

THE INVESTIGATION OF CHRONIC CONSTIPATION FOR SURGICAL MANAGEMENT

Y H Ho, H S Goh

ABSTRACT

Aims: This study was conducted to ascertain the incidence of patients requiring surgery for intractable constipation. We also aimed to determine the anorectal physiology findings which influenced the surgery, and the outcome of surgical intervention.

Methods: A prospective study was done on 217 patients (34 men, 183 women; mean age 59 years [SD 17.7]) managed in a tertiary referral centre. Physiological tests consisting of transit marker studies, anal manometry, electromyography (EMG) and synchronised mano-myo-cindefaecography (SMC), were then performed where appropriate. Surgical management was based on the results of these investigations. The mean follow-up was 19.6 months (SD 9.3).

Results: Eighteen patients (8.3 percent) underwent surgery: 2 for Hirschsprung's disease, 8 for colonic inertia (CI) and 8 for obstructed defaecation (OD). CI patients were younger than the OD patients ($p=0.03$). Transit marker studies were abnormal but manometry was not different from the OD patients. The latter were identified on SMC to have rectoceles, sigmoidocele or rectal intussusception. The stool frequency significantly improved after surgery (before = 1.9 bowel motions a week [SD 0.9], after = 8.8 bowel motions a week [SD 1.2]; $p=0.003$). There were no complications.

Conclusions: A small but significant proportion of constipation patients require surgery. Good results are obtainable when surgery is directed by the findings of anorectal physiology investigations.

Keywords: colon, constipation, physiology, rectum, surgery

SINGAPORE MED J 1996; Vol 37: 291-294

INTRODUCTION

Failure to diagnose surgically treatable intractable constipation may condemn such patients to a lifetime of misery. Unfortunately, many of these are young adults^(1,2), who would be unnecessarily hampered in their most productive years. The complications of constipation include abdominal pains, rectal discomfort, nausea, anorexia, overflow incontinence and stercoral ulceration⁽³⁾. The latter is rare, but the resulting faecal peritonitis and bleeding may be lethal. Basic medical education would lead medical practitioners to believe that too few patients would benefit from being aware of this condition. However, there is little data available on the incidence to support such a conviction.

This is a prospective study. The aims were to assess the incidence of surgery required in patients managed for intractable constipation in a specialist unit. The anorectal physiology findings were analysed. The outcome of surgery was also appraised.

METHODS

Two hundred and seventeen patients presented with constipation to the Department of Colorectal Surgery, Singapore General Hospital during the 3-year period from December 1991 to December 1994. There were 34 men and 183 women, with a mean age of 59 years (SD 17.7). Their symptoms were infrequent stools (less than 3 bowel motions a week), excessive straining at defaecation (more than 25 percent of time) or frequent feeling

of incomplete defaecation, for at least six weeks. A thorough history, physical examination and thyroid function tests (free thyroxine and thyroid stimulating hormone serum levels) excluded constipation secondary to other causes. This included generalised neurological and metabolic diseases (including hypothyroidism), as well as drugs. All patients underwent complete colonoscopy to exclude organic lesions. A six-week trial of at least 30 g dietary fibre and 1.5L (8 glasses) oral fluids per day, was then prescribed.

Patients who did not respond satisfactorily underwent transit marker studies and anorectal physiology tests. For transit marker studies, 20 radio-opaque markers (Konsyl, Fort Worth) were ingested. After five days during which no laxatives were allowed, a plain abdominal X-ray was taken. Colonic inertia (CI) was diagnosed when more than 20 percent of the markers were retained in a diffuse pattern all over the colon^(4,6) (Fig 1). Anorectal physiology tests comprised of electromyography (EMG), manometry and proctometrography. EMG was performed on the puborectalis muscle during simulated defaecation, using a Neuromatic 3000M (Dantec, Skovlunde) EMG apparatus. Patients thus diagnosed to have paradoxical puborectalis contractions causing obstructed defaecation⁽⁷⁻¹⁰⁾ were excluded from surgery. Manometry was performed using a microcapillary perfusion system (Synectics, Stockholm) which measured the pressure profile in various positions of the anus and rectum⁽¹¹⁾. The mean resting pressure and maximum squeeze pressure were measured in the anal canal. These measured the function of the internal and external anal sphincters. Proctometrography was performed by controlled distension of a balloon placed in the rectum. The presence of the rectosphincteric inhibitory reflex was noted by a transient drop in the anal pressures, during the rectal distension. The volume of initial sensation was the distending volume when rectal sensation was first felt. The maximum tolerable volume was the volume when rectal distension could no longer be tolerated. The rectal compliance was the change in distending volume divided by the change in the measured rectal pressures. The volume of initial sensation, maximum tolerable volume and compliance measured respectively the rectal sensitivity, reservoir capacity and elasticity.

