year old female patient with worsening urinary tract infection with fevers, chills, abdominal/back pain since 4-5 days. Contrast CT abdomen and pelvis coronal and sagittal images demonstrate, a dilated cecum in the mid abdomen(*), ileocecal volvulus(*), Whirl sign (*) with a perforation and abscess (*) formation adjacent to terminal ileum, surrounding mesenteric edema, free air, partial SBO













66 year old female patient with history of Right upper quadrant and flank pain, Contrast CT Abdomen and pelvis demonstrates, Cecal Volvulus, dilated cecum in the left mid abdomen with Whirl Sign at the central mid abdomen, Beak sign adjacent to the site of twist, and a grossly dilated cecum with closed loop obstruction(*).











FINDINGS IN CECAL VOLVULUS

Dilated and displaced cecum with Whirl sign were the most common imaging findings seen in 97.5% and 95% of the patients diagnosed with Cecal volvulus.

Cecal wall thickening was seen in 11.2% of the studies, associated small bowel obstruction was seen in 32.5% of the studies and a beak sign was demonstrated in 48.7% of the studies.







OTHER FINDINGS IN CECAL VOLVULUS



Rare findings (<5%) included pneumatosis, Free Air

MANAGEMENT:

Colonoscopy, highly rated for diagnosing and reducing sigmoid volvulus is not ideal for treating cecal volvulus.

Uncomplicated cecal volvulus is treated with surgical exploration and cecopexy.

Complications may result in bowel ischemia and gangrene and need radical surgical procedures.

Perforation, Gangrene, signs of bowel ischemia such as bowel wall thickening, mesenteric hemorrhage and pneumatosis intestinalis require surgical colonic resection

Surgical intervention lowers mortality and recurrence.







SCALE OF CERTAINTY IN CT DIAGNOSIS OF CECAL VOLVULUS



Each study was assigned a score between 1-10 based on level of confidence in the diagnosis of cecal volvulus. Studies with classic CT signs were scored 10 and comprised of 65 % of the cases in this series.

Ectopic cecal location with identifiable haustral markings was the hallmark for diagnosis of cecal volvulus.

Cecal position in the left upper quadrant increases certainty of diagnosis

Identifiable mesenteric twist in addition to cecal dilatation and ectopic location was assigned higher certainty

Classic signs : Whirl sign, beak sign, coffee bean sign increase diagnostic probability







CONCLUSION

This pictorial review demonstrates findings helpful in making the diagnosis of cecal volvulus :

- Different locations of the displaced caecum.
- Incidentally diagnosed uncomplicated cecal volvulus.
- Beak sign and Whirl sign of cecal volvulus
- Complicated cecal volvulus with small bowel obstruction
- Bowel wall thickening, pneumatosis, free air, abscess: indicators of complications including bowel ischemia and sepsis.
- Dilated and displaced cecum in abnormal location was seen in all cases, Whirl sign(95%), Distal colon decompression (53.7%) and Beak sign(48.7%) were the most classic findings of cecal volvulus in this series.







TAKE HOME MESSAGE

Cecal volvulus is an acute abdominal emergency requiring expeditious diagnosis.

Identification of an abnormally located dilated cecum with a whirl sign on CT is helpful to alert the referring physician of this entity.

It is important to identify cecal volvulus on imaging of the abdomen and pelvis in the emergency setting with special attention to the common complications that can lead to significant morbidity in the acute phase.







REFERENCES

- Peterson Christine, Anderson John, et al. Volvulus of the Gastrointestinal Tract: Appearances at Multimodality Imaging. Radiographics 2009;29:1281 1293.
- 1. Hasbahceci Mustafa, Basak Fatih, et al. Cecal Volvulus. Indian J Surg (November–December 2012) 74(6):476–479.
- 2. Juliana M Rosenblat, Alla M. Juliana M. Rosenblat, Alla M. Rozenblit, Ellen L. Wolf, Ronelle A. DuBrow, Elana I. Den, Jeffrey M. Levsky, Findings of Cecal volvulus at CT, Radiology July 1 2010; vol 256, No 1
- 3. Huang YM, Wu CCJ. Whirl sign in small bowel volvulus. BMJ Case Reports 2012;10.1136/bcr-2012-006688.
- 4. MJ Caroline, CM Frank, FK Fishman. CT of Cecal Volvulus; AJR 2001;177:95–98 0361–803X/01/1771–95.
- 5. Frank AJ, Goffner LB, Fruauff AA, Losada RA. Cecal volvulus: the CT whirl sign. Abdom Imaging 1993;18:288–289







THANK YOU





