A study of large-bowel volvulus in urban Australia

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Background: Large-bowel volvulus is a rare cause of bowel obstruction in the industrialized world. We analyzed the presentation and outcome of 49 patients at the Princess Alexandra Hospital, Brisbane, Australia, who received a diagnosis of colonic volvulus from 1991 to 2001. **Methods:** A retrospective chart study was carried out. **Results:** Twenty-nine patients had sigmoid volvulus (59%), 19 patients had cecal volvulus (39%) and 1 patient had a transverse colon volvulus (2%). The diagnosis of sigmoid volvulus was made accurately on plain abdominal radiography or contrast enema in 90% of cases (n = 26), compared with only 42% of cases (n = 8) of cecal volvulus. Twenty-two patients with sigmoid volvulus were treated initially with endoscopic decompression. The success rate was 64% (n = 14). There was a high early recurrence rate of sigmoid volvulus for those treated by endoscopic decompression alone (43%) during a mean period of 32 days. Of the 14 patients with cecal volvulus who were treated with right hemicolectomy, 12 had primary anastomosis and 2 had end ileostomy with mucous fistula formation. There was no anastomotic leak following right hemicolectomy with primary anastomosis, even though 6 of these patients had an ischemic cecum. **Conclusions:** Endoscopic decompression of the sigmoid volvulus was safe and effective as an initial treatment but has a high early recurrence rate. Any patient who is fit enough to undergo operation should have a definitive procedure during the same admission to avoid recurrence. Cecal volvulus is associated with a higher incidence of gangrene and is treated effectively by right hemicolectomy with or without anastomosis. The need for swift operative intervention is emphasized.

Contexte : Un volvulus du gros intestin cause rarement une occlusion intestinale dans le monde industrialisé. Nous avons analysé la présentation et les résultats de 49 patients du Princess Alexandra Hospital de Brisbane, en Australie, qui avaient reçu un diagnostic de volvulus du côlon entre 1991 et 2001. **Méthodes :** On a procédé à une étude rétrospective de dossiers. **Résultats :** Vingt-neuf patients avaient un volvulus sigmoïde (59 %), 19 patients avaient un volvulus cœcal (39 %) et 1 patient avait un volvulus du côlon transverse (2 %). Le diagnostic de volvulus sigmoïde avait été fait avec précision par simple radiographie abdominale ou lavement par contraste dans 90 % des cas (n = 26), par rapport à seulement 42 % des cas (n = 8) de volvulus cœcal. Vingt-deux patients ayant un volvulus sigmoïde ont d'abord été traités par décompression endoscopique. Le taux de réussite a été de 64 % (n = 14). Il y a eu un taux de récurrence précoce élevé de volvulus sigmoïde chez les patients traités uniquement par décompression endoscopique (43 %) durant une période moyenne de 32 jours. Parmi les 14 patients dont le volvulus cœcal a été traité par hémicolectomie droite, 12 ont présenté une anastomose primaire et deux, une iléostomie terminale avec formation de fistules muqueuses. Il n'y a pas eu de fuite anastomotique à la suite de l'hémicolectomie droite avec anastomose primaire, même si 6 de ces patients présentaient une ischémie du cæcum. **Conclusions :** La décompression endoscopique du volvulus sigmoïde était sécuritaire et efficace comme traitement initial mais elle a fait l'objet d'un taux de récurrence précoce élevé. Tout patient capable de subir l'opération devrait recevoir un traitement définitif pendant le même séjour pour éviter la récurrence. Le volvulus cœcal est associé à une incidence plus élevée de gangrène et est traité efficacement par hémicolectomie droite avec ou sans anastomose. On insiste sur la nécessité d'une intervention chirurgicale rapide.

Large-bowel volvulus is an uncommon cause of bowel obstruction in the industrialized world. This condition is much more common in the developing world, where sigmoid volvulus accounts for 50% of all bowel obstructions as compared with 5% in the developed world.[1,2] The usual sites are the sigmoid colon, cecum, descending colon and transverse colon in descending order of frequency. This study reviews our

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experience at the Princess Alexandra Hospital, a 700-bed, urban public hospital in Brisbane, Australia, over a 10-year period with a view to determining local outcomes for this condition.

