Factors Associated with Redundant Sigmoid Colon at Mulago Hospital, Kampala.

G. Tumusiime, Kakande I, N.M. Masiira
Department of Surgery, Mulago Hospital, Kampala, Uganda

Correspondence to: Tumurald@gmail.Com

Background: Sigmoid Volvulus is the most common form of Volvulus of the gastrointestinal tract and in Uganda; this condition is one of the top causes of intestinal obstruction. It is associated with a pre-existing redundant sigmoid colon which has a narrow attachment of the sigmoid mesentery to the posterior abdominal wall. The objectives of this study was to establish the demographic, dietary and socio-economic factors associated with redundant sigmoid.
Methods: A case-control study comparing demographic, dietary and socio-economic factors between 68 patients diagnosed with redundant sigmoid colon, and 136 controls in Mulago Hospital from May to December 2006 was undertaken.
Results: The majority (64.7%) of the patients with redundant sigmoid colon were aged between 30 and 70 years with a male to female ratio of 5:1. Statistically significant association was observed between redundant sigmoid colon and consumption of cereals, fruits and fats (OR 1.5-2.9, P=O.OO) and irregular bowel habits (OR = 4.9, P = 0.00). The majority (57.4%) of cases of cases were peasants. There was no statistically significant association between sex and redundant sigmoid colon (P = 0.45; 95% C.I = 0.6 – 2.8). Neither was there a statistically significant association between the level of education and redundant sigmoid colon (P = 0.07; 95% C.I = 0.6 – 0.9)
Conclusions: Redundant sigmoid colon was common among the young and middle age groups and predominantly occurred in males. There was an association between redundant sigmoid colon and consumption of cereals, fruits and fats. People with irregular bowel habits were about five times more likely to have redundant sigmoid colon than those who had regular bowel habits. Majority of patients with redundant sigmoid colon were of low socioeconomic status.

Introduction

Despite advances in monitoring techniques, surgical techniques, antimicrobial therapy and anesthetic care, redundant sigmoid colon volvulus is still an important cause of morbidity and mortality in Africa, Asia and Eastern Europe[1-4]. Previous studies have mainly emphasized the increasing mortality as a redundant sigmoid colon progresses from a simple volvulus to strangulating obstruction and then gangrene when these patients present to clinicians as cases of intestinal obstruction, and different safe management protocols have been recommended[5,6,7,8]. However, the patients studied are probably a small proportion of many people with redundant sigmoid colon who do not seek medical attention because they do not have life threatening symptoms or are not able to go to health facilities because of their socio – economic status. The exact cause of redundant sigmoid colon has not been established and where high fibre diet has been implicated, the different sources and quantity of fibre with respect to the locally available foods has not been specified yet such information would provide a basis for formulation of primary preventive measures[9,10,11,12,13,14,15]. This study was aimed at determining the socio-demographic factors associated with redundant sigmoid colon

Patients and Methods

A case-controlled study was carried out from 1st May 2006 to 31st December 2006 at Mulago hospital in Uganda. The study population included 68 patients with a redundant sigmoid colon confirmed by barium enema or at laparotomy and 136 controls who were randomly selected from the wards where cases were selected to compensate for possible selection bias caused by obtaining cases from the hospital. Cases with concurrent sigmoid colon tumours were excluded. Controls with abdominal conditions other than redundant sigmoid colon were excluded from for fear of the risk factors being studied being associated with other abdominal conditions. The study was carried out with approval of the Department of surgery,

the Faculty of Medicine Research and Ethics Committee, Mulago Hospital administration, Makerere University School of Graduate Studies and the National Council of Science and Technology. Informed consent was obtained from each participant and evidenced by the participant's signature or the eligible next-of-kin on a consent form. Demographic, Dietary and socio-economic factors were ascertained using an interviewer administered questionnaire. Comparison was done using frequencies and cross tabulation with SPSS Version 11. The measures and strength of association were determined by the odds ratio (OR), p-values and 95% confidence intervals obtained from two by two tables and chi square analysis.

