Observations on the pattern of vomiting and morbidity in patients with acute sigmoid volvulus

Raveenthiran V

ABSTRACT

Background: Vomiting is usually a late and an infrequent symptom of colonic obstructions. Contrary to this general rule, it occurs early and more frequently in some cases of sigmoid volvulus.

Aim: To study the clinical significance of vomiting in patients with sigmoid volvulus.

Setting: Teaching hospital in Western Orissa, India

Study Design: Prospective observational study

Material and Methods: Prospectively enrolled subjects with sigmoid volvulus diagnosed on the basis of clinical, radiological and laparotomy evidence were included in the study carried out in a tertiary care centre in India. Detailed history was obtained from them, especially to elicit information about the occurrence of various symptoms. Information regarding type of vomiting was also obtained. Efforts were made to exclude other causes of vomiting. Statistical tests such as Chi-Square test, Fisher’s exact test or Student’s t test were used.

Results: Ninety-three consecutive subjects with sigmoid volvulus were enrolled. Five patients with possible other aetiologies for vomiting and seven patients with compound sigmoid volvulus were eliminated from further analysis. Two patterns of vomiting were noted in 81 evaluable patients with sigmoid volvulus. In 33 patients (Group A), vomiting preceded or coincided with the onset of other abdominal symptoms (Type 1 vomiting). In 48 patients (Group B) vomiting occurred after the onset of other abdominal symptoms (Type 2 vomiting). The period between the onset of these symptoms and that of vomiting varied from a few hours to several days. Group A patients sought medical help much earlier than those of Group B. Incidences of circulatory shock (24% vs. 8%), haemorrhagic ascites (21% vs. 6%) and colonic gangrene (64% vs. 35%) were significantly higher in Group A than in Group B. The mortality rate (15% vs. 4%) was higher in Group A as well. About 25% (n = 7) of Group A patients in contrast to 4% (n=2) of Group B required hospitalization exceeding 3 weeks. Vomitus was predominantly non-bilious (21 out of 33 patients) in Group A (64%) and bilious (10 out of 11 patients) in Group B (91%).

Conclusion: Type 1 vomiting appears to be an indicator of more severe presentation and is associated with an increased morbidity and mortality. This study suggests that the pattern of vomiting could be a simple and useful predictor of prognosis in sigmoid volvulus.

KEY WORDS: Sigmoid colon, volvulus, vomiting, morbidity, colorectal surgery, prognosis, intestinal obstruction, gangrene of large gut

Vomiting is a cardinal symptom of intestinal obstruction. When the jejunum is mechanically obstructed, vomiting is profuse and occurs early. As the site of obstruction becomes more and more aboral, the onset of vomiting is delayed for several hours and its incidence, frequency and severity diminish proportionately. Therefore, vomiting is relatively uncommon in colonic obstructions. For example, the incidence of vomiting in acute carcinomatous obstruction of the right, left and sigmoid colon has been cited as 32%, 15% and 0%, respectively.

Sigmoid volvulus is a common cause of the acute obstruction of the distal colon. Therefore, theoretically, vomiting should have been a late and infrequent symptom of this disease. Contrary to this expectation, vomiting has been reported in 30 to 88% of patients with volvulus and in a few cases it occurs quite early in the course of the disease. More intriguing than this is the varying nature of vomitus. Usually, vomitus in colonic obstruction consists of feculent material. However, vomitus in sigmoid volvulus may be clear, bile-stained, feculent or bloody. The significance of such diverse manifestations of vomiting in sigmoid volvulus is not known. Extensive review of the literature since 1940 did not reveal any journal article on this issue. Hence, this study was undertaken to determine the importance of various patterns of vomiting with reference to morbidity in sigmoid volvulus.
Material and Methods

This prospective study was carried out in a tertiary care centre in the state of Orissa over a period of 35 months beginning March 1994. Subjects with sigmoid volvulus diagnosed on the basis of clinical, radiological and laparotomy evidence were included in the study. A detailed history was obtained from them, especially to elicit information about the time of occurrence of various symptoms. Information regarding type of vomitus was also obtained. Efforts were made to exclude other causes of vomiting such as intake of nauseant drugs, acidosis, ureaemia, electrolyte imbalance and presence of concomitant medical illnesses such as diabetic ketosis. Vomiting was carefully differentiated from regurgitation. Variables such as age of patients, sex, duration of symptoms, viability of colon, circulatory shock on admission, hemorrhagic ascites, dehydrogenation, rate of recurrence of volvulus, duration of hospital-stay and mortality were recorded.

