The Place of Motility Studies in the Management of Motor Disorders of the Large Bowel


In considering the place of motility studies in the management of motor disorders of the large bowel, we immediately encounter a semantic difficulty which can be expressed in the form of a question: What is a motility study? If words are to have meaning, a motility study must be concerned with some aspect of gastrointestinal movement. This definition excludes in-vitro studies of strips of muscle; we know that such studies, involving the registration of electrical activity and contractility down to cellular level, are of fundamental importance in elucidating the mechanisms involved in motor activity of the gut, but they should not be included in the term “motility study.” Even excluding such in-vitro studies, the term motility study is still used loosely to embrace observations which do not measure motility. For example, we have already heard from several speakers (Connell, Misiewicz, Ritchie, and Painter) that intraluminal pressure recordings do not bear a reliable relationship to gastrointestinal movements; these recordings certainly reflect some aspects of motor activity, but not necessarily movement of the gut wall or of its contents. It can be shown by simultaneous cineradiography that high pressure waves can occur in the sigmoid colon with no movement when the bowel is segmented and isometric contractions occur; and, conversely, there can be large movements of the contents of the gut with negligible changes on the pressure tracing if the bowel lumen is nowhere obstructed by a contraction ring.1 2 Between these 2 extreme cases, an almost infinitely variable set of pressure patterns can be generated and, as a result, it is questionable whether pressure tracings can ever be interpreted in terms of gut movement in any precise fashion.

An intraluminal pressure recording by itself, therefore, cannot be classed as a motility study. It should be given another name in order to avoid perpetrating the confusion which has been created by our past erroneous belief that such a tracing could be interpreted in terms of motility. The use of the term “colonic motility index” to express a particular way of analyzing a pressure tracing in numerical terms3 has helped to create the confusion, but at the time it was coined the cineradiographic study of colonic movements had not begun, and it was assumed that the use of cineradiography simultaneously with intraluminal pressure recording would enable the pressure tracings to be
interpretable in terms of bowel movement. Cineradiography showed that this assumption was false. It is conceivable that intraluminal recording with complex registering tips will change the position, but there is no immediate sign of this happening.

When balloons are used intraluminally, they do not give an accurate record of intraluminal pressure, since they record a resultant of the true intraluminal pressure and the effect of deformation of the balloon by the bowel wall. A balloon is more likely to register movements of the bowel wall than is an open-ended tube, but the resulting tracing should not be regarded as an intraluminal pressure tracing. When balloons are used in this way, it would be desirable to use another term, such as “a balloon tracing,” and to do our best to see that everybody understands the uses and limitations of this type of study.

Intraluminal pressure recording is appropriate for certain purposes. For example, in diverticulosis of the colon, the diverticula are mucosal herniations through weak points in the muscular wall of the bowel. Such diverticula could arise either because the bowel wall is exceptionally weak or because the intraluminal pressures are unduly high—or from a combination of both of these factors. Crucial studies on the strength of the bowel wall have not been made, but at least the intraluminal pressures can be studied with precision. The observation that, in some circumstances, the colonic segment which bears diverticula is prone to develop very high intraluminal pressures supports the view that we are dealing with pulsion diverticula and that the _vis a tergo_ which drives the mucosal herniations out through the muscle wall is the intraluminal pressure generated by powerful contractions in a segmented gut. It is tempting to coin the phrase “weakness through strength” to express this concept. Morphine causes the generation of high intraluminal pressures in diverticulosis, and this provides a prima facie case for avoiding this drug as an analgesic in acute diverticulitis.

Cineradiography will reveal the changing contour of the bowel lumen and will permit different types of movement to be recognized. It suffers from 2 serious limitations. First, it can be employed only for a limited period of time, owing to the hazards of radiation. Second, when used on its own, it may be difficult to interpret the film in terms of the forces operating; I do not want to go into details except to say that simultaneous intraluminal recording may assist in this interpretation.

Transit times are an important aspect of motor activity. Regarded teleologically, the object of motor activity in the gastrointestinal tract is that food and digestive secretions should be mixed and transported in an orderly way from the mouth to the anus. As far as the colon is concerned, a measure of the transit time from mouth to anus gives a rough measure of colonic transit time, for it takes an average of 3 or 4 days before ingested markers are cleared.