Original Article

Sigmoid Colon Torsion: Retrospective Analysis of Nineteen Cases

Sigmoid Kolon Torsiyonu: On Dokuz Olgunun Retrospektif Analizi

Metin Yucel [1], Hakan Çakıt[1], Adnan Ozpek[1] , Fatih Basak[1] , Sema Yuksekdag[1] , Aylin Acar[1] , Ali Kilic[1]

1. Department of General Surgery, Umraniye Training and Research Hospital, Istanbul, Turkey

Corresponding author:

Metin Yucel; MD

Adem Yavuz street No:1 Umraniye, Istanbul, TURKEY

Phone: +90 216 632 1818, Fax: +90 216 632 7124 E- Mail: drmetin69@mynet.com

Geliş tarihi / Received: 10.10.2016 **Kabul tarihi / Accepted:** 10.08.2017

Abstrac

Background: Sigmoid colon torsion is an emergency situation for which there is no consensus for diagnosis and treatment. The objective of this study is to determine the incidence and appropriate treatment approach by analyzing patients treated and followed up in our clinic for sigmoid colon torsion.

Material and Methods: This study screened patients retrospectively. The patients were diagnosed through physical examination, standing abdominal X-ray, and computerized tomography if required. Following resuscitation, emergency laparotomy was performed for patients with acute abdomen symptoms. Colonoscopic detorsion and semi-elective or elective definitive surgery were performed for stabilized patients. Demographic data, incidence rates, colonoscopic detorsion results, and type of surgery applied were analyzed.

Results: This study included a total of 19 patients, 13(68.4%) males and 6(31.6%) females with a mean age of 58.00±24. Colonoscopic detorsion was attempted for 18 patients (94.7%), and successful results were achieved in 17(94.4%). After successful colonoscopic detorsion, semi-elective resection and primary anastomosis were performed for 5 patients, while elective resection and primary anastomosis were applied for 4 patients. Recurrences were seen in one (9%) of the patients who underwent surgery and in 4(66,6%) of the 6 patients who rejected the surgery. No mortality was seen in the operated patient group, whereas 4 patients (50%) died in the non-operated group. Recurrence and mortality were statistically significantly higher in the non-operated group (p=0.027, p=0.018 , respectively).

Conclusion: In cases with no symptoms for acute abdomen, colonoscopic detorsion followed by elective or semi-elective definitive surgery is an appropriate approach for sigmoid colon torsion.

Key words: Torsion, volvulus, endoscopic detorsion

Öz.

Amaç: Sigmoid kolon torsiyonu, tanı ve tedavisinde henüz bir konsensusun sağlanamadığı, fakat geç kalındığında yüksek oranda morbidite ve mortalite ile sonuçlanan acil bir durumdur. Bu çalışmanın amacı, kliniğimizde sigmoid kolon torsiyonu nedeniyle takip ve tedavi edilen hastaları inceleyerek insidans ve uygun tedavi yaklaşımını belirlemek idi.

Materyal ve Metod: Bu çalışma hastaların retrospektif olarak taranması ile dizayn edildi. Hastaların tanısı fizik muayene, ayakta direkt batın grafisi ve gereği halinde bilgisayarlı tomografi ile konuldu. Resussitasyonu takiben akut batın bulguları olan hastalara acil laparotomi, genel durumu iyi ve stabil olan hastalara ise önce kolonoskopik detorsiyon daha sonra semi-elektif veya elektif şartlarda definitif cerrahi uygulandı. Hastaların demografik verileri, insidansı, kolonoskopik detorsiyon ve uygulanan cerrahinin sonuçları analiz edildi.

Bulgular: Çalışma süresi içinde intestinal obstrüksiyon nedeniyle takip edilen 706 hastanın 19'u (%2,7) sigmoid kolon torsiyonu idi. Bunların 13'ü erkek (%68,4), 6'sı (%31,6) kadın olup yaş ortalaması 58.00 ±24 idi. On sekiz

hastaya (%94,7) kolonoskopik detorsiyon denendi ve 17'sinde (%94,4) başarılı sonuç elde edildi. Kolonoskopik detorsiyonun başarılı olduğu hastalardan 5'ine semi-elektif, 4'üne ise elektif şartlarda rezeksiyon ve primer anastomoz yapıldı. Detorsiyonun başarılı olmadığı bir hastaya acil ve rektal tüp uygulaması yapılan başka bir hastaya semi-elektif şartlarda Hartman prosedürü uygulandı. Opere edilen hastaların birinde (%9) nüks görülürken ameliyatı kabul etmeyen 6 hastanın 4'ünde (%66,6) nüks gelişti. Opere edilen hasta grubunda mortalite görülmezken opere edilemeyen hasta grubunda 4 hasta (%50) mortal seyretti. Opere edilmeyen hastalarda nüks ve mortalite istatistiksel olarak anlamlı düzeyde yüksek bulundu (p=0,027, p=0,018 sırasıyla).

