

Progress of Chinese and Western Medicine Research on Chronic Pelvic Pain in Gynecology

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Abstract: Chronic pelvic pain is a syndrome of non-cyclical pelvic pain caused by a variety of causes lasting more than 6 months with organic or functional causes, which involves a wide range of systems, unclear etiology, complex species, high incidence, difficult diagnosis, and poor treatment, and seriously affects the quality of life of patients. Gynecologic factors are common causes among many etiologies. This article reviews the etiology, diagnosis and treatment of chronic pelvic pain caused by gynecological factors, with a view to providing a certain reference basis for the clinical diagnosis and treatment of chronic pelvic pain.

Keywords: Gynecology; chronic pelvic pain; endometriosis; pelvic adhesions

1. Introduction

Chronic pelvic pain (CPP) is a symptom, not a diagnosis, and refers to a syndrome of non-cyclical pelvic pain of organic or functional causes lasting more than 6 months caused by various reasons, and is a common symptom in women of clinical reproductive age, with the main symptoms being lower abdominal cramping, pain and lumbosacral pain, which intensifies before and after exertion, sexual intercourse and menstruation [1]. Chronic pelvic pain involves a wide range of systems, has an unclear etiology, is complex, has a high incidence, is difficult to diagnose, and has poor therapeutic effects, and seriously affects the physical and mental health of women. And gynecologic CPP accounts for about 90% of CPP, so the diagnosis of gynecologic CPP is a major challenge for all gynecologists [2]. Common gynecologic factors causing chronic pelvic pain include gynecologic pelvic inflammatory diseases, endometriosis, pelvic venous stasis syndrome, and pelvic adhesions [3]. Because of the insidious onset and complex etiology of chronic pelvic pain, current noninvasive examination methods are of limited value for definitive etiological diagnosis, making diagnosis more difficult and consequently treatment relatively tricky [4]. Understanding the etiology of chronic pelvic pain due to gynecological factors can help to correctly guide the treatment of this disease, improve the therapeutic effect and improve the quality of life of patients. In this paper, we review the etiology, diagnosis, and treatment of chronic pelvic pain due to gynecological factors in order to provide some reference basis for the diagnosis and treatment of chronic pelvic pain in clinical practice.

2. Etiology

About 90% of chronic pelvic pain is caused by gynecological factors (Table 1), with insidious onset, low consultation rate, complex etiology, and most noninvasive diagnostic methods fail to clarify the etiology, and the development of laparoscopic techniques has provided a deeper understanding of the etiology of gynecological CPP [2]. Among them, chronic pelvic inflammatory disease accounts for about 23%-30% of CPP, endometriosis accounts for about 25%-38%, followed by pelvic venous stasis syndrome and pelvic adhesions [5].

Table 1: Partial gynecological diseases

Disease	Clinical presentation	Diagnostic methods
Pelvic inflammatory diseases	Lower abdominal pain, aggravated by exertion or menstruation, etc.	Gynecologic examinations
Endometriosis	Secondary dysmenorrhea, progressive worsening, menstrual disorders, deep intercourse pain, etc.	Laparoscopy
Pelvic congestion syndrome	Irregular pain sites, congestive dysmenorrhea, deep intercourse pain, post-coital pain, and pain relief after prolonged standing	Pelvic Venography
Pelvic adhesions	Cramping and pain in the lower abdomen, aggravated by exertion or menstruation, etc.	Laparoscopy

2.1. Pelvic inflammatory diseases

Pelvic inflammatory disease is a common infectious disease in non-pregnant women and a major cause of pelvic pain, with a wide variety of pathogenic microorganisms and often associated with mixed infections, varying clinical symptoms, signs and severity, high diagnostic uncertainty, and irregular treatment, resulting in pelvic inflammatory disease that cannot be cured in a timely manner, has a high recurrence rate, and may cause other complications such as infertility. The pathogenesis is not yet fully understood, and may be related to inflammation causing abnormalities in the uterus, fallopian tubes, and ovarian travel, and the inflammatory response stimulates pelvic congestion and causes chronic pelvic pain [3]. Pelvic inflammatory disease often occurs after childbirth, infection following miscarriage or abortion, and impure sexual intercourse. The pain is a persistent dull or hidden pain, swelling, cramping or lumbosacral cramping in the lower abdomen, aggravated by exertion or menstruation, and often accompanied by increased leucorrhea and excessive menstruation. Diagnosis: gynecologic examination may palpate a striated thickening or a rasping pattern in one or both adnexal areas with mild pressure pain; in severe cases, a cystic mass of variable size and irregular shape may be palpated in the bilateral adnexal area or the posterior aspect of the uterus, which is inactive and mostly has pressure pain [2].

