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Review Article

Bowel Function and Hysterectomy – A Review

R. Thakar[1], I. Manyonda[1], S. L. Stanton[1], P. Clarkson[2] and G. Robinson[2]

[1]St George's Hospital, London; [2]Mayday Hospital, Croydon, UK

Abstract: Hysterectomy is the most common major gynecological operation performed in the United Kingdom and in the United States. As the operation disrupts the innervation and the intimate anatomical relationship of the pelvic organs such as the bowel and the bladder, function of these organs may be affected. Frequently women date the onset of their bowel symptoms to the time of hysterectomy, though there is no scientific evidence to support causation. Although so frequently performed little is understood of the true incidence of bowel dysfunction after a hysterectomy or the pathophysiology behind it.

Keywords: Anorectal physiology; Bowel; Constipation; Hysterectomy; Irritable bowel syndrome

Introduction

Frequently women date the onset of their bowel symptoms to previous gynecological surgery, particularly hysterectomy. However, bowel dysfunction, whether irritable bowel syndrome [1,2], functional abdominal pain [3] or constipation [4] is common among women with gynecological symptoms. This may be because many women with disordered bowel function tend to be anxious and polysymptomatic [5], or that many women with abdominal discomfort are primarily referred to the gynecologist, who often recommends a hysterectomy [1,4]. In such patients the preoperative symptoms may persist or even worsen after hysterectomy.

Correspondence and offprint requests to: Dr Ranee Thakar, Department of Obstetrics and Gynecology, St George's Hospital, Blackshaw Road, London SW17 0QT, UK. Tel: 0181 725 2055; Fax: 0181 725 1011; E-mail: bthakar@sghms.ac.uk

This paper reviews current literature on bowel function following hysterectomy. A literature search was carried out using MEDLINE (1966–1999), and the key word *hysterectomy* was cross-referenced with *constipation*, *irritable bowel syndrome*, *bowel* and *anorectal physiology* to identify all published English-language articles. The bibliographies of retrieved articles were searched manually.

There are several mechanisms, by which bowel dysfunction may occur after hysterectomy, including neuroanatomical, hormonal, pharmacological and psychological.

Neuroanatomical Considerations

The parasympathetic innervation of the sigmoid colon and anorectum is derived from the second, third and fourth sacral segments via the pelvic nerves. The sympathetic nerves arise from the second, third and fourth lumbar ganglia and form the inferior hypogastric plexus. The pelvic plexus, which is of paramount importance in the coordinated contractions of the smooth muscle of the bladder and bowel, is formed by the junction of the pelvic parasympathetic and sympathetic nerves. This plexus is intimately related to the bladder, cervix and vagina, and the nerve supply of the pelvic organs is derived from it [6]. It is therefore conceivable that damage to this automatic innervation during pelvic surgery may result in functional disorders of the pelvic viscera, and indeed it has been suggested that constipation following hysterectomy may be caused by autonomic denervation of the hindgut [7]. Perry et al. [8] found a higher incidence of constipation in women who had presacral neurectomy (31.8%), hysterectomy (27.7%) and other gynecologic surgery (25%) than in

those who did not have surgery (10.5%). They concluded that this might be due to parasympathetic nerve dysfunction.

During the operation of total hysterectomy the pelvic plexus may be at risk in four areas. First, the main branches of the plexus, which pass beneath the uterine arteries, may be damaged during the division of the cardinal ligaments [9]. Secondly, the major part of the vesical innervation, which enters the bladder base before spreading throughout the detrusor muscle, may be damaged during blunt dissection of the bladder from the uterus and cervix. Thirdly, the extensive dissection of the paravaginal tissue may disrupt the pelvic neurons which pass from the lateral aspect of the vagina [10]. Finally, the removal of the cervix can result in loss of a large segment of the plexus, which is intimately related to it. The remaining portion of the plexus may be inadequate to deal with afferent impulses from the rectum and bladder, possibly leading to bladder and rectal dysfunction [11]. This might explain the occurrence of lower intestinal tract symptoms as well as urinary symptoms after total hysterectomy [12,13]. Because a radical hysterectomy procedure involves extensive dissection of structures of the pelvis and removal of the uterus and the cervix with its surrounding tissue, it is likely to cause more damage to the innervation of the rectum and bladder [14–16]. Conversely, lesser dissection of the pelvic organs with subtotal hysterectomy may preserve pelvic organ function [17–20]. However, anatomical studies suggest there is little risk to the pelvic autonomic nerves during hysterectomy unless the cardinal ligaments or an unusually large cuff of vagina are removed [21].

