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Significance of hysteroscopy in diagnosis and treatment of congenital uterine anomalies

Značaj histeroskopije u dijagnostici i tretmanu urođenih anomalija materične šupljine

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Abstract

Background/Aim. Hysteroscopy is one of the important methods in the endoscopic diagnosis and treatment of infertility, particularly at the examination of the morphology and function of the uterus. Uterine factor is present at 10% of infertile women, in which changes of the uterus can be congenital or acquired. The aim of this study was to estimate the significance of hysteroscopy in the diagnosis and treatment of congenital anomalies of the uterine cavity in patients in whom there was a reasonable suspicion for them based on prior clinical, ultrasound and hysterosalpingography (HSG) findings. The significance of hysteroscopy is considered in relation to the number of pregnancies achieved depending on the malformations in the 12 months period after the completion of the diagnostic or operational hysteroscopy. **Methods.** The study included 176 patients with congenital uterine anomalies, which had undergone hysteroscopy, diagnostic or operative, in the period from January 1, 2013 till January 1, 2016. Percentage of pregnancy was followed at all patients during the first 12 months after surgery. Patients were divided into two groups: the first group contained women who had pregnancy, and the second group included women who earlier were not pregnant. Their characteristics were compared, such as: age, duration of infertility, previous pregnancy and/or pregnancy loss, HSG and ultrasound findings, types of congenital anomalies, type of hysteroscopy, as well as the existence of associated pathology. **Results.** The mean age of patients tested in the study was 35 years. The group of patients with primary infertility had a total of 107 patients, while 69 patients were with secondary infertility. The average duration of infertility was 3 years in the studied patients. In the 12-months period, 39 of the examined women began pregnancy, which was completed with term delivery in 33 women. χ^2 test showed a statistical significance difference ($p < 0.05$) between the groups of the patients with or without pregnancy after hysteroscopy in relation to infertility types as well as in relation to the number of previous miscarriages. **Conclusion.** *Subseptus* and *septus uteri* were the most common congenital uterine malformations in our patients. Very rare were *uterus arquatus*, *uterus unicornis* and *uterus bicornis*. In our study, 1/5 of examined women achieved pregnancy after hysteroscopy in the reporting period of 12 months, while the majority of these pregnancies ended with term delivery. The percentage of miscarriages in the examined women was reduced from 38% to 15% after hysteroscopy. In women who achieved pregnancy, uterine septum and subseptum were mostly diagnosed and in these patients hysteroscopic resection was successfully performed.

Key words:
hysteroscopy; uterus; congenital abnormalities; diagnosis; gynecologic surgical procedures; pregnancy.

Apstrakt

Uvod/Cilj. Histeroskopija predstavlja jednu od važnih endoskopskih metoda u dijagnostici i lečenju infertiliteta, posebno u ispitivanju morfologije i funkcionalnosti materice. Uterusni faktor je zastupljen kod oko 10% infertilnih žena, pri čemu promene u materici mogu biti urođene i stečene. Cilj rada je bio da se proceni značaj histeroskopije u dijagnostici i tretmanu urođenih anomalija materične šupljine kod osoba ženskog pola kod kojih je postojala osnovana sumnja za to na osnovu prethodnog kliničkog, ultrazvučnog i histerosalpingografskog (HSG) pregleda. Značaj histeroskopije je posmatran u odnosu na broj ostvarenih trudnoća u zavisnosti od dijagnostikovane anomalije u periodu od 12 meseci nakon obavljene histeroskopije u dijagnostičke ili operativne svrhe. **Metod.**

