

Review

The Influence of Laparoscopic Benign Hysterectomy in Sexual Function

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Abstract

Objectives: Hysterectomy is the most frequent major surgery performed worldwide in women and in recent years most studies include validated instruments to measure sexual quality of life pre and post operatively. The present review assesses sexual function following abdominal hysterectomy for benign pathology, especially in relation to minimally invasive surgery: laparoscopic and robotics according to different considerations. **Mechanism:** The uterus has traditionally been considered a sexually functioning organ, so uterine removal has been associated with negative outcomes on patients' sexual function despite limited and controversial evidence. By contrast, reviews conducted in recent years conclude that hysterectomies performed for benign uterine pathology improve patients' sexual function and quality of life. **Findings in brief:** Some factors associated with surgery have been specially assessed: the combination of hysterectomy with bilateral oophorectomy in patients with benign pathology can lead to alterations in sexual function and should be restricted only to patients at high risk of ovarian cancer, moreover, there is no current scientific evidence to justify performing a subtotal hysterectomy to preserve or improve sexual quality of life over total hysterectomy. **Conclusions:** postoperative sexual changes have not been demonstrated to mainly depend on surgical approach, in fact, patients who had sexual concerns prior surgery will continue to present them after hysterectomy despite of the vaginal cuff suture approach.

Keywords: benign hysterectomy; sexual function; laparoscopic hysterectomy; dyspareunia; vaginal cuff suture

1. Introduction

Hysterectomy is the most frequent major surgery performed worldwide in women, after cesarean section [1]. Indications for hysterectomy include mostly benign pathologies (approximately 90% of hysterectomies) such as abnormal uterine bleeding, myomas, endometriosis and uterine prolapse [2,3].

The surgical approach may be laparotomic, vaginal or minimally invasive techniques by laparoscopy or robotic surgery [4].

The uterus has traditionally been considered a sexually active organ [5], so surgical removal has been associated with negative outcomes on patients' sexual function despite limited and controversial evidence [6,7].

In fact, undergoing a hysterectomy has often been thought to be predisposed to psychological problems for women, as the uterus has been considered a central organ for them. The perception of one's self-image may be modified, the social relationships with friends and partners may change leading to possible anxiety problems [5,8,9]. However, the evidence of some prospective studies have demonstrated an improvement of quality of life and psychological problems (decreased depression and anxiety) after hysterectomy, probably due to the resolution of symptoms of uterine bleeding, prolapse or pelvic pain for which the surgery was indicated. [5].

In addition, reviews conducted in recent years [8,9] conclude that hysterectomies performed for benign uterine pathology improve patients' sexual function. These improved results appear to be unrelated to the surgical route or if the uterine cervix is retained or not.

Published studies assessing sexual function after hysterectomy are not very homogeneous and therefore the conclusions that can be drawn are not very firm. One cause of heterogeneity is the differences between the populations studied, due among other reasons, to endocrinological situations that are difficult to compare, such as postmenopausal status or not. Another factor that adds to the complexity of drawing conclusions is the multidimensionality involved in assessing female sexual function, since, for example, aging, as well as biological, social, cultural and psychological factors that may affect sexual quality of life and sexual functioning in women [10]. However, different randomized studies [11–13], as well as a Cochrane review [14] assessing sexual function after hysterectomy have recently been published.

The present review assesses sexual function following abdominal hysterectomy for benign pathology, especially in relation to minimally invasive surgery: laparoscopic and robotics according to different considerations.



2. Information Sources and Search Strategy

A search was carried out using the following databases: EMBASE, Medline via Pubmed and Cochrane Database, including publications from the 1990s to December 2021. This interval was established considering the development of laparoscopic and robotic surgery.

Reference lists from studies initially selected and from existing reviews were also searched to identify any additional relevant studies not identified by the electronic searches.

Publications were considered if the full text of the article was available, and data were clearly reported. All types of clinical studies were considered addressing sexual outcomes specifically after minimal invasive hysterectomy (laparoscopy) for benign conditions excluding prolapse and vaginal surgery.

The key terms of interest used in the search were: “sexual function”, “laparoscopic hysterectomy”, “benign hysterectomy”, “postoperative sexual outcomes”.

The search included only works in English. Over the total of 500 articles published from the past 30 years, 64 were finally considered for this article.

3. The Role of Concomitant Bilateral Oophorectomy during Hysterectomy

Bilateral salpingo oophorectomy (BSO) is performed in the same surgical act in approximately 50% of cases. The associated oophorectomy reduces the risk of ovarian cancer to practically zero, but the consequent estrogen deficit can lead to negative consequences on the woman's quality of life [15].