2.2. Endometriosis

Endometriosis (EMS) is a gynecological condition caused by active endometrial cells in a woman's uterus that are implanted in a location other than her endometrium [6]. The vast majority of patients with endometriosis have varying degrees of chronic pelvic pain. The main manifestation of endometriosis is secondary dysmenorrhea, which is progressively worse and often associated with menstrual disorders, deep intercourse pain, infertility, and intestinal or urinary tract symptoms. Endometriosis is a pelvic inflammatory process that causes a more complex mechanism of pain production, and nerve conduction is thought to be an important cause of chronic pelvic pain due to endometriosis [3].

The causes of chronic pelvic pain due to endometriosis [7] may be: (1) EMS patients mostly have pelvic adhesions, and their adhesion sites may form fibrous fasciculations that restrict the movement of their pelvic organs, resulting in pulling pain when they move. (2) The nerve fibers in the lesion sites of EMS patients produce impulse conduction, which can cause pain in their areas innervated by that nerve. (3) The pain caused by EMS caused by dysmenorrhea or painful intercourse can lead to central sensory hypersensitivity in patients, increasing their sensitivity to pain.

Diagnostic methods: (1) Cystic, inactive masses with light pressure pain in close adhesion to the uterus are palpated at one or both adnexa of the uterus on gynecological examination; painful nodules are palpated in the fundic ligament, lower part of the posterior uterine wall, and vaginal rectal septum [2]. (2) Laparoscopic diagnosis is the gold standard for the diagnosis of endometriosis, and blood CA125 and ultrasonography assist in the diagnosis.

2.3. Pelvic congestion syndrome

Pelvic congestion syndrome (PCS), also known as ovarian venous syndrome, is a gynecological disorder caused by poor blood flow from the pelvic veins, filling and stasis of the pelvic veins. Pelvic congestion syndrome is one of the main factors causing chronic pelvic pain. Premenopausal women are the main group of patients with pelvic congestion syndrome, which suggests that the occurrence of

pelvic congestion syndrome may be related to the decrease in the level of sex hormones in women [6]. Pelvic congestion syndrome is mainly characterized by irregular pain sites, congestive dysmenorrhea, deep intercourse pain, postcoital pain, and pain relief after prolonged standing. Diagnostic methods: (1) physical examination: mild deep pressure pain in the lower abdomen is the only positive sign in the abdominal examination of pelvic venous stasis syndrome; (2) gynecological examination signs are mostly inconspicuous and easily misdiagnosed as chronic pelvic inflammatory disease; (3) ultrasound is not very sensitive; (4) laparoscopic examination without inflammatory manifestations and organic lesions, with a slightly large spherical uterine body with a purplish-blue, florid surface and thickened pelvic veins like earthworms or in clusters. (5) Pelvic venography reveals dilated pelvic veins with slow evacuation of contrast, which is the main method to confirm the diagnosis [2].

2.4. Pelvic adhesions

Pelvic adhesions (pelvic adhesions) include uterine adhesions, fallopian tube adhesions, and ovarian and fallopian tube adhesions. Pelvic adhesions are a common postoperative complication in patients undergoing pelvic surgery and are one of the main causes of chronic pelvic pain. A study by J. Wei [8] found that pelvic adhesions are the third cause of chronic pelvic pain in addition to endometriosis and inflammatory pelvic diseases. A related study pointed out that performing pelvic surgery (especially open surgery) can cause damage to the patient's peritoneum, which can lead to fibrosis of the peritoneum and the formation of adhesions between the peritoneum and the surrounding organs, causing strain and irritation to the surrounding organs, which can lead to chronic pelvic pain. The adhesions cause damage to the organs and nerve impulses are transmitted to the central nervous system, which innervates the corresponding dermatomes to produce pain. Clinical information on the incidence of pelvic adhesions causing chronic pelvic pain is high, but it is not clear whether there is a causal relationship with the occurrence of chronic pelvic pain [3,6].