Patients with absent rectosphincteric inhibitory reflex (I-o)

Department of Colorectal Surgery
Singapore General Hospital
Outram Road
Singapore 169608

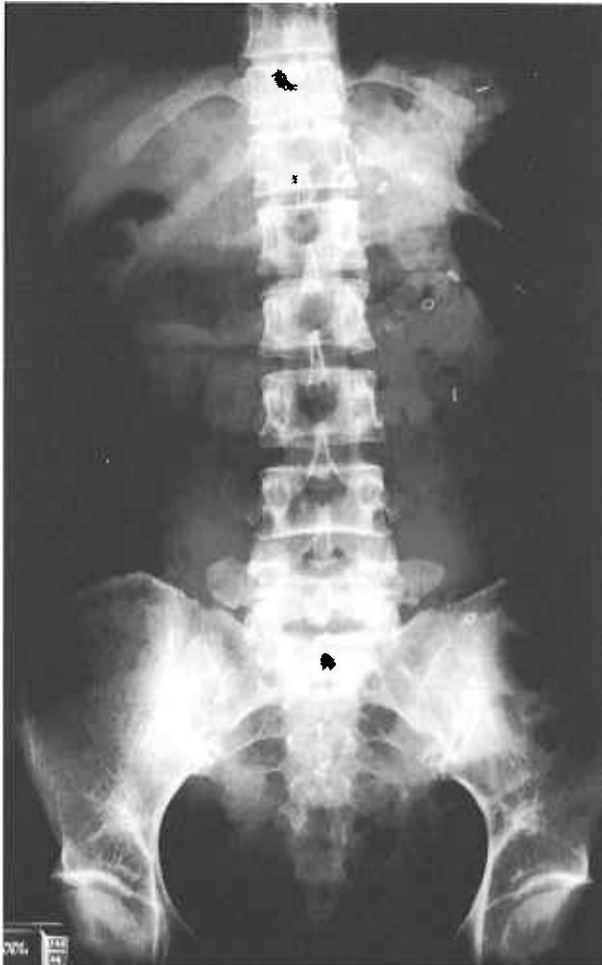
Y H Ho, MBBS Hons, FRACS, FAMS
Consultant Surgeon

#04-08 Gleneagles Medical Centre
6 Napier Road
Singapore 258499

H S Goh, BSc (Hons), FRCS, FAMS
Consultant Surgeon

Correspondence to: Dr Y H Ho

Fig 1 – Abnormal retention of transit markers diffusely over the colon in colonic inertia.



underwent rectal biopsy to confirm Hirschsprung's disease (HD). They were subsequently treated by low anterior resection. Patients with CI were investigated by barium enema to assess for megarectum. Those without megarectum were treated by total colectomy with ileo-rectal anastomosis. Those with megarectum were treated by restorative proctocolectomy. All patients who complained predominantly of excessive straining or frequent feelings of incomplete defaecation also underwent synchronised mano-myo-cinedefaecography (SMC). In this technique, the manometry, proctometrography, and EMG were computer integrated with contrast cinedefaecography, to produce a composite picture. SMC identified certain anatomical abnormalities which caused obstructing defaecation (OD; Fig 2). These were rectoceles, sigmoidoceles and rectal intussusception. Rectoceles were repaired by a transanal approach. Sigmoidoceles were treated by anterior resection. Rectal intussusceptions were treated with transabdominal rectopexy.

