Observation on the Effectiveness of Hysteroscopy Combined with B-Ultrasound in Diagnosing Uterine Incision Diverticulum after Cesarean Section

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Abstract: *Objective:* To analyze the positive significance of employing hysteroscopy and B-ultrasound together in diagnosing uterine incision diverticulum after cesarean section. *Methods:* The study was conducted at the Shaanxi Provincial People's Hospital from February 2023 to February 2024. A total of 100 patients, all with a history of secondary cesarean section, were selected as research subjects for this experimental study. The selected patients were divided into two groups: the experimental group, who received a diagnosis through hysteroscopy combined with B-ultrasound diagnosis, and the control group, who underwent vaginal ultrasound diagnosis. Each group comprised 50 patients. The detection of uterine incision diverticula using the two methods was analyzed. *Results:* The combined diagnostic method of hysteroscopy and B-ultrasound in the experimental group revealed higher length, width, and depth measurements of uterine incision diverticulum defects post-cesarean section compared to the diagnostic method of the control group ($P < 0.05$), indicating a better diagnostic effect. *Conclusion:* Upon observing the recovery of patients after cesarean section, the diagnostic method involving hysteroscopy combined with B-ultrasound yielded superior results. This method enhances diagnostic accuracy and enables the identification of patients' incisional diverticulum, facilitating proactive intervention. Its significance is noteworthy and merits promotion.

Keywords: Cesarean section; Uterine incision diverticulum; Hysteroscopy; B-ultrasound; Diagnostic effect

1. Introduction

In recent years, with the development and advancement of China, the rate of cesarean sections has gradually increased, highlighting postpartum recovery as a crucial issue in clinical development. Following cesarean section procedures, patients often face complications such as chronic pelvic pain and incisional diverticulum, with the latter being the most prevalent in clinical practice [1-3]. Uterine incision diverticula, also referred to as

uterine scar diverticula or uterine scar defects post-cesarean section, manifests clinically at an incidence rate of approximately 6.9%–19.4%. Patients typically present with persistent vaginal bleeding, diverticular pregnancy, and prolonged menstruation, significantly impacting their quality of life and necessitating active treatment.

Given the imperative of postoperative recovery, timely detection of patient's conditions is paramount. Therefore, selecting appropriate diagnostic methods to ensure clinical accuracy is of utmost importance [4-5]. This study focuses on patients selected from the Shaanxi Provincial People's Hospital as research subjects, employing a combination of hysteroscopy and B-ultrasound diagnostic methods. Subsequently, a detailed analysis of the specific diagnostic effects was conducted.

2. Materials and methods

2.1. General information

This experimental research was conducted at the Shaanxi Provincial People's Hospital, commencing in February 2023 and concluding in February 2024. A total of 100 patients with uterine incision diverticulum following cesarean section were selected as research subjects. These patients were divided into two groups, each comprising 50 individuals: the experimental group and the control group.

In the experimental group, the age ranges varied from 27 to 46 years, with an average age of 34.28 ± 4.28 years. The duration since the patients' previous cesarean sections ranged from 2 to 12 years, with an average of 4.23 ± 1.84 years. For the control group, the age range was between 28 and 45 years, with a mean age of 34.28 ± 4.19 years. The duration since the patients' previous cesarean sections ranged from 2 to 13 years, with an average of 4.18 ± 1.74 years. Statistical analysis comparing various data between the two groups yielded results with $P > 0.05$, indicating the establishment and adherence of this experimental study to research standards.

2.2. Methods

Patients in the control group underwent vaginal color ultrasound diagnostic examination. Meanwhile, patients in the experimental group underwent B-ultrasound combined with hysteroscopy. The specific examination methods were as follows:

The patient was positioned in the bladder lithotomy position and received combined spinal-epidural anesthesia. Following the induction of anesthesia, standard draping was applied, and a rotatable passive continuous perfusion hysteroscope was utilized. The hysteroscope, produced by Beijing BestScope Technology Co., Ltd., with model H6982, was selected for this study. Concurrently, ultrasonic instrumentation from China General Electric Medical Systems Company was employed, with model RT300 in combination with a real-time linear array ultrasonic instrument, model T2600, for ultrasonic diagnosis. The ultrasonic probe's frequency ranged mainly from 6 to 7.5 Hz, with uterine dilation maintained at 80–100 mm, and sodium chloride solution with a concentration of 0.9% utilized for fluid secretion. Perfusion speed was controlled at 260 mL/min. The anesthetic intervention involved infiltration anesthesia of the patient's cervical canal, primarily using 2% lidocaine at a dosage of 1 mL.

