

Original Article

Outcome and Complications of Rectal Tube Placement in Intestinal Obstruction Due to Sigmoid Volvulus

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ABSTRACT

Background: The most common site of colon volvulus is in the sigmoid colon and then in the cecum and transverse colon. The aim of this study was to evaluate the results of the rectal tube placement as an initial treatment for devaluation of sigmoid volvulus. **Materials and Methods:** In this cross-sectional study, 60 patients with sigmoid volvulus admitted to the emergency department of Imam Reza and Sina Teaching Hospitals due to intestinal obstruction were undergone blind rectal tube placement. After discharge, patients were followed up in two 1 month and 6 months intervals, so the rate of recovery, relapse, or mortality of the patient (in case of the patient's death) were investigated. **Results:** Of the 60 patients reported, 41 patients (68.3%) were male, 54 patients (90%) the operation was successful and the patient was devaluated, but in the remaining 6 patients (10%) the operation was not successful and the patient immediately underwent an operation. The number of attempts to devaluation of patients with the rectal tube was once in 50 patients (83.3%), twice in 2 cases (3.3%) and three times in 8 cases (13.3%). The rate of hospitalization after surgery (in patients who had undergone surgery) was 6.44 ± 0.9 days. The overall rate of hospitalization in patients with sigmoid volvulus with initial treatment by rectal tube placement to devaluation was 5.78 ± 0.96 day. **Conclusion:** We suggested that rectal tube placement is less costly and available procedure in the treatment of patients with sigmoid volvulus.

INTRODUCTION

Colon volvulus occurs when a segment of colon (large intestine) full of gas rotates around its mesentery.^{1,2} The most common site of colon volvulus is in the sigmoid colon and then in the cecum and transverse colon.^{3,4} The prevalence of this type of volvulus is higher in older people and is one of the causes of mortality in the elderly.^{5,6}

This study aimed to evaluate the therapeutic effects and complications of blind placement of rectal tube in patients with sigmoid volvulus who do not have indication for surgery. Given that sigmoidoscopy is the initial standard treatment in patients, but this equipment is not available in all centers, this study aimed to examine whether rectal tube can be used as the initial treatment for devolvulation of sigmoid volvulus in these centers or not.^{7,8} If the complications and outcomes of this method prohibit its use, the continued use of this method can be questioned.

METHODS

This prospective analytical descriptive study was conducted on patients who referred emergency departments in two centers of Imam Reza and Sina due to intestinal obstruction during one year. This is a multicenter study and the study population included patients with sigmoid volvulus who referred emergency departments of Imam Reza Hospital and Sina Hospital in Tabriz during one year. Rectal tubes were inserted by an emergency attending professor or a senior surgery resident in patients who were diagnosed with sigmoid volvulus. After obtaining patient's consent, they were followed up from the beginning to the end of the hospital stay and their information was recorded. After discharge, patients were followed up at intervals of 1 month and 6 months to record the rate of recovery, relapse or death of the patients (the cause of death, if occurred). The subject and purpose of the study were explained to patients and their questions were answered; then written informed consent was obtained from them. The patients were assured of the confidentiality of their personal information.

At the beginning of the study, all the advice patients needed was provided to them, and further information was provided, if needed, during the study and thereafter. Exclusion criteria were patient's or their family's disinclination to participate in the research, tenderness and rebound tenderness in the abdomen, abdominal guarding, any neurological disorders in the patient's history and examination, including stroke, and trauma-induced neurological impairment. The protocol reversion by the appropriate institutional review. It is important to say that the ethical standards were observed and all patients' data were kept confidential and the participants' consent to participate in the project was obtained. All Helsinki criteria were met as well. The data were analyzed by descriptive statistical methods (Mean±SD), frequency, percentage and mean difference test for quantitative variables in independent groups and chi-square test or Fisher's exact test for qualitative variables using SPSS 15.0™ software. The level of significance in this study was considered $P < 0.05$.