The frequency data were analysed using Chi-square test with Yate’s correction for continuity. If the contingency tables disobeyed Cochran’s rule, Fisher’s exact test was applied. Continuous data with homogeneity of variance were analysed using unpaired two-tailed Student’s ‘t’ test. Statistical significance was set at P < 0.05.

Results

Ninety-three consecutive subjects with acute sigmoid volvulus were enrolled in the study. Their median age was 50 years (Inter-quartile range—40 to 60). The mean as well as the median duration of symptoms was 3 days (Range—12 hours to 9 days; Inter-quartile range—2 to 4 days) (Table 1). Five were eliminated from further analysis as there was a possibility of other aetiologies for vomiting. These included renal failure in one patient and two with alcohol intake. Two more subjects were excluded from analysis as one of them had received narcotic analgesics at the referring hospital and the other resorted to self-induction of vomiting. None of the 39 female subjects was pregnant. In addition, 7 patients with compound volvulus of the sigmoid colon (the ileo-sigmoid knotting) were also eliminated from the analysis.

The remaining 81 subjects demonstrated two distinct patterns of vomiting. In 35 patients (Group A), vomiting preceded or coincided with the onset of other abdominal symptoms. In these patients with Type 1 vomiting, within a few minutes of the onset of abdominal pain, non-bilious vomiting or retching occurred forcefully. The number of episodes of vomiting at this phase varied from 1-3. This was followed by a vomiting-free quiescent period that ranged from 20 hours to 8 days. At the end of this quiescent period vomiting re-occurred demonstrating a bimodal pattern. However, vomiting in the second phase was noted to be bilious or feculent. As time progressed, the vomiting became more and more severe.

In 48 patients (Group B) vomiting occurred much after the onset of other abdominal symptoms (Type 2 vomiting). The period between the onset of these symptoms and that of vomiting varied from 2-9 days. The group demonstrated a unimodal pattern of vomiting, as once begun, there was no quiescent period. However, even at the onset, the vomitus was bilious or feculent in nature and with passage of time it worsened in severity.

The summary of comparisons between the two groups is provided in Tables 1 and 2. There was no significant difference between the groups with respect to mean age of patients, sex, ratio of recurrence of volvulus and incidence of dehydration (Table 1). Patients belonging to Group A presented earlier than those belonging to Group B. Circulatory shock (Odds Ratio 0.284; 95% Confidence Interval 0.078 – 1.039), haemorrhagic ascites (Odds Ratio 0.248; 95% CI 0.059 – 1.041) and colonic gangrene (Odds Ratio 3.191; 95% CI 1.267 – 8.036) were significantly more common in Group A (Table 1). The mortality rate was 15% (n=5) in Group A as compared to only 4% (n=2) in Group B (Odds Ratio 4.107; 95% CI 0.746 – 22.613). More importantly, all the 4 patients who died immediately after admission belonged to Group A. The duration of hospitalisation was significantly prolonged in Group A (Table 2). In Group A, the nature of vomitus was non-bilious in 64% and bilious or feculent in 36%, whereas in Group B it was almost always (91%) bilious or feculent (X² = 10.022; df = 1; P = 0.002). One patient of Group B had haematemesis due to stress-induced erosive gastritis.

Therapeutic options were chosen on the basis of viability of gut, haemodynamic stability and vascularity of resected edges. Thirteen patients underwent elective colectomy following spontaneous or non-operative deflation, 8 underwent Hartmann’s operation, and 56 underwent emergency resection and primary anastomosis. Four patients died before institut-

Table 1: Comparison of variables between the two patterns of vomiting in patients with sigmoid volvulus

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group A (n=33)</th>
<th>Group B (n=48)</th>
<th>Statistical test and significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)*</td>
<td>48 ± 27</td>
<td>50 ± 22</td>
<td>t = 0.672; df. = 79; P = 0.504; NS</td>
</tr>
<tr>
<td>Sex ratio (Male: Female)</td>
<td>18:15</td>
<td>24:24</td>
<td></td>
</tr>
<tr>
<td>Duration of Symptoms (days)*</td>
<td>2.3 ± 3.5</td>
<td>3.5 ± 3.7</td>
<td></td>
</tr>
<tr>
<td>Circulatory Shock†</td>
<td>8 (24%)</td>
<td>4 (8%)</td>
<td>Fisher’s Exact Test; P = 0.0492; S</td>
</tr>
<tr>
<td>Haemorrhagic Ascites†</td>
<td>7 (21%)</td>
<td>3 (6%)</td>
<td></td>
</tr>
<tr>
<td>Dehydrogenation†</td>
<td>18 (55%)</td>
<td>19 (40%)</td>
<td></td>
</tr>
<tr>
<td>Recurrent attacks of volvulus in the past†</td>
<td>6 (18%)</td>
<td>7 (15%)</td>
<td></td>
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<tr>
<td>Gangrene of colon†</td>
<td>21 (64%)</td>
<td>17 (35%)</td>
<td></td>
</tr>
</tbody>
</table>

