

THE EVALUATION OF RELATIONSHIP BETWEEN MESOSIGMOID DIAMETERS IN CREATING SIGMOID VOLVULUS

Esmail Hajinasrollah MD*¹, Fateme Moghimi MD⁴, Hadi Mirhashemi MD², Hasan Peyvandy MD³, Bahador Oshidari MD², Faribors Rashno MD² and Ghazal Hajinasrollah MD⁴

¹Professor of General Surgery Shahid Behshti University of Medical Science Loghman Medical Center.

²Assistant Professor of General Surgery Shahid Behshti University of Medical Science Loghman Medical Center.

³Associated professor of General Surgery Shahid Behshti University of Medical Science Loghman Medical Center.

⁴Rezident of General Surgery Shahid Behshti University of Medical Science Loghman Medical Center.

*Corresponding Author: Dr. Esmail Hajinasrollah MD

Professor of General Surgery Shahid Behshti Medical University, Loghman Medical Center.

Article Received on /05/2017

Article Revised on 26/04/2017

Article Accepted on 17/06/2017

ABSTRACT

Background: In the sigmoid volvulus, the sigmoid region of the colon wraps around itself and its mesentery. Definite role of these factors is not yet obvious in Iranian population. Hence in this study the association of different sigmoid measurements with sigmoid volvulus was assessed. **Methods and materials:** In this case-control study, 49 patients under elective surgeries in a general training hospital in 2015 and 2016 were enrolled. Patients were two groups including those with and those without sigmoid volvulus and sigmoid measurements in two groups were compared. **Results:** The total sigmoid length was 25.6 ± 3.9 and 54.92 ± 9.4 in case and control groups, respectively with significant difference ($P=0.0001$). Mesosigmoid length was 73.8 ± 20.4 and 16.9 ± 3.4 in case and control groups, respectively with significant difference ($P=0.0001$). Base of mesosigmoid length was 10.1 ± 3.6 and 9.5 ± 2.7 in case and control groups, respectively with significant difference ($P > 0.05$). **Conclusion:** Totally according to our results it may be concluded that anatomical findings of sigmoid support the assertion that sigmoid volvulus is due to a long and wide mesosigmoid that rotates on a constant mesosigmoid root width.

KEYWORDS: In the sigmoid volvulus, the sigmoid region of the colon wraps around.

INTRODUCTION

In the sigmoid volvulus, the sigmoid region of the colon wraps around itself and its mesentery.^[1] Sigmoid volvulus accounts for less than ten up to fifty percent of all colonic obstructions.^[2] The community-based incidence of sigmoid volvulus in the United States is 1.67 per 100,000 persons per year.^[3] Sigmoid volvulus is the third most common etiology of colonic obstruction in the United States after cancer and diverticulitis.^[4] In contrast, sigmoid volvulus is the underlying etiology in 50 to 80 percent of patients with intestinal obstruction in other parts of the world^[5] The overall mortality is ranged from 10% to 50%, while the overall morbidity is 6% to 24%.^[6]

The redundancy of the sigmoid colon, dolichol mesentery, and the narrowing of the base of the sigmoid mesentery are considered related factors for the development of sigmoid volvulus.^[7-9] These anatomical characteristics may be acquired and in rare cases, they are congenital.^[10] However definite role of these factors is not yet obvious in Iranian population. Hence in this

study the association of different sigmoid measurements with sigmoid volvulus was assessed.

MATERIALS AND METHODS

In this case-control study, 49 patients under elective surgeries in a general training hospital in 2015 and 2016 were enrolled. The study was approved by local Ethical Committee and the Helsinki declaration was respected all over the study. Patients were two groups including those with and those without sigmoid volvulus. All operations and measurement were performed by single surgery team and the sigmoid measurements in two groups were determined by blind observer.