RESULTS

Sixty patients who were diagnosed with sigmoid volvulus were recruited; 41 patients (68.3%) were male and 19 patients (31.7%) were female. The mean age of patients was 60.83 ± 2.56 years (Min=17, Max=88). The mean age of male patients was 59.12 ± 3.11 years (Min=22, Max=87) and the mean age of female patients was 64.53 ± 4.5 years (Min=17, Max=88). There was no significant difference between the two genders in statistical analysis of the mean age, $P=0.817$. The studied patients referred to the centers with a chief complaint of abdominal pain, inability to defecate or bleeding during defecation. Of the 60 patients surveyed, 26 patients (43.3%) had no history of previous diseases, 18 patients (30%) had a history of hypertension, 10 patients (16.6%) had a history of diabetes mellitus, 13 patients (21.6%) had a history of coronary artery disease and finally 21 patients (35%) had a history of gastrointestinal diseases. Of the 60 patients, 35 patients (58.3%) had no history of previous hospitalization, while 25 patients (41.7%) had a

history of previous hospitalization (for various reasons). Also, 35 patients (58.3%) had a history of medication use, and 25 patients (41.7%) did not use any medication in the past 3 months. Previous history of surgery (including all surgical cases) was positive in 18 patients (30%) and negative in 42 patients (70%).

The initial examination of patients referred to the emergency department with the mentioned complaints revealed that 40 patients (66.7%) had a history of constipation (recurrent), and also 10 patients (16.7%) had a history of diarrhea (occasionally or alternate with constipation). Considering the chief complaint of patients, 33 patients (55%) had constant pain and 27 patients (45%) had colicky pain. The nature of pain in 26 patients (43.3%) was widespread and in 34 patients (56.7%) was localized. From a total of 60 patients surveyed, 7 patients (11.7%) had a history of hematochezia, while there was no sign of bleeding during defecation in other 53 patients (88.3%).

Sigmoid volvulus occurred for the first time in 47 patients out of 60 patients (78.3%); while in 9 patients (15%) it occurred for the second time, in three patients (5%) for the third time and in one patient (1.7%) for the fourth time. The mean duration from the onset of symptoms to presenting to the emergency department or treatment center was 3.18 ± 0.31 hours (range: 3 hours to 11 days). Patients' vital signs and also laboratory findings in the early hours in the emergency department are shown in Table 1. Once the patients were diagnosed with sigmoid volvulus and were stabilized, rectal tube was inserted blindly for devolvulation, which was successful in 54 patients (90%) and they were devolvulated. However, it failed in the remaining 6 patients (10%) who underwent surgery immediately. The number of attempts for devolvulation of patients with rectal tube was once in 50 patients (83.3%), twice in two patients (3.3%) and thrice in eight patients (13.3%). The success rate of patient's devolvulation based on the number of attempts with rectal tube is shown in Figure 1. Of the whole study population, 54 patients (90%) were successfully devolvulated using rectal tube. In six patients (10%) it failed and they underwent

Table 1. Vital Signs & lab data of patients referred to Emergency Department (first hours)

Variables	Total	Female	Male	P-value
HR	85.32 ± 1.48	84.89 ± 3.24	85.51 ± 1.59	0.84
DBP	120.82 ± 2.2	119.47 ± 4.04	121.44 ± 2.65	0.68
SBP	76.35 ± 1.51	76.84 ± 2.45	76.12 ± 1.92	0.82
BT	37.08 ± 0.4	37.04 ± 0.08	37.1 ± 0.04	0.49
RR	16.72 ± 0.36	16.11 ± 0.46	17 ± 0.48	0.25
WBC	8.78 ± 0.38	8.46 ± 0.71	8.92 ± 0.46	0.58
LAB data				
Na	139.5 ± 0.43	139.95 ± 0.78	139.3 ± 0.53	0.56
K	4.06 ± 0.06	4.04 ± 0.1	4.07 ± 0.07	0.82
PH	7.4 ± 0.01	7.37 ± 0.02	7.41 ± 0.01	0.09
PaCO ₂	35.98 ± 1.08	35.36 ± 1.56	36.28 ± 1.43	0.69
HCO ₃	22.54 ± 0.67	21.67 ± 1.41	22.97 ± 0.73	0.37
BE	0.83 ± 0.82	1.47 ± 1.33	0.53 ± 1.05	0.59

*HR: Heart Rate, DBP: Diastolis Blood Pressure, SBP: Systolic Blood Pressure, BT: Body temperature, RR: respiratory rate, WBC: White blood cell, Na: Natrium, K: Potassium, BE: Base Excess

surgery immediately. However, of the 54 patients with successful results, 25 patients (41.7%) did not consent to elective surgery and were discharged at their own discretion and only 29 patients (48.3%) underwent elective surgery after devolvulation. The hospitalization rate and final result in follow-up periods in patients are shown in Table 2 according to the type of treatment. But the hospitalization rate of patients after surgery (in patients who underwent surgery) was 6.44 ± 0.9 days (range: 1 to 30 days). Also the overall rate of hospitalization was 5.78 ± 0.96 days (range: 1 to 30 days) in all patients with sigmoid volvulus who received the initial devolvulation by the rectal tube. Patients' vital signs and also laboratory findings based on the type of treatment procedure are shown in Table 3.