The defect in the uterosacral–cardinal fascial supports of the upper vagina caused at the time of hysterectomy may result in enterocele formation, with vaginal vault prolapse [22]. Vault prolapse and rectoceles are common after hysterectomy [23–25]. Symmonds et al. [23] reported that, of 190 patients with enterocele and vault prolapse, 91 had undergone abdominal and 99 a vaginal hysterectomy. A higher incidence of enteroceles (40% versus 25%), as well as a higher incidence of perineal descent (25% versus 15%), has been reported on selective defecography after hysterectomy. This could be due to a generalized weakness of the pelvic floor, lending itself to excessive perineal descent and the development of a rectal and vaginal wall prolapse [25]. It is generally accepted that rectoceles and enteroceles can give rise to severe defecatory symptoms [26,27], and this could be attributed to the hysterectomy. Most rectoceles are asymptomatic [28,29]. However, a prospective study of symptom-producing rectoceles found an improvement in 88% of the constipated patients postoperatively [30]. Others have also found an improvement in defecatory symptoms after rectocele repair [31]. The failure to identify a deep pouch of Douglas during hysterectomy is often cited as a reason for the development of a posterior enterocele [32,33]. In addition, pulsion enterocele may coexist with a vaginal vault prolapse following hysterectomy. However, using combined evacuation proctography and peritoneography, Halligan et al. [34] found that the presence of an enterocele was not associated with impaired rectal evacuation in constipated patients. Therefore, care should be exercised before ascribing symptoms to the presence of an enterocele.

Hormonal Factors

Change in bowel habit after hysterectomy could be due to the change in hormonal status. Women with constipation due to slow transit tend to have reduced levels of estradiol, and urinary estrogen, and increased serum prolactin, which are normal in women with irritable bowel syndrome [35]. Others have shown a consistent reduction in adrenal steroids in constipated women, which may be pathologically important [36]. However, constipation may just be part of the climacteric, when the serum estrogen levels are reduced as a result of oophorectomy or ovarian failure, which occurs on average 4.5 years earlier after hysterectomy than in women with an intact uterus [37]. Other possible agents could be the uterine-derived prostaglandins. The onset of menstruation is associated with a rise in prostaglandins produced by the endometrium [38]. Prostaglandins, particularly prostaglandin $F_{2\alpha}$, are known to have a stimulatory effect on motor and secretary activity in the bowel [39]. Removal of the uterus, which is a potential source of prostaglandins, could give rise to decreased prostaglandin levels in the blood, predisposing to bowel disturbance [40]. It is interesting to note that some of the patients questioned by Preston and Leonard [4] only defecated at the time of menstruation, providing an explanation for posthysterectomy exacerbation of a previously tolerable bowel habit.

Psychological Factors

It has been alleged that hysterectomy causes depression [41], although this hypothesis has been refuted by others [42,43]. Depressive illness can give rise to constipation [44] and this can be aggravated by the use of antidepressants. In 17% of women undergoing hysterectomy the reason is pelvic pain [45], which is considered by some to be a psychosomatic syndrome [46]. It is important to establish pre-existing bowel function in these patients, as there is evidence incriminating physical and sexual abuse as a contributory factor in gastrointestinal disorders [47].