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Studijom preseka je bilo obuhvaćeno 176 ispitanica sa kongenitalnim anomalijama materice kod kojih je urađena histeroskopija, dijagnostička ili operativna, u periodu od 1.1.2013–1.1.2016. godine. Kod svih ispitanice je praćen procenat nastalih trudnoća u toku prvih 12 meseci posle operacije. Na taj način formirane su dve grupe ispitanica: one koje su ostvarile trudnoću i one koje nisu, i njihove karakteristike su upoređivane: godine života, trajanje infertiliteta, prethodne trudnoće, ultrazvučni i HSG nalazi, vrste kongenitalnih anomalija, vrste histeroskopskog tretmana, kao i postojanje udružene patologije. **Rezultati. S**rednja životna dob ispitivanih žena iznosila je 35 godina. Grupu sa primarnim infertilitetom činilo je ukupno 107 žena, dok je u drugoj grupi (sa sekundarnim infertilitetom) bilo 69 žena. Prosečna dužina trajanja infertiliteta kod ispitivanih osoba iznosila je 3 godine. U periodu od 12 meseci posle operacije, kod 39 žena je došlo do trudnoće, koja je kod njih 33 završena porođajem u terminu. χ^2 testom je dobijena statistički značajna razlika ($p < 0.05$) između posmatranih grupa (sa i bez ostvarene trudnoće posle histeroskopije) u odnosu na vrstu infertiliteta, kao i broj prethodnih pobačaja. **Zaključak.** Od svih kongenitalnih anomalija materice, najzastupljeniji su bili *uterus subseptus* i *septus*, a ređe zastupljeni su bili *uterus arquatus*, *uterus unicornis* i *uterus bicornis*. U našem istraživanju, jedna petina ispitanica je ostvarila trudnoću nakon histeroskopije u posmatranom periodu od 12 meseci i kod većine njih trudnoća je bila završena porođajem u terminu. Procenat pobačaja kod ispitivanih žena bio je smanjen sa 38%, pre histeroskopije, na 15%, nakon histeroskopije. Kod žena koje su ostvarile trudnoću, većinom su dijagnostikovani septum i supseptum uterusa i kod njih je sa uspehom je izvršena histeroskopska resekcija promena.

Ključne reči:
histeroskopija; materica; anomalije; dijagnoza; hirurgija, ginekološka, procedure; trudnoća.

Introduction

The absence of pregnancy during one year of marital life and regular sexual relations, without the use of contraceptive means, is marked as infertility and represents a reversible condition.

During intrauterine development and differentiation of organs, disorders as congenital malformations of the genital organs can occur. Their frequency, according to literature data, is 0.5%–1% in the general population of women. The uterine factor is present at approximately 10% of infertile women.

In female embryos, mesonephric channels caese to exist, while paramezonephric channels evolve, merging in the central part. The cranial horizontal parts of the Miller canal remain unbroken and evolve into the Falopian tube, while the middle and caudal parts merge and form an uterovaginal channel, from which the upper third of the vagina and the epithelium of the body and neck of the uterus are developed. Stroma of the uterus and myometrium originate from the splanchic mesoderm. The Miller tuberculum of the urogenital sinus thickens and forms two parts of the vaginal plate, which separate from it with the lumen that forms the lower two thirds of the vagina.

The occurrence of complete and incomplete longitudinal septum happens in 30–35%, which makes it most common among uterine anomalies. The septum is represented by poor vascular fibro muscular tissue and leads to spontaneous abortion. A complete longitudinal septum extends from the fundus to the inner cervix, dividing the cavum into two parts; it is commonly associated with the longitudinal septum in the vagina. The incomplete septum does not reach the inner cervix and there is communication between the parts of the cavity. During the first trimester, the risk of spontaneous abortion in patients with uterine septum is elevated, and the cause is a poorer vascularization of the implantation site.

The aims of this study were to: 1) evaluate the importance of hysteroscopy in the diagnosis and treatment of congenital anomalies of the uterine cavity in patients with diagnosed infertility; 2) determine the types and frequency of congenital anomalies in the investigated groups of patients; 3) estimate the prevalence of previous pregnancies and their outcome in patients with diagnosed anomalies; 4) determine type of hysteroscopy treatment and its safety (existence of complications or re-intervention); 5) determine the number of pregnancies achieved, depending on the diagnosed anomaly, for a period of 12 months after hysteroscopy performed for diagnostic or surgical purposes.

Methods

The cross-sectional study covered 176 infertile patients with congenital uterine anomalies in which hysteroscopy was performed in the period from January 1, 2013 to anuary 1, 2016. Indications for hysteroscopy in all patients were based on anamnestic data, previous clinical examination, ultrasound examination, and additional methods such as three/dimensional ultrasound and/or hysterosalpingography (HSG). All patients had indication for hysteroscopy. They all had fully laboratory, bacteriological, physical and clinical examinations (including an examination by a anesthesiologist), and then hysteroscopy was performed according to all rules of asepsis.

