

The role of anorectal physiology studies in the investigation of anorectal and anal sphincter disorders

Anorectal physiology studies began with the demonstration of the rectoanal inhibitory reflex by Gowers [1]. In the present era of modern technology, anorectal manometry studies have gained wide acceptance as tools for diagnosis and therapeutic decision making in the management of anorectal disorders. What is less widely known is that there are many controversies surrounding these tests, and that results should be interpreted critically by those who are familiar with these techniques. There are a variety of devices for measurement of anorectal pressures which include, side opening water perfused catheters, solid-state microtransducers, and air or water filled balloons of various sizes and designs [2]. In addition, there are different measurement techniques and study protocols. All this adds to the confusion, and questions arise regarding their validity and reproducibility [3,4]. This article outlines some of these issues.

Several methods have been described to perform anorectal manometry; slow pull-through, rapid pull-through, station pull-through and stationary techniques. The American Gastroenterological Association has recommended the resting and squeeze anal sphincter pressures to be assessed either by station pull-through, slow pull-through or rapid pull through techniques using water perfused catheters [2]. They have also given reference values for different age groups and sexes. The reproducibility of anorectal manometry in 16 patients investigated 20 days apart by two independent investigators who were blinded to patient details [5] found a significant difference between the two sets of values, indicating that there is poor reproducibility. Another study of 14 subjects [6] found that independent resting and squeeze pressures correlated well between different investigators, but one drawback was the small numbers studied.

Another study of 10 healthy male volunteers [3], investigated the inter- and intra-individual variability of normal values and the reproducibility of anorectal manometry. According to a standardised protocol, they performed three anorectal manometry studies 4 hours apart and repeated the same 4 weeks later. The measured parameters were, sphincter length, resting pressure, maximum squeeze pressure, relaxation of the internal anal sphincter and rectal compliance. They found a significant variability in maximum squeeze pressure, relaxation of internal anal sphincter and rectal compliance. However, there was significant correlation between the results of repetitive measurements, and good reproducibility was found for sphincter length and resting pressure. This is probably due to the fact that these two parameters need the least voluntary involvement of the patient whereas other measurements require a great deal of patient

participation, which may vary from time to time and from patient to patient. The intra-individual day-to-day reproducibility of resting pressure, squeeze pressure and rectal compliance in 19 healthy individuals using perfusion manometry found them to be highly reproducible [7]. Another recent study of 54 patients with constipation or faecal incontinence [8] compared three different techniques in measuring resting pressure of the anal sphincter. It compared the results of stationary, stationary pull-through and slow pull-through techniques using a 7 lumen water perfused silicone rubber catheter and the pressures were compared between groups and between techniques. The results indicated that resting anal sphincter pressure was lower with the stationary technique compared with stationary pull-through and slow pull-through techniques. This may be due to the fact that when the catheter is being pulled by the operator the anal sphincter gets stimulated leading to minor involuntary or unintentional contractions which get added on to the resting pressure value, thus giving a higher value. The stationary technique may therefore be more accurate in measuring sphincter pressures as it does not tend to stimulate the sensitive anal sphincter zone [9,10]. In addition, the stationary method has a minor advantage in discriminating between constipation and incontinence, and requires significantly less time for completion compared to the other two techniques. Anorectal pressure measurements using air-coupled balloon catheters and water perfused catheters demonstrated that anorectal resting and squeeze pressures were not significantly different when different catheters were used [11].

Another controversial investigation is pudendal nerve terminal motor latency measurement (PNTML). This measurement has been used in the investigation of external anal sphincter (EAS) weakness where a differentiation has to be made between neuropathy and muscle injury. At present the specificity and sensitivity of PNTML is being questioned. Kiff and Swash [12] reported that PNTML is prolonged in patients with idiopathic faecal incontinence compared to healthy controls. Nearly 50% of patients with prolonged PNTML have normal squeeze pressures [13]. Other studies have demonstrated that many patients with prolonged PNTML have structural anal sphincter damage on endoanal ultrasound [2, 14], and found no relationship between prolonged PNTML and reduced anal squeeze pressures [15, 16]. This may be because PNTML has been shown to increase with age [17] and only measures the fast conducting fibres in the pudendal nerve [2]. The nerve, although injured, may contain a few fast conducting fibres thus giving a normal latency. Patients with prolonged PNTML fared less well with anterior EAS repair [18] but a larger study involving 55 patients [19] found that PNTML was not predictive of the final outcome of surgery, and

that PNTML is not a good predictor of the results of post-anal repair for neurogenic incontinence [20]. The clinical usefulness of this test is still controversial and the guidelines given by the American Society of Gastroenterology [2] do not recommend PNTML for evaluation of patients with anal incontinence.

In conclusion, there is no universally accepted technique for anorectal manometry, and each of the techniques that are in use appear to have advantages and disadvantages. In addition, normal values also differ according to the technique and the device used, and individual laboratories have to establish their norms for these tests [21]. Therefore, although quantification of anal sphincter function can be considered a prerequisite for management of anorectal disorders and anal sphincter dysfunction, the results of these studies should be interpreted critically.

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