Jinekoloji - Obstetrik ve Neonatoloji Tıp Dergisi
The Journal of Gynecology-Obstetrics and Neonatology

ÖZGÜN ARAŞTIRMA / ORIGINAL ARTICLE

DOI: 10.38136/jgon.1529774

Pregnancy outcomes in infertile patients who had hysterescopy

Histereskopi yapılan infertil hastalarda gebelik sonuçları

Hüseyin KAYAALP[1], Aydın ÖCAL[2], Fatih Mehmet FINDIK[3], Mehmet Sait İÇEN[3]

[1]Ankara Bilkent Şehir Hastanesi Kadın Hastalıkları ve Doğum Bölümü Perinatoloji Kliniği, Ankara, Türkiye
[2]Sağlık Bilimleri Üniversitesi, İstanbul Haseki Sağlık Uygulama ve Araştırma Merkezi, Cerrahi Tıp Bilimleri Bölümü, Kadın Hastalıkları ve Doğum Anabilim Dalı, İstanbul, Türkiye
[3]Dicle Üniversitesi Tıp Fakültesi, Cerrahi Tıp Bilimleri Bölümü, Kadın Hastalıkları ve Doğum Anabilim Dalı, Diyarbakır, Türkiye

ABSTRACT

Aim: To evaluate pregnancy outcomes following hysteroscopic correction in patients diagnosed with primary or secondary infertility and found to have congenital or acquired uterine pathology.

Materials and Methods: This study included 52 patients who underwent diagnostic hysteroscopy (H/S) and laparoscopy (L/S) due to primary or secondary infertility and were subsequently found to have intrauterine pathology requiring operative hysteroscopy at the Department of Obstetrics and Gynecology, Dicle University Medical Faculty, between January 2011 and December 2014. Patients were contacted via telephone numbers retrieved from hospital archives and provided verbal informed consent after receiving information about the clinical study. Data were collected regarding patients' age, gravidity, parity, number of living children, and other demographic characteristics before and after the procedure. The aim was to investigate the effects of operative hysteroscopy on pregnancy outcomes.

Results: Of the patients, 46% (n=24) were diagnosed with primary infertility (PI), and 54% (n=28) with secondary infertility (SI). No pregnancies were observed in the PI group prior to the operation, whereas 65 pregnancies were reported in the SI group. Of these, 69.23% (n=45) resulted in spontaneous abortion, 10.76% (n=7) in preterm birth, and 20% (n=13) in term delivery. The live birth rate per patient in the SI group before the operation was 53.5%. Following operative hysteroscopy, 17 pregnancies were detected in the PI group. The live birth rate per patient was 58.3%, with 11.7% (n=2) resulting in spontaneous abortion, 11.7% (n=2) in preterm birth, and 76.4% (n=13) in term birth. In the SI group, 31 pregnancies occurred postoperatively. The live birth rate per patient in this group increased to 67.8%, with 32% (n=10) resulting in spontaneous abortion, 12.9% (n=4) in preterm birth, and 54.8% (n=17) in term birth.

Conclusion: In infertile patients with congenital or acquired uterine cavity pathologies, operative hysteroscopy was associated with a decrease in spontaneous abortions and an increase in term and live births.

Keywords: Infertility, congenital uterine anomaly, hysteroscopy

ÖZ

Amaç: Primer, sekonder infertilite tanısı ile başvuran, konjenital veya edinsel uterin patoloji tespit edilen olgularda histeroskopik onarım sonrası gebelik sonuçlarının incelenmesidir.