Hysteroscopy was performed by 5 doctors, which had adequate professional training for endoscopic methods in gynecology and years of experience. It was performed in early proliferative phase of the cycle, with the use of 0.9% NaCl solution as distension media and after the dilatation of cervix to 10.5 mm, hysteroscope with diameter of 10 mm (Karl Storz, Germany) was inserted in the uterus. Mechanical instruments (scissors) and versa-point electrode were used in resection on septum and subseptum, and removing polyps.

In patients with suspected severe congenital anomalies, a laparoscopic intervention was performed along with hysteroscopy in order to establish the exact diagnosis of congenital anomaly, at approximately 30% of the patients. In the case of patients with septum and subseptum in hysteroscopy, a septum was resected. Septum was classified as a longitudinal septum with the length more than 15 mm from the fundus, which divided uterus inside in half. The safety of hysteroscopy, which was assessed on the basis of complications and the need for re-intervention, was observed.

The percentage of pregnancies was observed during the first 12 months after surgery in all patients. Thus, two groups of patients were formed: the first one with patients who became pregnant and the second one with patients who were not pregnant during the observed period. Their characteristics were compared: previous pregnancy, ultrasound and HSG findings, types of congenital anomalies, types of hysteroscopy treatment, and the existence of associated pathology. The following parameters were monitored for all patients: age, professional capacity, type of infertility, duration of infertility, the existence of earlier delivery or abortion, ultrasound findings, findings at hysteroscopy and type of hysteroscopy surgery performed.

The obtained data were processed using the descriptive and analytical statistic methods. Data processing was done using the statistical packages Med Calc 15.8 and SPSS 20.0. From the descriptive statistic method, the arithmetic mean, the standard deviation, the range, the grouping and the tabulation of the data were used. Analytical methods used the *t*-test for numerical data and the χ^2 test for attribute data. The obtained data were analyzed and compared with the results available in domestic and foreign literature. On the basis of the obtained results, the conclusions were brought out in the paper. The study procedure was conducted in accordance with the Helsinki Declaration and approved by the Institutional Ethics Committee.

Results

The study included 176 patients whose basic characteristics are shown in Table 1. The average age of the examined patients was 35 years (from 29 to 47 years). The group of subjects with primary infertility included a total of 107 (61%) of the patients, while 69 (39%) of the patients made thegroup of subjects with secondary infertility. The average length of infertility in the patients tested was 3 years (1–6 years). Only 3% of the patients had previous successful pregnancies. Four patients with one miscarriage had previous *in vitro* fertilization (IVF) process; 8 patients with 2 miscarriages and 2 patients with 3 miscarriage had previously been subjected to IVF process. Fourteen (8%) of all patients had previous one IVF and 2 intrauterine insemination (IUI) processes. In 20% of the subjects the presence of associated pathological changes was observed, such as endometrial polyps, myoms or longitudinal vaginal septum. Polyps were removed at hysteroscopy, myoms were small and also were removed during hysteroscopy, and longitudinal vaginal septum was resected.

Table 1

Characteristics of the study population

Characteristics	Values
Total number, n (%)	176 (100)
Age (years), mean ± SD (range)	34.7 ± 5.5 (21–49)
Infertility, n (%)	
primary	107 (61)
secondary	69 (39)
Duration of infertility (years), mean ± SD	2.8 ± 1.5
Previous childbirth, n (%)	5 (3)
Previous miscarriages, n (%)	66 (38)
1	33 (19)
2	24 (14)
≤ 3	9 (5)
HSG finding, n (%)	52 (30)
normal	7 (4)
uterine anomaly	45 (26)
Associated pathology, n (%)	
polyp	30 (17)
myoma	3 (2)
vaginal septum	2 (1)

HSG – hysterosalpingography.

Complications during hysteroscopy were reported in 2% of the subjects, mainly with complete uterine septum. Repeated hysteroscopy was needed in 5% of the subjects, at resection of a complete septum.

Figure 1 shows distribution of the patients by age. They were grouped in six age groups (in five-year intervals which included the reproductive period of women). Most respondents (34%) were in the age group 30–35 years; in the group of 35–40 years were 30% of the women; the group of 40–45 years included 15% of the patients; the group of 25–30 years had 12%, and the group of 20–25 years had 4% of the patients. Ony 3% of the women were in the age group of more than 45 years.

