

Experience in Surgical Coordination of Type III Cesarean Scar Pregnancy Removal with Combined Assistance of Hysteroscopy and Laparoscopy

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Abstract: *Objective:* This paper aims to summarize the operative nursing coordination essentials of type III cesareans car pregnancy removal. *Methods:* Six patients were recruited for this study, and the patient's condition was fully evaluated before the operation. In addition, the personnel, environment, and materials were well prepared before the operation, and the preparation of special intraoperative instruments and equipment was perfected. *Results:* The operation is successfully performed in all six patients. Each surgery lasted 70 to 120 minutes with an average duration of 90 minutes. Postoperative blood loss was about 100-500 ml. Postoperative recovery was good without complications in all the patients. *Conclusion:* In summary, laparoscopic removal of gestational tissue from type III cesareans car pregnancy in conjunction with hysteroscopy ensures complete removal of gestational tissue, while avoiding damaging the surrounding organs and tissues, thus greatly avoiding common complications which usually occur during the surgery. Effective surgical coordination is helpful to further improve the success rate of the operation.

Keywords: Cesarean scar pregnancy (CSP); Hysteroscopic assistance; Surgical coordination; Gestational tissue

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1. Introduction

In recent years, with the comprehensive implementation of the family planning policy, the cesarean section rate in women of childbearing age is extremely high. The number of women with second pregnancy after cesarean delivery increased sharply, and the incidence of cesarean scar pregnancy (CSP) exhibits a significant rising trend. According to foreign reports, the incidence of CSP among women with a history of cesarean section is 1 in 2500 to 1 in 1800 pregnancies. According to domestic reports, the incidence of CSP is 1 in 2221 pregnancies, accounting for 1.05% of ectopic pregnancy [1-3].

CSP is a relatively new type and a rare form of ectopic pregnancy which happened at the scar region forms from previous cesarean delivery, resulting in the implantation of a blastocyst within myometrial scar tissue in the anterior lower uterine segment. It is a long-term complication after a cesarean section. Studies have shown that poor muscle healing at the uterine incision scar after cesarean section, which forms a wide uterine scar diverticulum, or the formation of tiny pores in the incision scar under the action of inflammatory factors, may contribute to the development of CSP. A fertilized egg that moves too fast or is underdeveloped does not have a good implantation capacity when it passes through the uterine cavity. CSP may develop when the fertilized egg reaches the scar and enters the myometrium through the tiny pores for implantation. Abnormal vaginal bleeding after cessation of menstruation, with or without lower abdominal pain is the most common clinical manifestation. Indeed, some patients do not show typical clinical manifestations and

symptoms. If it is misdiagnosed as a common intrauterine pregnancy and blindly undergoes an abortion, the patient is susceptible to massive hemorrhage that is difficult to control effectively during operation. In a worse situation, the uterus may need to be removed by surgery. Therefore, doctors should be highly vigilant about the possibility of CSP in women with a second pregnancy after cesarean delivery in clinical. Once diagnosed with CSP, the pregnancy should be terminated as soon as possible. However, traditional dilation and curettage have significantly increased the risk of direct damage to the scar, massive bleeding, and uterine rupture^[4]. At the same time, it is more likely to result in a hysterectomy, which affects women's reproductive health and endangers their lives in serious cases. In type III CSP, (1) the gestational sac usually implants completely in the muscular layer at the uterine incision scar and protrudes toward the bladder; (2) the uterine cavity and cervical canals are often empty; (3) the myometrium at the scar is significantly thinner (with a thickness ≤ 3 mm) or absent; and (4) if transvaginal surgery is done, it is prone to massive bleeding, which cannot be controlled effectively during the surgery, and may even require hysterectomy.

There are few reports on the surgical options and nursing coordination in these patients. How to complete the perioperative nursing preparation, ensure tacit operative cooperation and the smooth implementation of surgery, avoid surgical complications as much as possible, and improve the success rate of the surgery has become a huge challenge facing surgical nurses. From January 1, 2020 to January 1, 2023, six patients with type III CSP successfully underwent the laparoscopic removal of uterine scar pregnancy assisted by hysteroscopy in our hospital with good clinical results.

2. Perioperative nursing

2.1. Preoperative visit

The day before the operation, operating room nurses should fully familiar with the medical record, understood the patient's previous medical history, history of present illness, and the results of various routine examinations, as well as the patient's preoperative basic information and problems in nursing. Through the preoperative interview, we found that the biggest psychological stress facing by the six patients before the surgery was "anxiety and worry about the impact of the disease to their health and fertility." CSP may injure the bladder during excision with a risk of massive bleeding. Therefore, we conducted targeted specialist education knowing the patient's concerns. We walked them through the procedures, told them about the techniques that we use to avoid complications, and that the surgeons are quite experienced and have conducted many surgeries successfully in the past. We introduced the operating room environment to the patients, and showed them the workflow from the time the patient enters the operating room until before anesthesia, i.e., pre-operative safety check by the surgeon, the anesthesiologist, and operating room nurses, signing of anesthetic consent, venipuncture, body positioning (while completing limb function assessment). We told them that they would be under anesthesia during the operation, that the anesthesiologist would adjust the dosage of drugs according to the needs of the operation and the patient's vital signs, and that the whole process of monitoring would ensure that the patient receives the operation safely and painlessly, as well as how should patients cooperate during the postoperative anesthetic period to get through the recovery. We did our utmost to enhance patients' sense of trust and security, and relieve their perioperative tension and anxiety, thus enabling them to cooperate in the surgical treatment and nursing with an optimistic attitude.