Gereçler ve Yöntem: Bu çalışmada Ocak 2011-Aralık 2014 tarihleri arasında Dicle Üniversitesi Tıp Fakültesi Kadın Hastalıkları ve Doğum Kliniğine primer, sekonder infertilite nedeni ile diagnositik H/S ve L/S yapılıp intrauterin patoloji izlenen ve sonrasında ise operatif H/S yapılan 52 hasta değerlendirildi. Hastalara hastane arşiv kayıtlarından elde edilen telefon numaraları aranarak ulaşıldı, Yapılan klinik çalışmayla ilgili bilgi verilip sözlü onamları alındı. Hastaların operasyon öncesi ve sonrası yaş, gravide, parite, yaşayan çocuk ve diğer demografik yapılarıyla ilgili sorular soruldu. Bu çalışma ile op H/S' nin gebelik sonuçları üzerindeki etkilerini araştırmak amaçlandı.

Bulgular: Primer infertil (PI) %46'ı (n=24) idi. Sekonder infertil (SI) %54'ü (n=28) idi. PI'de gebelik izlenmedi. SI'de ise 65 gebelik izlendi. Bu gebeliklerin%69,23'ü (n=45) spontan abortustu,%10,76'sı (n=7) preterm, %20'si (n=13) term doğumdu. SI'de hasta başına düşen canlı doğum oranı %53,5'di. PI'de operasyon sonrası 17 gebelik tespit edildi. Operasyon sonrası PI'de hasta başına canlı doğum oranı %58,3'tü. Bu gebeliklerin %11,7'si (n=2) spontan abortus, %11,7'si (n=2) preterm doğum, %76,4'ü (n=13) term doğumdu. SI'de ise operasyon sonrası 31 gebelik tespit edildi. Operasyon sonrası SI'de hasta başına canlı doğum oranı %67,8'di. Bu gebeliklerin %32'si (n=10) spontan abortus, %12,9'u (n=4) preterm doğum, %54,8'i (n=17) term doğumdu.

Sonuç: Uterin kaviteye konjenital veya edinsel bir patoloji nedeni ile müdahale edilen infertil hastalarda operatif H/S sonrası hastaların spontan abortus sayıları azalırken term doğum ve canlı doğum sayısında artışlar izlendi.

Anahtar Kelimeler: İnfertilite, konjenital uterin anomali, histereskopi

Cite as: Kayaalp H, Öcal A, Fındık FM, İçen MS. Pregnancy outcomes in infertile patients who had hysterescopy. Jinekoloji-Obstetrik ve Neonatoloji Tıp Dergisi 2025;22(2):229–233.

Geliş/Received: 10.08.2024 • **Kabul/Accepted:** 22.10.2024

Sorumlu Yazar/Corresponding Author: Hüseyin KAYAALP, Talaytepe Mah, 4007. Sok., Kayapınar-Diyarbakır, Türkiye
E-mail: huseyinkayaalp.2121@gmail.com

Çevrimiçi Erişim/Available online at: https://dergipark.org.tr/tr/pub/jgon

INTRODUCTION

Infertility is the inability of couples to become pregnant despite full unprotected intercourse for 1 year. If the infertile woman has never been able to get pregnant before, it is called primary infertility (PI); If pregnancy occurs even once, it is called secondary infertility (SI) (1).When women who conceive spontaneously are examined, it is seen that most of them become pregnant within the first 3 years (2). As a result, infertility emerges as a health problem that affects approximately 10-15% of women (3). In the latest research conducted by the World Health Organization (WHO) in developed countries regarding these patients suffering from infertility problems, it was found that female factor was responsible for 37% of infertility, male factor was responsible for 8%, and female and male factors were responsible for 35% (4). If a woman has passed 2 years despite regular intercourse and still cannot get pregnant, the reason that prevents pregnancy should be investigated. The most prevalent causes of infertility in women are as follows: 1. Ovulatory dysfunction, 2. Endometriosis, 3. Pelvic adhesion, 4. Tubal and uterine causes (5). When we look at uterine pathologies, there are congenital uterine anomalies (septate, bicornuate, didelfus, arcuate, unicornuate) and acquired uterine anomalies (myoma, polyp, asherman, diethylstilbesterol), but congenital uterine anomalies are observed more frequently. It has been known for many years that uterine anomalies cause obstetric complications. Congenital or acquired pathologies of the uterus; It is associated with recurrent pregnancy losses, preterm birth, abnormal fetal position, dysmenorrhea and infertility (6). While the frequency of congenital anomalies, which constitute the majority of uterine anomalies, is unknown, many cases are discovered incidentally after examination, while some cannot be diagnosed because they do not cause symptoms (7). In the studies conducted so far, there are very different results regarding pregnancy outcomes after hysteroscopy in infertile patients with uterine anomalies. In this study, we investigated the effects of operative hysteroscopy on the pregnancy and live birth rates of couples in primary or secondary infertile patients with uterine pathology diagnosed in our clinic.