Sonuç: Sigmoid kolon torsiyonunda akut batın bulguları yoksa ilk girişim olarak kolonoskopik detorsiyon, sonrasında elektif veya semi-elektif şartlarda definitif cerrahi uygun bir yaklaşımdır.

Anahtar kelimeler: Torsiyon, volvulus, endoskopik detorsiyon

Introduction

Sigmoidal colonic torsion (SCT) is an emergency medical condition where the sigmoidal colon rotates around its mesentery. Although the exact cause is unknown, it is generally multifactorial. Narrow mesentery, constipation, previous abdominal surgery, high-fiber foods, anticholinergic drugs, and neurological and psychiatric disorders are among the predisposing factors (1–5). While closed-loop obstruction develops in the torsioned colon segment, dilation develops in the proximal colon. Late diagnosis and treatment can cause life-threatening complications such as intestinal ischemia, gangrene, and perforation. Despite advances in diagnosis and treatments, consensus has still not yet been achieved regarding the most appropriate treatment. The aim of this study is to determine the incidence and appropriate treatment approach by analyzing patients treated and followed up after being diagnosed with SCT in our clinic over a period of six years.

Material and Methods

We retrospectively analyzed patients hospitalized with a diagnosis of SCT in our clinic between January 2010 and June 2015. The patients were diagnosed through physical examination, standing abdominal X-ray, and computerized tomography (CT) if required. Diagnosed patients were resuscitated after hospitalization. Colonoscopic detorsion was attempted as the first treatment for patients without acute abdominal symptoms. In cases of unsuccessful detorsion or acute abdominal symptoms, urgent laparotomy was performed. Definitive surgery was recommended to patients with successful colonoscopic detorsion. Patients who agreed to the surgery were operated on under semi-elective (in the same hospitalization) or elective (in 2 months) conditions. The patients were followed up with physical examination and phone calls. The demographic data, incidence rates, and the results of surgery and colonoscopic detorsion were analyzed.

Statistical analysis

The data were analyzed using descriptive statistics, means, and standard deviations for continuous variables, and percentages and numbers for categorical data. A t-test and Fisher's exact test were used for comparison. Significance was assessed at the 95% confidence interval, and $p<0.05$ was considered significant.

Results

The diagnoses of 706 patients who were treated and followed up for intestinal obstruction are listed in table 1. Among these, the 19 patients (2.7%) with SCT were assigned to the study group, including 13 males (68.4%) and 6 females (31.6%) with a mean age of 58.00 ±24 (range: 19–89). The average age was 57.2±25.1 for males and 59.7±23.6 for females, and no difference was considered between sexes (p=0.844).

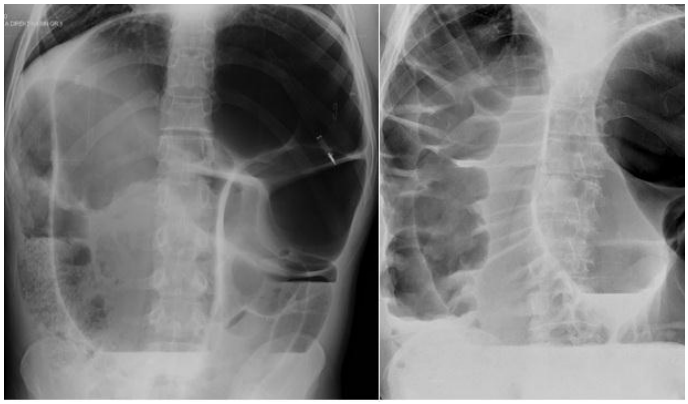

Figure 1. *Standing abdominal X-ray in sigmoid colon torsion*

Standing abdominal X-ray was obtained for all patients. Air-fluid levels and bowel dilatation were observed in all cases (Figure 1). CT scan was also required for 14 patients, and all of the scans showed obstructions (Figure 2).