Methods

A retrospective study of all the patients who presented with large-bowel volvulus from 1991 to 2001 was performed. The patients' charts were obtained from the medical records department, and notes were made of the presentation, method of diagnosis, treatment and recovery. Postoperative complications including recurrence were recorded, as well as length of follow-up and any further treatment.

Results

A total of 49 patients with colonic volvulus presented to our hospital during the 10-year study period. They consisted of 22 men and 27 women. Twenty-nine patients presented with sigmoid volvulus, 19 patients with cecal volvulus and 1 patient with a transverse colon volvulus. The mean age of our patients with sigmoid volvulus was 68 years and for cecal volvulus, 63 years. The male-to-female ratio was 1:0.6 for sigmoid volvulus and 1:3.8 for cecal volvulus.

The most common symptom of sigmoid volvulus was distension (79%), followed by pain (58%) and obstipation (55%), whereas most patients with cecal volvulus presented with pain (89%). The diagnosis of sigmoid volvulus was made on plain abdominal radiography alone in 66% of cases. Four of these cases were confirmed by barium enema. Seven patients' cases were diagnosed only on barium enema, and 2 cases were diagnosed at laparotomy. The diagnosis of cecal volvulus was made at laparotomy in 11 of 19 patients. For cecal volvulus, 5 patients' cases (26%) were diagnosed correctly on plain abdominal radiography, with 2 confirmed by barium enema. Three cases were diagnosed only after barium enema (Table 1).

Twenty-two of the 29 patients with the sigmoid volvulus were managed initially by endoscopic decompression (16 patients were treated with rigid sigmoidoscopy alone, 5 patients required flexible as well as rigid sigmoidoscopy, and 1 patient had a colonoscopy). Fourteen patients were treated successfully by these means (Fig. 1). Of the 8 patients who failed to show improvement even with endoscopic decompression, 7 had laparotomy (2 Hartmann's procedures, 4 sigmoid colectomies with double-barrelled colostomy and 1 sigmoidopexy). One patient was not operated upon because of his poor medical state, and he died after 2 days.

Of the 14 patients successfully treated by initial endoscopic decompression, only 2 patients were scheduled for sigmoid colectomies later. Of the 12 patients who did not have elective sigmoid colectomy, 6 did not present again with recurrence (Fig. 1). The mean follow-up period was 30 days for 5 of these 6 patients who had an average age of 86 years, whereas the other patient, aged 24 years, was lost to follow-up. Only 2 of the 6 patients were resident in nursing homes and, overall, these 6 patients were not managed differently. The other 6 patients who were initially managed conservatively did develop a recurrent volvulus over a mean period of 32 days, but 1 patient had 2 recurrences within 30 days. Four of these patients had emergency operations at their next admission, and 2 were treated again with rigid sigmoidoscopy. The overall mean follow-up period was 84 days.

The emergency operations for sigmoid volvulus (including first and recurrent presentations) consisted of 4 Hartmann's procedures, 9 sigmoid colectomies with double-barrelled colostomy and 1 sigmoidopexy performed for acute sigmoid volvulus. Gangrenous colon was found in 3 of 15 patients (20%) during emergency laparotomy for sigmoid volvulus. No primary anastomosis was performed. With elective sigmoid colectomies (4 open and 1 laparoscopy-assisted), all patients had primary anastomoses. The single sigmoidopexy was performed successfully for a frail 82-year-old patient in order to expedite her operative procedure.

Complications after operation for sigmoid volvulus included 5 cardiorespiratory and 3 urinary problems, 6 cases of ileus and 1 necrotic colostomy. There were no anastomotic leaks and no recurrences after elective surgery. The average follow-up was 96 days. There were 5 deaths among the whole group with sigmoid volvulus, but none of these occurred in the group with elective surgery. The 5 deaths were the result of pulmonary embolus, multi-organ failure and pneumonia.

