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Original Research Paper

Radio-Diagnosis

A RARE RADIOLOGICAL DIAGNOSIS: RIGHT SIDED SIGMOID COLON: FINDINGS AND ITS CLINICAL SIGNIFICANCE.

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ABSTRACT Right sided sigmoid colon is a rare anatomical variation. It is necessary to recognize and report such variations by the radiologists in order to guide the physicians and surgeons. We hereby report a rare case of right sided descending and sigmoid colon diagnosed on triphasic CT. On CT, descending colon and sigmoid colon were noted incidentally on right side. These were noted in anterior relation to cecum and ascending colon. The transverse colon was seen crossing the midline twice at L2-L3 and L4-L5 intervertebral disc levels respectively thus malpositioning the descending and sigmoid colon on the right side. These findings need to be mentioned and reported by the radiologists as it can change the course of patient management by the physicians, surgeons and gastroenterologists for common condition such as appendicitis, chronic intestinal obstruction, acute abdomen. The malposition and/or malrotation is important to mention as it will prevent the treating doctor for any mistakes while executing investigative or surgical procedures in this region like sigmoidoscopy, percutaneous cecostomy and anterior transperitoneal approach of kidney.

KEYWORDS : Sigmoid Colon, Descending colon, Malposition, Triphasic CT, Radiologists.

INTRODUCTION

During normal embryological development of gastro-intestinal tract, the descending colon and sigmoid colon gets fixated in the anatomical left position. The sigmoid colon extends from the left iliac fossa to third sacral vertebrae. Right sided sigmoid and descending colon is a rare anatomic variation. It occurs due to early fixation of sigmoid colon on right side causing imperfect descent of caecum because of which it was observed in right lumbar region. It is important to diagnose and report such rare variations as it guides treating physicians and surgeons to appropriately manage common ailments such as acute appendicitis, acute abdomen, chronic intestinal obstruction.

Case Report

A male patient of age 62 years with complaints of abdominal pain and constipation since 20 days was referred by the gastroenterologist for triphasic CT. The triphasic CT scan was performed on 32 slice seimens system in arterial, venous and equilibrium phases and sagittal and coronal MPR were done. Tracing of the colon was done based on its blood supply and anatomic location. Superior mesenteric artery and Inferior mesenteric artery which were seen originating from abdominal aorta at L1 vertebral body and L3-L4 intervertebral disc level respectively. The caecum, ascending colon and proximal part of transverse colon noted on the right side of abdomen. The transverse colon at L2 vertebral body seen descending diagonally and seen crossing the midline at L2-L3 intervertebral disc space travelling to the left side anterior to spleen which descends towards the left pelvic brim and at L5 seen ascending diagonally towards right side and crosses midline at L4-L5 intervertebral disc and forms Descending colon which continues to descend anterior to ascending colon and descends into the pelvis to end as a right sided sigmoid colon.

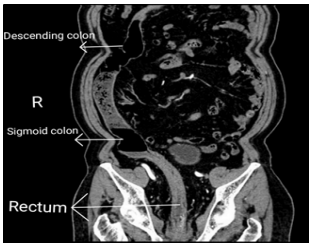

Image 1. A Coronal MPR Image of CT Showing Right Sided Sigmoid Colon.

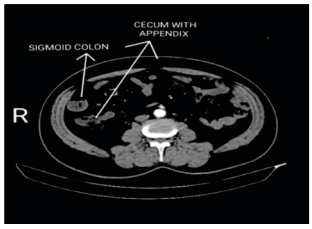

Image 2. An Axial Slice of CT Showing Sigmoid Colon on Right Side in Anterior Relation to the Cecum and Appendix.

DISCUSSION

During normal development of gastrointestinal tract, 3 divisions of the GI tract (foregut, midgut, hindgut) herniate out from the abdominal cavity, where they undergo a 270 degrees counterclockwise rotation around the superior mesenteric vessels. Following this rotation, the bowels return to the abdominal cavity, with fixation of the duodenojejunal loop to the left of the midline and the cecum in the right lower quadrant.

Normal Rotation [1]:

First Stage: No distinct boundary between intra and extra-embryonic coeloms.
Second Stage: (Herniation at 6 weeks) Herniation with 180 degrees counterclockwise twist around the SMA.
Third Stage: (Return to the Abdomen) Further 90 degrees rotation counterclockwise to make the total rotation 270 degrees counterclockwise. The cranial limb enters first and the terminal ileum and cecum enters last.
Fourth stage: (Fixation at 12 weeks until birth) Portions of the mesentery fuse with the posterior peritoneum.

The sigmoid colon is a S-shaped loop of variable length and extends from iliac fossa to the third sacral vertebra where it joins the rectum. A few common types of anatomical variations of sigmoid colon are
1. Short, straight, oblique into pelvis.
2. Looping to right side.
3. Ascending high into abdomen

In this case, due to faulty fixation of gut derivatives in stage 4, the mesentery of ascending and descending colon failed to

fuse with the peritoneum of posterior abdominal wall and led to the retention of the mesentery. In this case early fixation of sigmoid colon on right side caused imperfect descent of caecum because of which it was observed in right lumbar region and lead to short length of ascending colon. The genesis can be explained by the forkhead box transcription factor Foxf1 which plays a key role in the formation of dorsal mesentery. The ultrastructural changes in the dorsal mesentery initiate intestinal rotation and generate the left-right asymmetry [2]. Intestinal malrotation can be due to abnormalities of either left-right patterning, dorsal mesentery, intestine itself or may be due to other abdominal contents. The identification of new genes with a role in intestinal development will benefit families via genetic counseling, information about recurrence risk and pre-natal diagnosis where the disorder is lethal.

According to Madiba and Haffajee [3], the present case falls into the primitive variety, suprapelvic in position but on the right side. In this case, the right sigmoid loop lies anterior to the cecum in contrast to the case described by Madiba and Haffajee [3]. It can be classified as type 5 in the detailed classification of Madiba and Haffajee [3], which has been reported only once before by Preeti Shrivastava et all [4]. The right sigmoid colon has been reported radiographically with barium enema, by Fiorella and Donnelly [5] and Saxena et al. [6] in American and Indian children, respectively, <5 years of age. Komiyama and Shimada [7] have also described a right-sided sigmoid loop behind the ascending colon in an adult. Considering these reports, the present case stands as a rare finding in adults in describing an intermediate origin of the sigmoid colon with a bent hairpin shape lying on the right side anterior to the cecum and ascending colon.

CONCLUSION

A malpositioned sigmoid colon needs to be mentioned and reported by the radiologists as it may poses problems in investigation, diagnosis and surgical interventions. The case of right sided sigmoid colon may mimic symptoms of appendicitis, chronic bowel obstruction, acute abdomen, so in diagnosing these conditions the possibility of right sided sigmoid colon must be kept in mind. Interventional radiologists should be aware of the possibility of such variation in procedures, including percutaneous cecostomy and anterior transperitoneal approach of the kidney to avoid colon puncture. Contrast enhanced multi-slice CT abdomen delineates normal and abnormal anatomy in exquisite details.

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