

Current research on Chinese and Western medicine treatment of prolonged menstruation due to uterine scar diverticulum

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Abstract: The clinical symptoms of CSD are prolonged menstrual periods, which often last more than 7 d or even half a month. This not only causes great psychological burden to patients, but also significantly reduces the quality of life. With the opening of China's three-child policy, the rate of cesarean section is increasing year by year, and the number of cases of prolonged menstruation due to CSD is increasing. In recent years, many scholars have done a lot of clinical research on the application of Chinese medicine for the treatment of prolonged menstruation due to CSD, and have achieved more satisfactory results.

Keywords: uterine scar diverticulum; prolonged menstruation; Chinese and Western medicine therapy; review

1. Introduction

Uterine scar diverticulum (CSD) refers to the poor healing of the incision after cesarean delivery, with the local muscular layer thinning and the mucosa protruding outward to form a cavity, which is a major long-term complication of cesarean delivery, with endometrial congestion, lymphocytic infiltration and capillary dilation as the main pathological features. CSD is usually seen in women more than six months after cesarean delivery ^[1], and its incidence is as high as 20%-60% ^[2], with the incidence of CSD is increasing year by year with the opening of China's two-child policy and the increase of cesarean delivery rate ^[3]. At present, with the arrival of the national three-child policy, the cesarean section rate and the incidence of CSD will be on the rise. In clinical practice, morphological disruption of the lower uterine segment and local contraction disorders due to CSD can lead to localized retention of menstrual blood in the diverticulum and prolonged or incomplete menstruation, which is the main reason for consultation of CSD patients. 76% of patients with cesarean scar diverticula diagnosed by transvaginal ultrasound have prolonged and incomplete menstrual bleeding ^[4]. Several studies have found that the formation of CSD after cesarean section can cause prolonged periods ^[5-7]. CSD can lead to prolonged periods, abdominal pain, scar pregnancy, infertility, etc., and its possible scar pregnancy, uterine rupture, placental implantation, etc., will seriously affect the physical and mental health of women, and in serious cases, even life-threatening ^[8]. Prolonged periods due to CSD do not have a name in ancient Chinese medical texts, let alone a specific theory. It is named as "uterine incision pseudo-cavity", and according to its symptoms, it can be classified as "prolonged menstrual period", "leakage of blood" and other gynecological blood evidence in Chinese medicine for treatment.

2. Western medical understanding of prolonged menstruation due to CSD

2.1. Etiology and pathogenesis

Luo Wenxiang ^[9] et al. found that the formation of CSD may be related to the location of the lower uterine incision and its suturing method or suturing technique, endometriosis at the site of the cesarean incision scar, instruments and suture materials used to clamp the uterine incision, timing and number of cesarean deliveries, infection, multiple pregnancies, induction of labor with contractions, age, malnutrition and obesity, and other adverse habits such as smoking, alcohol, and even drug use.

Previous studies have found an association between dilated uterine orifices and the development of uterine scar diverticula [9-10], and a dilated cervix of more than 5 cm predisposes to the formation of CSD [11], in addition, comorbidities and complications during pregnancy may increase the risk of CSD [12]. Some studies [8] have also found that posterior uterus is twice as likely to develop CSD as anterior uterus, probably due to the posterior tilt and retroflexion of the uterus, which may lead to excessive tension at the incision site and poor local blood supply, thus affecting healing. [13] During labor, prolonged labor is usually due to large fetus, fetal position, birth canal or abnormal labor force, and the lower uterine segment is stretched longer and the uterine incision is easily selected too low, resulting in the incision close to the cervical tissue and less muscle tissue in this area, which is not conducive to the healing of the incision tissue.

Modern medicine believes that the possible causes of prolonged menstruation caused by CSD include four aspects, one is that although the diverticulum and the uterine cavity are connected, the activation of the scar at the lower end of the diverticulum hinders the drainage of menstrual blood, which in turn causes prolonged menstruation [14]; second is that the endometrium peels off periodically, while the uterine diverticulum has poor blood flow because of the scar, poor local tissue contraction and long recovery time, resulting in prolonged menstruation [15]; third is that the drainage of the diverticular cavity is relatively small. Fourth, if there is blood and fluid accumulation at the diverticulum, infection and bleeding may occur at the same time, which eventually leads to prolonged menstruation [16]; Complications and complications during pregnancy may increase the risk of scar diverticulum, which in turn leads to prolonged menstruation.

2.2. Prolonged menstruation due to CSD treated by Western medicine

Western medical treatment of CSD can be divided into pharmacological and surgical treatment.