2.2. Preoperative discussion

The operating room nurses took the initiative to participate in the preoperative discussion of the gynecologist team. We fully understood the conception of the surgeons, and get familiar with the surgical steps. We made the final confirmation of the patient's preoperative preparation such as the signing of surgical consent, preoperative hair removal, surgical medication instructions, preoperative blood allocation, preoperative fasting, and preoperative education. According to the discussion and the needs of the surgeon,

the circulating nurse discussed with the head of the operating room specialist and the head nurse about the manpower arrangement, the preparation of special equipment and materials, and the emergency cooperation process of intraoperative emergencies.

2.3. Preoperative coordination

2.3.1. Personnel preparation

Medical staff in the operation including the anesthesiologist, the nurse anesthetist, the surgeon, 3 assistant doctors, the scrub nurse (who are familiar with all kinds of difficult and critical surgery cooperation in gynecology), and the circulating nurse (senior specialist nurses). All surgical team members participated in the preoperative discussion, familiarized themselves with the patient's situation and the surgical plan, and identified the surgical risks.

2.3.2. Environment, goods, and equipment preparation

The proposed surgical procedures before surgery are as follows: Initially, a hysteroscopy is performed to have a grasp of the location of retained products of conception, and then pelvic adhesion release and removal of the uterine scar pregnancy are performed by laparoscopy. Therefore, various equipment and materials are required. On the day of the operation, the circulating nurse should complete the environment arrangement and materials preparation 30 minutes before accepting the patient into the operating room. The bed unit should be pre-insulated in advance, and the disinfectant, dilatation liquid, peritoneal washing liquid, and rehydration liquid for operation should be placed into the warm tank in advance. It is essential to reconfirm that the operating bed, postures, electrosurgical equipment, camera system, etc. are in good condition and in standby condition. The endoscopy (hysteroscope, 30-degree laparoscope) includes hysteroscope (vaginal speculum, cervical forceps, curet, uterine probe, cervical dilator of different sizes, abortion aspirator, etc.); surgical instruments include common instruments (towel clips, pneumoperitoneum needles, knife handle, sponge forceps, etc.), laparoscopic special instruments (elastic separating plier, non-invasive ureteral forceps, stomach clamp, various types of hemostatic clamps, endoscopic needle holder, etc.), and disposable consumables (No. 11 sharp blade, 3 to 4 sets of puncture instrument, endoscope yarn strip, double channel catheter, injection syringe, urine bag, 2-0/3-0 absorbable sutures, various types of vascular sutures, and methylene blue solution); hemostatic materials such as ultrasonic knife, bipolar electric coagulation forceps, hemostatic clamps, etc. are sufficient in quantity, intact in packaging, effectively sterilized, and within the validity period.

2.3.3. Intraoperative coordination

First, the hysteroscopy was performed to determine the shape and size of the uterine cavity, and the location and size of the gestational tissue. Then, a laparoscopic exploration was performed to determine the site of the scar pregnancy lesion and its adhesion to the surrounding tissue. The surgeon separated the ovaries and pelvic wall on both sides with an ultrasonic knife, opened the anterior lobe of the ligament to find the internal iliac artery and uterine artery on both sides, and identified the ureter, and lastly cut the uterine artery with a hemostatic clamp. The vesicouterine pouch was opened from the left and right sides, if the bladder is found to be closely attached to the lesion during the process, it should be filled with normal saline, the uterus should be lifted and the bladder should be pushed down with the manipulator to expose the scar pregnancy lesion, then the ultrasound knife is used to cut the scar into the uterine cavity and remove the gestational tissue. After thorough hemostasis, the wound was sutured continuously with 2-0 absorbable thread, and the incision was sutured by locking. Examination: There was no active bleeding spot on the bladder wound, and the methylene blue test was performed. The peritoneum was sutured, the wound was stopped by electrocoagulation, the pelvic cavity and abdominal cavity was completely washed, and no

bleeding was seen. A hysteroscopy was performed again to confirm that the gestational tissue in the uterine cavity was completely cleared and there was no bleeding. The operative materials were checked and the abdomen was closed after the operation.