Results

Forty three (21%) of the 204 patients were females and 161 patients (79%) were males. Of the 68 cases with redundant sigmoid colon, 51 (82%) giving a male to female sex ratio of 5: 1. In the controls group, 105 (77%) of the 136 cases were males with a male to females ratio of 3: 1.There was no statistically significant association between sex and having a redundant sigmoid colon, P = 0.45 (95% C.I = 0.6 – 2.8).

Ages ranged from 15 to 91 years with a mean of 55years for cases and for the controls, the ages ranged from 18 to 96 years with a mean of 40 years. The majority (64.7%) of the cases was aged between 30 and 70 years compared to 45.6% of the controls in the same age group (Table 1). The majority of the Bantu tribes were of Ganda tribe constituting 60% (35/53) of the cases and 61.3 percent (68/111) of the controls.

Table 1. Age Distribution

Age in Years	Cases (n = 68)	Controls (n = 136)
11 – 30	9 (13.2%)	63 (46.3%)
31- 70	44 (64.7%)	62 (45.6%)
71- 100	15 (22.1%)	11 (8.1%)

Table 2. Tribal Distribution

Ethnicity	Cases (n = 68)	Controls (n = 136)
Bantu	53 (77.9%)	111 (81.6%)
Nilotics, Nilo – Hamites	15 (20.1%)	25 (18.4%)

Table 3. Level of Education

Level Of Education	Cases (n = 68)	Controls (n = 136)
No Formal Education	10 (14.7%)	15 (11.0%)
Primary Education	36 (52.9%)	52 (38.2%)
Ordinary Level	11 (16.2%)	20 (14.7%)
Advanced Level	2 (2.9%)	7 (5.1%)
Tertiary Institution	9 (13.2%)	42 (30.9%)

Table 4. Occupation

Types of Occupation	Cases (n = 68)	Controls (n = 136)
Peasant farmer	39 (57.4%)	43 (31.6%)
Business person	10 (14.7%)	29 (21.3%)
Technician	6 (8.8%)	24 (17.6%)
Accountant	4 (5.9%)	5 (3.7%)
Driver	3 (4.4%)	15 (11.0%)
Teacher	2 (2.9%)	7 (5.1%)
Student	2 (2.9%)	5 (3.7%)
Others	2 (2.9%	8 (5.9%)

Only 11 (16.1%) of the cases had reached advanced or tertiary education (Table 3). There was however no statistically significant association between the level of education and redundant sigmoid colon. P = 0.07 (95% C.I = 0.6 – 0.9). Only 32.4% (22/68) of the cases were educated beyond primary level compared to 50.7% (69/136) of the controls.

Although the majority of cases (57.4%) and controls (31.6%) were peasant farmers, the main source of income was peasant farming for 52.9% of cases compared to 27.2% of controls. The main source of income for 48.5% of controls was formal employment compared to only 17.6% of the cases. There was a statistically significant association between redundant sigmoid colon and the source of income P = 0.00 (95% C.I = 1.5 – 2.8). Statistically significant association was also found between redundant sigmoid colon and consumption of: rice (OR = 1.9, P = 0.00), millet porridge (OR = 1.5, P = 0.00), wheat products (OR = 2.9, P = 0.00), Irish potatoes (OR = 2.4, P = 0.00), yams (OR = 2.8, P = 0.00), peas (OR = 2.6, P = 0.00), soya beans (OR = 2.1, P = 0.00), blue band (OR = 2.0, P = 0.00), poultry (OR = 1.6, P = 0.01) and oranges (OR = 2.1, P = 0.00). No statistically significant association was found between redundant sigmoid colon and consumption of Matooke, the staple food of Ganda tribe (OR 0.9, P-value 0.25, CI .7-1.2). The family average income per month for the majority of cases (47.1%) was below 50,000 Uganda shillings (Ug. Shs) compared to only 19.9% of the controls (1 US $ = Ug shs 1500).
The majority (66.2%) of cases had irregular bowel habits while the majority (71.5%) of controls had regular bowel habits. There was a strong association between irregular bowel habits before onset of symptoms and redundant sigmoid colon, O.R =4.9 and P – values =0.00.

