

The dynamic continence challenge – a simple test to predict faecal continence before colostomy closure

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Background. A common problem in clinical practice is predicting whether a patient will be continent after treatment of a severe perineal injury. Several tests have been described. Anal manometry is unreliable; continence can be normal with low pressures, and poor with high or normal pressures. Endo-anal ultrasound only illustrates anatomical sphincter integrity. The saline continence test involves the quite unphysiological instilling of saline into the rectum, and assessing seepage. What is needed in the prediction of continence is a normal stool simulator.

Method. We propose the use of powdered instant mashed potato reconstituted with water to the consistency of faeces. About 100 - 150 ml is introduced into the rectum using a catheter-tipped syringe. The patient is instructed to walk around for half an hour. On return the underwear is examined for any soiling. If there is no leakage the colostomy may be reversed.

Results. Over the past 15 years, 53 patients have undergone this test. In 47 patients there was no leakage, all had their stomas reversed, and none was incontinent during follow-up.

Conclusion. The dynamic continence challenge is an accurate physiological test that allows clinicians to simulate the effects of colostomy reversal and assess a patient's continence before actually proceeding to the reversal.

S Afr J Surg 2012;50(4):125-126. DOI:10.7196/SAJS.1356

A common problem in clinical practice is predicting whether a patient with a colostomy will be continent after treatment of perineal injuries if the colostomy is reversed. Several tests have been described, but their usefulness is not clear. Protagonists argue that physiological testing is essential, whereas sceptics claim that the tests add little to decision making. For example, continence can be normal despite low manometric pressures, and poor with normal pressures. Endo-anal ultrasound (EAUS) illustrates anatomical integrity, but not the function of the sphincters. What is needed is a realistic simulator of the challenges that a sphincter is likely to face.

Methods

Originally we used porridge from the hospital kitchen, but the supply was unreliable and the consistency inconsistent. This was replaced with powdered instant mashed potato (Smash), which is readily available and easily stored until needed. Between 100 and 150 ml is reconstituted with water to a consistency that matches the surgeon's notion of normal faeces. The material is introduced into the rectum with a catheter-tipped syringe. The perineum is then cleaned. The patient gets dressed and is instructed to walk around for half an hour or so. On return their underwear is examined for any soiling. Should there be no leakage the colostomy can be reversed.

The study was a retrospective audit of the database of the colorectal unit at Helen Joseph Hospital; it was approved by the Human Research Ethics Committee of the University of the Witwatersrand.

Results

Since 1997, 53 adult patients have undergone this test. Indications for the faecal diversion were gunshot wounds to the anus; complex perianal fistulas; pelvic fractures with anal disruption; anal rape; recurrent rectovaginal fistulas; repeat sphincter repairs after obstetric trauma or sexual assault; the disintegrated AIDS perineum (now less frequent, since the government has permitted antiretroviral therapy for the indigent); perineal burns; and Fournier's gangrene. Forty-seven patients had no leakage after half an hour, and all had their stomas reversed. No patient was incontinent at follow-up after 1 month, and none has subsequently returned complaining of recurrent incontinence. The remaining 6 patients had significant 'faecal' loss, and all were advised against having their colostomies reversed. We did not feel that it was ethical to propose reversal to a patient when there was a high likelihood of failure with the need for re-creation of the stoma. Although our radiotherapists require a temporary diverting colostomy in HIV-positive patients before commencing the Nigro regimen for squamous cancer of the anus, no such patients were referred for assessment prior to reversal during this study.

Discussion

A plethora of tests has been proposed to assess faecal continence. The protagonists firmly believe that some form of physiological testing must be performed before a patient undergoes reversal of

a stoma, while the sceptics feel that physiological testing should remain a research tool.

Various factors influenced the choice of volume, material, consistency and time in our study. The average daily faecal output in the West is between 100 and 150 ml.¹⁻³ Most patients (personal communication) are prepared to accept occasional faecal leakage on the rare occasions that they have loose stools, as long as they are continent with normal stools, if the alternative is a stoma. The duration of half an hour was chosen because most people with a call to stool will be able to find a toilet within 30 minutes.