Of the 19 patients who presented with cecal volvulus, 1 patient recovered spontaneously, but the rest underwent emergency operations shortly after admission. Fourteen right hemicolectomies were performed, of which 12 had primary anastomosis and 2 had end

Table 1

Diagnosis of sigmoid and cecal volvulus

Diagnostic method	Diagnosis, no. (and %) of cases	
	Sigmoid volvulus *n* = 29	Cecal volvulus *n* = 19
Plain abdominal radiography (AXR)	19 (66)	5 (26)
AXR + gastrografin enema	26 (90)	8 (42)
Colonoscopy	1 (3)	0 (0)
Laparotomy	2 (7)	11 (58)

ileostomies with mucous fistula. One patient was treated with tube cecostomy and 3, with cecopexy. Gangrenous colon was found in 8 of 18 patients (44%) with cecal volvulus.

Complications after operation for cecal volvulus included 3 cardiorespiratory events, 1 acute renal failure, 2 cases of ileus, 1 wound dehiscence and 1 small-bowel peristomal volvulus. There was no anastomotic leak or recurrence. One patient died after right hemicolectomy with end ileostomy due to multiple myeloma and multi-organ failure.

The case of the single patient with transverse colon volvulus was diagnosed on barium enema, and she received urgent colonoscopic decompression. She was treated by transverse colectomy 1 month later as an elective procedure and had no complication after 2 years' follow-up.

Discussion

Large-bowel volvulus is a rare form of large-bowel obstruction in the industrialized world, but is much more prevalent in the developing world. Volvulus occurs when a loop of bowel and its mesentery twist on a fixed point at the base, especially in situations when a large, mobile segment of colon has a narrow, fixed mesenteric attachment that allows axial rotation to occur.[3–5] Predisposing factors in the developed world for sigmoid volvulus are thought to include chronic constipation, prolonged bedrest, institutionalization and a high-fibre diet.[6] For cecal volvulus, poor intestinal muscle tone and a freely mobile cecum are thought to play a part, as well as previous pelvic adhesions, pregnancy and malrotation.[7,8] An obstructing lesion of the left colon resulting in cecal distension will occasionally result in cecal volvulus.[7,9] Colonoscopy has also been implicated.[7,8]