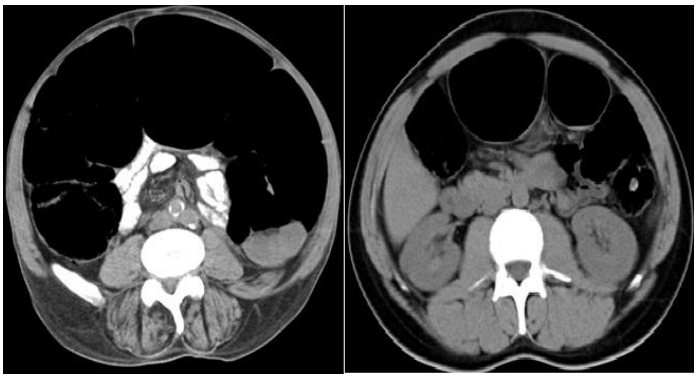

Figure 2. *Computerized tomography image showing the obstruction in sigmoid colon torsion*

Colonoscopic detorsion was attempted in 18 (94.7%) patients, among which the obstruction was successfully treated in 17 (94.4%) cases. One patient with unsuccessful detorsion underwent urgent surgery, and the Hartman procedure was applied. In cases of successful detorsion, 9 of the patients agreed to the proposed surgery. Definitive surgery was applied for 5 patients in semi-elective conditions and for 4 patients in elective conditions. Sigmoid colon resection and primary anastomosis were applied in all of these cases. Recurrence developed in one patient from the semi-elective surgery group within 10 months. The obstruction was treated with colonoscopic detorsion. A rectal tube was applied in one patient without colonoscopic detorsion. Because of continued complaints, the

patient underwent semi-elective surgery and the Hartman procedure.

In 2 of the patients with successful colonoscopic detorsion, surgery could not be applied because of poor general condition. These patients died after follow up in the intensive care unit. SCT recurrence developed in 4 of the 6 patients who rejected surgery. A second successful colonoscopic detorsion was applied in 3 of these patients. Among these, one patient underwent surgery with semi-elective sigmoid colon resection and primary anastomosis, while the other two patients rejected surgery again and died. One patient underwent surgery in another hospital.

Etiology	n (%)
Postoperative adhesions	385 (54.5)
Abdominal wall hernias	174 (24.7)
Colon tumor	35 (5)
Mesenteric ischemia	30 (4.2)
Diverticulitis	28 (4)
Sigmoid colon torsion	19 (2.7)
Crohn's disease	6 (0.8)
Bezoar	5 (0.7)
Gastroenteritis	5 (0.7)
Others	19 (2.7)

Table 1. *Causes of intestinal obstruction*

Recurrence was seen in 1 (9%) of 11 patients who underwent surgery and in 4 (66.6%) of 6 patients who rejected surgery. No mortality was seen in the group of patients who were operated on, whereas 4 (50%) of the patients without surgery died. Recurrence and mortality rates were statistically significantly higher in the patients without surgery (p=0.027, p=0.018, respectively).

Discussion

SCT is an important cause of intestinal obstruction, and incidence varies in different regions of the world. In developing regions of Asia, Africa, South America, and the Middle East, SCT is endemic and constitutes 50% of all intestinal obstructions (6,7). In developed regions like Europe and North America, it is sporadic and constitutes 3–5% of all intestinal obstructions (8,9). Despite studies showing a high incidence rate in Turkey (10,11), SCT was responsible for only 2.7% of the intestinal obstruction cases in our study.

The incidence of SCT increases with age (2,12). The reason is that predisposing factors like chronic constipation, immobilization, and neurological diseases are seen more often in the elderly. Some studies also show that the mesocolon lengthens with age (13). SCT is found more often in males (2,14,15), who also tend to have longer mesocolons (16). Moreover, a narrow pelvis in males prevents spontaneous detorsion. In our series, the mean age was 58 and the male to female ratio was 2.2.

