Hysteroscopic findings in cases of secondary infertility after cesarean section

Hazem S. E. M. Ibrahim, Ahmad A. M. Abdelaleem, Ayman A. A. A. Askar

Department of Obstetrics and Gynecology, Assiut University Hospital, Assiut, Egypt

Correspondence to Ayman A. A. A. Askar, MSc, Elhelaly Street, Assiut, Egypt.
Zip Code: 71111;
Tel: +20 101 901 4640;
e-mail: aiman@med.aun.edu.eg

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Background
Cesarean section (CS) is a common procedure nowadays. Although being essential in many conditions, CS has short-term and long-term complications. One of the long-term complications is infertility. Presence of a previous CS raises the possibility of uterine factor as a contributing cause of infertility. Hysteroscopy is the gold standard method to assess the uterine cavity. It can identify some abnormalities missed by hysterosalpingography or ultrasound.

Patients and methods
A prospective observational study was conducted that included 56 women with complaint of secondary infertility after CS. Office hysteroscopy was done for all women to assess the uterine cavity and to find out any subtle abnormalities in these women. The authors excluded women with clear causes of infertility and medical disorders that may preclude the hysteroscope, such as epilepsy, cardiac diseases, and women with active cervical or uterine infection.

Results
All participating women did not have an apparent cause of infertility. A total of 25 (44.7%) patients had normal hysteroscopic findings and 31 (55.3%) patients were found to have abnormal findings: nine (16.1%) patients with uterine niche, eight (14.3%) patients with endometrial adhesions, seven (12.5%) patients with endometrial polyp, four (7.1%) patients septate uterus, and three (5.4%) patients with submucous myoma.

Conclusion
The study showed that a high proportion of patients with secondary infertility after CS have uterine cavity abnormalities that warrant hysteroscopic examination, but further study is needed to evaluate the pregnancy outcome of correction of these abnormalities.

Keywords:
cesarean section, hysteroscopy, infertility

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Introduction

Cesarean section (CS) is among the essential comprehensive intrapartum services. CS can be a lifesaving intervention for the fetus, the mother, or both. According to the WHO global survey, the CS rates varied widely across countries, ranging from less than 10% to more than 50% [1].

In spite of being essential and lifesaving in many conditions, CS has many complications either short term or long term. One of the long-term complications is infertility.

Infertility is 'a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse' [2].

Incidence of secondary infertility is higher if the preceding pregnancy ended by CS. CSs were associated with fewer subsequent pregnancies and longer inter-pregnancy intervals than vaginal deliveries [3]. Presence of a previous CS raises the possibility of uterine factor as a contributing cause of infertility. It may lead to intrauterine adhesions or CS scar diverticulum or what is called isthmocele. Moreover, other intrauterine lesions may be present and contribute to causing infertility [4].

Many investigations are available currently for an infertile couple. Hysteroscopy is very useful because it allows direct visualization of uterine cavity, endometrial lining, and endocervical lining. Hysteroscopy can identify some abnormalities missed by hysterosalpingography or ultrasound like endometrial or endocervical polyps, small submucous fibroids, chronic endometritis, and intrauterine adhesions [5].

This study aimed to determine the hysteroscopic findings in cases that have secondary infertility after CS.

Patients and methods

This was a descriptive study conducted in Outpatient Infertility Clinic of Women's Health Hospital, Faculty of Medicine, Assiut University, during the period from March 2018 to June 2019.

This study aimed to identify uterine abnormalities that are usually missed by other investigations and to assess the cesarean scar in women who complain of infertility and have no apparent cause as evident by normal husband's semen analysis, normal hysterosalpingography with patent tubes, and good ovulation detected by transvaginal ultrasound. Women with active cervical or uterine infection, those known to be epileptic, or those who have valvular, ischemic, or arrhythmic heart disease were excluded.

Recruited patients were subjected to history taking, inquiry about clinical data, age, residency, parity, duration of infertility, and previous gynecological procedures like myomectomy, dilation and curettage (D&C), or metroplasty.

Patients were subjected to general examination, including measuring height and weight, calculation of BMI, pelvic examination to evaluate the vagina and the cervix regarding the presence of abnormal discharge, and bimanual examination of the uterus to evaluate its size, position, symmetry, and mobility.

Diagnostic office hysteroscopy

Patients were subjected to diagnostic office hysteroscopy using vaginoscopic approach to evaluate the uterine cavity first by getting a panoramic view of the cavity, and then focusing on the cesarean scar and endometrial surface for thickening, and vasularization.

The examination was performed in the office hysteroscopy unit of Women's Health Hospital, using 30° scope, which is 2.7 mm in diameter and 31 cm in length (Promis). The diagnostic sheath was single flow, 4 mm in diameter (Promis, Germany).