DISCUSSION

According to the results, the success rate of rectal tube placement in patients with sigmoid volvulus was 90% in that from a total of 60 patients, rectal tube insertion led to devolva-

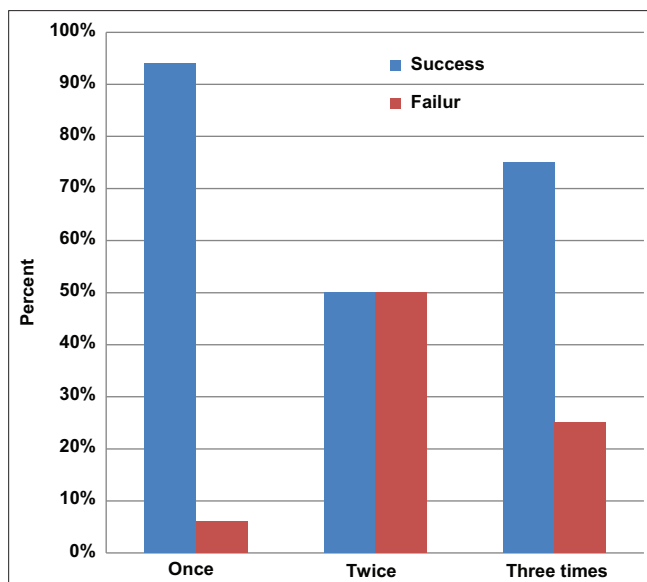


Figure 1. Success rate of patient's devolvulation based on the number of attempts with rectal tube

tion in 54 patients in this study.

Furthermore, only one case of recurrence was recorded six months after initial devolvulation. It should be noted that from 54 patients with successful rectal tube insertion, 25 patients were discharged at their discretion after devolvulation and resolution of symptoms, so they did not receive the next measures (elective surgery). The recurrent case belonged to this group of patients.

During the follow-up period, one case of death was recorded from among the patients with successful devolvulation with rectal tube who was discharged at their own discretion without elective surgery; however, patient's death was due to cardiopulmonary disease and not devolvulation procedure.

As shown in Table 2, the mean length of hospitalization in patients with unsuccessful devolvulation with rectal tube who underwent emergency surgery was 12.3 ± 4.66 days, which was the longest time. Patients with successful devolvulation by rectal tube with elective surgery (7.11 ± 0.68) and patients with successful devolvulation with rectal tube without elective surgery (2.76 ± 0.39) came in the second and third place. However, the significantly lower rate in the third group can be attributed to rapid discharge of patients at their own discretion. Therefore, there was a significant difference between the total days of patients' hospitalization if this group was excluded, and only the first and second groups were compared ($P < 0.0001$). So it can be concluded that initial devolvulation of patients with rectal tube followed by elective surgery has a significant effect on the overall rate of hospitalization days.

Treatment of sigmoid volvulus involves devolvulation and prevention of recurrence.⁹ Sigmoidoscopy, as an initial treatment, was introduced by Bruusgaard in 1947 and now is the selective method for patients with viable bowel.^{10,11,12}

Sudden devolvulation in rigid sigmoidoscopy is successful in 70-90% of cases.^{13,14} However, given the importance of immediate devolvulation in these patients, the main problem appears when the patient is visited for the first time in a center without surgical facilities or sigmoidoscopy. At this time, the importance of initial non-surgical treatments is much more obvious; as this non-surgical treatment may

Table 2. Hospitalization rate & final result in follow-up courses in patients based on the type of treatment