MATERIALS AND METHODS

In the study, patients who applied to our clinic due to primary or secondary infertility between January 2011 and December 2014, were diagnosed with uterine anomalies, and underwent operative hysteroscopy were retrospectively examined. Before starting this study, approval was obtained from our institution's human research ethics committee. The patients were informed about the clinical study and their verbal and written consent was obtained. The following variables were recorded: age, gravidity, parity, spontaneous abortion, preterm delivery, term delivery, number of living children, number of dead fetuses, comorbidities, history of surgery, intrauterine insemination (IUI)-in vitro fertilization (IVF), duration of infertility, mode of delivery, and the time elapsed between the operation and the conception of the pregnancy. The hospital electronic archive was consulted to obtain the following reports: hysterosalphngography (HSG), ultrasound, magnetic resonance imaging, laparoscopy, and hysteroscopy operation notes, as well as hormone profiles of the cases. Women with abnormal spermiograms of their husbands and those who smoked, consumed alcohol, were obese (body mass index >25), and had bilateral tubal obstruction on HSG were excluded from the study because they might have influenced the results.

All patients underwent diagnostic laparoscopy and hysteroscopy as the initial procedure. Subsequently, operative hysteroscopy was performed in patients with pathological findings. In the context of operative hysteroscopy, septum resection was performed in cases where a septum was present, polyp resection in cases where polyps were identified, and myoma resection in cases where fibroids were observed. These 52 patients were divided into 2 groups as PI and SI according to infertility status. Subsequently, the postoperative pregnancy outcomes were evaluated.

In the study, the SPSS 15 (Statistical Package for the Social Sciences) package program was used to analyze the data. The significance limit of all statistical tests used was set at 0.05. The Shapiro-Wilk test was utilized to assess normality. Parametric tests were used for data showing a normal distribution, and non-parametric tests were used for data that did not. Descriptive statistics were used for demographic descriptions.

RESULTS

The present study included 52 patients presenting at our clinic due to infertility who had undergone surgical intervention with hysteroscopy. The distribution of the patients according to infertility type was 46% (n=24) PI and 54% (n=28) SI. When all patients in our study were evaluated, the age range was 18-44, with an average age of 28.1. (p: 0.822), The preoperative follicular stimulating hormone (FSH) (p: 0.753), luteinizing hormone (LH) (p: 0.721), and estradiol (E2) (p: 0.690), levels of the patients were evaluated on the third day of the menstrual cycle. The age, duration of infertility, and hormonal values of the patients are presented in Table 1. Of the patients who underwent hysteroscopy, 73.1% were diagnosed with congenital and 26.9% with acquired uterine anomalies. A comparison of the average duration of pregnancy following surgery, stratified by type of infertility, revealed that the mean was 14.42±5.7 months for PI and 14±4.71 months for SI. There was no significant difference in the duration of pregnancy between the two groups (p = 0.987).