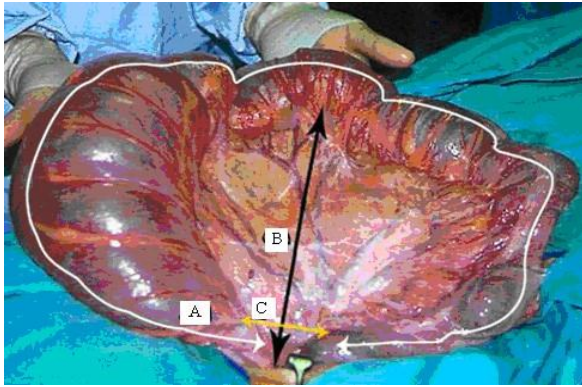


Figure 1: Sigmoid colon measurement A- Total sigmoid length; B-Meso sigmoid length; C-Base sigmoid length.

Data analysis was performed among 49 subjects including 25 patients in control group and 24 subjects in case group. Data analysis was performed by SPSS (version 24.0) software [Statistical Procedures for Social Sciences; Chicago, Illinois, USA]. Chi-Square and Independent-Sample-T tests were used and were considered statistically significant at P values less than 0.05.

RESULTS

The mean age was 49.8 ± 18.4 and 50.04 ± 14.78 years in case and control groups, respectively ($P > 0.05$). In case and control groups 72% and 45.8% were male, respectively ($P > 0.05$). The surgery and constipation history were positive in 8 subjects (33.3%) and 12 patients (50%) respectively.

The mean sigmoid diameter was 4.2 ± 1.5 in control group. As shown in Table 1 the total sigmoid length was 73.8 ± 20.4 and 37.01 ± 14.0 in case and control groups, respectively with significant difference ($P=0.001$). Meso sigmoid length was 25.6 ± 3.9 and 14.4 ± 6.4 in case and control groups, respectively with significant difference ($P=0.001$). Base sigmoid length was 10.1 ± 3.6 and 10.3 ± 3.1 in case and control groups, respectively without significant difference ($P > 0.05$).

Table 1: Sigmoid measurements in two groups.

Sigmoid measurements	Case group	Control group	P value
Total sigmoid length	73.8 ± 20.4	37.01 ± 14.0	0.001
Meso sigmoid length	25.6 ± 3.9	14.4 ± 6.4	0.001
Base sigmoid length	10.1 ± 3.6	10.3 ± 3.1	> 0.05

DISCUSSION

Sigmoid volvulus is a life-threatening situation that results from the colon wraps around itself leading to a closed-loop obstruction.^[11] The study by Bhatnagar *et al.*^[12] showed that the sigmoid mesocolon of the female

was brachymesocolic (wider than long), whereas that of the male was dolichomesocolic (longer than wide). This might explain the higher incidence of sigmoid volvulus in the male which was also seen in our study but without significant difference.

Study by Akinkuotu *et al.*^[13] showed that when compared to controls, the mesosigmoid of cases had a greater length and maximal width; however, mesosigmoid root width was similar between groups. These findings were similar to our study. Similarly Alatisé *et al.*^[14] reported that the lengths of the sigmoid colon and mesocolon may increase with age and this may probably be the anatomical basis for the frequent occurrence of sigmoid volvulus and also the failed colonoscopy among the older population in our environment.

Madiba *et al.*^[15] reported that sigmoid colon was longer, and the sigmoid mesocolon root was narrower in Africans compared with the other population groups, and the sigmoid colon had a suprapelvic disposition among Africans. In Africans, the sigmoid colon was longer in male subjects with a long-narrow shape. These differences may also explain geographical and racial differences in sigmoid volvulus. Another study by them^[16] also showed that African patients had the longest combined length of the rectum and sigmoid colon translating into a long sigmoid colon. They also had the highest number of redundant sigmoid colon. This may explain the high incidence of sigmoid volvulus in African patients. At their last study they^[17] also reported that elongated sigmoid colon seen in Black Africans is present in utero and occurs more frequently in Black African males. A narrow shape is more common in male fetuses and the broad shape is more common in female fetuses. These anatomical features may be the cause of the predisposition to sigmoid volvulus in Black African adults.^[5] and also in Iranian patients.^[18]

Totally according to our results it may be concluded that anatomical findings of sigmoid support the assertion that sigmoid volvulus is due to a long and wide mesosigmoid that rotates on a constant mesosigmoid root width. However further studies with larger sample size are required to attain more definite results about the role of anatomical measurements.