Effects of Simple Hysterectomy on Bowel Function

To date few studies have been conducted to evaluate the relationship between hysterectomy and postoperative bowel function disturbances. Constipation is a common problem and opinions vary on its definition. Heaton et al.

[48] found that a third of women defecated less than once a day, and 1% of women once a week. Constipation may therefore predate the operation, and this should be taken into consideration. Taylor et al. [12] performed a case–control study through detailed questionnaires in which posthysterectomy women and controls were compared, and showed that women with previous hysterectomy were more likely to report infrequent defecation, firmer stool consistency and more frequent use of laxatives; they also consulted the doctor more often [12]. This study was criticized for its retrospective nature and failure to identify the type of hysterectomy and the estrogen status of the women. Also, in finding matched controls they excluded women who had had extensive bowel operations and those with irritable bowel syndrome, but the same exclusions were not applied to the hysterectomy group. In a comparative study, self-reported constipation was more common in women who had had a previous hysterectomy and straining during defecation was more frequent, particularly in older women [4]. Conversely, Prior et al. [13] observed that after hysterectomy constipation was more likely to disappear than to develop, and there was no change in whole-gut transit times.

A more recent retrospective study comparing women who had had hysterectomy (abdominal, vaginal, radical and subtotal) against a control group who had had laparoscopic cholecystectomy indicated that in women who had normal bowel function prior to hysterectomy, 31% reported severe deterioration in bowel function whereas 11% showed moderate changes after hysterectomy: severe straining and incomplete and/or digital evacuation were the predominant symptoms. No significant difference in the incidence of bowel symptoms was noted with the different types of hysterectomy. Compared to the control group a significantly lower incidence of bowel dysfunction (9%) was noted in the laparoscopic cholecystectomy group ($P<0.001$). In patients with changes in bowel function, changes in bladder function were observed more frequently ($P<0.001$) than in the group without deterioration of bowel function after hysterectomy. The time lapse since operation was: cholecystectomy 3 months to 26 years (mean 7 years), and hysterectomy 4 months to 31 years (mean 11 years). Retrospective data must be interpreted with caution as there is a reliance on the recall of bowel function going back as long as 5 years [49]. Besides, change in bowel habits (usually soft stools or diarrhoea) is a well described but poorly understood phenomenon following hysterectomy, and is a poor control group.

Hysterectomy is unlikely to cause damage at the level of the anal sphincters, and most anorectal studies substantiate this (Table 1). The external anal sphincter is innervated by the somatic motor pudendal nerves and is therefore not affected by autonomic nerve damage [50]. The internal anal sphincter function is not affected, as it is largely dependent for its function on the intrinsic myenteric plexus, which is also responsible for the rectoanal inhibitory reflex [51]. Evidence of increased rectal compliance, rectal sensory threshold, maximum tolerated rectal distension and reduced motility has been noted after hysterectomy compared to controls [7,15]. In contrast to this study, when Roe et al. [52] studied 31 women with slow-transit constipation, i.e. intractable constipation that has proved to be resistant to the usual therapeutic measures and found that 14 (45%) developed severe symptoms following a hysterectomy, usually within the first year. The rest had symptoms arising de

Table 1. anorectal function after simple hysterectomy

Author	Type of study	Type of hysterectomy	No. of patients	Ano-rectal physiology in hysterectomy patients
Roe et al. 1988	Retrospective	Not mentioned	14 Hyst 22 Controls 16 STC	No difference in anal canal pressures, rectosigmoid motility, ano-rectal inhibitory reflex or rectal sensitivity
Smith et al. 1990	Retrospective	AH (12), VH 2	14 Hyst 14 Controls	No difference in anal canal pressures or pudental nerve motor terminal latency Reduced rectal sensitivity and increased compliance Reduced motility
Barnes et al. 191	Prospective (Pre and 1 wk) Comparative	RH (15)	15 Hyst 3 Controls	No difference in anal canal pressures Increased distention needed to trigger relation Reduced sensitivity Controls normal
Prior et al. 1992	Prospective (Pre and 6 wks)	VH (18), TH (8)	26	No difference in anal canal pressures, rectal compliance, ano-rectal inhibitory reflex or motility Rectal sensitivity increased at 6 weeks
Goeffeng et al. 1997	Prospective (Pre, 3 and 11–18 mths) Comparative	SH (32), TH (10)	42	No difference in anal canal pressures, rectal sensation or whole gut transit
Kelly et al. 1998	Prospective (Pre and 16 wks)	AH (16), 14 (VH)	30	Significantly reduced anal canal squeeze pressure more in multiparous women No difference in ano-rectal inhibitory reflex, rectal senation or pudendal nerve latencies