3. Discussion

In type III CSP, (1) the gestational sac usually implants completely in the muscular layer at the uterine incision scar and protrudes toward the bladder; (2) the uterine cavity and cervical canals are often empty; (3) the myometrium at the scar is significantly thinner (with a thickness ≤ 3 mm) or absent; and (4) if transvaginal surgery is done, it is prone to massive bleeding, which cannot be controlled effectively during the surgery, and may even require a hysterectomy. Therefore, once diagnosed, the CSP should be terminated as soon as possible. The principles of the treatment are as follows: under the premise of ensuring the life safety of patients, we will control bleeding, remove the lesion, and preserve the reproductive function of patients. Studies have shown that hysteroscopy in conjunction with laparoscopy has an irreplaceable role in the treatment of type III CSP compared with hysteroscopy alone or uterine artery embolization with curettage, which integrates the advantages of both for further diagnosis, reduction of bleeding, removal of the lesion, and evaluation of the suture effect after the laparoscopic scar repair. It has the advantages of safety, effectiveness, short operation time, less bleeding, fast recovery, shorter hospital stays, etc. Meanwhile, patients' reproductive function preserved with these procedures, may reduce the risk of uterine rupture in patients with CSP who have a demand for re-birth and a thin muscle layer at the scar [6-7].

Based on this case, the medical group discussed and concluded before the operation that there is a risk of intraoperative uterine and bladder rupture, which may even cause massive hemorrhage and endanger the patient's life if not handled promptly. Therefore, the patient's perioperative safety poses a higher challenge to nursing care. The cooperation of the paramedics in the operating room in this type of surgery is particularly important.

The preoperative tripartite safety check reconfirmed the recent relevant imaging data and the patient's readiness, such as whether deep venipuncture was established for emergency transfusion to avoid the uterine and bladder rupture; a hysteroscopy and a laparoscopic exploration were performed before surgery, combined with preoperative B-ultrasonography to comprehensively understand the implantation position of the gestational sac and the vulnerable part of the uterus, to achieve targeted and successful operation; circulating and scrub nurses should understand the surgical procedures before surgery, and prepare the corresponding equipment and instruments in advance to prevent the delay of rescue during emergencies, including the establishment of unobstructed venous access before surgery, the preparation of surgical materials, and the signing of the blood transfusion consent and blood allocation order. Since type III CSP is characterized by a gestational sac that often lies completely in the myometrium of the uterine incision scar and protrudes toward the bladder, the separation of the peritoneum of the bladder from the uterus is the key to the procedure. To expose the uterus as wide as possible without damaging the bladder, we need to prepare the lifting cup in advance, leave a urinary catheter in place, fill the bladder with melphalan solution if necessary to facilitate the separation of the peritoneum, and confirm that there is no leakage of urine from the bladder after separation. And, because the gestational sac was embedded next to the bladder, the ureter was closely associated with the uterine artery even in normal anatomy. The surgeon has to open the anterior lobe of the broad ligament on the affected side and the peritoneal reflection of the bladder and push down on the bladder to separate and ligate the uterine artery and free the ureter to the entrance of the ureteral tunnel to avoid damage to the uterine artery and ureter, and ultimately, avoid complications.

The development and implementation of a rational surgical plan are important, as well as the impact of patients' perioperative anxiety on their recovery. At present, with the transformation of the bio-psycho-

social medical model, human health and diseases are affected by biological factors, and are closely connected with psychological factors. Study by Li^[8] suggests that apart from improving the satisfaction of patients, the implementation of a series of humanistic care for perioperative patients and patients in the intensive care unit reduces patients' psychological pressure, and prompts them to cooperate in the treatment positively. We found from the patient during their preoperative visit that they are more worried about the complications of surgery than the pain caused by surgery, such as massive bleeding of the uterus and bladder resulting from surgical injury, bladder injury, and even afraid that it may affect the fertility function. We established a good trust relationship with the patient through psychological intervention during the perioperative period, and an explanation of accessible surgical knowledge, and also encouraged the patient to express their feelings in the whole process. We provided the patient with information about treatment and prognosis, and helped them by clarifying misconceptions. The patient's mental stress is relieved, encouraging them to cooperate with medical treatment and care throughout the perioperative period, which may accelerate postoperative rehabilitation.

The laparoscopic removal of the CSP requires comprehensive nursing by nurses before, during, and after the operation to ensure the safety and effectiveness of the operation. The results of this study indicate that the laparoscopic removal of CSP is a safe and effective treatment with a good postoperative recovery, which is recommended to be applied in clinical treatments.

The success of the operation is inseparable from the tacit cooperation of operation and nursing. Only when the paramedics have a comprehensive understanding of the surgical plan formulated by the operator and the possible emergencies during the operation, have formulated a contingency plan in advance, and have a comprehensive assessment and adequate preparation of all factors of human, machine, material, method, and environment, coupled with the close monitoring of the patient by the anesthesia and nursing team during the operation, can the operation be completed with close cooperation with the medical team during emergencies.

Disclosure statement

The authors declare no conflict of interest.

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