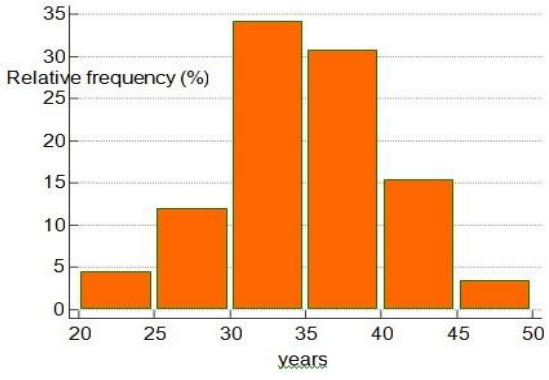

Fig. 1 – Patients age.

Characteristics of respondents who achieved pregnancy after hysteroscopy in observed 12- months period are given in Table 2. Thirty nine subjects had pregnancy; 64% of them were with spontaneous pregnancy, 36% of the patients with

Table 2

Characteristics of patients with pregnancy after hysteroscopy

Characteristics	Patients n (%)
Total number	39 (100)
Spontaneous pregnancy	25 (64)
Medically assisted fertilization	14 (36)
IUI	6 (15)
IVF	8 (21)
Childbirth	33 (85)
spontaneous	28 (72)
cesarean section	5 (13)
Miscarriages	6 (15)

IUI – intrauterine insemination; IVF – *in vitro* fertilisation.

pregnancy underwent the medically assisted fertilization process – 15% of the patients had intrauterine insemination (IUI) and 21% of the patients had IVF. Thirty three respondents successfully terminated pregnancy with children born in a term (28 women had spontaneous delivery and 5 had a cesarean section, while 6 (15%) of the women had miscarriage in the first trimester after hysteroscopy.

Figure 2 shows the type and frequency of uterine anomalies found in hysteroscopy: 76% of the patients had subseptum, 16% had a septum, while rarely presented were *uterus arquatus* (in 4%), *uterus unicornis* (in 3%) and *uterus bicornis* (in 1%).

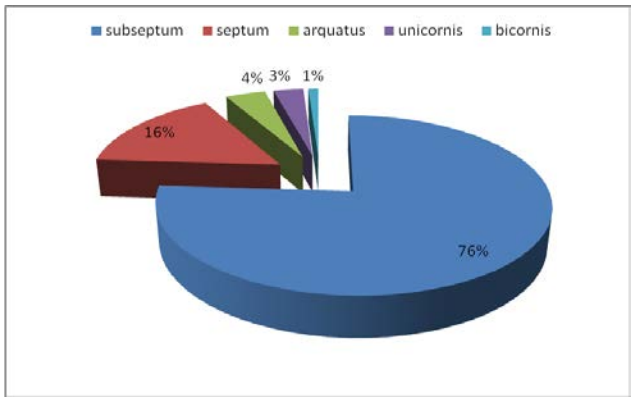

Fig. 2 – Type and frequency of congenital uterine anomalies determined by hysteroscopy.

Figure 3 shows the types of congenital uterine anomalies of the examined women and their frequency in both groups. In the group of subjects who had pregnancy, 28 of them had subseptum, 10 had septum and 1 had *uterus arquatus*. In the group of patients who were not pregnant, the representation of anomalies was: the highest number of respondents (105) had subseptum, 19 had septum, 7 had *uterus arquatus*, 5 had *uterus unicornis* and only one had *uterus bicornis*.

Table 3 shows the data of the patients who conceived after hysteroscopy and those who did not.

The first group consisted of 39 women, only 22% of all respondents involved in study. Their average age was 33

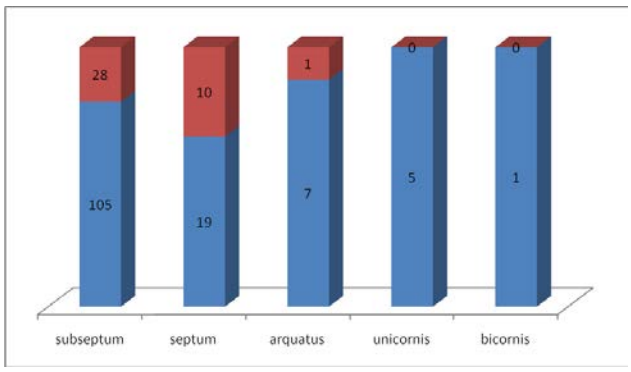

Fig. 3 – The type of congenital anomalies of the uterus in both groups of subjects (red – women with pregnancy after hysteroscopy; blue – women with no pregnancy after hysteroscopy).