In fact, this association may compromise the favorable outcomes of isolated hysterectomy in terms of quality of life and quality of sexual life as a function of the age at which bilateral oophorectomy is performed [16]. Bilateral salpingo oophorectomy performed during the premenopausal status has a significant adverse impact on cardiovascular, cognitive, mental, and psychosexual health. The resulting estrogen and androgen deficiency will lead to sexual dysfunction such as decreased sexual pleasure, frequency, and comfort during sexual intercourses. Moreover, in postmenopausal patients undergoing bilateral oophorectomy in addition to hysterectomy, global sexual function has also been described to worsen [17]. Surgical menopause has been associated with an increase in multiple problems associated with sexual health compared to reaching a natural menopause [18].

Postoperative estrogen therapy, in particular vaginal application, had been demonstrated by few studies to benefit some aspects of sexual function especially vaginal dryness and dyspareunia after hysterectomy with BSO [19,20].

In other words, the combination of hysterectomy with BSO in patients with benign indications can lead to alterations in sexual function and should be therefore restricted only to patients at high risk of ovarian cancer: women car-

rying *BRCA1/2* or *HNPCC* gene mutation or having a first-degree family history with ovarian, breast, bowel, stomach, lung cancer or lymphomas [16]. Women should be informed and individually counseled in the patient's decision making prior to surgery.

4. Total vs Subtotal Hysterectomy

Previous articles published in the past considered that due to subtotal hysterectomy requires less dissection of surrounding tissue, it was associated with better sexual function [21] and less damage to nerve structures compared to the removal of the cervix [22].

Later a Cochrane review comparing total and subtotal hysterectomy for benign indications was published in 2012 [14]. Six randomized studies performed between 2002 and 2010 with assessment of sexual function with a follow-up up to 2 years were included. Multiple outcomes related to sexual function were analyzed: pain symptoms, dyspareunia, satisfaction, relationship, and functioning, measured in different ways. Most of the studies were abdominal approaches [23–27] and only one of these studies assessed the laparoscopic route [28]. The meta-analysis found no differences in sexual satisfaction or dyspareunia between leaving or removing the uterine cervix. The authors of the Cochrane review, however, limited the results to the lack of blinded studies. One of the studies included in this review, subsequently published a 5-year follow-up, and still found no changes in sexual satisfaction after total or subtotal hysterectomy [11].

In summary, there is no current scientific evidence to justify performing a subtotal hysterectomy to preserve or improve sexual quality of life over total hysterectomy.

5. Systems for Measuring Postoperative Sexual Function

Measuring health-related quality of life after surgery has been essential for postoperative evaluation by patients and surgeons. The majority of previous studies in hysterectomy assessed standardized questionnaires based on postoperative pain, return to normal activity, patient satisfaction during the follow-up but no specifically related with the sexual function [29], fortunately in recent years most studies include validated instruments to measure sexual quality of life.

One of the problems in establishing robust conclusions between surgical approaches, is the use of different systems for measuring sexual function pre and postoperatively. Systems that are not specifically addressed for surgery and in many cases are used in menopausal populations.

The most important validated tools that have been published by some studies to compare laparoscopic versus laparotomic hysterectomy in terms of sexual function are:

The female Sexual Function Index (FSFI): is a validated self-administered questionnaire developed by Rosen *et al.* [30] which includes 19 questions and measures six

outcomes of sexual function: desire, arousal, lubrication, orgasm, satisfaction, and pain. The sum of each score is obtained, higher scores mean healthy sexual life (the maximum score obtainable is 95). An optimal cut off was considered as >26.5 [30]. Is one of the most used questionnaires pre and postoperatively and it has been adapted and translated into more than 29 languages [31–34].

The Libido Scoring System: comprises four questions about: orgasmic function, coital frequency, sexual desire, and sexual self-interest. A total score less than 3 is considered as loss of libido. It is well-correlated with FSFI [35].

The Brief Index of Sexual Functioning for Women (BISF-W): evaluates female sexual function and defines the nature and degree of altered sexual function in women presenting surgical menopause. It provides seven- dimension scores: thoughts/desires, arousal, frequency of sexual activity, receptivity/initiation, pleasure/orgasm, relationship satisfaction, and problems affecting sexual function [36].

Unfortunately, it is difficult to obtain homogeneous data since many studies have not administered validated questionnaires and are based on patient subjective perceptions.