2.5. Chronic pelvic pain after gynecological surgery

Some studies [9] have suggested that injury to the inferior abdominal hypogastric plexus caused by childbirth, gynecological laparoscopic surgery, cesarean section, pelvic inflammatory diseases, and trauma and the resulting nerve reconstruction can lead to chronic pelvic pain by the following mechanisms(Figure 1) [10]: (1) the female genital organs are innervated by nerves originating from the pelvic plexus and inferior abdominal plexus; (2) nociceptive nerve fibers distributed in the uterus and vagina, whose nerve impulse generation and the nociceptive nerve fibers in the uterus and vagina are influenced by the reproductive state of the reproductive organs; (3) nerve impulses interact in different nerve conduction pathways; (4) the pelvic organs have the same nerve conduction pathways, and the functional states of different organs can interact with each other.

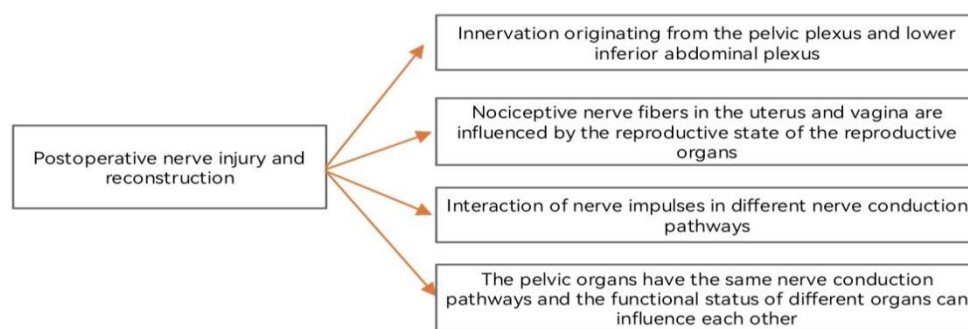


Figure 1: Possible mechanisms of nerve injury and reconstruction leading to chronic pelvic pain

2.6. Others

Uterine adenomyosis is the invasion of endometrium and its interstitial cells into the myometrium, forming foci locally. During menstruation, intermyometrial lesions release large amounts of prostaglandins and inflammatory mediators that stimulate or damage nerve endings, and massive bleeding from intermyometrial lesions can also stimulate abnormal contractions of the uterus and destroy uterine smooth muscle cells, resulting in chronic pelvic pain [11]. Chronic pelvic connective tissue inflammation is mostly secondary to severe cervicitis, which mainly manifests as congestion and

edema in the acute phase, and after developing as chronic inflammation the bilateral uterosacral ligaments and parametrial tissues are significantly thickened, which can cause the uterus to shift or deviate to one side, or restrict anterior and posterior movements, and patients experience lumbosacral or lower abdominal distension and pain, and chronic pelvic pain occurs [12]. In addition, uterine smooth muscle tumors and pelvic organ prolapse can likewise cause the development of chronic pelvic pain [3]. In addition hormonal changes, social factors, abuse and negative psychological traits are all associated with the development of chronic pelvic pain, but the exact mechanisms need to be further investigated [13].

3. Treatments

3.1. Western medicine

Currently, for the treatment of chronic pelvic pain, western medical treatment includes pharmacotherapy, surgery, physical therapy and psychotherapy. Drug treatment is mainly based on analgesic, hormonal drugs and psychotropic drugs. Since there are no specific therapeutic drugs for chronic pelvic pain, treatment methods are often difficult to completely improve the clinical symptoms of patients. (Figure 2)