years, 44% of them were with primary infertility and 56% with secondary infertility. There were no previous deliveries of women in this group. In this group, 21% of the women had one previous miscarriage, 28% had 2 miscarriages and 8% of the patients had 3 or more miscarriages. The existence of septum and subseptum was diagnosed and resection of changes was made in 97% of the patients. Diagnostic hysteroscopy was performed to verify *uterus unicornis*, associated with diagnostic laparoscopy, in 3% of the women. HSG was performed prior to hysteroscopy in 28% of the women and findings indicated the presence of congenital uterine anomalies.

The second group of respondents consists of 137 women, or about 78% of all respondents. Their average age was 35 years; 66% of the women in this group were with primary infertility and 34% of them with secondary infertility; 4% of the women had previous deliveries; 18% had one previous miscarriage, 10% had 2 miscarriages and 4% had 3 or more miscarriages. The septum and subseptum were diagnosed in 90% of these women and resection of changes was made. Diagnostic hysteroscopy with laparoscopy was performed to verify the *uterus unicornis*, *uterus bicornis* or *uterus arquatus* in 10% of the women in this group. HSG was performed prior to hysteroscopy in 24% of the women and findings indicated the presence of congenital uterine anomalies.

By using the χ^2 test, statistically significant difference ($p < 0.05$) was obtained between the observed groups in the type of infertility, as well as in the number of previous miscarriages. In the group of respondents who had a pregnancy after hysteroscopy, 56% of the subjects were with secondary infertility, and they had a higher percentage of previous miscarriages.

Discussion

The data on the frequency of congenital uterine anomalies as a result of incorrect development of the Miller channels are different, depending on the population included in studies. There are data from the literature, on the incidence of congenital anomalies of the uterus in the general population of about 1%, and even 19% in the

Table 3

Comparison of the groups of patients –with and without pregnancy after operation (OP)

Characteristics of patients	With pregnancy [n = 39 (22.16)]	Without pregnancy [n = 137 (77.84)]	*p*
Age (years), mean ± SD	33.4 ± 4.6	35.0 ± 5.7	0.099
Infertility, n (%)			
primary	17 (44)	99 (66)	0.021
secondary	22 (56)	47 (34)	
Duration of infertility (years), range	1 – 6	1 – 6	0.147
Previous childbirth, n (%)	0 (100)	5 (4)	0.506
Previous miscarriages, n (%)			
1	8 (21)	25 (18)	0.010
2	11 (28)	13 (10)	
< 3	3 (8)	6 (4)	
Hysteroscopy, n (%)			
diagnostic	1 (3)	13 (10)	0.282
resection of septum/sub-septum	38 (97)	124 (90)	
Anomalies, n (%)			
septum /subseptum	38 (97)	124 (91)	0.283
uterus unicornis, uterus arcuatus, uterus duplex	1 (3)	13(9)	
HSG finding, n (%)			
normal	1 (3)	6 (4)	0.661
uterine anomaly	12 (28)	33 (24)	

HSG – hysterosolpingography.

infertile patient population [1]. The true prevalence of uterine anomalies is difficult to estimate because many of them are asymptomatic.

The occurrence of a complete and incomplete longitudinal septum of the uterus occurs in 7–76% of women, depending on the investigated group, which makes it the most common among uterine anomalies. Other anomalies occur in lower percentages (1–10%) and represent anomalies in which hysteroscopy and laparoscopy were performed for the purpose of diagnosis and treatment. The obtained data are similar to those available in the literature. In one of the studies [2], 188 women were examined, with an incidence of anatomical anomalies of 42%, of which *uterus septus* was present in 12%, *uterus bicornis* in 1% and *uterus arquatus* in 0.5% of the women. In the other study [3], the prevalence of the septum in the test population was 7–16%, depending on the classification, after ultrasound examination. In the third study [4] with infertile patients, incidence of the subseptum and septum was 60% and 40%, respectvely. In the fourth similar study [5], 287 women had diagnosed anomalies of the uterus: *uterus septus* (in 55%), *uterus arquatus* (in 14%), *uterus bicornis* (in 10%), *uterus unicornis* (in 6%), and only 2% of the patients had *uterus septum* with double cervix.

