Sexual Dysfunction Following Proctocolectomy for Benign Disease of the Colon and Rectum

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Standard surgical therapy for the treatment of chronic ulcerative colitis is total extirpation of the colon and rectum. Since ulcerative colitis is primarily a disease of young adults affecting many people at the inception or height of their sexually active years, postoperative sexual dysfunction is an extremely disconcerting complication. Between July 1973 and May 1981, 291 proctectomies for benign disease of the colon and rectum were performed by the authors. This included 135 men and 156 women. Resection of the rectum was performed using an intrasphincteric technique with dissection kept extremely close to the wall of the rectosigmoid, rectum, and anus. Proctectomy was performed in this manner to prevent significant disruption of the nerves carrying stimuli to the genital organs. Of the 135 males undergoing a proctectomy, four (3%) had a permanent deficit in sexual function. Two men, aged 32 and 30, could sustain an erection but had retrograde ejaculation. Two patients, age 19 and 44, have remained impotent for 1½ and two years, respectively. One hundred fifty-two of the 156 females are sexually active and only two (1.3%) have complained of any physical sexual dysfunction. Each had temporary dyspareunia lasting between nine months and one year after operation.

STANDARD SURGICAL therapy for the treatment of chronic ulcerative colitis is total extirpation of the colon and rectum. Ulcerative colitis is primarily a disease of young adults affecting many people at the inception or height of their sexually active years. Because resection of the rectum may adversly affect sexual function, it is important to detail any sexual dysfunction following resection of the colon and rectum.

Much of the earlier literature on the incidence of impotence and other sexual dysfunction was based on reports of abdominoperineal resection for carcinoma of the rectum and the rate of impotence in some series approached 95%.[7,12] This high rate has been confirmed in several more recent series.[1,11] An early series[4] in which cases were limited to total proctocolectomy performed for the treatment of ulcerative colitis also reported a relatively high rate of impotence. Although Dowd[6] reported a rate of impotence of 20%, most of the recent literature suggests that the rate of impotence following total proctocolectomy for benign disease is much lower than previously reported.[2,3,5,8,9,13]

This paper reviews postoperative sexual dysfunction in the authors' personal series of 291 patients having total proctocolectomy for benign disease during an eight-year period. The neuroanatomic basis of sexual dysfunction is described and related sexual problems discussed.

Material

Between July 1973 and May 1981, 291 proctectomies were performed by the authors (Table 1). There were 135 men and 156 women in the group. In the vast majority of cases, the proctectomy was performed as part of a total proctocolectomy for inflammatory bowel disease. In some cases, the procedure was performed because of multiple polyposis of the colon. Cases in which a radical proctectomy was performed because of carcinoma of the rectum were excluded from this series.

All patients were interviewed at the time of the first postoperative office visit, four to six weeks after operation. Inquiries in males were directed toward urinary or sexual dysfunction with particular regard to achieving and sustaining an erection, ability to ejaculate, and the presence or absence of normal sensation. A significant number of patients had not had the opportunity to resume sexual activity in this time period and these questions were then deferred to the second postoperative visit, two to four months after operation. If there was any sexual dysfunction at either of the early visits, follow-up interviews were conducted until the status of the postoperative sexual function could be ascertained. The questions in females were directed toward dyspareunia, change in sensation, and "any alteration in previous sexual function."

TABLE 1. *Resection of the Rectum for Benign Disease of the Colon and Rectum; July 1973–1981*

Men	135
Woman	156
Total	291

Results

Of the 135 males having a proctectomy, four had a permanent deficit in sexual function (Table 2). Two of these men, aged 32 and 30, were capable of sustaining an erection but had retrograde ejaculation. Two patients, aged 19 and 44, have remained impotent for 1½ and 2 years, respectively. One additional patient initially had pain during erection with decreased rigidity of the erection for a period of four months after operation. Full erectile function was regained after that.

