

# How to prevent the complications caused by the changes of pelvic anatomical relationship after gynecological surgery?

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## Summary

Gynecological surgery may bring about a series of corresponding diseases, because the excision of certain organs will have changed the pelvic anatomical relationship. The gynecologist must be well aware of the surgical indications for various diseases and select the proper method, range, and approach to achieve the optimal therapeutic effects with minimal injuries. This paper discusses some diseases caused by changes of pelvic anatomical relationship after gynecological surgeries, as well as their prevention and treatment.

*Key words:* Gynecological surgery; Pelvic anatomy; Complications; Prevention.

## Introduction

In recent years, as the standard of living improves, women's healthcare concerns also grow, causing many gynecological diseases to be diagnosed at an earlier stage and treated in time. As a kind of therapeutic measure, while alleviating pain in female patients, surgery also implicates a series of issues, including diseases and discomforts of various degrees, such as mental and psychological disorders and functional alterations. This paper discusses some diseases caused by changes of pelvic anatomical relationship after gynecological surgeries, as well as their prevention and treatment.

## Discussion

### *Hysterectomy*

The uterus is an important female reproductive organ, located at the center of the pelvic cavity and between the urinary bladder and rectum, connected to the vagina at its lower part, having a uterine tube, and an ovary on both sides. Depending on the supports of the uterine ligament, pelvic floor muscles, and fascia, the uterus maintains its anteversion and anteflexion and performs important physiological functions [1]. For benign uterine diseases requiring surgical treatment, according to the patient's specific conditions, the adoptable surgical methods mainly consist in subtotal hysterectomy and hysterectomy; the former reserves the cervix of the uterus, uterosacral, and cardinal ligaments [2]. While a hysterectomy cures the previous disease, other following diseases may result due to the loss of the uterus and resulting change of anatomical positions of other organs around the pelvic floor.

#### *1) Prolapse of the ovary*

While carrying out hysterectomy or subtotal hysterectomy reserving the ovary, the left ovary is not fixed, and some patients with a long infundibulopelvic ligament may show prolapse or torsion, resulting in pain or discomfort. The pain is periodic or continuous, and is mostly dull, or non-radiating to the lower abdominal or lumbocostal regions.

Generally, pain caused by prolapse of the ovary is mild but cannot be treated. Prevention includes a good knowledge of pelvic anatomy, while fixating the ovaries on both sides and embedding the residual ends to avoid ovarian prolapse or torsion.

#### *2) Prolapse of vaginal or cervical residual end*

The female pelvic floor is comprised of multiple layers of muscles and fasciae closing the pelvic outlet, and the urethra, vagina, and rectum penetrate through it. The pelvic floor muscle group, fasciae, ligaments, and their nerves form a complex pelvic floor support system and sustain the pelvic organs at their proper positions, such as the uterus, urinary bladder, and rectum.

Under normal conditions, the uterosacral and cardinal ligaments together perform the function of maintaining the position of the uterus, and the round ligament possesses the function of preventing its anteversion. After hysterectomy, the vaginal residual end loses the pulling and drawing action of the uterosacral, cardinal, and round ligaments; with subtotal hysterectomy, if the round ligament is not fixed to the cervical residual end, the reserved cervix of the uterus loses the pulling and drawing action of the round ligament; especially, when there are inducing factors of prolapse (such as long-term standing, increase of abdominal pressure, hard physical labor, and long-term cough), prolapse of vaginal or cervical residual ends may occur [3-5].

Prevention and treatment methods include: (a) mastering of the surgical indications, selection of proper surgical methods, and avoiding excessive treatment; (b) for

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hysterectomy patients, the round ligament can be suspended on the vaginal or cervical residual end; however, an incorrect suspension of the round ligament, such as an improper grasp and too tight a suspension may cause the patient lower abdominal discomfort or pain. With surgical indications permitting, an intrafascial hysterectomy should be carried out as much as possible; (c) reserve the ovary or ovarian tissues as much as possible, to maintain the normal body hormone level, and reduce the prolapse of genital meatus caused by lack of hormone; (d) for patients showing the prolapse trend, while carrying out the suspension of round ligament, shortening of uterosacral ligament should also be included; (e) if the cause is lack of estrogen, under the condition of free of contraindications, the estrogen preparation should be applied locally; (f) for patients with serious prolapse, surgical treatment is indicated.