6. Sexual Function Related to Surgical Approach

A Cochrane review published in 2015 [37] included a total of 47 randomised controlled trials (RCTs) comparing all surgical routes (abdominal, vaginal, laparoscopic, and robotic-assisted hysterectomy) to evaluate the most effective and safe approach for benign hysterectomy. Nevertheless, regarding sexual function all comparisons among them, were not studied. There is only one randomized study (low quality evidence) assessing total laparoscopic hysterectomy (TLH) versus laparoscopic-assisted vaginal hysterectomy (LAVH) which found in 101 women that dyspareunia decreased significantly post-operatively in the LAVH group, but not in the TLH group. A significant reduction in the frequency of orgasms after surgery was detected in both groups [38].

Farrell *et al.* [39] conducted a systematic review (18 studies were included) regarding the influence of hysterectomy on sexual behaviour concluding that women who underwent hysterectomy presented an improved quality of life with no negative effects on their sexuality. Most of the studies included abdominal and vaginal surgery. Only one study, Ewert *et al.* [40] included laparoscopic assisted vaginal hysterectomies observing that sexuality of these patients was generally at least unaltered or even considerably improved, more than one-third of the women experienced an increased libido and/or increased sexual sensitivity after LAVH and one-fourth had more sexual intercourse and 35% noticed greater sexual activity.

Small number of studies have reported than postoperative sexual function is comparable between open or laparoscopic approach with similar negative effects in patients

undergoing hysterectomy for benign conditions [41–46]. A chinese retrospective study for benign tumors found no significant differences between open or laparoscopic hysterectomy, reporting for both groups decreased satisfaction with sexual life, reduced frequency of sexual activity, decreased libido, orgasm dysfunction and increased dyspareunia after hysterectomy [41]. Prospective studies in turkish population [43–45] also revealed a detrimental effect using validated pre and postoperative questionnaires, without differences for the two different hysterectomy techniques. Lernmann *et al.* [46] compared five different types of technique, with a mean follow up of two years, and no differences were observed using the Brief Profile of Female Sexual Function score regarding the prevalence of hypoactive sexual desire disorder (HSDD) after hysterectomy.

Recently, Beyan *et al.* [47] conducted an observational cohort study in turkish population comparing abdominal total hysterectomy vs laparoscopic approach for benign conditions not included in previous reviews: they concluded that both were effective in improving sexual function, which was statistically superior in the laparoscopy group was: the mean postoperative FSFI score, the mean desire and arousal scores and postoperative orgasm score of the laparoscopic group were significantly higher. There were no statistically significant differences between groups in terms of preoperative and postoperative means of lubrication, satisfaction and pain scores.

By contrast Wang *et al.* [41] analyzed a retrospective chinese study between abdominal and laparoscopic hysterectomy using the Brief Index of Sexual Functioning for Women (BISF-W) [36]. The authors found lower sexual satisfaction after surgery in both groups with no significant difference between them in any of the indexes of postoperative sexual function. Both laparoscopy and open hysterectomy for benign pathologies, showed comparable negative effects on sexual function in Chinese women, with a decreased frequency of sexual activity, low libido, orgasm alteration, and superior dyspareunia.

Thus, it has been thought that overall postoperative sexual changes are initially unrelated to the surgical approach, in fact, some authors have shown that the quality of the preoperative sexual relationship is the most significant predictor [48].

Regarding robotics most of studies are focused on oncology [49] or prolapse surgery [50] with very few comparative studies.

A German study [49] in women with early stage of cervical cancer, tried to compare different routes laparoscopically assisted radical vaginal hysterectomy, vaginally assisted laparoscopic or robotic radical hysterectomy or laparoscopic total hysterectomy, and detrimental sexual dysfunction was common in all surgical groups. Moreover, 38% of patients considered their vagina too short which was significantly associated with deep dyspareunia.

Recently, although they do not reported data on sexual functioning, there are many articles on Hysterectomy via transvaginal natural orifice transluminal endoscopic surgery (V-NOTES) [51], suggesting non inferiority regarding surgical outcomes compared with the vaginal approach [52]. Baekelandt *et al.* [53] in 2017 published a systematic review and meta-analysis comparing V-NOTES hysterectomy with laparoscopy assisted vaginal hysterectomy (LAVH) or total laparoscopic hysterectomy (TLH) in women undergoing surgery for benign indications without uterine prolapse, but none of the included studies provided data on sexual function [53]. More studies in the future will be addressed in sexual outcomes comparing minimally invasive surgeries: laparoscopy, robotic and V-NOTES.