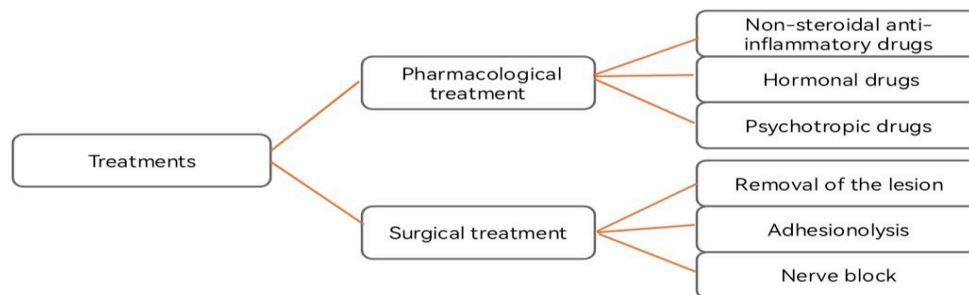


Figure 2: Treatments

3.1.1. Pharmacological treatment

3.1.1.1. Non-steroidal anti-inflammatory drugs

Non-steroidal anti-inflammatory drugs are commonly used as clinical analgesics, and the commonly used drugs include aspirin, diclofenac sodium, indomethacin, acetaminophen, etc. These drugs have the advantages of short half-life cycle, repeated use and light side effects, and clinical adverse effects are mainly gastrointestinal discomfort. In the clinical treatment of chronic pelvic pain, different NSAIDs are administered according to the patient's pain level in a stepwise manner, and different NSAIDs are selected in a targeted manner, and their combined application with opioids can enhance the analgesic effect of opioids and reduce the drug dosage [14].

3.1.1.2. Hormonal drugs

Clinically used hormonal drugs include progestins, gonadotropin-releasing hormone agonists, and levonorgestrel intrauterine extended-release systems. Gonadotropin-releasing hormone agonists can relieve pain by adjusting estrogen in a low state via the pituitary gland. Treatment of patients with chronic pelvic pain with progestins or estrogens may inhibit their ovulation, reduce the incidence of spontaneous uterine contractions, and block their prostaglandin synthesis, which in turn may relieve their pain [6]. The clinical adverse effects are possible breakthrough bleeding and breast tenderness.

3.1.1.3. Psychotropic drugs

Patients suffering from chronic pelvic pain are more likely to suffer from depression and anxiety, and the quality of sleep will be reduced when the condition worsens. Such patients can take oral psychotropic drugs to relieve depression and other problems.

3.1.2. Surgical treatment

3.1.2.1. Removal of the lesion

Chronic pelvic pain caused by endometriosis combined with pelvic masses should be treated surgically to remove the lesions visible to the naked eye and reconstruct the pelvic anatomy [15]. Meanwhile, surgical treatment of chronic pelvic pain caused by gynecological diseases such as uterine

fibroids and ovarian tumors can significantly improve chronic pelvic pain and reduce patients' suffering. Among them, conservative surgery, which involves removing as much of the lesion as possible and preserving its uterus and adnexa, the more completely the lesion is removed, the more significant the pain relief and the lower the recurrence rate, and this method is suitable for patients with reproductive needs [16].

3.1.2.2. Adhesionolysis

Adhesionolysis is recommended only after comprehensive treatment has failed, in order to eliminate or relieve pelvic pain [17]. However, adhesiolysis is prone to recurrence of pelvic adhesions, so laparoscopic adhesiolysis is considered for the treatment of chronic pelvic pain caused by severe pelvic adhesions in clinical practice [3].

3.1.2.3. Nerve block

Nerve block is the excision of the nerves of the anterior sacral and uterosacral ligaments, and both excisions are used to block pain transmission for the treatment of chronic pelvic pain [3]. Laparoscopic uterine nerve removal in patients with chronic pelvic pain can cut the uterosacral ligaments on both sides of the uterus, blocking the nociceptive nerve conduction pathways, which in turn can provide pain relief [6]. This method has a general therapeutic effect and causes more chances of injury, so it is not widely used clinically.

3.1.2.4. Nerve block therapy

During the development of chronic pelvic pain, repeated stimulation can induce pathological changes in the cells of the dorsal horn of the spinal cord, generating reverse action potentials, and nerve endings release substances and nerve growth factors that enhance the transmission of peripheral nociceptive signals to the center. It also induces ectopic electrical activity, which causes abnormal nerves to produce electrical activity in the absence of external stimulation, resulting in nociceptive hyperalgesia and sensory abnormalities. Therefore, nerve block therapy can be used as a third method for the treatment of chronic pelvic pain and dysmenorrhea. Nerve block therapy refers to the use of drugs or physical measures to block the conduction function of local sensory nerve fibers for the purpose of relieving or eliminating pain. The use of drugs, i.e. chemical nerve block therapy, involves the injection of local anesthetics or drugs that destroy nerve tissue into the nerve local to block or destroy the conduction function of nerve fibers to achieve temporary or long-lasting bouts of pain. When pharmacological and surgical treatments are ineffective or not preferred, nerve block therapy is a promising treatment [18].