The light source was a single lamp 250 watt halogen source with wide-caliber light cable (Promis). The visualization system consisted of high-resolution single-chip video camera (Promis) connected to 20-inch TV (Toshiba, Japan). The infusion was performed using sterile single-use intravenous infusion set connected to 500 ml bottle of sterile saline solution. Pressure was obtained through sphygmomanometer cuff.

For the procedure, the woman was positioned in the dorsal lithotomy position, with the buttocks 5 cm beyond the edge of the bed, and with the hips elevated to 45 degree. The feet of the patient rested on the extended side supports with no support at the knee. After inspection and bimanual examination, the patient's vulva and vagina were disinfected by 10% povidone iodine solution. The lens with the sheath was then connected to the camera, the light source, and the infusion set. A vaginoscopic approach was used while the infusion is started; the scope was introduced through labia without the use of speculum or tenaculum. After distension of the vaginal walls, a panoramic view of the vagina and portio vaginalis of the cervix was taken, and then the scope was introduced through the external os into the cervical canal following the dark spot of the canal. The cervical morphology was noted for the cervical rugae, presence of cysts, polyps, or masses.

The scope was then passed through the internal os into the uterine cavity. The scope is stopped at the level of internal os until adequate distension of the cavity is obtained to have a panoramic view of the cavity. In the case of presence of bleeding or blood clots, the scope was introduced gently through the turbid view to visualize the fundus and tubal ostia in a close view that will not be affected by the initial turbidity. Meanwhile the blood had been washed and the lens is retracted backward to allow the visualization of the rest of the cavity and have a panoramic view. This was quite sufficient for most of the cases. Close view of the endometrial surface for thickening and vascularization was then obtained.

Sample size calculation

This study included all women who presented to the Infertility Outpatient Clinic at Women's Health Hospital, Assiut University, complaining of infertility after previous CS in the period from March 2018 to June 2019.

Statistical tests

Data analysis was performed by SPSS software version 18 (USA). Qualitative and quantitative variables were analyzed. The P values of less than 0.05 were considered significant. Continues data were compared using Student's t-test, and categorical data were compared using χ^2-test.

Ethical issues

The study was subjected to Ethical Review Board of the Faculty of Medicine, Assiut University, and got approval. A written consent was obtained from all recruited women. Women received appropriate management according to findings and were not subjected to harm. Registration number: NCT03166657, started May 2017.

Results

Over the study period of 16 months, a sample of 56 women presented with infertility and previous CS. For all of them, diagnostic office hysteroscopy was done. A total of 25 women had normal hysteroscopic findings, whereas 31 women had uterine cavity pathologies.

Personal and clinical data

There were no significant differences regarding the age, parity, duration of infertility, and body mass index between the group of women with normal uterine cavity and the group of women with uterine cavity pathologies (P =0.397, 0.943, 0.630, and 0.083, respectively) (Table 1).

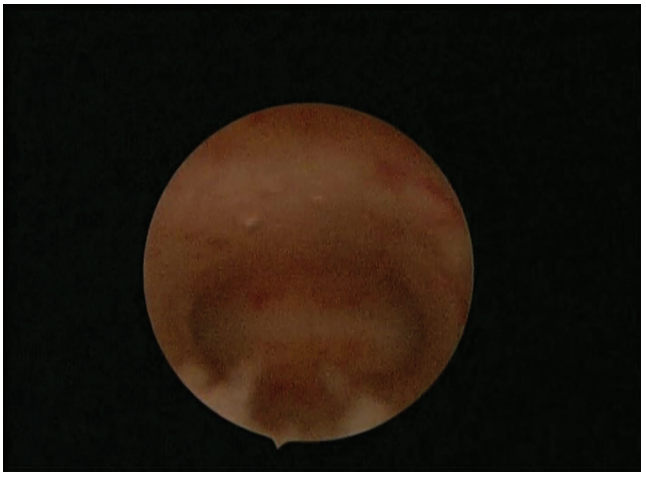
The mean age of women with normal uterine cavity was 32.2 ± 4.23 years, whereas the mean age of women with uterine cavity pathologies was 31.16 ± 4.86 years. The mean parity was 1.28 ± 0.54 in the group of women who had normal uterine cavity and 1.29 ± 0.53 in the group of women who had uterine cavity pathologies. The duration of infertility in the normal and abnormal groups was 4.8 ± 1.71 and 5.1 ± 2.65 years, respectively. The mean BMI was 26.32 ± 3.83 in the normal group and 28.58 ± 5.4 in the abnormal group. No significant difference between the group of women with normal uterine cavity and the group of women with uterine cavity pathologies regarding the age, parity, duration of infertility, or BMI (Fig. 1).