Originally we used porridge from the hospital kitchen, but the supply was unreliable. Dried instant mashed potato has a more or less indefinite shelf-life when used for this purpose, is cheap, can easily be stored in the endoscopy suite, and can be made up whenever needed, without wastage. The St Mark's group,⁴ whose results are similar to ours, used a reconstitutable porridge.

One criticism of our results is that some patients may have subsequently developed incontinence without our knowledge, but this uncertainty is limited by the structure of colorectal services in Johannesburg, where the overwhelming majority of cases (particularly of incontinence) are referred to a single unit.

Clinical examination in the form of digital rectal examination (DRE) has always been the cornerstone of the assessment of anal tone. Read *et al.*⁵ and Matheson and Keighley⁶ showed no correlation between DRE findings and anal manometry. In contrast, and in line with Allingham's 'practised and intelligent finger', Hallan *et al.*⁷ O'Kelly and Mortensen⁸ and Hill *et al.*⁹ demonstrated that DRE could reliably predict manometric findings.

Wexner and Jorge¹⁰ performed a retrospective study on 308 consecutive patients referred for assessment of constipation, incontinence or proctalgia. There were 80 patients with incontinence. Pudendal nerve terminal motor latency (PNTML) testing was found to be of particular value if the incontinence was due to pudendal nerve damage, but this is not relevant in this context, since the need is to predict continence after injury rather than evaluate incontinence.

The literature is filled with papers on the merits of physiological testing. Williams *et al.*¹¹ and Roberts *et al.*¹² both advocate manometry to assess sphincter function. The Roberts study was small, comprising 9 patients following obstetric trauma. They claimed that manometry not only confirmed clinical examination, but could also demonstrate other defects that were not apparent clinically. Read *et al.*⁵ showed that although two-thirds of incontinent patients had a maximum squeeze pressure less than 100 mmHg, more than a quarter of matched continent controls also had a maximum squeeze pressure less than 100 mmHg.

PNTML was used in the 1990s, before EAUS was developed.⁹ PNTML cannot assess anatomical integrity and may give misleading results regarding functional status; it has been little used since the introduction of ultrasound.

EAUS, while invaluable in the assessment of incontinence, only gives anatomical information;¹²⁻¹⁴ it cannot gauge the function of the sphincters. A pitfall of EAUS is that the probe distorts the anal canal by stretching and compressing mucosal and submucosal tissue; MRI may give a better image of the external sphincter.^{15,16}

The saline infusion test has been used to assess continence. It was first described by Read *et al.*⁵ in 1979 in the assessment

of incontinent patients with diarrhoea. A caveat to the test was that continence to the saline infusion test depended on several non-sphincteric factors, such as motivation to suppress the call to stool when the defecation reflex had been strongly stimulated, the degree of colonic and rectal compliance, and the degree to which saline refluxed into the colon. Henry and Swash¹⁷ showed that in the presence of large volumes of watery diarrhoea the normal anal sphincter may not be able to maintain continence; indeed, for most of us this would be akin to a bout of cholera.

A similar study to ours (using Ready Brek porridge) was reported from St Marks, with long-term follow-up on 11 patients whose stomas had been closed after the test had predicted continence; only 3 mentioned some limitations in their activities of daily living due to impaired control,⁴ indicating that the long-term predictive value of the test is good.

The faecal infusion test is mentioned only for completeness. A suitably large volume of stool is removed from the colostomy bag and inserted into the rectum, and the patient is then monitored for seepage. We do not know of any unit that regularly uses this test.

Conclusion

Considering the uncertainty surrounding traditional testing, we propose that by simulating the effects of colostomy reversal with a realistic and socially acceptable substitute, the dynamic continence test is the most useful predictive physiological test.

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