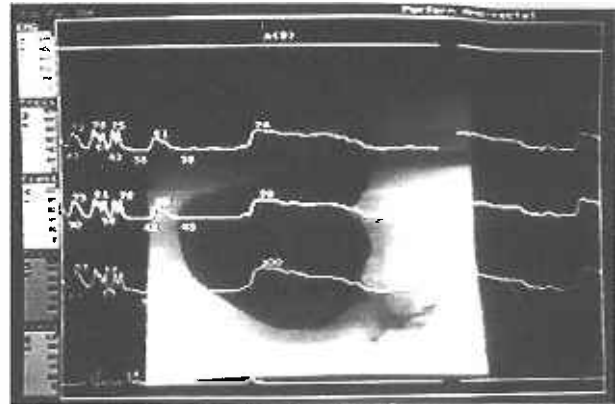
The mean follow-up after surgery was 19.6 months (SD 9.3). Statistical analysis was performed by computer, using SPSS for Windows (SPSS Inc, Chicago). Statistical significance was analysed using the Mann-Whitney test.

RESULTS

Incidence of surgery for constipation

Eighteen of the 217 patients (8.3%) investigated for constipation were found to have a cause treatable surgically (Fig 3). Two had Hirschsprung's disease, 8 had colonic inertia and 8 had obstructed defaecation. The 2 male HD patients (mean age 21.5 years [SD

Fig 2 – Synchronised mano-cinedefaecography showing a rectocele on fluoroscopy. Synchronous pressure tracings revealed no significant paradoxical puborectails contractions.



2.1]) underwent low anterior resection. Eight patients had CI (Table I), of which five underwent total colectomy and ileorectal anastomosis. The remaining three with megarectum, underwent restorative proctocolectomy. Of the 8 OD patients, 6 had rectoceles (treated by rectocele repair), one had a sigmoidocele (treated by anterior resection) and one had rectal intussusception (treated by transabdominal rectopexy).

Anorectal physiology

The anorectal physiology parameters and the age of the patients with CI and OD are shown in Table I. The patients with CI were significantly younger than those with OD ($p=0.03$). There were no other differences.

Outcome of surgery

Prior to surgery, the mean stool frequency was 1.9 bowel motions a week (SD 0.9). After surgery, there was a very significant improvement to 8.8 bowel motions a week (SD 1.2; $p=0.003$). All symptoms of excessive straining and sensation of incomplete defaecation subsided after surgery. There were no post-operative complications.

DISCUSSION

We found that 8.3% of our patients with intractable constipation benefited from surgery. These patients had Hirschsprung's disease, colonic inertia or obstructive defaecation. Anorectal physiology tests were useful in diagnosing HD, by the absence of the rectosphincteric inhibitory reflex. This was an effective and non-invasive technique to screen for HD⁽¹²⁻¹⁵⁾, which may otherwise be difficult to diagnose in adulthood⁽¹⁶⁾. Anorectal physiology parameters did not differentiate between patients with CI and OD. Nevertheless, anorectal physiology assessment is important before contemplating bowel resection surgery for any form of constipation⁽²⁾. Constipated patients can have weak anal sphincters^(17,18) from associated pelvic floor neuropathy⁽¹⁹⁾. Injudicious bowel resection may thus leave the patient incontinent, because weak anal sphincters cannot cope with the resulting increased stool frequency.

The CI patients were significantly younger than those with OD. This may be related to the aetiology of this condition, which remains uncertain. Studies suggest visceral nerve⁽²⁰⁾ and neurotransmitter abnormalities⁽²¹⁻²⁵⁾, possibly inborn. As a result, the motor activity is reduced in various parts of the colon^(26,27). At present, transit marker studies cannot adequately delineate the segment of colon causing the constipation. Therefore, total colectomy with ileorectal anastomosis remains the procedure of