### 3) Prolapse of the Fallopian tube

Prolapse of the Fallopian tube, a rare complicating disease of hysterectomy, means that the Fallopian tube falls off into the vaginal residual end. It occurs most frequently with vaginal hysterectomy than during transabdominal surgery. If it has occurred within several months after hysterectomy, it is referred to as early-stage prolapse, or later-stage prolapse if several years have elapsed. The common clinical symptoms of prolapse of the Fallopian tube include: watery or blood-watery vaginal discharge, painful sexual intercourse, contact bleeding, and lower abdominal pain [6]. During examination, a polyp-like red tissue can be seen at the vaginal residual end; while palpating or pulling, the lower abdominal pain occurs, and the mass can be palpated at the top of the vagina. In 2006, the Peking Union Medical College Hospital reported that among 7,949 patients with a hysterectomy performed in that hospital during the last 20 years, the incidence rate of Fallopian tube prolapse was 0.11% - lower than 1.3% overseas; it was 0.08% for laparotomy, and 0.51% for vaginal hysterectomy; there was no single case of vaginal hysterectomy performed laparoscopically [7].

The most common reason for Fallopian tube prolapse is that during hysterectomy, the residual ends of adnexa and round ligament are sutured to the vaginal residual end, translating the Fallopian tube closer to the vaginal residual end; the vaginal residual end is open or the drainage tube is placed, causing infection of vaginal residual end, non-healing, dehiscence, Fallopian tube adhesion, fallout of fimbria; while pulling out the drainage tube, there is a risk that the fimbria tip is also drawn out. The prolapse of the Fallopian tube should be distinguished from vaginal adenosis, granulation tissue of vaginal residual end, and from tubal endometriosis.

Prevention methods include: (a) after laparotomy and carrying out hysterectomy, fixating the adnexa on the side wall of the pelvis; (b) carrying out peritonization of vaginal residual end during surgery can avoid Fallopian tube prolapse; (c) after surgery, if the vaginal drainage

tube is applied, it should be placed in the retroperitoneal gap and in the residual vaginal end; (d) while removing the vaginal drainage tube, the patient should raise her buttocks, and rest for 1-2 hours after its removal, and then made to walk to avoid the Fallopian tube from prolapsing into the extraperitoneal gap.

Treatment methods include: for the vaginal fallocectomy, the exposed tube should not only be resected, but the vaginal residual end should also be reopened while freeing it completely, and then retracted and resecting the entire Fallopian tube.

### 4) Change of vaginal structure

For patients with hysterectomy, there is no cervix of the uterus on top of the vagina and the surgical technique sutures the anterior and posterior vaginal fornix; since the cervix of uterus is resected and the anatomical integrity of vagina is damaged, the length of the vagina is shortened to some degree. As known that during sexual intercourse, the cervix of the uterus plays the role as orgasm trigger, the pressing of cervix of the uterus causes the pendular movement of uterus and ligament, and stimulates the uterus to contract and surrounding peritoneum to produce pleasure; when the uterus and cervix of uterus are resected, the anatomical structure of the vagina is altered, causing the reduction of such stimulus, and consequently the reduction of quality of sexual life after surgery [8, 9].

After hysterectomy, the vaginal top innervation of the uterus and integrity of the pelvic floor are damaged, causing the innervation at the upper vaginal section, intestinal tract, urinary bladder, and these areas to be damaged, while reducing pleasure during sexual intercourse; at the same time, since the sources of leucorrhea decrease (body of uterus, cervix of uterus), the vagina becomes dry, resulting in the discomfort of sexual activity.