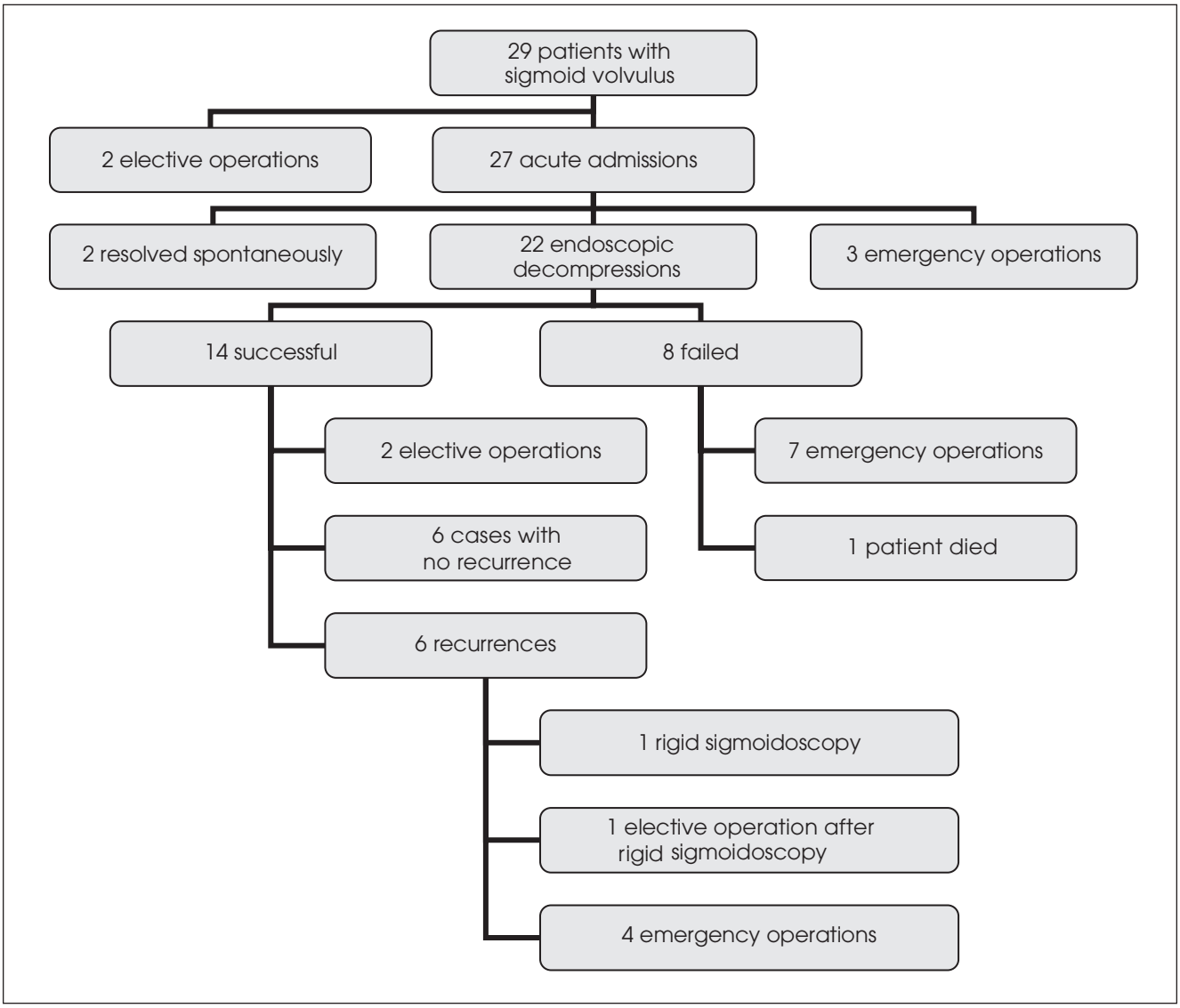

FIG. 1. Outcomes of 29 patients with sigmoid volvulus.

Cecal volvulus was confirmed as being more common in women in our study.[10] Several studies suggest that sigmoid volvulus is most common in nursing-home patients.[6,11] However, in our series this was not so apparent, with only 28% of patients with sigmoid volvulus being resident in a nursing home. The average age of our patients was 68 years, but the condition also occurred occasionally in much younger patients (Fig. 2).

The diagnosis of cecal volvulus on plain radiography of the abdomen is made classically by the findings of a loop of dilated colon on the erect film, with a single fluid level in the left upper quadrant of the abdomen (Fig. 3).[12] Anderson and Mills also described the shape of the distended cecum on supine radiographs as a comma with an open triangular defect facing inferiorly and to the right.[7] However, this may be subtle, and surgery is often performed simply on the basis of clinical findings including shock, acidosis and peritonitis. The clinical picture is more often suggestive of small-bowel obstruction and is not specific for cecal volvulus.[7] This was confirmed in our study with 58% of cases of cecal volvulus being diagnosed only at laparotomy. This situation does not pertain to sigmoid volvulus, where most cases are diagnosed on the plain abdominal radiography alone[2] (Fig. 4). In our own experience, 66% of our patients' cases were diagnosed on plain abdominal radiography, and this improved to 90% with water-soluble contrast enema (Table 1).

The initial treatment of sigmoid volvulus is generally accepted to be endoscopic decompression by either rigid or flexible sigmoidoscopy.[13] In our study, we emphasize that 36% (8/22) of the patients failed to show improvement by these measures and required early operative treatment. This success rate of 64% (14 of 22 patients) is slightly lower than the 81% reported by Grossman and colleagues.[6] We also found that there was a high rate of early recurrence following decompression alone (43%) within 30 days. Similar results have been reported by Isbister with a recurrence rate of 29% in that study.[14] Again, we emphasize that this relatively large number of patients with early recurrence of sigmoid volvulus following endoscopic decompression alone argues strongly for a definitive procedure during the same admission if patients are medically fit, thus potentially avoiding a stoma.