Fig 3 – Management of patients with chronic intractable constipation

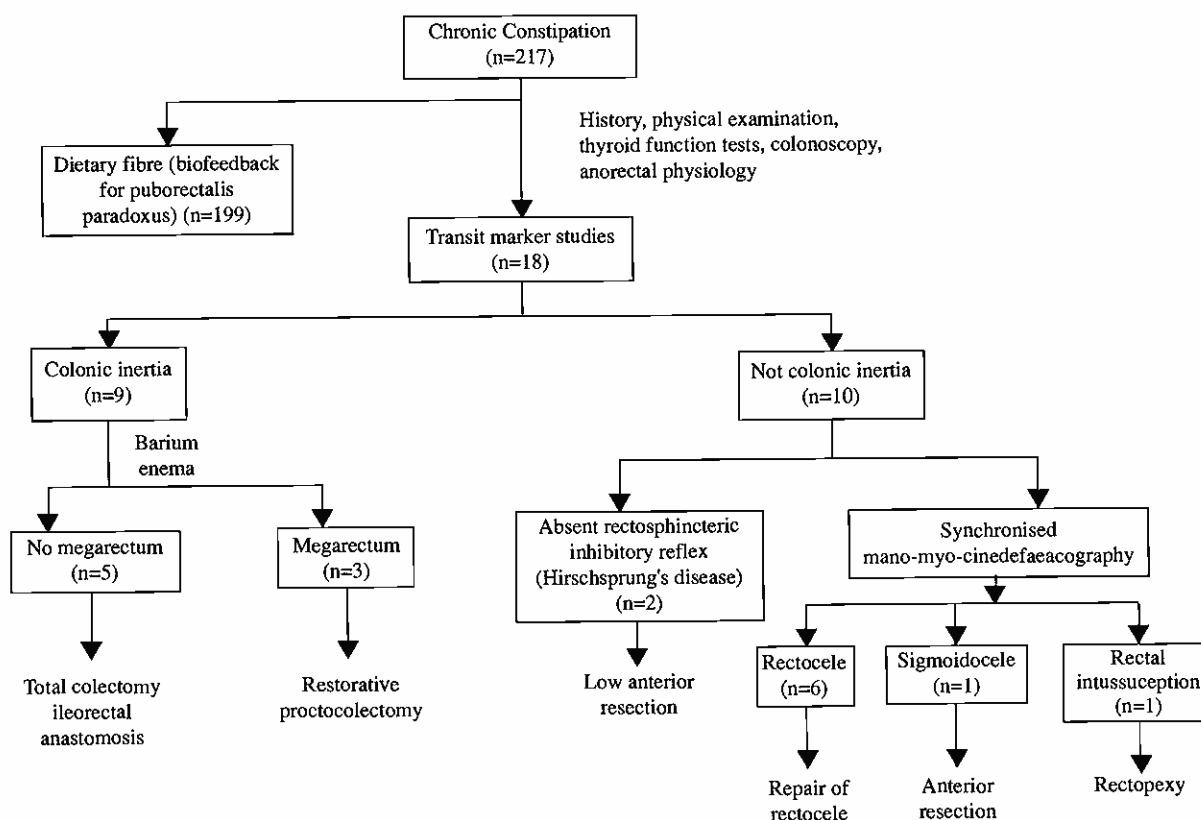


Table I - Anorectal physiology in patients with colonic inertia and obstructed defaecation.

	Colonic inertia	Obstructed defaecation
No	8	8
M:F	1:7	1:3
Age (years)	38.3 (18.7)	50.5 (11)*
Mean resting anal pressure (mmHg)	56.9 (19.2)	56 (30.3)
Maximum anal squeeze pressure (mmHg)	91.9 (29.1)	89.3 (8.5)
Volume of initial rectal sensation (mL)	35.8 (18.7)	39 (31.7)
Maximum tolerable rectal volume (mL)	201 (93.1)	70.3 (108.9)
Rectal compliance (mL/mmHg)	17.1 (26.3)	6.8 (6.8)
Pudendal nerve motor terminal latency (ms)	2.3 (1.1)	2.4 (1.7)

Values in mean (SD).

