

The role of CT and MRI in the diagnosis of sigmoid volvulus

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Sigmoid volvulus (SV) is the wrapping of the sigmoid colon around its own base (1). Although SV is an uncommon disease, its incidence is relatively high in Turkey, particularly in East Anatolia (2,3), where our hospital is located. The disease generally presents as large bowel obstruction and correct preoperative diagnosis is difficult (3).

To examine the diagnostic role of computed tomography (CT) and magnetic resonance imaging (MRI) in SV, we reviewed the records of 960 patients with SV who were treated over a 47-year period between June 1966 and June 2013. Abdominal X-rays were obtained for all patients, while CT or MRI results were obtained for some stable patients of recent years. Both diagnostic and therapeutic sigmoidoscopy was performed in stable SV patients, while surgery was used in the patients with acute abdominal findings, melanic stools, and unsuccessful nonoperative detorsion. To determine the correct diagnosis rates, the diagnosis was corroborated by endoscopy or surgery.

The correct diagnosis rate was 71.4% (685/960) based on the clinical findings, including abdominal pain, distention, and obstipation. Of the X-ray films, 67.4% (545/809) presented SV findings, including a sigmoid dilatation with intestinal air-fluid levels. The correct diagnosis rate was 81.8% (785/960) when clinical findings were evaluated together with X-ray findings. Based on clinical and radiological considerations, SV was misdiagnosed as an obstructive emergency in 161 patients (16.8%) and as a nonobstructive emergency in

14 patients (1.5%). Sigmoidoscopy demonstrated 100.0% (144/144) correct diagnosis rate in patients in whom diagnostic endoscopy was applied by showing torsioned lumen and impossibility of the insertion of the instrument proximally into the torsioned site. Otherwise, 96.6% (57/59) and 97.4% of cases (37/38), respectively, were correctly diagnosed based upon CT and MRI findings by showing evidence of SV, including mesenteric whirl pattern with sigmoid dilatation and intestinal air-fluid levels. The major cause of misdiagnosis was the absence of the whirl sign, which resulted in improper diagnosis of nonspecific intestinal obstruction.

The CT whirl sign, which was first determined by Fischer in 1981, is defined as twisted bowel loops encircling mesenteric vessels. It is an uncommon sign on CT and it is easy to overlook (4). Although Levisky et al. (5) reported the whirl sign in 12 of 21 patients with SV (57%) and they found the presence of sigmoid dilatation (86%) to be more sensitive, according to the report of Macari et al. (6), all 16 patients with SV had a CT whirl sign, which is in agreement with our results. In our opinion, the presence of the mesenteric whirl sign in addition to sigmoid dilatation and intestinal air-fluid levels on abdominal CT or MRI is highly diagnostic of SV. In addition to the preferable use of MRI in pregnant patients (7), the use of CT or MRI may improve preoperative diagnostic confidence in SV.

References

1. Atamanalp SS, Gündoğdu C, Ünal D, Halıcı Z, Kısaoğlu A, Özoğul B. Stereological evaluation of ganglion cells in the sigmoid colon in primary and recurrent sigmoid volvulus. *Turk J Med Sci* 2013; 43: 509–514.
2. Raveenthiran V, Madiba TE, Atamanalp SS, De U. Volvulus of the sigmoid colon. *Colorectal Dis* 2010; 12: e1–e17.
3. Atamanalp SS. Sigmoid volvulus: diagnosis in 938 patients over 45.5 years. *Tech Coloproctol* 2013; 17: 419–24.
4. Suarez Vega VM, Marti de Gracia M, Veron Sanchez A, Alonso Gamarra E, Garzon Moll G. Trapped on the 'whirl': diagnostic sign on emergency CT. *Emerg Radiol* 2010; 17: 139–147.
5. Levisky JM, Den EI, DuBrow RA, Wolf EL, Rozenblit AM. CT findings of sigmoid volvulus. 2012; 194: 136–143.
6. Macari M, Spieler B, Babb J, Pachter HL. Can the location of the CT whirl sign assist in differentiating sigmoid from caecal volvulus? *Clin Radiol* 2011; 66: 112–117.
7. Atamanalp SS, Öztürk G. Sigmoid volvulus in pregnancy. *Turk J Med Sci* 2012; 42: 9–15.

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