REFERENCES

1. Raveenthiran V, Madiba TE, Atamanalp SS, De U. Volvulus of the sigmoid colon. *Colorectal Dis.*, Jul, 2010; 12(7): e1-17.
2. Atamanalp SS. Sigmoid volvulus: diagnosis in 938 patients over 45.5 years. *Tech Coloproctol*, Aug, 2013; 17(4): 419-24.
3. Osiro SB, Cunningham D, Shoja MM, Tubbs RS, Gielecki J, Loukas M. The twisted colon: a review of sigmoid volvulus. *Am Surg*, Mar, 2012; 78(3): 271-9.

4. Lal SK, Morgenstern R, Vinjirayer EP, Matin A. Sigmoid volvulus an update. *Gastrointest Endosc Clin N Am.*, Jan, 2006; 16(1): 175-87.
5. Asbun HJ, Castellanos H, Balderrama B, Ochoa J, Arismendi R, Teran H, Asbun J. Sigmoid volvulus in the high altitude of the Andes. Review of 230 cases. *Dis Colon Rectum*, 1992; 35(4): 350.
6. Atamanalp SS. Sigmoid volvulus. *Eurasian J Med.*, Dec, 2010; 42(3): 142-7.
7. Levsky JM, Den EI, DuBrow RA, Wolf EL, Rozenblit AM. CT findings of sigmoid volvulus. *AJR Am J Roentgenol*, Jan, 2010; 194(1): 136-43.
8. Rosenblat JM, Rozenblit AM, Wolf EL, DuBrow RA, Den EI, Levsky JM. Findings of cecal volvulus at CT. *Jul*, 2010; 256(1): 169-75.
9. Atamanalp SS, Yildirgan MI, Başoğlu M, Kantarci M, Yilmaz I. Sigmoid colon volvulus in children: review of 19 cases. *Pediatr Surg Int.*, Jul, 2004; 20(7): 492-5.
10. Salas S, Angel CA, Salas N, Murillo C, Swischuk L. Sigmoid volvulus in children and adolescents. *J Am Coll Surg*, Jun, 2000; 190(6): 717-23.
11. Vandendries C, Jullès MC, Boulay-Coletta I, Loriau J, Zins M. Diagnosis of colonic volvulus: findings on multidetector CT with three-dimensional reconstructions. *Br J Radiol*, Nov, 2010; 83(995): 983-90.
12. Bhatnagar BN, Sharma CL, Gupta SN, Mathur MM, Reddy DC. Study on the anatomical dimensions of the human sigmoid colon. *Clin Anat*, Apr, 2004; 17(3): 236-43.
13. 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*, Jul, 2011; 24(5): 634-7.
14. Alatise OI, Ojo O, Nwoha P, Omoniyi-Esan G, Omonisi A. The role of the anatomy of the sigmoid colon in developing sigmoid volvulus: a cross-sectional study. *Surg Radiol Anat*, Apr, 2013; 35(3): 249-57.
15. Madiba TE, Haffajee MR. Sigmoid colon morphology in the population groups of Durban, South Africa, with special reference to sigmoid volvulus. *Clin Anat*, May, 2011; 24(4): 441-53.
16. Madiba TE, Haffajee MR, Sikhosana MH. Radiological anatomy of the sigmoid colon. *Surg Radiol Anat*, Jul, 2008; 30(5): 409-15.
17. Madiba TE, Aldous C, Haffajee MR. The morphology of the foetal sigmoid colon in the African population: a possible predisposition to sigmoid volvulus. *Colorectal Dis.*, Dec, 2015; 17(12): 1114-20.
18. Hajinasrollah A, Koshkar A, Gohar Shenasan P, Rafiee A. The Evaluation of Relationship Between Mesosigmoid Diameters in Creating Sigmoid Volvulus. *Ira Surg J*, 2005; 13: 34.