In our study, the mean age of the examined patients was 35 years, ranging from 20 to 49 years. Similar results were published by other authors [6, 7].

The average duration of infertility in our patients was3 years (range 1–6 years). In available data from other studies, the duration of infertility was more than 2 years [6].

Only 3% of our respondents had previously successful pregnancies, while 38% of the respondents had previously miscarriages (19% had 1 miscarriage, 14% 2 miscarriages and 5% three or more miscarriages). Similar data are available in the literature, and the percentage of births in the examined group before the hysteroscopic operation was 5% [8]. During the first trimester, the risk of spontaneous abortion in patients with uterine septum is 28–45%, according to literature data [2, 9, 10], and the cause of weaker vascularization of the implant site is considered to be the cause.

Today, we use routine resection of the septum during hysteroscopy. Retrospective cohort studies performed on women who underwent hysteroscopic resection of the uterine septum indicate a significant reduction in the abortion rate from 67% to 13% [7, 9] and an increase in the live-birth rate to 37% [7, 11]. According to literature data, the percentage of pregnancy after hysteroscopic resection is 43% [12] and even 69% [13] with an incidence of live births of 49% [13]. In a similar study, patients with an idiopathic infertility were diagnosed with uterine septum; 12 months after the hysteroscopic resection, 44% of the subjects achieved pregnancy, and in 37% pregnancy ended in live births [11]. Some authors questioned the justification of hysteroscopy after 2 miscarriages [10].

The scientific community carried out a reassessment of the clinical significance of hysteroscopy in the diagnosis and treatment of uterine factors and the role in the treatment of infertility, thanks to its potential for improving reproductive results and reducing time to pregnancy [14]. Studies can also be found to investigate the possibility of diagnosing and treating uterine septum only on the basis of hysteroscopy, which implies that only the use of hysteroscopy is insufficient [7, 15], without prior detailed preparation, previous clinical examination, ultrasound measurement and review of additional methods such as three dimensional (3D) ultrasound technique (3D), HSG or magnetic resonance (MR) [15].

According to the available data, the success of 3D ultrasound in diagnosis of uterine anomalies ranges from 96%–100% [16, 17], which makes this technique recommended for routine use as accurate and precise [18–20]. Additional diagnostic method, such as HSG, are less commonly used for diagnosis of congenital uterine anomalies. In our study, HSG was applied in 30% of the patients, and in 24% of the patients, HSG-diagnosed anomalies were confirmed by hysteroscopy, while 6% of the patients had false-negative results. Some authors have concluded that HSG is not an optimal method for diagnosing uterine anomalies (because of the impossibility of visualizing the outer contour of the uterus), while the 3D ultrasound technique may be an alternative method for MR [21]. According to literature data, MR is successful in 29–60% of the cases in the diagnosis of congenital uterine anomalies [16, 20].

Complications of hysteroscopy were recorded in 2% of our subjects, mainly those with complete uterine septum. Repeated hysteroscopy were needed in 5% of the patients, in the resection of the complete septum. According to literature data, the percentage of re-intervention is 2% [4, 22]. There are also available data on 64 patients with hysteroscopic septum resection of which 3% had complications such as the uterine wall perforation [13]. In other studies, the overall percentage of intraoperative/postoperative complications and re-intervetions was 1.7% and 6%, respectively 6% [13].

In 20% of the subjects in our study, the presence of associated pathological changes was observed, of which polyps were present in 17% of the subjects, myomas in 2%, and septum of the vagina in 1% of the subjects. In available literature data, 8% of infertile patients with recurrent abortion, were diagnosed with myoma by hysteroscopy [23].

In our study, 39 (22%) of the patients experienced pregnancy after hysteroscopy in the observed period of 12 months. In a study similar to ours, out of 88 respondents in the observed period of 12 months after hysteroscopy resection, 41% of the respondents had pregnancy [6]. In other studies, the observed period was on average 12 up to 68 months, with the overall percentage of pregnancies being 60%, and the percentage of live births being 45% [13].