Discussion

The study showed a male to female sex ratio of 5:1 among patients admitted to Mulago Hospital with redundant sigmoid colon. This was significantly lower than that reported in 1969 by Shepherd[14] who found male to female ratio of 38:1 among patients with sigmoid volvulus seen at Mulago hospital. In 1988, Mugisa[16] reported a male to female ratio of 10:1. These authors however reported results of cross sectional studies and studied patients whose redundant sigmoid colon had undergone volvulus.

The cases studied had symptoms that led to their being investigated with barium enema or being operated on. The low incidence in females could be because females rarely get complications of a redundant sigmoid colon like volvulus which would warrant them to be admitted to surgical wards due to the fact that females are believed to have a wide pelvis and lax abdomen to accommodate the redundant sigmoid colon and their regular bowel habits protects the sigmoid colon from being over loaded. The youngest patient was a 15 year old male while Shepherd[14] found the youngest case of a 12 year old boy in the review of 312 cases of sigmoid volvulus admitted at Mulago hospital from 1949 to 1965. The youngest patient reported in literature was a 3 months old baby girl by Metheny[17] (1943). Contrary to their series where both the 12 year old and 3 month old died, in this study the 15 year old youngest patient survived. However, whereas the 12 year old was documented to have had Hirschsprung's disease confirmed by histology, both the histology results of the 3 months old and 15 year old patients' redundant sigmoid colons were not documented.

Although volvulus of a redundant sigmoid colon in Mulago hospital was referred to as a disease of the elderly men by Kaggwa[18], Nzarubara[19]and Mugisa[16], this study showed that the majority of the affected patients being were young or middle aged. This being the most productive age group, it is no surprise that the majority of the affected patients in this study had a family income of below 50,000 Ug. shs per month the equivalent of under 30 US $.

Another explanation for a shift from the elderly to the young and middle age groups seen recently could be the improvement in health seeking behaviour and the referral system since these patients came from different parts of Uganda. In agreement with previous studies conducted in Mulago Hospital[16,18,19,20], these results suggest that redundant sigmoid colon is more common among the Bantu tribes in general and the Ganda in particular. However, the previous belief that this is because these tribes are matooke - eaters does not hold since this study achieved no statistically significant association between matooke

consumption and redundant sigmoid colon, (P = 0.25, 95% C.I = 0.7 – 1.2). On the other hand, the majority of controls also being of Bantu tribes, suggests that Mulago hospital is the nearest health facility for the Bantu tribes.

Statistically significant association between redundant sigmoid colon and consumption of rice, millet porridge, wheat products, yams, peas, Soya beans, oranges and mangoes achieved in this study is in conformity with other studies which have attributed redundant sigmoid colon to high carbohydrate diet, cereals and high fibre diet[1-3,5,8,9,10,11,12,13,14]. Their argument was that such a diet produces bulky stools or contains indigestible cellulose that is acted upon by colonic bacteria to produce gas that causes persistent sigmoid colon distension.

Results suggest that people who have irregular bowel habits are about five times more likely to have redundant sigmoid colon than those who have regular bowel habits. These results are in agreement with the argument by Cummings et al[21] that shortened intestinal transit time due to high fibre diet tend to over load the rectosigmoid with faeces and flatus if there is negligence or irregularity in bowel movement. This also coincides with a study in Ethiopia by Tegegne[22] who concluded that the regular behaviour of bowel movement among women protected the sigmoid colon while the irregular bowel behaviour in males predisposed to distension of the sigmoid colon and volvulus. Similar to reports by other authors[6,12,23,24], the majority of patients with redundant sigmoid colon were of low socio-economic status. This may be because they cannot work to their full potential due to the symptoms of redundant sigmoid colon or they spend most of their family income on treating the symptoms. They are also likely to get inadequate treatment due to inability to meet the cost.

Gaya[7] attributed the good outcome of patients with complications of redundant sigmoid colon to the good socio-economic status leading to affordability of private treatment and early presentation. On the other hand, Mishra and Sahoo[6] and Dülger et al[24] noted that patients of low socio-economic status will not agree to have an elective operation and in case of recurrence will not agree a second operation due to inability to meet additional costs. It is our strong belief that knowledge of the demographic, dietary and socio-economic factors associated with redundant sigmoid colon may give us a provides messages for possible cause of and preventive measures of redundant sigmoid colon and may help us to identify individuals who are likely to develop sigmoid volvulus.