Group A includes Type 1 vomiting and Group B includes Type 2 vomiting, *Values are mean ± 2 standard deviations, †Values are number of patients (Percentage), X²: Chi-Square with Yate’s Correction for continuity; df: degree of freedom, t: Unpaired two-tailed Student’s t test, NS: Not significant, S: Significant
Table 2: Hospital stay and pattern of vomiting in patients with sigmoid volvulus

<table>
<thead>
<tr>
<th>Duration of hospital stay</th>
<th>Group A (n = 28)</th>
<th>Group B (n = 46)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10 days</td>
<td>7 (25%)</td>
<td>18 (39%)</td>
</tr>
<tr>
<td>11 to 20 days</td>
<td>14 (50%)</td>
<td>26 (57%)</td>
</tr>
<tr>
<td>&gt; 21 days</td>
<td>7 (25%)</td>
<td>2 (4%)</td>
</tr>
</tbody>
</table>

Group A includes Type 1 vomiting and Group B includes Type 2 vomiting. *Seven patients who died were excluded from analysis. †Values are number of patients (percentage), $\chi^2 = 7.271$, d.f. 2, $P = 0.026$. Significant

**Discussion**

Various patterns of vomiting in sigmoid volvulus have been alluded to in the literature. As early as 1947, Bruusgaard noted, “Vomiting occurs as a reflex at the onset, but later vomiting is rare and indicates complications”. In 1960, Hall-Craggs wrote, “Vomiting is usually associated with the onset of pain, but perhaps does not occur again unless the gut becomes gangrenous”. These early descriptions are consistent with the definition of Type 1 vomiting in the present study. Agrawal and Misra classified vomiting in sigmoid volvulus into early (10%) and late (55%) types. Hinshaw and Carter observed that vomiting occurs early in patients with acute fulminant volvulus while delayed or late vomiting is a feature in patients with subacute progressive disease. Apart from these early annotations there are no detailed studies on the significance of vomiting in sigmoid volvulus.

From a preliminary study of this nature, it is difficult to deduce the pathological basis of the varying patterns of vomiting. As Hinshaw and Carter observed, the force with which the colon twists appears to differ amongst patients. In some of them (as in Group A), the torsion of colon occurs very violently while in others (as in Group B) it occurs more slowly. Any vigorous stimulation of splanchnic afferent nerves is known to produce vomiting by a vagal-mediated reflex. This neurogenic reflex of violent torsion could explain early emesis in Type 1 vomiting (Group A). In such cases, the vomitus is frequently non-bilious as the reflex spasm of the pylorus prevents any efflux of bile into the stomach. Ferocious torsion will quickly compromise colonic vascularity. This probably explains why Group A patients had a high incidence of gangrene, shock and haemorrhagic ascites. Acute pain of sudden violent torsion could be the reason as to why the patients of Group A sought medical help earlier than those of Group B. Higher incidence of gangrene in Group A is obviously the reason for prolonged hospital stay and increased death rates of this group.

The prognosis of sigmoid volvulus is constantly improving during the past few decades. The operative mortality of 75% that was reported at the beginning of 20th century has been brought down to as low as 2%. Several risk factors of poor outcome have been identified. These include geographical location (Western countries), age older than 40 years, mean arterial pressure lower than 70 mmHg, presence of purulent or feculent peritoneal fluid, evidence of gangrenous colon with or without perforation, delayed diagnosis, and emergency surgery. There was no statistically significant difference in the mortality rate with regard to sex, length of history and leukocyte count. Nevertheless, vomiting has not previously been recognized as a prognostic indicator of sigmoid volvulus.

The pattern of vomiting is neither a clue for earlier diagnosis nor a guide for the selection of therapeutic options. Irrespective of the type of vomiting, endoscopic or surgical intervention of the sigmoid volvulus is essential to save the patient. However, the pattern of vomiting appears to be a simple and useful predictor of prognosis. Patients who present with Type 1 vomiting more often develop gangrene of the colon in a short span of time. Therefore, they probably require earlier referral and institution of more aggressive treatment and intensive monitoring than those with Type 2 vomiting.

In conclusion, high incidence of gangrene, shock, hemorrhagic ascites, more deaths and prolonged hospital stay of Group A indicate that Type 1 vomiting is an ominous symptom of sigmoid volvulus. This study suggests that the pattern of vomiting could be a useful predictor of prognosis in sigmoid volvulus.

**References**