Four of the 156 females had never had sexual intercourse before or during the period of follow-up. Of the 152 sexually active females, only two complained of any physical sexual dysfunction. One patient complained of postoperative dyspareunia accompanied by a vaginal discharge that lasted for approximately nine months. The other women complained of dyspareunia that lasted for approximately one year. In both of these women, a vaginal laceration was sustained during the performance of the proctectomy. Both lacerations were sutured with absorbable suture material during the initial procedure and both healed well. In the early postoperative period, granulation tissue was noted at the vaginal suture line.

Many women had various transient or permanent psychogenic sexual disorders related either to changes in body image, or to anxieties about the security of the ileostomy appliance. Discussion of these findings are not within the scope of this report.

Anatomy

The nerve supply controlling sexual function in humans can be separated into three major components: cerebrospinal, sympathetic, and parasympathetic.

TABLE 2. *Sexual Dysfunction After Resection of the Rectum*

Men . . . 135

Permanent Impotence	2 (Age 19 and 44)
Temporary Impotence	1 (Fully recovered 4 months after operation)
Retrograde Ejaculation	2 (Age 30 and 32)

Women . . . 156

Sexually inactive before operation and during time of follow-up period (4)
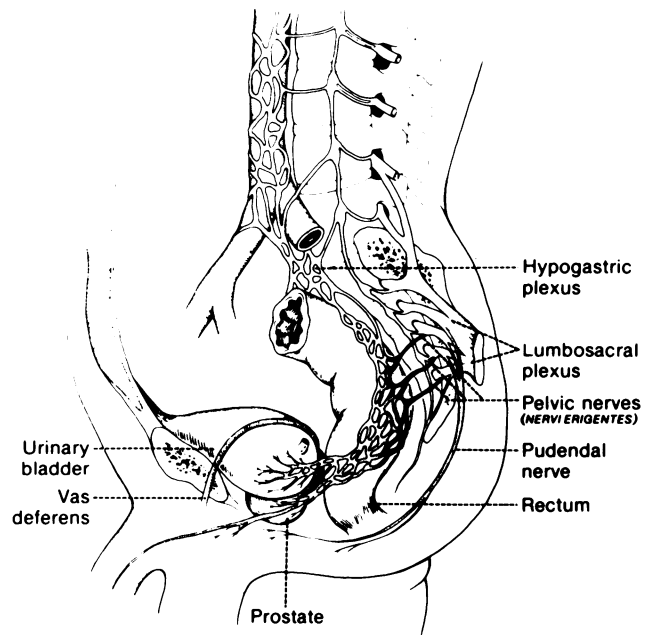
Temporary Dyspareunia (2) (1.3%)

FIG. 1. Parasympathetic nerve supply (dark) intermingling with sympathetic nerve supply to pelvic organs.

Locally, in the pelvis, the parasympathetic nerve supply plays the greatest role. The parasympathetic preganglionic fibers (Fig. 1) arise from the sacrospinal segments and enter the second, third, and fourth sacral nerves. These fibers emerge through the sacral foramen and are called the nervi erigentes. They pass through the inferior hypogastric plexus and then join with the sympathetic fibers to form the pelvic plexus. The pelvic plexus is located between the rectum and posterior-lateral portion of the bladder. The nerve fibers that comprise the postganglionic nerves lie just below the peritoneal reflection on either side of the rectum and in close proximity to it.

The sympathetic nerves to the pelvic genital organs arise in the lower thoracic and upper lumbar spinal segments (Fig. 2). The preganglionic fibers synapse with postganglionic fibers in the preaortic plexus. These postganglionic fibers continue into the pelvis and lie immediately beneath the peritoneum anterior to and on either side of the aorta. These preaortic fibers form the superior hypogastric plexus located at the bifurcation of the aorta. Just below the sacral promontory, the superior hypogastric plexus divides to form the inferior hypogastric plexus.