The findings in the 56 women were as follows:

(1) Twenty five women had normal hysteroscopic findings, representing 44.6%
(2) Nine women had CS scar diverticulum or pouch 'niche' (16.07%)
(3) Seven women had endometrial polyps (12.5%), with size of 1–1.5 cm, being sessile polyps. Of them, four were on the posterior wall near the ostia, two were on the lateral wall, and one was on the middle 1/3 of the anterior wall
(4) Eight women had intrauterine adhesions (14.29%), where six of them were filmy adhesions with both ostia seen and two were dense adhesions with both ostia not seen. Moreover, five of them involved less than 1/3 of the cavity and three of them involved 1/3–2/3 of the cavity
(5) Four women had uterine septum (7.14%); all of them were involving upper third of the endometrial cavity and two-thirds of the endometrial cavity were free. Sonohysterography after hysteroscopy was done by making use of the distension media as saline infusion to delineate exterior and interior of the uterus to differentiate between septate and bicornuate uterus by coronal and sagittal view of the uterus
(6) Three women had uterine submucous fibroids (5.36%). All of them were grade 2 and less than 2–2.5 cm in its endometrial projection. Overall, two of them were at the anterior wall and one at the posterior wall (Table 2).

Factors like age, BMI, parity, duration of infertility, number of previous CS, number of abortions, and presence of previous gynecological procedures (D and C or myomectomy) did not have significant effect on whether the patient will have uterine cavity abnormalities or not.

Figure 1



Prevalence of uterine cavity pathologies in women with secondary infertility after cesarean section.

Discussion

In the studied group of patients, uterine cavity abnormality was present in slightly more than half of the patients. The most prevalent abnormality was CS

Table 1 Clinical characteristics of study subjects

	Scope findings (mean±SD)		P
	Normal (n=25)	Abnormal (n=31)	
Age	32.2±4.23	31.16±4.86	0.397
BMI	26.32±3.83	28.58±5.4	0.083
Duration of infertility	4.8±1.71	5.1±2.65	0.630
Parity	1.28±0.54	1.29±0.53	0.943

Table 2 Factors predicting presence of uterine cavity pathologies

	P	Exp(B)	95% CI for Exp(B)	
			Lower	Upper
Age	0.100	0.869	0.736	1.027
BMI	0.085	1.238	0.068	1.077
Number of abortions	0.169	1.859	0.768	4.497
Parity	0.224	0.236	0.023	2.416
Duration of infertility	0.214	1.216	0.894	1.655
Previous caesarean section	0.116	7.308	0.612	87.333
Previous gynecological procedures	0.445	0.515	0.094	2.821

niche. The second most common abnormality was intrauterine adhesions, followed by endometrial polyp, then uterine septum, and lastly, submucous myoma.

A study was done to evaluate the uterine cavity of patients with infertility and whose infertility workup is normal using hysteroscopy. Uterine abnormality was present in about one-third of the cases, with the most prevalent abnormality being endometrial adhesions, followed by endometrial polyp [6].

In another study done by Fatemi to know the prevalence of unsuspected uterine cavity abnormalities diagnosed by office hysteroscopy being IVF, only 11% of the cases had such abnormality. The most common abnormality was endometrial polyp, followed by endometrial adhesions [7].

A study done on patients who had undergone two or more failed IVF cycles, all the participating patients had primary infertility and normal appearance of the uterine cavity on hysterosalpingography. Normal hysteroscopic findings were found in 62%, whereas 38% had abnormal office hysteroscopy findings, which were corrected at the same time. The most common abnormality was endometrial polyps, which constituted 33.7% of the total abnormalities [8].

In our study, the prevalence of uterine cavity abnormalities was much higher (more than half of patients) because all cases were secondary infertility, whereas other studies included both primary and secondary infertility or cases with primary infertility only, another cause was that all our cases had CS whereas other studies included both vaginal and cesarean deliveries. Most of other studies included only cases prepared for IVF, whereas the cases in our studies were not candidates for IVF.

In our study the prevalence of uterine niche was ~16.1% using office hysteroscopy among population complaining of infertility with normal menstrual pattern and Bij de Vaate *et al.* [9] found a niche prevalence of 56% with SHG and 24% with TVS, among random population with previous 1 or more CS. The high prevalence of uterine niche in this study may be because they defined niche to be found if the depth was just 1 mm or more using gel infusion sonography, whereas in our study, we considered niche to be present if there was a pouch that can be seen using hysteroscope in the area of isthmus.

El Mazny *et al.* [10] detected scar defect in nearly one-fourth of cases at SHG and in nearly one-third of cases at diagnostic hysteroscopy, but this prevalence was among population with various complaints, not only infertility but also complaints of menstrual disorders and recurrent pregnancy loss.

A study done in Nigeria included 1115 women complaining of infertility. Approximately half of the women with primary infertility had uterine cavity pathologies. Nearly two-thirds of the women with secondary infertility had abnormal hysteroscopic findings [11].

Conclusion

High proportion of patients with secondary infertility after CS have uterine cavity abnormalities that warrant hysteroscopic examination. No certain factors can predict presence of uterine cavity pathologies.

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The manuscript has been read and approved by all the authors, the requirements for authorship have been met, and each author believes that the manuscript represents honest work.

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Conflicts of interest

There are no conflicts of interest.

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