*p = 0.03

choice⁽¹⁾. However, if the rectum is also involved as evidenced by megacolon, it must also be removed. Bowel continuity is then restored by anastomosing a reservoir pouch constructed from the distal ileum to the anal canal (restorative proctocolectomy).

The older age of the OD patients probably relates to the degenerative nature of these disorders. These disorders were readily identified on SMC. In this technique, the manometry, proctometrography, and EMG were computer integrated with contrast cindefaecography, to produce a composite picture^(28,29).

Therefore, any event can be identified and correlated in various modalities of investigation. The physiological significance of any co-existing paradoxical puborectalis contractions then may be ascertained. This is important because obstruction predominantly due to paradoxical puborectalis contractions are effectively treated by biofeedback therapy^(30,31). However, rectoceles, sigmoidoceles and rectal intussusception are best managed surgically. Rectoceles result from weakness of the anterior rectum. This diverts the faecal stream to become obstructed in the rectocele pouch. Surgical repair of the weakened rectal wall and obliteration of the pouch is required. Sigmoidoceles consist of redundant sigmoid colon flopping into the rectovesical or rectovaginal recess to cause obstruction. This redundant colon is removed by anterior resection. Rectal intussusception occurs when rectal mucosa prolapses circumferentially to cause obstructed defaecation. The prolapse is fixed by rectopexy. A correct understanding of the pathophysiology in each patient was essential in the correct choice of surgical procedures. This ensued in good results.

CONCLUSION

Doctors need to be aware that 8.3% of constipated patients referred to a specialist unit need surgical treatment. These patients would otherwise suffer long years of persistent abdominal distention and discomfort, not adequately relieved by laxatives. There are diverse causes of such intractable constipation, each requiring a differently tailored surgical strategy. Therefore, a proper sequence of physiological tests are required for precise diagnosis. The physiological status of the anal sphincters also needs to be adequately appreciated, before the correct choice of operation can be safely performed. It is only by such meticulous measures from beginning to end, that satisfactory results may ensue.