2.2.1. Drug treatment

Drug therapy is a relatively new concept of treatment, mainly hormonal treatment, hormonal treatment is mainly to regulate menstruation, there are oral short-acting contraceptive pills, levonorgestrel intrauterine device (LNG-IUS). Contraceptive drugs have a repairing effect on the human endometrium, improve the blood circulation in the diverticulum, and promote the simultaneous development and peeling of the endometrium of the diverticulum and the uterine cavity to improve the symptoms of prolonged menstruation. [17] In a study by Tahara et al. [17], 0.05 mg of estrogen and 0.5 mg of progestin were administered orally to observe the effectiveness of the treatment of CSD, and the patients' symptoms were significantly relieved. The patients' symptoms were significantly relieved. The treatment with levonorgestrel intrauterine device (LNG-IUS) is also a type of hormonal therapy, which improves or eliminates the existing symptoms by releasing a constant amount of progestin in the uterine cavity and thus inhibiting endometrial hyperplasia, resulting in a significant reduction in bleeding time and even amenorrhea. [18] Compared with oral hormonal drugs, Mannaile is more effective and more acceptable to patients [19]. Pang Qiushi et al. [20] found that drug therapy could shorten the duration of menstruation in patients with uterine scar diverticula, but since the diverticula did not disappear, the possibility of recurrence after discontinuation of oral drug therapy alone was high. The application of mannitol after 3 to 6 months of oral drospirenone ethinyl estradiol tablets (II) can better relieve patients' clinical symptoms and reduce the incidence of irregular vaginal bleeding. This regimen can be used for patients without fertility requirements or those who refuse surgical treatment. Some studies [21] also suggest that the occurrence of CSD is largely related to the intestinal blood flow rate, and by decreasing the intestinal blood flow rate, it can allow sufficient time for healing and improve the symptoms it causes.

2.2.2. Surgical treatment

Currently, the surgical procedures for the treatment of CSD include: total hysterectomy, abdominal uterine scar diverticulectomy, transvaginal diverticulum repair, hysteroscopic diverticulotomy, hysteroscopic diverticulotomy and suturing, and hysteroscopic diverticulum folding and suturing.

(a) Diverticulectomy: transvaginal, transabdominal, transabdominal, combined hysteroscopic and laparoscopic options are available.

Transvaginal treatment of PCSD has been reported to be 92.9% effective [22] and is an effective, less invasive and faster recovery modality. Some studies [23] found that transabdominal CSD resection has been gradually replaced by other better surgical procedures due to its high injury and slow recovery. It

has been suggested that laparoscopy provides fuller exposure of the surgical field, more complete removal of the lesion, and satisfactory treatment results [24]. Combined laparoscopic and transvaginal surgery reduces the risk of bladder injury, provides complete removal of the lesion, and allows better suturing, but is less commonly used clinically because of its high cost.

(b) Diverticuloplasty: Hysteroscopic diverticuloplasty can reduce the formation of intra-diverticular secretions, promote the flow of menstrual blood and diverticular accumulation, and improve clinical symptoms such as dripping menstruation. The effectiveness of hysteroscopic diverticuloplasty in improving symptoms varies from 59.6% to 100% [24], and its effectiveness and feasibility of treatment have been confirmed [25].

(c) Hysterectomy: Hysterectomy can be considered for older women with no reproductive requirements, heavy clinical symptoms, ineffective drug control, poor financial situation, and poor follow-up compliance to achieve the goal of eradicating CSD and completely eliminating clinical symptoms.

3. Chinese medicine understanding of prolonged menstruation due to CSD

Prolonged menstruation due to uterine scar diverticulum is not documented in traditional Chinese medicine and is a new disease due to surgical trauma in modern medicine. It can be classified as "prolonged menstruation", "excessive menstruation", "menorrhagia" and "intermenstrual bleeding" according to the clinical manifestations of the patient. It can be classified as "prolonged menstruation", "excessive menstruation", "menorrhagia" and "intermenstrual bleeding".