It is recommended that the public should be advised to seek medical advice as soon as their bowel habits become irregular.

References

1. Ballantyne GH. Brandner M.D, Beart R.W. Volvulus of the sigmoid colon. Ann Surg. 1985; 202:83 – 91.
2. Mangiante E. C, Crose M.A, Fabian T.C, Moore III F. O, Britt L.G. sigmoid volvulus: A four – decade experience. Am. Surgeon 1989; 55: 41 – 44.
3. Assan A, Slivanov I. Sigmoid Volvulus Management and primary anastomosis East Cent. Afr. J. Surg. 2001; 6: 19 – 20.
4. Gibney E. J. Sigmoid volvulus in rural Ghana. Br. Surg. 1989; 76: 737.
5. Ballantyne GH. Review of sigmoid volvulus: History and results of treatment. Dis. Colon Rectum 1982; 25:494 – 500..
6. Mishra S.B. Sahoo K.P. Primary resection and anastomosis for volvulus of the sigmoid colon. J. Indian Med. Assoc. 1986; 84: 265 – 268.
7. Gaya Z. The treatment of sigmoid volvulus. Proc. Surg. East Afr. 1990; 13:26 – 27.
8. Khanna A.K, Kumar P; Khanna R., sigmoid volvulus: study from a North India hospital. Dis. Colon Rectum 1999; 4: 1081 – 1084.
9. Ojara EA. Sigmoid Volvulus in Kinyatta hospital. East Afr med J. 1983; 60:290 – 296.
10. Segal I. Decreasing incidence of sigmoid volvulus at Baragwanath Hospital, Johannesburg S.A. M.J. 1985; 67: 443.

11. Carden A.B.G Acute volvulus of the sigmoid colon. Aust. N.Z.J. surg. 1966; 35: 307 – 312.
12. Sinha R.S. Clinical appraisal of volvulus of the pelvic colon with special reference to aetiology and treatment. Br. J. Surg. 1969; 56:538 – 840.
13. Burkitt D. No relation of sigmoid volvulus to fibre content of African diet N. Eng. J. Med. 1981; 304:914.
14. Shepherd J.J. The epidemiology and clinical presentation of sigmoid volvulus. Br. J. Surg. 1969; 56:353 – 359.
15. Nyarango P.M. Sigmoid volvulus at Kitale district hospital: Preliminary results. E. Afr. Med. J. 1983; 63: 742 – 748.
16. Mugisa D.B complications following laparotomy. Dissertation for the award of M. Med degree, Makerere University 1988.
17. Metheny, A.B, Nicholas H.E. Volvulus of the sigmoid. Surg. Gyn. Obst. 1943; 76:239 – 246.
18. Kaggwa LN. Resection and primary anastomosis of sigmoid volvulus dissertation for the award of M. med degree, Makerere University.
19. Nzarubara G.R. Abdominal emergencies in Mulago Hospital Proc Assoc. Surg East Afr. 1984; 7:242
20. Burkitt D.P, Nelson C.L, Williams. Some geographical variations in disease pattern in East and Central Africa E. Afr. Med. J. 1963; 40:1 – 6.
21. Cummings J.H, Stephen A.M: The role of dietary fibre the human colon. Can. Med. Assoc. J. 1980; 123: 1109 – 1114.
22. Tegegne A. Cultural bowel patterns and sex differences in sigmoid volvulus morbidity in an Ethiopian hospital. Trop. Geog. Med. 1995; 47: 212 – 216.
23. Kakande I, Ekwaro I, Obote W.W. Nassali G, Kyamanywa P. Intestinal volvulus at St. Francis Hospital, Kampala. East Cent. Afr. j. surg. 2001; 6: 21 – 24.
24. Dulger M, Cabturk, Utkan N.Z, Gonullu. Management of sigmoid colon volvulus Hepatogastroenterology. 2000; 47: 1280 – 1283.