SH, subtotal hysterectomy; TH, total hysterectomy; VG, vaginal hysterectomy; AH, abdominal hysterectomy and RH, radical hysterectomy.

novo. Compared to controls, there was no difference in rectosigmoid motility, rectal compliance or maximal tolerable volume in the hysterectomy group [52]. Goffeng et al. [53], in a prospective study, were unable to demonstrate a change in bowel symptoms or in anorectal physiology in 42 women studied before and 18 months after hysterectomy.

Some women with irritable bowel syndrome date the onset of symptoms to previous hysterectomy. However, a strong association has been found between gynecological symptoms and irritable bowel syndrome [1]. A prospective study designed to determine the incidence of gastrointestinal symptoms arising after hysterectomy and the effect of surgery on pre-existing gastrointestinal symptoms reported irritable bowel syndrome in 22% women prior to hysterectomy, of whom 60% were symptom free 6 months after surgery. However, 22% were worse and 5% developed de novo symptoms of irritable bowel syndrome. The authors concluded that hysterectomy had little if any effect on the de novo development of irritable bowel syndrome, and in fact suggested that pre-existing gastrointestinal symptomatology may improve after hysterectomy [54].

Effect of Radical Hysterectomy on Bowel Function

Fewer studies have been done on women having radical hysterectomy. In a study by Barnes et al. [16], 15 patients with stage I cervical cancer underwent anal manometry before and 1 week after radical hysterectomy. Preoperative bowel function and manometric tests were normal in all patients, but following radical hysterectomy many patients complained of loss of the urge to defecate and of problems with rectal evacuation. A number of factors may have influenced the results of this study, including analgesia, pelvic edema or possible pelvic collections. The manometric tests were abnormal in almost all patients, compared to tests from three control patients who had undergone simple abdominal hysterectomy. Patients 1 week after radical hysterectomy have been found to have reduced rectal sensitivity and require increased rectal distension to elicit an anorectal inhibitory reflex. Longer follow-up of these patients revealed that 20% of radical hysterectomy patients had persistent defecation problems more than 1 year after surgery [16]. However, others have refuted these findings [14].

Conclusions

Many women date the onset of bowel symptoms to hysterectomy, although there is no conclusive evidence to indicate causation. It is therefore not surprising that, although hysterectomy is the most common gynecological operation, bowel dysfunction is not considered as a contraindication to perform it. Most studies to date are largely retrospective and lack adequate control groups or objective data. There is evidence of a higher incidence of bowel symptoms in gynecological patients. It is plausible that hysterectomy itself has no significant influence on bowel dysfunction, and that motility disorders actually predate hysterectomy. A well-designed prospective longitudinal study trial is needed to clarify whether hysterectomy has any effect on bowel dysfunction.

A debate is currently gathering momentum among gynecologists as to whether subtotal hysterectomy, which involves less disruption of the anatomy, confers any benefits over total hysterectomy [16]. A modified technique for radical hysterectomy has been suggested with the aim of sparing the autonomic nerves [14]. As the extent of dysfunction may be related to the degree of dissection during hysterectomy, it is plausible that a less extensive operation may minimize any potential morbidity. To address this issue, we are currently completing a prospective randomized double-blind study comparing bowel, bladder, and sexual function following total versus subtotal hysterectomy.

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