It is important to consider another recent review of the Cochrane published in 2019 [54], which included 12 RCT to evaluate the effectiveness and safety of robot-assisted surgery for treating benign and malignant gynaecological conditions (including hysterectomy, and sacrocolpopexy (with or without concomitant hysterectomy)). Only one randomized study reported longer-term complications (sexual dysfunction and urinary tract infection) when robotic versus laparoscopic colposacropepy was compared: very few women experienced these complications, and the authors noted no clear differences between surgical approaches for either outcome [55].

7. Impact on Sexual Functioning, is a Problem of Surgical Technique?

Different studies have evaluated sexual function after hysterectomy depending on surgical technique.

Some explanations for the deleterious physical effects of hysterectomy in the sexual function have been described: scar tissue in the vagina, the removed tissue can also reduce the capacity for vasocongestion [56] and moreover the possibility of nerve injury [57] and posterior dyspareunia. These anatomic factors after surgical injury have been studied with contradictory results. A review performed by Danesh *et al.* [58] assessed the impact of hysterectomy in dyspareunia including the positive conclusions of some studies that even though reported an increase in vaginal dryness, and in sexual satisfaction, showed a decrease in dyspareunia, following hysterectomy [59]. In the same line, Thakar *et al.* [25] showed that deep dyspareunia after hysterectomy improved 6 to 12 months, while superficial dyspareunia improved 6 months after surgery but worsened after 12 months. Conversely, some other authors found that hysterectomy caused pain during sexual intercourses; dyspareunia may be explained by the narrowness and shortening of vagina and the decrease in vaginal lubrication [60–62].

There is one randomized study that investigated the method of vaginal cuff closure [63]. Patients were randomized to vaginal cuff closure vaginally versus the laparoscopic approach. The authors measured the Female Sexual

Function Index and the vaginal length: There were no differences in the FSFI between vaginal or laparoscopy and although the vaginal closure was significantly faster in the vaginal approach, vaginal lengths 3 months postoperatively were significantly longer in the laparoscopic group, so the authors stated that, laparoscopic route for vaginal cuff closure could be more appropriate due to better postoperative vaginal length and a shorter operative time.

Recently Ucella *et al.* [64] performed a randomized trial as a secondary analysis of a previous multicentric study [65] conducted by the Italian Society of Gynecological Endoscopy using the validated questionnaire FSFI, comparing outcomes of transvaginal or laparoscopic closure of the vaginal vault, concluding that transvaginal and laparoscopic vaginal suture after total laparoscopic hysterectomy had similar sexual postoperative outcomes. The women who presented a sexual disorder before surgery had a significantly higher likelihood of presenting a sexual disorder after hysterectomy. In addition, complications in the vaginal cuff, did not influence postoperative FSFI score, neither in the laparoscopic nor vaginal group.

Finally, regarding the type of suture, a randomized trial performed by Einarsson [66] between standard vaginal suture with Vicryl versus barbed suture, they concluded no significant differences in pre and postoperative sexual function between groups. The incidence of dyspareunia decreased after surgery (not statistically significant). They found a significant improvement in desire and satisfaction in the Vicryl group compared with the barbed group although the overall FSFI score was not significantly different between the groups.

8. Conclusions

Hysterectomy for benign pathology has positive effects on sexual function and quality of life independently of the surgical approach and technique due to the resolution of symptoms (abnormal uterine bleeding, pain, organ prolapse). But despite this, the complaints after hysterectomy have been widely described including the loss of libido, dyspareunia, low frequency of intercourse and sexual responsiveness, difficulty with reaching orgasm, decreased vaginal sensitivity, possibility of vaginal shortening, and loss of vaginal elasticity and lubrication. Patients who had sexuality issues before hysterectomy will continue to present them after surgery regardless of the vaginal cuff suture or the type of surgical approach. That is why the concerns of sexual dysfunction after hysterectomy must be properly informed and discussed with the patient and should be assessed individually with each woman.

Author Contributions

These authors contributed equally. MG, MÁMZ, CCB and FC made substantial contributions to conception and design, and have been involved in drafting and revising the manuscript. All authors read and approved the final manuscript.

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Conflict of Interest

The authors declare no conflict of interest. María Ángeles Martínez-Zamora is serving as one of Guest editors of this journal. Camil Castelo-Branco is serving as one of the Editorial Board members/Guest editors of this journal. We declare that María Ángeles Martínez-Zamora and Camil Castelo-Branco had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to Heon Jong Yoo.

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