3.1.3. Physiotherapy

Due to the fact that the causes of pain may be multifaceted, such as physical and psychological factors, therefore our treatment method should also adopt a multidisciplinary collaborative approach. The combination of various physical therapies has achieved good therapeutic effects on chronic pelvic pain. (Figure 3)

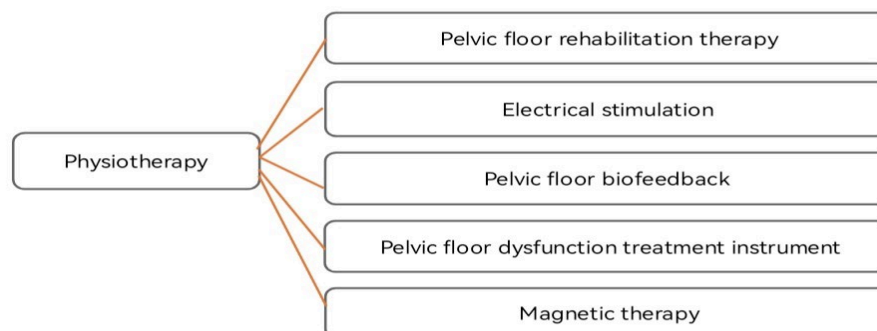


Figure 3: physiotherapy

3.1.3.1. Pelvic floor rehabilitation therapy

Pelvic floor rehabilitation therapy stimulates the patient's nerves and allows the muscles in the pelvic area to contract freely and be used scientifically, which in turn promotes normal blood flow [19].

3.1.3.2. Electrical stimulation

Local electrical stimulation can close the pain penetration gate and accelerate muscle contraction by

exciting the crude fibers, thus promoting blood circulation, reducing pelvic stasis, and promoting the reduction of pelvic inflammatory response for the purpose of improving chronic pelvic pain treatment. Meanwhile, electrical stimulation can activate endogenous morphine-peptide-ergic neurons in the brain and reduce pain by inhibiting prostaglandin secretion ^[20]. In addition, the electric current of electrical stimulation treatment can pass through the pelvic tissues and reduce pelvic pain symptoms.

3.1.3.3. Pelvic floor biofeedback

Pelvic floor biofeedback is an electronic biofeedback therapy instrument that converts information about pelvic floor muscle activity into auditory and visual signals through the vagina or rectum and feeds back to patients, allowing them to perform autonomous pelvic floor muscle training under the guidance of a physician, promoting the formation of conditioned reflexes, which in turn enhances the effect of pelvic floor muscle training and promotes pelvic floor muscle recovery ^[21].

3.1.3.4. Pelvic floor dysfunction treatment instrument

Not only far-infrared heat therapy function, but also magnetic field therapy function, infrared light and heat radiation can effectively promote local vasodilation, accelerate blood flow rate, improve local tissue nutritional status, and promote body microcirculation, thus enhancing body macrophage function and leukocyte function. At the same time, the heat therapy function of the pelvic inflammatory therapy instrument can effectively improve the efficacy of drugs, prolong the action time of drugs and promote pelvic blood circulation. And the magnetic field therapy of pelvic inflammatory disease treatment instrument can also make the drugs work better on the lesion and make the drug effect play to the maximum intensity ^[22].

3.1.3.5. Magnetic therapy

Magnetic therapy is a new treatment method, which is designed according to Faraday's law of electromagnetic induction, using a certain intensity of time-varying magnetic field to stimulate excitable tissues, thus generating induced currents in the tissues. Magnetic stimulation technique is easy to operate, safe, painless, noninvasive, noninvasive, and penetrating. The magnetic treatment range is deeper and wider, which can stimulate pelvic floor muscle contraction, promote pelvic floor blood circulation, increase the number of muscle fiber recruitment, relax the pelvic floor muscles, and correct muscle overactivity and dysfunction ^[23].