Table 1. Distribution of patients' ages, hormone profiles, and infertility periods

	Primary infertility Mean ± S.D. (Min – max)	Secondary infertility Mean ± S.D. (Min – max)	P value
Age	27,5 ± 6,31 (18-43)	28,78 ± 6,85 (20-44)	0.822
FSH (mIU/ml)	6,20 ± 1,84(4-9)	5,80 ± 1,98 (2-9)	0,753
LH (mIU/ml)	6,16 ± 1,78 (2-9)	5,78 ± 1,87 (2-10)	0.721
E2 (pg/ml)	45,70 ± 13 (25-82)	45,96 ± 16(19-80)	0.690
Infertility time (years)	3,81 ± 2,51 (1,5-10)	3,46 ± 1,88 (1-8)	0.987

Abbreviations: E2: estradiol, FSH: follicular stimulating hormone, LH: luteinizing hormone, Min-Max: minimum-maximum, S.D.: standart deviation

Upon examination of the pregnancy outcomes of patients who underwent operative hysteroscopy, it was observed that 14 of the patients in the PI group became pregnant, while 10 did not. In the PI group, 17 pregnancies were identified following the operation. A total of 11.7% (n=2) of the pregnancies were spontaneous abortions, 11.7% (n=2) were preterm births, and 76.4% (n=13) were term births. In a preterm patient, an intrauterine fetal demise was observed. Following the operation, live births occurred in 14 of the pregnancies. The live birth rate per patient in postoperative PI was 58.3%. Twenty-two of the patients with spontaneous intrauterine death became pregnant, while six did not. In total, 31 pregnancies were detected in patients with SI after the operation. Of these pregnancies, 32% (n=10) were spontaneous abortions, 12.9% (n=4) were preterm births, and 54.8% (n=17) were term births. Two patients exhibited intrauterine fetal demise. Live births were observed in 19 of these pregnancies. The live birth rate per patient in postoperative SI was 67.8%. Table 2 shows the number of pregnancies and live birth rates before and after the operation. Table 3 presents the pregnancy outcomes according to the uterine anomaly status of PI and SI following operative hysteroscopy. The comparison of the time between the operation and the occurrence of pregnancy in PI and SI patients is shown in figure 1.

In our study, 71% (n=37) of 52 patients exhibited a concordance between HSG and hysteroscopy, while 29% (n=15) exhibited a discordance. A frequency distribution of the patients' pregnancy

Table 2. Number of pregnancies before and after the operation, live birth rates

	Before Op H/S			After Op H/S		
	Primary İnfertility (PI) n:0 (percent)	Secondary İnfertility (SI) n:65 (percent)	Total (percent)	Primary İnfertility (PI) n:17 (percent)	Secondary İnfertility (SI) n:31 (percent)	Total (percent)
Spontaneous abortion	0	45 (%69.2)		2 (%11.7)	10 (%32.2)	
Preterm birth	0	7 (%10.8)		2 (%11.7)	4 (%12.9)	
Term birth	0	13 (%20)		13 (%76.4)	17 (%54.8)	
Live birth rate (per patient)		%53.5	%28.8	%58.3	%67.8	%63.4

Table 3. Evaluation of pregnancy outcomes according to the uterine anomaly status of PI and SI after operative hysteroscopy

	Primary İnfertility (PI)			Secondary İnfertility (SI)		
Uterine anomaly type	Spontaneous abortion	Preterm birth	Term birth	Spontaneous abortion	Preterm birth	Term birth
Septate Uterus	2	0	11	5	3	13
Bicornuate Uterus	0	0	0	1	0	3
Arcuate Uterus	0	0	0	0	1	1
Polyp	0	2	1	3	0	0
Myoma	0	0	1	1	1	0
Total	2 (%11,7)	2(%11,7)	13(%76,4)	10(%32)	5(%12,9)	17(%54,8)