In females, the inferior hypogastric plexus passes inferiorly within the hollow of the sacrum where the fibers are directed toward the uterosacral ligaments close to the rectal ampulla. These fibers, along with the nervi erigentes and the sacral sympathetic chain, form the pelvic plexus. The fibers from the pelvic plexus travel

obliquely along the base of the broad ligament, and fibers from it continue to innervate the pelvic organs.

In males, fibers of the inferior hypogastric plexus pass downward and anteriorly just below the peritoneum adjacent to the rectum. These continue around the rectovesical pouch. Fibers of inferior hypogastric and pelvic plexus pass immediately adjacent to the anteriolateral wall of the rectum. The nerves are imbedded in a layer of loose areolar tissue that frequently contains many lymph nodes. These fibers lie just beneath the peritoneum overlying the rectum. At this point the pelvic plexus gives rise to the periprostatic plexus. The periprostatic plexus contains nerve fibers from both the nervi erigentes and the inferior hypogastric nerves. The nervi erigentes innervate and cause dilatation of the pudendal artery in men and women and the arteries of the corpora cavernosa in men. Fibers from the periprostatic plexus course through the prostatic capsule, intermingle with the prostatic venous plexus, and then innervate the corpora cavernosa, seminal vesicles, and the prostate. The pudendal nerves also have motor and sensory components that are distributed to the external sphincter of the bladder and also supply sensory perception to the pelvis and perineum in both sexes.

Physiology

In men, erection is primarily initiated by neural stimulation from the parasympathetic nerves. This results in dilatation of the penile vessels and engorgement of the corpora cavernosa. Blood flows into the corpora through both internal pudendal and dorsal penile arteries. The nervi erigentes carry the parasympathetic impulses responsible for dilatation of the arteries. Impulses carried by the pudendal nerve cause contraction of the ischio and bulbo cavernosus muscles. Although psychic stimulation may initiate erection, it may also occur purely as a sacral reflex arc mediated by the fibers in S2, and 3, S4.

The second component of the male sexual response, ejaculation, is mediated by stimuli from the sympathetic nerves in the inferior hypogastric plexes. These stimuli cause contraction of the smooth muscle in the wall of the seminal vesicles, prostatic septa, and ejaculatory ducts. During ejaculation, the sympathetic impulses also cause contraction of the internal sphincter of the bladder and, thus, the secretions from the seminal vesicles and prostate are expressed into the posterior urethra. The contraction of the ischio and bulbo cavernosus muscle cause the semen to move through the meatus of the penis.

In women, cerebral control and peripheral sensory nervi stimulation in the perineum play a more significant role than the autonomic nerves in the control of
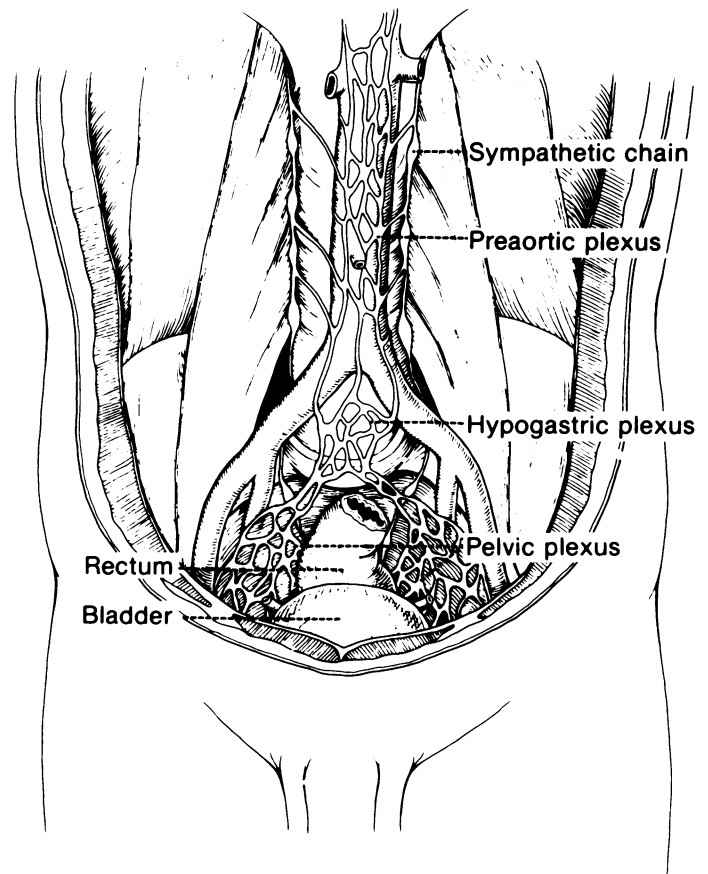