REFERENCES

1. Zenilman ME, Dunnegan DL, Soper NJ, Becker JM. Successful surgical treatment of idiopathic colonic dysmotility. The role of preoperative evaluation of coloanal motor function. *Arch Surg* 1989; 124: 947-51.
2. Wexner SD, Daniel N, Jagelman DG. Colectomy for constipation: physiologic investigation is the key to success. *Dis Colon Rectum* 1991; 34: 851-6.
3. Keighley MRB. Constipation. In: Keighley MRB, Williams NS, editors. *Surgery of the anus, rectum and colon*. London: WB Saunders, 1993: 609-38.
4. Pemberton JH. Anorectal and pelvic floor disorders: putting physiology into practice. *J Gastroent Hepatol* 1990; Suppl 1: 127-43.
5. Hinton JM, Lennard-Jones JE, Young AC. A new method for studying gut transit times using radiopaque markers. *Gut* 1969; 10: 842-7.
6. Chaussade S, Roche H, Rhyari A, Couturier D, Guerre J. Mesure du temp de transit colique: Description et validation d'une nouvelle technique. *Gastrointestinal Clin Biol* 1986; 10: 385-9.
7. Preston DM, Lennard-Jones JE. Anismus in chronic constipation. *Dig Dis Sci* 1985; 30: 413-8.
8. Jones PN, Lubowski DZ, Swash M, Henry MM. Is paradoxical contraction of puborectalis muscle of functional importance? *Dis Colon Rectum* 1987; 30: 667-70.
9. Wasserman IF. Puborectalis syndrome (rectal stenosis due to anorectal spasm). *Dis Colon Rectum* 1964; 7: 87-98.
10. Wexner SD, Marchetti F, Salanga VD, Corredor C, Jagelman DG. Neurophysiologic assessment of the anal sphincters. *Dis Colon Rectum* 1991; 34: 606-12.
11. Ho YH, Goh HS. Computerized 3-dimensional vector volume analysis - the role of a new method for assessing anal sphincter competence. *Ann Acad Med Singapore* 1992; 21: 263-6.
12. Aaronson I, Nixon HH. A clinical evaluation of anorectal pressure studies in the diagnosis of Hirschsprung's disease. *Gut* 1972; 13: 138-46.
13. Verder M, Petersen W, Mauritzen K. Anal tonometry in the neonatal period for the diagnosis of Hirschsprung's disease. *Acta Paediatr Scand* 1991; 80: 45-50.
14. Crocker NL, Messmer JM. Adult Hirschsprung's disease. *Clin Radiol* 1991; 44: 257-9.
15. Nagasaki A, Ikeda K, Sumitomo K. Rectoanal reflex induced by H₂O thermal stimulation. *Dis Colon Rectum* 1989; 32: 765-8.
16. Doig CM. Hirschsprung's disease and mimicking conditions. *Dig Dis* 1994; 12: 106-16.
17. Kiff E, Swash M. Slowed conduction in the pudendal nerves in idiopathic (neurogenic) faecal incontinence. *Br J Surg* 1984; 71: 614-6.
18. Snooks SJ, Barnes PRH, Swash M, Henry MM. Damage to the innervation of the pelvic floor in chronic constipation. *Gastroenterology* 1985; 89: 977-81.
19. Kamm MA, Lennard-Jones JE. Rectal mucosal electrosensory testing - evidence for a rectal sensory neuropathy in idiopathic constipation. *Dis Colon Rectum* 1990; 33: 419-23.
20. Schouten WR, ten-Kate FJ, de-Graaf EJ, Gilberts EC, Simons JL, Kluck P. Visceral neuropathy in slow transit constipation: an immunohistochemical investigation with monoclonal antibodies against neurofilament. *Dis Colon Rectum* 1993; 36: 1112-7.
21. Gue M, Junien JL, Bueno L. Conditioned emotional response in rats enhances colonic motility through the central release of corticotrophin releasing factor. *Gastroenterology* 1991; 100: 964-70.
22. Bassotti G, Chiarioni G, Imbimbo BP, Betti C, Bonfante F, Vantini I, et al. Impaired colonic motor response to cholinergic stimulation in patients with severe chronic idiopathic (slow transit type) constipation. *Dig Dis Sci* 1993; 38: 1040-5.
23. Lincoln J, Crowe R, Kamm MA, Burnstock G, Lennard-Jones JE. Levels of serotonin and 5-Hydroxyindoleacetic acid are increased in the sigmoid colon in severe idiopathic constipation. *Gastroenterology* 1990; 98: 1219-25.
24. Koch TR, Carney JA, Go L, Go VLW. Idiopathic chronic constipation is associated with decreased vasoactive intestinal peptide. *Gastroenterology* 1988; 94: 300-10.
25. Milner P, Crowe R, Kamm MA, Lennard-Jones JE, Burnstock G. Vasoactive intestinal polypeptide levels in the sigmoid colon are reduced in idiopathic constipation, and increased in diverticular disease. *Gastroenterology* 1990; 99: 666-75.
26. Ferrara A, Pemberton JH, Grotz RL, Hanson RB. Prolonged ambulatory recording of anorectal motility in patients with slow-transit constipation. *Am J Surg* 1994; 167: 73-9.
27. Grotz RL, Pemberton JH, Levin KE, Bell AM, Hanson RB. Rectal wall contractility in healthy subjects and in patients with chronic severe constipation. *Ann Surg* 1993; 218: 761-8.
28. Womack NR, Williams NS. Anorectum. In: Kumar D, Gustavsson S, ed. *An illustrated guide to gastrointestinal motility*. Chichester: John Wiley & Sons, 1988: 220-41.
29. Womack NR, Williams NS, Holmfield JHM, Morrison JFB, Simpkins KC. New method for the dynamic assessment of anorectal function in constipation. *Br J Surg* 1985; 72: 994-8.
30. Ho YH, Goh HS. Biofeedback is effective treatment for intractable constipation. *Asia Pac J Pharmacol* 1994; 9:S17.
31. Papachrysostomou M, Smith AN. Effects of biofeedback on obstructive defecation - reconditioning of the defecation reflex? *Gut* 1994; 35: 252-6.