

## Sigmoid volvulus: the first one thousand-case single center series in the world

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Received: 20 July 2017 / Accepted: 30 September 2017 / Published online: 27 October 2017  
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Dear Editor,

Sigmoid volvulus (SV) is the wrapping of the sigmoid colon around itself, causing an intestinal obstruction [1, 2]. Although it is a rare disease, its incidence is relatively high in eastern Turkey [3, 4], where our hospital complex is located. Consequently, our SV series, which is the largest single-center SV series in the world according to the literature in major research databases, including Web of Science [5] and PubMed [6], has increased to one thousand. In this short report, we present our clinical experience with 1,000 patients treated over a 51-year period between June 1966 and July 2017. The data were retrospectively analyzed until June 1986 and prospectively thereafter. This report includes the first one thousand-case single center SV series in the world [5, 6].

In our series, SV incidence was 19.6 cases per year, and 4.7 cases per 100,000 persons per year. The mean age was 59.0 years (range 10 weeks–98 years), and 819 patients (81.9%) were male. The most common symptoms were abdominal pain (98.9%), distention (96.4%), obstipation (92.1%), and vomiting (69.2%), while the most common signs were abdominal tenderness (98.9%), distention (96.4%), empty rectum (64.8%), hypo/akinetic bowel sounds (44.7%), hyperkinetic bowel sounds (30.7%), melanotic stool (10.7%), and guarding/rebound tenderness (8.5%). Additionally, 12.5% of the patients had shock. Using a plain abdominal X-ray, a dilated sigmoid colon with multiple intestinal

air-fluid levels was observed in 67.6% of the patients. The correct diagnosis rate was 82.3%, based on the clinical features together with the X-ray evidence. CT and MRI findings, which included a whirled sigmoid mesentery with a dilated sigmoid colon and multiple intestinal air-fluid levels, were observed in 96.7% (87/90) and 95.6% (43/45) of patients, respectively. Moreover, diagnostic endoscopy signs, which included a torsioned sigmoid lumen with an inability for endoscopic insertion, were observed in 150 of 152 patients (98.7%). Misdiagnoses generally included non-specific intestinal obstruction.

In our series, in uncomplicated and non-gangrenous patients, emergency non-operative detorsion procedures, including barium enema in 13 cases, rigid endoscopy in 351, and flexible endoscopy in 359, were used in a total of 723 patients (72.3%). The success rate of the non-operative detorsion was 82.4%, while the mortality, morbidity, and early recurrence rates were 0.7, 2.4, and 5.0%, respectively. In the complicated and gangrenous patients, or in patients in whom non-operative detorsion was unsuccessful, emergency surgical procedures, including detorsion in 47 cases, mesosigmoidopexy in 57, exteriorization in 4, sigmoid resection with stoma in 195, sigmoid resection with anastomosis in 164, and laparotomy in 1, were performed, resulting in a total of 468 patients (46.8%). The success rate of the emergency surgeries was 82.9%, while mortality, morbidity, early recurrence, and late recurrence rates were 16.5, 34.4, 0.6, and 5.1%, respectively. In 111 of the successfully detorsioned and approved 499 patients (22.2%), elective surgical procedures, including open or laparoscopic sigmoid resection with anastomosis, were applied. The success rate of the elective surgeries was 100.0%, while mortality, morbidity, late recurrence rates were 0.0, 11.7, and 0.0%, respectively.

Turkey, particularly our region, Eastern Anatolia, is an endemic area for SV [3, 4]. Additionally, our SV incidence

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is very high compared with that of Europe, which is below 4 cases per hospital per year [1], and with that of the USA, which is 1.67 cases per 100,000 persons per year [7]. The possible causes of this high SV rate are high altitude and high-fiber diet habits, which cause a long sigmoid colon with a narrow mesentery, which are known as important predisposing factors for SV [1–3]. Similarly, advanced age and male gender are the probable causes of this anatomical predisposition [1–3, 7], as were present in our series.

When we utilize the world literature, it is clear that, as the most common clinical presentation of SV, the classical triad, which consists of abdominal pain/tenderness, abdominal distention, and obstipation, is observed in 52.4–93% of patients [1–3, 7]. Moreover, in an endemic region, the presence of this triad in males over 40 years of age, is accepted as highly suggestive of SV [3]. Among a large number of described plain abdominal X-ray signs, the presence of a dilated sigmoid colon with multiple intestinal air-fluid levels is the most common sign, which is observed in an average of 57–80% of patients [1–3]. CT and MRI scans have a high diagnostic value of between 86–97.4% with the presence of a whirled sigmoid mesentery in addition to a dilated sigmoid colon and multiple intestinal air-fluid levels [1, 3, 8]. Diagnostic endoscopy is helpful in uncomplicated and non-gangrenous cases and is highly diagnostic, with a 76–98.7% success rate, by the demonstration of a torsioned and unpassable sigmoid lumen [1, 3, 9]. When CT, MRI, or endoscopy are not used, SV misdiagnosis is easy and is generally suspected as an obstructive acute abdominal case [3].

According to the literature knowledges, in uncomplicated and non-gangrenous patients, SV can be successfully detorsioned by endoscopy in 70–90% of cases, together with 0–9.1% mortality and 1–26.4% morbidity rates [1, 2, 4, 9, 10]. In gangrenous patients or in patients in whom endoscopic detorsion is unsuccessful, emergency surgery is required. If sigmoid colon is gangrenous, sigmoid resection with anastomosis or stoma; if the bowel is viable, detorsion alone or with a volvulus preventing procedure are generally preferred, in which the mortality, morbidity and recurrence rates of the emergency surgery are reported as 1–38.8%, 5–57.1% and 0–55.5%, respectively [1, 2, 4, 7, 9–11]. In selected detorsioned SV cases, due to the high recurrence rates, which are 15–55.5%, elective laparoscopic sigmoid resection with anastomosis, in which the mortality and morbidity rates are 0–2% and 0–12.5%, respectively, is recommended [1, 4, 12].

As a result, SV is generally seen in adult men. The volvulus triad, abdominal pain/tenderness, distention, and obstipation, is observed in most cases. Although X-ray is useful, the diagnosis is based upon CT and MRI findings. Uncomplicated and non-gangrenous SV patients are treated with endoscopic detorsion, while emergency surgery is needed in gangrenous patients or in patients in whom endoscopy is

unsuccessful. The prognosis of SV is relatively poor. Otherwise, all of the epidemiological, clinical, diagnostic, and therapeutic parameters of our SV series, which is the largest single-center series in the world, are compatible with the literature data. In other words, our country, as well as our hospital, has an important role in the data production for SV [5, 6]. Although an increase was observed in the SV incidence in our region, such as in some other endemic areas during recent years [1, 3, 13], in our opinion, our SV series will retain the highest number of subjects and provide a basis for future studies for many years.

#### Compliance with ethical standards

**Conflict of interest** Sabri Selcuk Atamanalp declares that he has no conflict of interest.

**Funding** No funding from external organizations occurred.

**Ethical approval** This study was approved by Ethical Committee of Ataturk University Faculty of Medicine, No: 23.02.2017-21.

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