FIG. 2. Sympathetic nerve supply to pelvic organs.

sexual function.[11] The sensory stimuli are mediated by the pudendal nerves. The stimuli reach the brain where they are integrated in the sexual centers that are located in the cerebrum. The pudendal nerves are situated immediately adjacent to the periosteum of the pelvic bones and are protected by a thick layer of endopelvic fascia.

Technical Considerations

During resection of the sigmoid colon and rectum, either or both the sympathetic or the parasympathetic fibers may be damaged (Fig. 3). The parasympathetic nerves are most frequently damaged just below the peritoneal reflection on either side of the rectum. The sympathetic fibers may be interrupted either at the promontory of the sacrum where the superior hypogastric plexus divides or just anterolateral to the rectum where they lie just under the pelvic peritoneum. In order to avoid injury to these nerves during proctocolectomy, consideration should be given to the following. During the mobilization of the sigmoid colon, the dissection of its mesentery and peritoneal attachments should be performed close to the rectum and sigmoid colon so as not to interrupt the nerve supply at that level. The superior
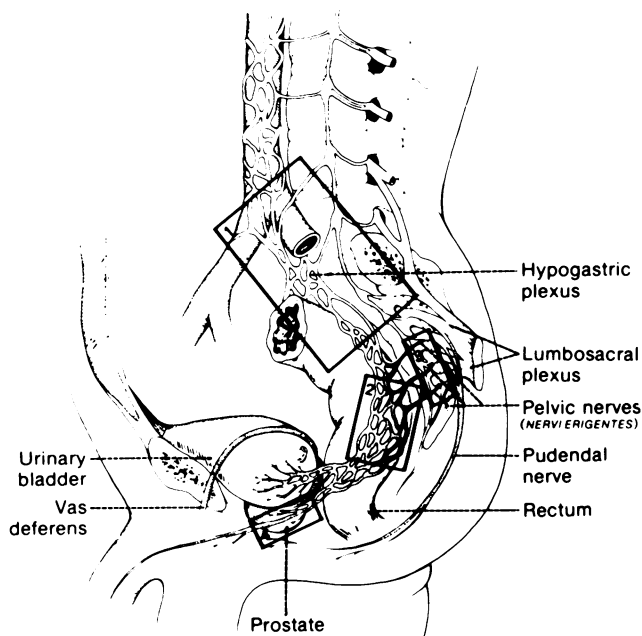
FIG. 3. Common sites for operative injury to autonomic nerves in the pelvis: 1) aortic and hypogastric plexus; 2) fusion of pelvic nerves and hypogastric plexus; 3) origin of pelvic nerves from lumbosacral plexus; 4) nervi erigentes in region of prostatic venous plexus.

hemorrhoidal vessels should also be ligated close to the bowel wall so that the layer of fatty and areolar tissue over the sacral promontory is undisturbed. When the operation is being performed for ulcerative colitis or familial polyposis, there is no benefit to be gained by dissecting any further from the bowel wall. On the contrary, when the operation is being performed for carcinoma of the sigmoid colon or rectum, it is essential to resect as much of the mesentery as possible in order to include lymphatics that may contain metastatic carcinoma. In this circumstance, injury to the parasympathetic sympathetic nerves in the pelvis is frequently unavoidable.