The disease is diagnosed based on physical, radiological, and endoscopic examination. The findings in physical examination are abdominal asymmetry, distention, pain, abnormal bowel

sounds, nausea, vomiting, lack of gas, and empty rectum upon digital rectal examination (2,12). In standing abdominal x-ray, findings like dilated sigmoid colon, air-fluid levels, and omega and "coffee bean" images suggest sigmoid colon torsion (4,17,18). CT scan and magnetic resonance imaging have higher diagnostic value and can reveal dilated sigmoid colon with air-fluid levels, torsioned sigmoid colon mesenteria, and colonic wall ishmeia (19). Endoscopic investigations show spiral-like rotated mucosa, ischemia, and necrosis (7,10). However, there should be no signs of acute abdomen for endoscopic investigation. In our study group, all standing abdominal X-ray and CT scans indicated SCT.

No consensus has been achieved yet on the best approach and treatment for SCT. If there is generalized peritonitis suggesting ischemia, gangrene, or perforation, urgent surgery is performed. For stabilized individuals with good overall status, endoscopic detorsion followed by semi-elective or elective definitive surgery is applied in most centers (8,20,21).

The importance of colonoscopic detorsion is great, and the success rate has been reported as 30–90% in several studies (2). In addition to its value in diagnosis, it also shows other pathologies that cause obstruction, such as tumors. Also, urgent cases are treated by detorsioning the intestinal segment, through which time is gained for performing surgery in better conditions (4). In our study group, colonoscopic detorsion was applied as the first treatment in 94.7% of the patients, and the success rate was 94.4%.

Surgery is recommended for SCT depending on the clinical status of the patients, the presence of peritonitis, intestinal ischemia, and the experience of the surgical team. Resection and primary anastomosis are a good choice if the clinical status of the patient is suitable and there is no peritonitis or ischemia (3,14,21). In the presence of these conditions, the Hartmann procedure would be a more appropriate approach (14,22). Some centers apply primary anastomosis in the presence of gangrenous intestine if the patient is clinically stabilized (1,23), but there are also studies that report high rates of mortality and anastomosis leakage (24). We did not detect anastomosis leakage in any of the 10 patients who underwent resection and primary anastomosis.

Advanced age, comorbidities, and urgent need for surgery are factors that increase morbidity and mortality (1,7,25). The presence of acute abdomen, signs of shock, gangrenous intestine, and perforation result in much higher rates of mortality. Therefore, the prognosis of SCT is correlated with early diagnosis and treatment. If the diagnosis and treatment are too late, vascular obstruction occurs in addition to intestinal obstruction. Ischemia and gangrene result in predisposing perforations.

The recurrence rate is quite high in patients treated with only endoscopic detorsion (1,4,8,15,20,26). Detorsion may provide temporary improvement in patients with high surgery risks. However, when definitive surgery cannot be applied, the mortality rate and recurrence are high. Larkin et al. reported a 36.4% mortality rate in patients who did not undergo operation and a 6% mortality rate in patients who did (15). In our study, a 66.6% recurrence rate was found in patients treated with colonoscopic detorsion who rejected surgery. No mortality was seen in patients who were operated on, whereas the mortality rate was 50% in non-operated patients.

Our results are consistent with the literature. However, there are limitations resulting from the small number of patients and the retrospective design.

Conclusion

SCT is an emergency situation with high morbidity and mortality in cases of late diagnosis and treatment. When there are acute abdomen symptoms, surgery is urgently needed, starting with colonoscopic detorsion when the patient is stabilized followed by elective or semi-elective definitive surgery. If the clinical condition is suitable and there is no peritonitis or intestinal necrosis, resection and primary anastomosis should be applied, whereas the Hartmann procedure should be applied in case of peritonitis or necrosis. Only detorsion without definitive surgery results in high rates of recurrence and mortality.