	De volvulus + With elective surgery	De volvulus + Without elective surgery	De volvulus - With emergent surgery	P-value
Total	29 (48.3)	25 (41.7)	6 (10)	
Age	60.41 ± 3.47	60.6 ± 4.4	63.83 ± 7.03	0.92
Male	17 (41.5)	21 (51.2)	3 (7.3)	0.56
Female	8 (42.1)	8 (42.1)	3 (15.8)	
Previous history of Sigmoid volvulus	1.31 ± 0.1	1.3 ± 0.1	1 ± 0.001	0.47
Average hospitalization after surgery	5.27 ± 0.5	-	11.5 ± 4.5	0.01
Overall mean of hospitalization	7.11 ± 0.68	2.76 ± 0.39	12.3 ± 4.66	<0.0001
Follow up				0.13
Recurrence of volvulus	0 (0)	1 (4)	0 (0)	
Non-recurrence of volvulus	29 (100)	24 (96)	6 (100)	
Dead	2 (6.89)	1 (4)	0 (0)	

Table 3. Vital Signs & lab data in patients based on the type of surgery

	De volvulus + With elective surgery	De volvulus + Without elective surgery	De volvulus - With emergent surgery	P-value
HR	87 ± 3.17	85.64 ± 2.79	84.69 ± 1.84	0.89
DBP	127.5 ± 7.71	121.16 ± 3.03	119.14 ± 3.42	0.55
SBP	79.17 ± 3.74	76.64 ± 2.39	75.52 ± 2.27	0.78
BT	37.3 ± 0.17	37.09 ± 0.06	37.01 ± 0.04	0.07
RR	15.67 ± 0.33	16.24 ± 0.49	17.34 ± 0.6	0.23
LAB				
WBC	8.83 ± 1.69	8.25 ± 0.6	9.22 ± 0.51	0.50
Na	139 ± 0.85	140.68 ± 0.61	138.72 ± 0.68	0.09
K	4.18 ± 0.29	4.12 ± 0.07	3.97 ± 0.09	0.41
PH	7.39 ± 0.03	7.4 ± 0.02	7.4 ± 0.01	0.95
PaCO ₂	37.05 ± 2.49	36.09 ± 2.36	35.62 ± 1.04	0.91
HCO ₃	22.58 ± 1.68	22.37 ± 1.13	22.67 ± 0.99	0.97
BE	1.9 ± 2.02	0.19 ± 0.87	1.59 ± 1.57	0.54

have a significant effect in mortality and morbidity in these patients.

In the study of Arnold GJ & et al conducted in Charity Hospital in New Orleans, America, 99 patients who had a total of 143 episodes of sigmoid volvulus were investigated.⁴ In this study, a variety of treatments and their outcomes were evaluated in these patients. In this study, patients underwent four treatments including proctoscopy, barium enema, saline enema and rectal tube insertion. Of 114 cases of proctoscopy, 87 (77%) were successful, of 18 cases of barium enema, 12 (67%) were successful, of eight cases of saline enema, six (75%) were successful and finally, of five cases of rectal tube insertion, all five cases (100%) were successful.⁴ So it can be seen that although the rectal tube insertion has not been considered the main treatment for this disease and sigmoidoscopy is still considered the standard treatment, the use of this method for devolvulation of patients with sigmoid volvulus provides acceptable results. As in our study, of 60 patients who were treated by this method, 54 (90%) patients were successfully treated and the rate of recurrence was 1.85% during a 6-month follow-up (even considering no complementary treatments and elective surgery).

In this study, 25 patients who were devolvulated with rectal tube insertion were discharged from the medical center at their own discretion after the resolution of symptoms, and they received no other treatment except rectal tube insertion. Therefore, this group is the best case to study the direct effect of the rectal tube. In our study, the only person who had recurrence at 6-month follow-up was in this group. Therefore, the recurrence rate of sigmoid volvulus in patients who were treated only by rectal tube was 4%. Given the lack of access to standard facilities and treatment, this figure is remarkable, and this technique can be used as a non-interventional or minimally interventional treatment as the initial treatment of patients with sigmoid volvulus.

In the study of Perez JLE et al, none of the patients underwent surgery and were treated with rectal tube insertion. In this study, patients' mortality was zero, similar to our results.¹⁵

In the study of Arnold GJ & et al on 99 patients, the mean age of patients was 66 years, ranging from 9 to 90 years old.⁴

Perez JLE & et al reported that the age group of patients was between 55 and 65 years and most patients were male.¹⁵

In our study, the mean age of patients was 60.83±2.56 years (range: 17 to 88 years). Furthermore, the mean age of male patients was 59.12±3.11 years and the mean age of female patients was 64.53±4.5 years, so there was no significant difference between the two genders (P=0.81).