For subtotal hysterectomy maintaining the cervix of the uterus, although the vaginal structure does not change in theory, because of the reduction of sources of secretion and loss of secretion from the endometrium, as well as the loss of supporting function to women's orgasm from the contraction of uterine smooth muscles, the quality of sexual life will be affected to varying degrees [10]. Ayoubi [11] discovered from questionnaires that the quality of sexual life of 60.4% patients with hysterectomy did not change, and in 18.3% it was reduced; among them, the influence upon patients' sexual function from laparoscopic hysterectomy and vaginal hysterectomy is less than that from laparotomized hysterectomy. Additionally, some reports stated that there was no statistical difference in the quality of sexual life after hysterectomy and subtotal hysterectomy, which may derive from the surgical skills and patients' psychological factors [12].

Of course, the quality of sexual life is also related to the patient psychological factors. Therefore, before carrying out therapeutic measures, good communication with the patients should address the issues that may result

from anatomical and psychology postoperative changes to reduce patient distress; heteropathy, as well as professional psychological treatment should be sought, if necessary. For patients experiencing a margin of other therapeutic methods, humanized services, i.e., under the condition of reaching curative purpose, respecting the patient's will to select an alternative method, and including whether to undergo or not surgery, should be provided.

### Adnexectomy

The ovary is a major organ that maintains female endocrine activities and reserves a series of important functions in the human body. Estrogen is mainly produced by the ovaries; if ovarian activity is incomplete or lost, besides the influence upon normal sexual function, various disease symptoms due to low level of estrogen may follow, such as vasomotor dysfunction, osteoporosis, lipid metabolism disorder, cardiovascular diseases, sexual organ atrophy, etc., affecting the patients' quality of life.

#### 1) Bilateral adnexectomy

Existing research shows that among women's genitourinary tract tissues, there are estrogen receptors (ERs) in the cardinal and uterosacral ligaments, levator ani muscle, posterior vaginal fornix, and in the vaginal wall tissue; the strength of ER expression is influenced by the level of estrogen. Postsurgical research on the macaques with ovariectomy showed that the reduction of tension of elastic fibers of tissues on both sides of the vagina, including collagen, and levator ani muscle, causes the chhalasis of the pelvic floor tissues [13]. When bilateral adnexectomy is performed, hysterectomy is often carried out simultaneously; therefore, the prolapse of pelvic floor organs is more likely to occur. Due to the lack of estrogen, a series of symptoms, such as hyperhidrosis, hectic fever, emotional fluctuation, vaginal dryness, pain, etc., may take place, affecting the quality of postsurgical life [14].

#### 2) Benign ovarian diseases (cyst or tumor or other focuses), focus excision or unilateral adnexectomy

The factors which may affect ovarian blood circulation and function include: excessive removal of normal ovarian tissue, electrocoagulation after laparoscopic focus excision without suture, damage to cortex of the ovary, lesser amount of residual normal ovarian tissue due to heavy focus, too dense suturing of residual ovarian tissue, etc.

The following methods can be used to prevent or reduce such issues: (a) for the patient requiring bilateral ovariectomy: the surgical indications should be strictly managed to avoid excessive treatment; for the patient with single ovariectomy: hormonal replacement therapy should be prescribed; (b) for hysterectomy patients with

ovary preservation: the uterine tube and natural ligament should be spared as much as possible; for the young patient with uterine myoma, even if child-bearing has been completed, myomectomy should be performed according to the patient's will and preserve the uterus; (c) for the pre-menopausal patient with benign ovarian disease: focal excision should be performed while preserving normal ovarian tissue as much as possible, and special attention should be paid not to damage the hilus vessel of the ovary. While performing laparoscopic surgery, the suture method should be adopted as much as possible; when electrocoagulation is a necessary, it should be performed accurately to avoid treating an unreasonable large-area; the residual ovarian tissue should not be sutured too densely as long as hemorrhage has been arrested.

In summary, since the changes of pelvic anatomical relationships after gynecological surgery will have a negative influence of varying degrees in multiple aspects of a women's life, as well as bringing about several possible complications, clinicians should master the surgical indications, select the proper method, range, and approach, according to the patient's age and requests, as well as carefully access the disease type and severity. Surgery should be as minimally invasive as possible to achieve optimal therapeutic effects, while reducing the long-term associated diseases as much as possible, which will be beneficial to the patient's physical and mental health, as well as improving the quality of life.

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