Under guidance from the injected uterine distension fluid, the hysteroscope was inserted into the patient's cervical canal to observe the cervical canal condition, ensuring real-time assessment of the uterine cavity shape and size, as well as evaluating the condition of the uterine incision and cavity post-cesarean section. Upon identifying severe diverticula from the uterine incision, including size, width, and distance from the serosal surface, appropriate treatment was administered according to individual circumstances, facilitating active patient management [6].

2.3. Observation indicator

The examination results of uterine incision diverticulum in both patient groups were compared and analyzed.

2.4. Statistical analysis

Calculations were conducted using SPSS 26.0 software. Categorical data are presented as [n (%)], while measurement data are presented as mean ± standard deviation (SD). During the data processing phase, comparison and calculation were primarily performed between different groups, utilizing the chi-squared test and the t-test to ascertain data differences. A P-value of less than 0.05 indicates a significant disparity between the groups.

3. Results

In comparison to the diagnostic method employed in the control group, the combined diagnostic method of the experimental group exhibited higher lengths, widths, and depths of uterine incision diverticulum defects post-cesarean section (P <0.05), resulting in improved diagnostic efficacy, as shown in **Table 1**.

Table 1. Comparative observation of the detection of uterine incision diverticula between the two groups of patients after cesarean section (x±s)

Group	Defect length (left & right diameter)	Width (head & tail diameter)	Depth
Test group ($n = 50$)	19.56 ± 6.56	16.56 ± 4.38	10.89 ± 2.76
Control group ($n = 50$)	15.45 ± 4.85	8.90 ± 3.22	6.34 ± 1.90
t	3.562	9.964	9.602
P	0.001	0.000	0.000

4. Discussion

Diverticula typically refer to dilated cystic protrusions occurring when the inner wall of the mucosa becomes convex. Manifestations of diverticula vary across different organs. In the case of uterine diverticula, there are typically two types: congenital uterine diverticula and acquired uterine diverticula. The former primarily develops due to improper embryonic development, while the latter arises under the influence of surgical procedures. With the gradual liberalization of the three-child policy in China, the incidence of cesarean section has increased, leading to a rising prevalence of acquired uterine diverticula in clinical settings [7-9].

In clinical practice, active diagnosis and treatment are imperative due to the significant impact diverticula can have on patient's lives and their overall health and well-being. Currently, ultrasound technology serves as the primary diagnostic method under development. This approach is deemed safe, reliable, and minimally invasive to patients, enabling direct visualization of the uterine structure through vaginal insertion. However, this method also possesses certain limitations and is unable to ascertain the severity of uterine diverticulum [10-12].

Hysteroscopy, as a gynecological diagnostic technology, comprises a light source system, imaging system, and energy system. Its application facilitates uterine expansion via a medium and allows for the detection of lesions within the uterine cavity. This method boasts high clinical diagnosis accuracy and is commonly employed in clinical practices such as intrauterine device placement and the diagnosis and treatment of endometrial polyps [13-15]. On the other hand, B-ultrasound is a painless, cost-effective examination method known for its repeatability and penetrative capabilities. By producing different acoustic impedances based on

tissue and organ density, it offers optimal diagnostic results for patients. The combined utilization of B-ultrasound and hysteroscopy in diagnosing patients with uterine incision diverticula post-cesarean section enhances clinical diagnostic accuracy, fully leveraging the advantages of both diagnostic methods. It allows for the detection of the distance between severe diverticula and the serosa, aiding physicians in making accurate judgments based on individual circumstances.

In summary, the combined application of hysteroscopy and B-ultrasound diagnostic methods in diagnosing patients with uterine incision diverticulum post-cesarean section enhances clinical diagnostic accuracy and enables the determination of diverticulum severity. This approach holds significant clinical relevance and warrants promotion and dissemination.

Disclosure statement

The authors declare no conflict of interest.

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