De and Ghosh[15] have recently reported a low mortality and anastomotic leak rate (1%) following primary anastomosis for acute sigmoid volvulus, and this approach would clearly be advantageous in communities in the developing world without good facilities for stoma care. Whereas we used primary anastomosis in the presence of gangrene regularly for cecal volvulus with good results, we have only occasionally used this approach for gangrenous sigmoid volvulus at our hospital and not at all during the study period. The mortality rate for elective surgery is lower than that associated with emergency surgery, as demonstrated by Grossman and colleagues[6] and confirmed in our study. Sigmoid colectomy with primary anastomosis is the definitive operation for sigmoid volvulus, and we found no recurrence after operation. Chung and colleagues[16] reported recurrent volvulus in 6 of their 27 patients after sigmoid colectomy, and they advocated subtotal colectomy in the

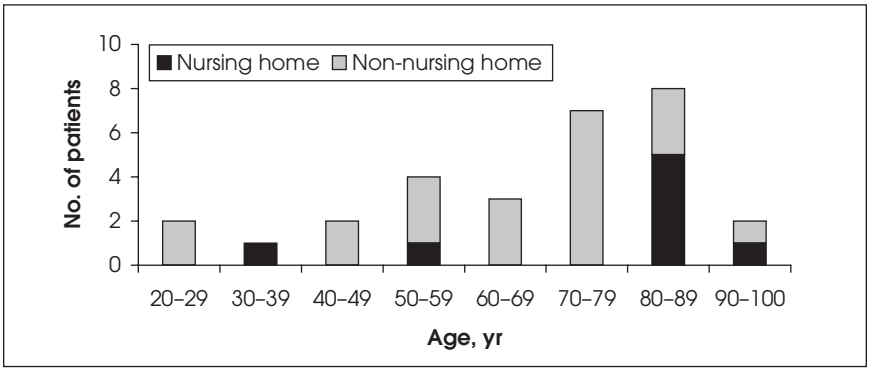

FIG. 2. Age distribution of patients with sigmoid volvulus.

FIG. 3. Plain abdominal radiograph of cecal volvulus.

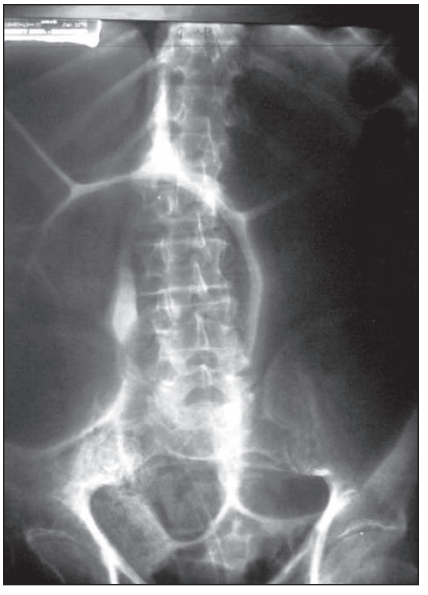

FIG. 4. Plain abdominal radiograph of sigmoid volvulus.

presence of concomitant megacolon or megarectum. Sigmoidopexy would not now be regarded as orthodox treatment,[17] although there has been some limited enthusiasm for it as a laparoscopic manoeuvre.[18]

The treatment for cecal volvulus nearly always involves an emergency operation.[10] Right hemicolectomy was safe and effective. A much larger proportion of patients with cecal volvulus (44%) were found to have gangrenous colon during emergency laparotomy compared with the proportion of patients with sigmoid volvulus (20%). They were most often treated by right hemicolectomy with primary anastomosis (6 of 8 patients), and this was not associated with any postoperative anastomotic leak or mortality. The data from our small study sample cannot be interpreted statistically; however, we conclude that it is safe to perform primary anastomosis even in the presence of gangrene in an otherwise fit patient. The importance of timely intervention is emphasized.

There was one interesting finding of a small-bowel peristomal volvulus after right hemicolectomy with end ileostomy and mucous fistula. This patient was found to have 360° of terminal ileum wrapped around the stoma. Laparotomy, reduction of volvulus and revision of stoma was necessary, and there has been no recurrence.

Conclusions

Endoscopic decompression is safe and effective as an initial treatment for sigmoid volvulus but has a high early recurrence rate. The average time to recurrence is 1 month after the initial decompression. Any patient who is fit enough to undergo an operation should have a definitive procedure during the same admission to avoid recurrence of sigmoid volvulus. Cecal volvulus is associated with a higher incidence of gangrene and is treated effectively by right hemicolectomy with or without anastomosis. Primary anastomosis in the presence of gangrene was not associated with anastomotic leak or other complication.

Competing interests: None declared.

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