3.1. Etiology and pathogenesis

Various modern TCM schools broadly classify the TCM evidence of prolonged menstruation due to CSD into four types: qi deficiency and blood stasis, qi and blood deficiency, liver depression and damp heat, and yin deficiency and blood heat. The etiology can be described as follows: surgical damage to the uterus and loss of control of menstrual blood. The main causative factors are attributed to deficiency, stasis and heat. According to the "General Records of Shengji", "A woman's pure yin is based on blood, and qi is used for the next month's affairs." The patient suffers from deficiency of qi in the body or excessive blood loss during cesarean section. Due to the attachment of qi and blood, the positive qi also disappears with postpartum blood loss. The deficiency of qi is unable to heal the uterine incision damaged by the golden blade, which is left as a diverticulum for a long time. The deficiency of qi is unable to absorb blood, and the blood does not follow the meridians, not falling from time to time; During cesarean section, the golden blade is injured, the wound repair is too slow, blood stasis remains as blood stasis, accumulates in the wound, corrodes into a false cavity, and blood stasis remains in the interior, not from time to time; "Qi deficiency leads to the inability of blood stasis to dissipate, while blood stasis leads to a greater deficiency of qi due to its consumption. Qi deficiency and blood stasis are mutually harmful consequences. Wounds that do not collect produce diverticula, and blood does not follow the meridians, rather than the current situation." Also because the patient cesarean delivery for heat invasion, postpartum weakness, heat with blood stasis stay in the wound, burning the uterus meridians, gradually into a depression defect; or because of gas deficiency and blood stasis, diverticulum has become, the patient's body weakness infection heat, direct invasion of the uterus, hiding in the diverticulum cavity chaos, heat forced blood flow, untimely and down. Therefore, deficiency, blood stasis and heat are the cause and effect of each other, hiding and fighting in the uterus, cooperating to disturb the recovery of the cesarean incision and the normal operation of Qi and blood in the uterus, resulting in the formation of scar diverticulum and prolonged menstrual period.

3.2. Prolonged menstruation due to CSD treated with TCM

3.2.1. Specialized prescription treatment

Yuan Shuo [24] et al. used the Tongxin-gong method to treat the prolonged menstruation caused by CSD. The treatment followed the nature of regular hiding of diarrhea in the uterus and applied the Tongxin-gong method during the menstrual period to treat the prolonged menstruation in CSD. If the prolonged menstrual period is accompanied by a small amount of menstruation and it is difficult to clean the drops, the method is to pass the menstruation; the medication is started when the menstruation comes, and the method is to activate the blood and pass the menstruation during the menstrual period, and the commonly used drugs are: Salvia miltiorrhiza, Paeonia lactiflora, Peach kernel, Safflower,

Motherwort, Zelenia, Angelica sinensis, Niubizi, Citrus aurantium, etc. For prolonged menstruation with excessive menstruation, the method is to remove blood stasis and stop bleeding; the medication is started at the onset of menstruation, and the method is to remove blood stasis and stop bleeding during menstruation. Wang Yuexing et al. [25] used Yanghe Tang with addition and subtraction to support the righteousness and warm the yang, protect the cell and create a new one, and benefit the qi and transport the spleen to treat the uterine scar diverticulum, so that the blood can be enriched, the cold stagnation and stagnation can be removed, and the uterine scar diverticulum can be healed, which has achieved good clinical results. Chen Wenjun et al. [26] studied that after combined hysteroscopic resection of CSD, patients were given Sanhuang Lintang Tang to benefit Qi, clear heat and dampness, cool blood and eliminate stasis to stop bleeding, which could further shorten the number of days of menstruation, increase the thickness of scar muscle layer and improve clinical symptoms. Lan Meiping [27] found that in the treatment of prolonged menstruation caused by CSD, the total effective rate of the treatment group with Gu Chong Tang combined with Lost Smile San was 93.0% (40/43) than that of the control group treated with Adrenochrome tablets 62.8.0% (27/43), the difference was statistically significant ($P<0.05$); the number of days of prolonged menstruation in the treatment group was significantly lower than that in the control group ($P<0.05$). This proves that Gu Chong Tang combined with Lost Smile San can significantly improve the total efficiency of treatment for prolonged menstruation caused by CSD and reduce the number of days of prolonged menstruation, which is worth promoting. Li Zhihui [28] A retrospective analysis of the clinical data of 80 patients with incisional diverticulum was done, and they were divided into observation group and control group (40 cases each) according to the different treatment modalities. The total effective rate of the treatment in the observation group (97.50%) was significantly higher than that in the control group (82.50%), and the difference was statistically significant ($P<0.05$), and the duration of menstruation and the area of false cavity were significantly reduced in the observation group after treatment compared with the control group, It is worthy of clinical promotion because of its significant efficacy and safety.

3.2.2. Staged treatment

Tao Weijuan et al. [29] summarized Professor You Zhaoling's treatment principle of benefiting qi, removing blood stasis, clearing heat and detoxifying, and astringing the blood in the uterus. In the second half of the menstrual period, i.e. from the 4th day of menstruation, Prof. You will give the Chinese medicine soup You's Four Flowers Tang plus or minus, to stop the blood in the uterus. After the menstrual period, Prof. You will take the pelvic inflammatory pills to detoxify and dispel the evil.