The point of fusion between the sympathetic fibers of the pelvic plexi and the parasympathetic outflow of the pelvic nerves (branches of S2,3,4) is intimately related to the middle hemorrhoidal blood vessels.[6] The lateral dissection in the area of the middle hemorrhoidal vessels also should be performed immediately adjacent to the wall of the rectum. This is frequently the most difficult part of the procedure especially in the conically shaped male pelvis. The middle hemorrhoidal vessels run through the lateral stalks of the rectum and sometimes can be most easily dissected during the perineal portion of the procedure. The perineal portion of the dissection is otherwise performed as close as possible to the rectal wall. The dissection is kept in the intrasphincteric plane and the fibers of the internal and external sphincter are left intact as the rectum is removed. Wide

lateral dissection of the levator ani is avoided. In the male, the anterior wall of the rectum is intimately adherent to the prostate. In this region, the dissection of the rectovesical septum is performed immediately adjacent to the rectal wall so as not to disturb any fibers of the periprostatic plexus.

Discussion

An understanding of the anatomy and physiology pertinent to normal sexual function in both the male and female is essential to clarify several postoperative sexual disorders. Organic sexual dysfunction after proctectomy is much more common in males than in females. The narrow conically shaped male pelvis frequently makes mobilization of the rectum much more traumatic than in females, and the nervi erigentes and the sympathetic nerve supply may be disrupted or stretched, resulting in a variety of postoperative sexual disorders. In addition, the increased incidence of sexual dysfunction in males may be explained by the fact that, in males, interruption of the nervi erigentes alone may completely abolish erectile function. In women, sexual function may be primarily mediated by the sexual centers in the cerebrum and by impulses carried by the pudendal nerves. The pudendal nerves are covered and protected from operative injury by the dense endopelvic fascia. Their function is completely independent of the more easily damaged nervi erigentes.

Occasionally, men may have normal erectile function but sustain retrograde ejaculation as a postoperative complication of excision of the rectum. This is explained neurophysiologically by the fact that the sympathetic nerves probably have been damaged while the nervi erigentes have been left intact. The most likely site for this occurrence is disruption of the nerve supply at the sacral promontory where only the sympathetic nerves are exposed, and easily injured during mobilization of the rectum. Retrograde ejaculation occurs enabling semen to pass retrograde into the bladder rather than being expressed through the penile meatus to the exterior.

When abdomino-perineal resection of the rectum is necessitated because of carcinoma of the rectum, impotence occurs in a high percentage of cases.[1,7,11,12] This is a result of the wide dissection of the mesentery and fatty tissue surrounding the rectum.

Prior to 1950, most surgeons performed abdominoperineal resection for chronic ulcerative colitis with the same technique as performed for carcinoma of the rectum. The early literature reported a high rate of impotence.[4] A report by Petter et al.[9] describes a group of patients in which 18% of the men had disturbed erectile function. Most recent reports describe a rate of impo-

tence between four and six %.[2,5,8,9,13] One small series[3] reports the absence of impotence in a group of ten adult men.

In the present series, the rate of permanent impotence is 1.5% with two additional patients having retrograde ejaculation.

Many authors[2,8-10] have stressed that the patients' age at the time of surgery is an important factor and that impotence is much more common in patients greater than 45 or 50 years old. Although this is well documented, both impotent patients in this series were under 45.

There are very few reports[2,9,10] on sexual dysfunction in women following proctocolectomy. These reports address many of the psychosocial and psychosexual sequelae of proctocolectomy. Petter[9] described dyspareunia in 10% of females undergoing proctocolectomy and ileostomy. Burnham[2] also describes that approximately 30% of the females in their group had some discomfort during intercourse. In this group of 152 sexually active females, only two complained of dyspareunia and this was temporary in both. Both patients sustained lacerations of the posterior vaginal wall during the excision of the rectum.

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