Symposium

Procidentia:
The Etiology of Rectal Procidentia

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Even though rectal procidentia has interested surgeons for many years, there is still no general agreement regarding either its cause or its treatment. Some surgeons believe the causative factor is a defect in the anatomy and physiology of the prolapsing bowel, with secondary changes in the pelvic floor. Others think the primary cause is a defective pelvic floor, with bowel changes occurring secondarily. It is not surprising, therefore, to find little agreement among surgeons regarding most aspects of rectal procidentia.

A combination of personal experience and a study of the literature leads me to think that rectal procidentia may result from any one of several causes, either in the bowel itself or in its support mechanism. Before speculating on possible causes, we should consider the mechanism which normally keeps the rectum in its proper place because, obviously, when prolapse occurs, some part of this mechanism becomes deficient.

It will help to begin by considering in simplistic terms the embryologic descent of the hindgut. The terminal end of the hindgut descends through the defect in the pelvic floor and through the external sphincter muscle to join the skin, which moves up to meet it.

On completion of this process, there are two funnel-shaped structures, one within the other (Fig. 1). The inner funnel is the rectum itself, with the internal sphincter, which is a part of it, and the outer funnel is the pelvic floor, along with the external sphincter. The two funnel-like structures are bonded together from the level of the pelvic floor downward by an extensive interlacing of the longitudinal muscle of the rectum and the levator itself and, at a lower level, by a dense network of fibrous tissue derived from the ends of the longitudinal muscle coat of the rectum. These strands of fibrous tissue fan out in all directions and finally some terminate in the skin of the perianal area. Normally, this fusion must of necessity be a firm one, otherwise slippage and rectal eversion would occur. But it is reasonable to assume that this attachment sometimes may be weak, either on a congenital basis or acquired through disease or injury.

Important events which occur after birth provide added protection to this critical area of attachment. This added protection is necessary in man because of his erect posture, and it is provided by skeletal changes, principally in the spine and pelvis. In the newborn, the vertebral curves are shallow, the pelvis is more or less vertical, and the rectum is straight. Under these circumstances, pressures from above have a great
impact on the weakest part of the pelvic floor. As the infant develops, the vertebral curves become more prominent and the pelvis tilts forward (Fig. 2). These changes are significant; their effect is to disperse pressures from above in several directions, preventing their full application on the pelvic floor, especially away from its anterior aspect. These skeletal changes also alter the direction of the rectum itself, from a straight, vertical path to a curved or undulating course. This change is highly supportive, especially against abnormalities of peristalsis.

The pelvic floor, which is essentially the levator ani muscle, is without a doubt the most important single element supporting the rectum. It provides a strong floor at all times except during defecation. This support function can be shown in several ways, one of which we described in 1959.1 Essentially, it functions by elevating the lower part of the rectum in a forward direction toward the pubic arch. This results in a more complete floor upon which the lower rectum rests. With straining, the levator muscle is inhibited and its fibers elongate, dropping the lower rectum to a more vertical position obliterating the anorectal angle. These are the two extremes, but the muscle is in a continual state of reflex activity, undergoing changes of all degrees in response to variations in pressure from above.

The rectum is also supported by the connective tissue elements which bind it to surrounding structures. During defecation, when the pelvic floor is relaxed, rectal descent to the outside is prevented by the attachment of the rectum to the levator muscle and by the connective tissue elements. These two elements work effectively, but only for short periods. If there were no levator function, eventually they would yield, and in time prolapse would occur. So, in summary, rectal stability is achieved by a combination of three kinds of support, namely connective tissue, skeletal, and muscular. This arrangement is so effective that procidentia is indeed rare.