3.2.3. Internal and external treatment

Ouyang Xia et al. [30] 70 patients with prolonged menstruation due to CSD after cesarean section were randomly divided into 35 patients in the treatment group and 35 patients in the control group, and the treatment group was treated with biochemical menstrual reduction pellets and auricular acupuncture therapy, while the control group was treated with mafron. The differences were statistically significant ($P<0.05$) when comparing the number of days of menstruation in the first month, the sixth month and the first month of the control group with those before treatment; the differences were statistically significant ($P<0.05$) when comparing the number of days of menstruation in the first month and the sixth month after treatment. It is proved that the treatment of prolonged menstruation caused by CSD with biochemical menstrual reduction pellets and auricular acupuncture therapy can effectively shorten the menstrual period and promote the healing of diverticula, with low recurrence rate.

4. Conclusion

The effectiveness of Chinese medicine in treating CSD with prolonged menstruation is remarkable, and it can improve clinical symptoms and restore normal menstruation with a low recurrence rate, which is agreed by many medical practitioners. However, due to the different purposes of clinical research, small sample size, the wide selection of prescriptions and various treatment methods, further research is still needed to more fully play the role of guiding clinical treatment, while the clinical evidence needs to be flexible and adaptable, know the method but not the prescription, pay attention to clinical observation and be good at summarizing experience.

References

[1] Zhong YH, Zhang Q. Professor Zhang Qin's experience in treating prolonged menstruation due to uterine incisional diverticulum [J]. *Journal of Zhejiang University of Traditional Chinese Medicine*,

2016, 40(3):203-205.

[2] Zhang Y. A comparative study of transvaginal repair and laparoscopic repair in the management of patients with previous cesarean scar defect [J]. *J Minim Invasive Gynecol*, 2016, 23(4):535-541.

[3] CARAULEANU A, LUPAŞ CU I A, CĂRĂULEANU D M, et al. Clinico- epidemiological study of endometrial hyperplasia- a risk factor for the development of endometrial carcinoma?[J]. *Rev Med Chir Soc Med Nat Iasi*, 2015, 119(1): 154-161.

[4] Dai Qing. Revisiting the application of ultrasound in the evaluation of cesarean delivery scar and scar diverticulum[J]. *Chinese Journal of Ultrasound in Medicine (electronic version)*, 2014, 11(10): 778-781.

[5] Pomorski M, Fuchs T, Zimmer M. Prediction of uterine dehiscence using ultrasonographic parameters of cesarean section scar in the nonpregnant uterus: a prospective observational study [J]. *BMC Pregnancy Childbirth*, 2014, 14: 365-372.

[6] Wang YH, Ma L, Kan YM, et al. Structural characteristics of scar diverticula after cesarean section and analysis of its risk factors observed by transvaginal ultrasound[J]. *Journal of China Medical University*, 2016, 45(02):158-161.

[7] Yao Shuzhong, Zhang Huanxiao. Emphasis on the diagnosis and management of distant complications of cesarean incision[J]. *Chinese Journal of Practical Gynecology and Obstetrics*, 2018, 34(08): 833-837.

[8] Wang S, Duan H. Mechanism of formation and diagnosis of cesarean scar diverticula[J]. *Chinese Journal of Practical Gynecology and Obstetrics*, 2018, 34(8):858-861.

[9] Pomorski M, Fuchs T, Rosner-Tenerowicz A, et al. Standardized ultrasonographic approach for the assessment of risk factors of incomplete healing of the cesarean section scar in the uterus[J]. *Eur J Obstet Gynecol Reprod Biol*, 2016, 205:141-145.

[10] Riitta M, Antila-Långsjö RM, Mäenpää JU, et al. Cesarean scar defect: a prospective study on risk factors[J]. *Am J Obstet Gynecol*, 2018, 219(5):458.

[11] Uppal T, Lanzarone V, Mongelli M. Sonographically detected caesarean section scar defects and menstrual irregularity[J]. *J Obstet Gynaeco*, 2011, 31(413-416).

[12] Pang Q.S., Cheng L.H., Wang J., et al. Analysis of risk factors for prolonged menstruation after cesarean section[J]. *Journal of Practical Obstetrics and Gynecology*, 2021, 37(11):835-838.