3.2. Traditional Chinese medicine

Chinese medicine does not have the name of chronic pelvic pain, and according to its symptoms, it is classified as "subterranean disease" and "abdominal pain in women". Some medical practitioners ^[24] believe that the main pathogenesis of this disease is the stagnation of dampness, which tends to block the qi mechanism, resulting in abnormal elevation of qi, stagnation of qi and blood stasis, and finally dampness and heat stasis, which leads to spleen deficiency and loss of transportation, and no source of qi and blood biochemical, resulting in the retention of the disease, lingering and recurrent attacks. (Table 2)

Table 2: Chinese Medicine Treatments

Chinese Medicine Retention Enema	It can unblock local blood circulation and accelerate the improvement of symptoms
Topical Chinese Medicine	Directly absorbed by the skin
Acupuncture Treatments	Improves local blood supply and circulation in the lower abdomen, pelvis and lumbosacral region
Chinese herbal collapse treatment	Relieving blood stasis and pain, unblocking the meridians
Pelvic Exercises	Regulates qi and blood and unblocks the meridians
Myofascial manipulation	Relieves muscle spasm, promotes blood circulation and improves tissue metabolism

3.2.1. Retention enema of Chinese medicine

Chinese medicine enema can be applied directly to the local area, which can directly reach the lesion and be absorbed through the rectum - inferior vena cava, reducing the first-pass effect of the liver and increasing the concentration of local blood medicine in the intestine. Local blood circulation can be unblocked, accelerating the improvement of symptoms and promoting inflammation. Or microwave irradiation can be used as an adjunct to treatment, using the biological tissue itself as the

internal heating of the heat source, with a certain degree of deep penetration after internal heating, directly improving local blood circulation [25].

3.2.2. External application of Chinese medicine

The external application of Chinese herbal medicine makes the drug directly absorbed by skin penetration, and it is easy to operate and has high patient compliance, which is useful for relieving the symptoms and psychological stress of patients with chronic pelvic pain [26].

3.2.3. Acupuncture treatment

Acupuncture treatment is mainly based on the identification of internal organs and meridians, and guided by the meridian theory, through acupuncture acupoints to balance yin and yang, regulate the internal organs, and unblock the meridians, which can improve the local blood supply and circulation in the small abdomen, pelvis, and lumbosacral area, and relieve or eliminate pain. And acupuncture or acupuncture combined with other therapies for chronic pelvic pain is effective, safe, and operable, and has certain advantages over surgery and drug therapy [27].

3.2.4. Chinese herbal collapse treatment

In the treatment of patients with chronic pelvic pain, Chinese herbal medicine can directly penetrate into the hairy orifices through the epidermis to resolve blood stasis and relieve pain and unblock the meridians, which has a better clinical effect.

3.2.5. Pelvic exercise

Based on the physiological structure and anatomical characteristics of the female pelvis, pelvic exercises, to a certain extent, gradually established a set of abdominal exercises based on the organic combination of Chinese medicine meridian theory and qi-blood theory, can achieve the effect of fitness while treating, and in the process of regulating qi-blood and unblocking the meridians, it helps to truly relieve pelvic adhesions and absorb pelvic inflammation, and helps to promote the realization of "no pain if you pass" and has the effect of analgesic treatment. At the same time, pelvic exercise is an aerobic exercise with abdominal breathing, which will strengthen the pelvic ligaments in particular by coordinating the movement of the whole body. Blood vessels and muscles, which in turn helps blood circulation, avoiding the production of lower limb veins and pelvic stasis, and helps absorb local stasis and inflammation, promoting a significant increase in local oxygen uptake, and a series of discomfort symptoms can be effectively improved, such as lumbosacral pain and lower abdominal cramping [28].

3.2.6. Myofascial manipulation massage

The use of muscle pulling method and deep pressure method can reduce neuromuscular excitation, relieve muscle spasm, promote blood circulation and improve tissue metabolism [23].

4. Summary

Chronic pelvic pain has complex etiology, involves more disciplines, and has various clinical manifestations. The clinic should pay attention to the questioning of medical history and comprehensive physical examination, pay attention to the differential diagnosis of gynecological factors and chronic pelvic pain caused by other systemic factors, treat the etiology to obtain better treatment efficiency, and adopt targeted and individualized treatment plan for patients with clear etiology. At present, the clinical unified treatment method about chronic pelvic inflammatory disease is usually given a combination of medication, surgical intervention, physical therapy and Chinese medicine characteristic treatment. Since the etiology of CPP can exist alone or in combination, multidisciplinary cooperation should be emphasized in the process of diagnosis and treatment.

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