References

1. Ören D, Selcuk S, Aydinli B, Yidirgan MI, Basoğlu M, Polat KY, et al. An algorithm for the management of sigmoid kolon volvulus and the safety of primary resection: Experience with 827 cases. Dis Colon Rectum 2007;50:489-97.
2. Heis HA, Bani-Hani KE, Rabadi DK, Elheis MA, Bani-Hani BK, Mazahreh TS, Bataineh ZA, Al-Zoubi NA, Obeidallah MS. Sigmoid volvulus in the Middle East. World J Surg 2008;32:459-64.
3. Madiba TE, Thomson SR. The management of sigmoid volvulus. J R Coll Surg Edinb 2000;45:74-80.
4. Tan KK, Chong CS, Sim R. Management of acute sigmoid volvulus: An institution's experience over 9 years. World J Surg 2010;34:1943-48.
5. Akinkuotu A, Samuel JC, Msiska N, Mvula C, Charles AG. The role of the Anatomy of the Sigmoid Colon in Developing Sigmoid Volvulus: A Case-Control Study. Clin Anat 2011;24(5):634-337.
6. Bagarani M, Conde A, Longo R. Sigmoid volvulus in West Africa: a prospective study on surgical treatments. Dis Colon Rectum 1993;36:186-90.
7. Raveenthiran V, Madiba TE, Atamanalp A, De U. Volvulus of the sigmoid colon. Colorectal Dis 2010;12(7 online):e1-17.
8. Mulas C, Bruna M, Garcia-Armengol J, Roig JV. Management of colonic volvulus. Experience in 75 patients. Rev Esp Enferm Dig 2010;102(4):239-48.
9. Valsdottir E, Marks JH. Volvulus: small bowel and colon. Clin Colon Rectal Surg 2008;21:91-3.
10. Turan M, Sen M, Karadayi K, Koyuncu A, Topcu O, Yildirir C, Duman M. Our sigmoid colon volvulus experience and benefits of colonoscope in detortion process. Rev Esp Enferm Dig 2004;96:32-5.
11. Atamanalp SS, Yildirgan MI, Basoglu M, Kantarci M, Yılmaz I. Sigmoid colon volvulus in children: review of 19 cases. Pediatr Surg Int 2004;20:492-5.
12. Tiah L, Goh SH. Sigmoid volvulus: diagnostic twists and turns. Eur J Emerg Med 2006;13:84-7.
13. Sadahiro S, Ohmura T, Yamada Y, Saito T, Taki Y. Analysis of the length and surface area of each segment of the large intestine according to age, sex and physique. Surg Radiol Anat 1992;14:251-7.
14. Samuel JC, Akinkuotu A, Msiska N, Cairns BA, Muyco AP, Charles AG. Re-examining treatment strategies for sigmoid volvulus: An analysis of treatment and outcomes in Lilongwe, Malawi. Glob J Surg 2010;1(2):149-53.
15. Larkin JO, Thekiso TB, Waldron R, Barry K, Eustace PW. Recurrent sigmoid volvulus-early resection may obviate later emergency surgery and reduce morbidity and mortality. Ann R Coll Surg Engl 2009;91:205-9.

16. Bhatnagar BN, Sharma CL, Gupta SN, Mathur MM, Reddy DCS. Study on the anatomical dimensions of the human sigmoid colon. Clin Anat 2004;17:236-43.
17. Burrell HC, Baker DM, Wardrop P, Evans AJ. Significant plain film findings in sigmoid volvulus. Clin Radiol 1994;49:317-9.
18. Feldman D. The coffee bean sign. Radiology 2000;216:178-9.
19. Levsky JM, Den EI, DuBrow RA, Wolf EL, Rozenblit AM. CT findings of sigmoid volvulus. AJR Am J Roentgenol 2010;194:136-43.
20. Grossmann E, Longo W, Stratton M. Sigmoid volvulus in department of veterans affairs medical centers. Dis Colon Rectum 2000;43:414-8.
21. Atamanalp SS, Oren D, Aydinli B, Ozturk G, Polat KY, Basoglu M, Yildirgan MI, Balik AA. Elective treatment of detorsioned sigmoid volvulus. Turk J Med Sci 2008;38:227-34.
22. Leong QM, Koh DC, Ho CK. Emergency Hartmann's procedure: morbidity, mortality and reversal rates among Asians. Tech Coloproctol 2008;12(1):21-5.
23. Raveenthiran V. Restorative resection of unprepared left-colon in gangrenous vs. viable sigmoid volvulus. Int J Colorectal Dis 2004;19:258-63.
24. Akcan A, Akyıldız H, Artis T. Feasibility of single-stage resection and primary anastomosis in patients with acute noncomplicated sigmoid volvulus. Am J Surg 2007;193:421-6.
25. Atamanalp SS, Aydınlı B, Öztürk G, Başoğlu M, Yıldırgan Mİ, Ören D, Kantarcı M. Classification of Sigmoid Volvulus. Turk J Med Sci 2008;38(5):425-9.
26. Yassaie O, Thompson-fawcett M, Rossaak J. Management of sigmoid volvulus: is early surgery justifiable?. ANZ J Surg 2013;83:74-8.