[13] Feng Peiming, Wang Xiaoyan, Li Bo, et al. Clinical analysis of factors influencing the formation of cesarean scar diverticula and the treatment effect of hysteroscopic combined with laparoscopic surgery[J]. *Journal of practical obstetrics and gynecology*, 2019, 35(11):860-864.

[14] Tower AM, rishman GN. Cesarean scar defects: an under recognized cause of abnormal uterine bleeding and other gynecologic complications[J]. *J Minim Invasive Gynecol*, 2013, 20(5):562-572.

[15] Su Cuihong, Li Xiaotian. Advances in the treatment of uterine incisional diverticulum in cesarean delivery[J]. *Journal of Practical Obstetrics and Gynecology*, 2013, 29(4):262-264.

[16] Huang M, Zhuang YZ, Fang WY, et al. Evaluation of the efficacy of transvaginal uterine scar diverticulectomy in 44 cases[J]. *Chinese and Foreign Medical Research*, 2019, 17(34): 151-153. DOI: 10.14033/j.cnki.cfmr.2019.34.064.

[17] Tahara M, Shimizu T, Shimoura H. Preliminary report of treatment with oral contraceptive pills for intermenstrual vaginal bleeding secondary to a cesarean section scar[J]. *Fertil Steril*, 2006, 86(2): 477-479.

[18] Ou YC, Chen YY, Lan KC, et al. Levonorgestrel intrauterine system for the treatment of intermenstrual spotting in patients with previous cesarean delivery scar defect[J]. *J Obstet Gynaecol Res*, 2022, 48(1):155-160.

[19] Irvine GA, Campbell-Brown MB, Lumsden MA, et al. Randomised comparative trial of the levonorgestrel intrauterine system and norethisterone for treatment of idiopathic menorrhagia[J]. *Br J Obstet Gynaecol*, 1998, 105(6):592-598.

[20] Pang QS, Cheng LW, Wang J, et al. Analysis of the efficacy of pharmacological treatment of uterine scar diverticulum after cesarean section[J]. *Electronic Journal of Practical Gynecological Endocrinology*, 2021, 8(02):51-54.

[21] Fu Liefeng. Causes of scarred uterine incision diverticulum formation and management countermeasures[J]. *Electronic Journal of Clinical Medicine Literature*, 2017, 4(42):8315-8316.

[22] Diaz-Garcia C, Estelles JG, Escriva AM, et al. Scar abscess six years after cesarean section: Laparoscopic and hysteroscopic management[J]. *J Minim Invasive Gynecol*, 2009, 16(6): 785-788.

[23] Chang Y, Tsai EM, Long CY, et al. Resectoscopic treatment combined with sonohysterographic evaluation of women with postmenstrual bleeding as a result of previous cesarean delivery scar defects[J]. *Am J Obstet Gynecol*, 2009, 200(4):370-371.

[24] Yuan Shuo, Qiu Jiahan, Deng Gaopi. Treatment of prolonged menstruation caused by uterine scar diverticulum by Deng Gaopi using Tongxin General Method[J]. *Journal of Chinese Medicine*, 2021,

36(11): 2368-2371.

[25] Wang Yexing, Fu Ping. *Fu Ping's experience in the treatment of uterine scar diverticulum using Yanghe Tang [J]. New Chinese Medicine, 2021, 53(02):29-31.*

[26] Chen WJ, Lu DH. *Clinical efficacy of San Huang Ligustrum Tang in promoting postoperative scar repair in patients with uterine scar diverticulum [J]. China Maternal and Child Health Care, 2021, 36(15): 3422-3425.*

[27] Lan Meiping. *Clinical efficacy of Gu Chong Tang combined with Lost Smile San in the treatment of prolonged menstruation in scarred diverticula [J]. Inner Mongolia Traditional Chinese Medicine, 2021, 40(01):20-21.*

[28] Li Zhihui. *Comparative analysis of clinical efficacy of Ginseng Astragalus Sihua Tang and Ma Fu Long in the treatment of prolonged menstruation due to uterine incision diverticulum [J]. Sichuan Traditional Chinese Medicine, 2017, 35(10):120-122.*

[29] Tao WJ, Ding Q, Liu W. *You Zhaoling's experience in the treatment of uterine incisional pseudocavity with prolonged menstruation [J]. Hunan Journal of Traditional Chinese Medicine, 2017, 33(07): 36-37.*

[30] Ouyang X, Luo ZJ. *Clinical observation of 35 cases of prolonged menstruation due to uterine scar diverticulum treated with Chinese herbal formula combined with auricular acupoint therapy[J]. Hunan Journal of Traditional Chinese Medicine, 2016, 32(06):64-66.*