In our study, pregnancy occurred spontaneously in 64% of all pregnancies and 36% occurred after the medically assisted fertilization process. Besides, 33 (85%) of the women had pregnancy with child born in a term, out of which 28 women had spontaneous delivery and 5 women had surgical deliveries. Six (15%) of the pregnancies ended with miscarriage. According to the literature data, 61% of the patients have been pregnant after hysteroscopy resection, with 25 pregnancies (13 from the IVF process, i.e. more than half) [24]. Also, the data of other authors indicate that percentages of successful pregnancies after hysteroscopy are increased by IVF processes [25]. Therefore, some authors advise the routine use of office hysteroscopy as the basic method preceding the IVF/ intracytoplasmic sperm injection (ICSI) attempt, even in women with correct results in transvaginal ultrasound examination [26].

In the literature, 63% of the respondents experienced pregnancy after hysteroscopic septum resection, while 56% of the subjects reported pregnancy in *uterus arquatus* [8]. Data from other studies indicate an improvement in fertility following hysteroscopic resections in other uterine anomalies, except in *uterus bicornis* [27]. Data in some studies indicate that there is no statistically significant difference in pregnancy outcomes after hysteroscopic resection in *uterus septum* and *uterus arquatus* [28]. Also, the incidence of complete and incomplete uterine septum among patients is dominated by the available data [24].

Using the χ^2 test, statistically significant difference ($p < 0.05$) was obtained between the observed groups in the representation of the type of infertility, as well as in the number of previous abortions. In the group of the women who had a pregnancy after hysteroscopy, 56% of them were with secondary infertility, and they had a higher percentage of previous miscarriages. Similar data on the association of previous miscarriages with successful pregnancy after hysteroscopic septum resection can be found in other clinical studies [29, 30]. Data on various techniques of resection and outcome of surgery for later pregnancies and delivery of children at birth are available [31–33]. It was shown that there was an increase in the percentage of pregnancies by using IVF/ICSI processes in women with uterine anomalies either treated or not treated by hysteroscopy [32]. Women with congenital uterine abnormalities have poorer reproductive outcomes (a greater percentage of miscarriages in the first trimester, higher preterm birth rates, less pregnancy), regardless of whether they have spontaneous pregnancy or pregnancy induced by medically assisted fertilization, compared to women with normal uterus [33]. Some studies also dealt with the problem of additional therapy after hysteroscopy [34]. According to available literature data, the worst prognosis for pregnancy have women with *uterus unicornis*, while those with uterine septum (complete or incomplete) have the highest miscarriage rate in the first trimester [33, 35].

Limitation of study

This study has some limitations. The study included women who were diagnosed with infertility according to valid criteria. The study had a relatively small number of subjects in one of the reference centers for hysteroscopic treatment of uterine anomalies. Since hysteroscopy was conducted only on the basis of indications, some women were admitted after one or more miscarriages and one or more unsuccessful processes of IVF. Some of the patients after hysteroscopic treatment and 12- months period of the control at the Clinic, had back to their hometowns, and did not get back to the Clinic in the next pregnancy and we did not know exactly how many of them had pregnancy and its outcomes after the 12-month period. Data of husbands/partners' infertility were not followed at all patients, so they were excluded from the study. It was recommended that center made some follow-up program

for the patients which had been diagnosed with congenital uterine anomalies and had laparoscopic, hysteroscopic or non-endoscopic operative treatment, so that doctors could follow them during pregnancy and its outcome.

Conclusion

The most common congenital uterine anomalies in our study were incomplete and complete uterine septum (subseptum in 76% and septum in 16% of the patients). Other congenital uterine anomalies were rare: *uterus arquatus* in 4%, *uterus unicornis* in 3% and *uterus bicornis* in 1% of the patients. A small number of patients with congenital anomalies (only 3%) had previously successful pregnancies completed by childbirth in a term. More than one-third (38%) of the respondents had data of previous miscarriage in the first trimester.

Hysteroscopy was shown to be a safe endoscopic method allowing the resection of longitudinal septum and subseptum. The complications were present in 2% of the patients with hysteroscopy performed, and re-interventions were made in 5% of the subjects (in the cases of a complete septum of the uterus).

More than 20% of the patients had a pregnancy after hysteroscopy in the observed period of 12 months, while in most of them, pregnancy was completed by childbirth in a term (85%). Pregnant women were mostly diagnosed with septum and subseptum of the uterus and hysteroscopy resection of changes was made. The percentage of miscarriages in the women decreased from 38%, before hysteroscopy to 15%, after hysteroscopy.

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