Hence, it can be seen that sigmoid volvulus occurs in a wide age range, but the peak age is in the 6th decade of life. This leads us to consider sigmoid volvulus in the early differential diagnosis in patients in this age range with chief complaints of abdominal pain or inability to pass gas, inability to defecate or bleeding during defecation.

In the study of Arnold GJ & et al the incidence rate was investigated in 99 patients, 54 male patients and 45 female patients (M/F ratio of 1.2).⁴ This confirms the results of our study, as well. In our study, the incidence rate of the disease was higher in males than in females. The study results of Perez JLE & et al, also confirm our findings.¹⁵ However, the gender ratio in our study was much higher than the study of Arnold GJ & et al. In our study, from a total of 60 patients, 41 patients were male and 19 patients were female (M/F ratio of 2.1).

CONCLUSION

According to the results, the success rate of rectal tube insertion in patients with sigmoid volvulus is 90%. Also the recurrence rate of sigmoid volvulus was 1.85% with elective surgical treatment and 4% without elective surgery (treatment only with rectal tube insertion). Given that the rectal tube insertion in patients with sigmoid volvulus is effective in hospitals without adequate surgical facilities and it reduces the rate of hospitalization, this treatment can be suggested as a lower-cost and available treatment for patients with sigmoid volvulus.

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DECLARATION OF CONFLICTING INTERESTS

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

ETHICAL APPROVAL

This article results from thesis submitted for M.D degree in Islamic Azad University Medical Sciences (Spring 2015-Student number 860524147)

AUTHOR CONTRIBUTION

CG and KSN: Study concept, design and supervision; SR, NG, SG and HS: literature review and drafting the manuscript. All authors read and revised and approved the manuscript.

REFERENCES

1. Suleyman O, Kessaf AA, Ayhan KM. (2012). Sigmoid volvulus: long-term clinical outcome and review of the literature: general surgery. *South African Journal of Surgery*, 50(1), 9-15.
2. Halabi WJ, Jafari MD, Kang CY, Nguyen VQ, Carmichael JC, Mills S, et al. (2014 Feb). Colonic volvulus in the United States: trends, outcomes, and predictors of mortality. *Ann Surg*, 259(2), 293-301.
3. Ifversen AK, Kjaer DW. (2014 Dec 28). More patients should undergo surgery after sigmoid volvulus. *World J Gastroenterol*, 20(48), 18384-9.
4. Arnold GJ, Nance FC. (1973 May). Volvulus of the sigmoid colon. *Ann Surg*, 177(5), 527-37.
5. Avots-Avotins KV, Waugh DE. (1982 Apr). Colon volvulus and the geriatric patient. *Surg Clin North Am*, 62(2), 249-60.
6. Oncu M, Piskin B, Calik A, Yandi M, Alhan E. (1991 Jun). Volvulus of the sigmoid colon. *S Afr J Surg*, 29(2), 48-9.
7. Lyerly HK, Sabiston DC. (1997). *Textbook of surgery: the biological basis of modern surgical practice*. WB Saunders.
8. Hajinasrollah A, Koshkar A, Goharshenasan P, Rafiee A. (2005). The Evaluation of Relationship Between Mesosigmoid Diameters in Creating Sigmoid Volvulus. *Iranian Journal of Surgery*, 13(34), 24-9. [Article In Persian].
9. Atamanalp SS. (2013 Oct). Treatment of sigmoid volvulus: a single-center experience of 952 patients over 46.5 years. *Tech Coloproctol*, 17(5), 561-9.
10. Bruusgaard C. (1947). Volvulus of the sigmoid colon and its treatment. *Surgery*, 22(3), 466.
11. Bak MP, Boley SJ. (1986 Jan). Sigmoid volvulus in elderly patients. *Am J Surg*, 151(1), 71-5.
12. Ballantyne GH. (1982 Jul). Review of sigmoid volvulus: history and results of treatment. *Dis Colon Rectum*, 25(5), 494-501.
13. Avots-Avotins KV, Waugh DE. (1982 Apr). Colon volvulus and the geriatric patient. *Surg Clin North Am*, 62(2), 249-60.
14. Cameron JL, Cameron AM. (2013). *Current Surgical Therapy: Expert Consult-Online*. Elsevier Health Sciences.
15. Parez JLE, Pedraza TS, Torres JCE. (2013). Manejo del valvulo de sigmoides en tres hospitales integrales comunitarios de la misian medica cubana en Bolivia. *Medisur*, 11(1), 37-43.