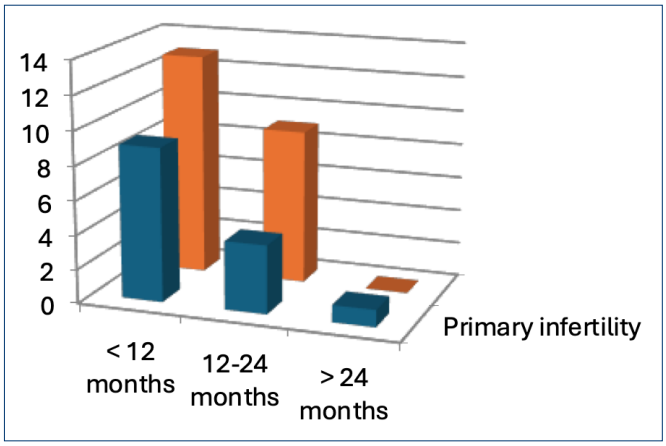

Figure 1. Frequency distribution of the time between surgery and pregnancy according to groups

times after the operation was conducted, revealing that 42% (n = 22) of the patients became pregnant in the first year, 25% (n = 13) in the second year, and 2% (n = 1) in the third year.

DISCUSSION

The objective of this study was to evaluate the cases diagnosed as PI or SI and who underwent operative hysteroscopy in our clinic. The available data in our study support the conclusion that operative hysteroscopy significantly affects pregnancy outcomes in a positive way. Our findings indicate that the occurrence of pregnancy and the course of pregnancies in the first two years after operative hysteroscopy were significantly higher in the primary and secondary infertile patient groups.

In the study conducted by Grimbizis GF et al., it was observed that the uterine septum was the most common uterine anomaly, accounting for 35% of all uterine malformations. Additionally, the bicornuate uterus and arcuate uterus were observed in 25% and 20% of cases, respectively (8). In a study conducted by Fox et al.,(9) in which 556 patients participated, the uterine anomaly rate was 17 (3.1%), with the following order of prevalence: septate, bicornuate, arcuate, unicornuate, and didelphys. In a study conducted in China, in which 21,961 pregnant women participated, the prevalence of uterine septum was 37%, followed by uterus didelphys (24%), bicornuate uterus (18%), arcuate uterus (13%), and unicornuate uterus (10%), respectively (10). In our study, the prevalence of uterine septum, bicornuate uterus, and arcuate uterus was 61.5%, 5.8%, and 5.8%, respectively. The septate uterus is the most prevalent type of uterine anomaly across studies, yet rates vary. Approximately 50% of women attempting to conceive during the reproductive age become pregnant within the first three months, 75% within the first six months, and more than 85% within the first year (2). In the study by Röyale et al., the mean interval between surgery and pregnancy was reported to be 10.8 ± 9.6 months across all groups (11). The results demonstrated that the mean duration of pregnancy in patients undergoing the procedure was 14.42 ± 5.7 months in the PI group and 14 ± 4.71 months in the SI group. Furthermore, 35 of the 36 patients who became pregnant after the operation became pregnant within the first two years. These findings indicate that, similar to fertile patients, the first two years of attempting to conceive are crucial for operated infertile patients.

A substantial body of research has been conducted to assess the impact of surgical intervention on pregnancy outcomes in women with uterine anomalies. The majority of these studies have demonstrated a positive effect of surgery on pregnancy outcomes. A review of the relevant literature revealed a significant reduction in the spontaneous abortion rate, from 86-92% preoperatively to 44.3% - 9.4% postoperatively (7, 12-14). Concurrently, the term birth rate increased from 3% - 14% to 33% - 79% (8, 12-14).

Once more, the live birth rate, which was between 3% and 4% before the operation, increased between 50% and 85.7% after the operation (8, 15, 16). In our study, the incidence of postoperative spontaneous abortion was found to decrease from 69.2% to 25%, while the term birth rate increased from 20% to 62.5%. Once more, the live birth rate following the operation increased from 53.5% to 67.8%. Once more, our findings align with those of previous studies, which have demonstrated that intervention in patients with uterine anomalies can enhance pregnancy rates. This has led to the conclusion that if uterine anomaly is detected in patients for any reason and pregnancy cannot be achieved, operative hysteroscopy is a valuable procedure in such patients and should be performed.

In a study conducted by Selçuk et al., which included a total of 181 patients diagnosed with primary and secondary infertility, the spontaneous abortion rate in PI increased from 0% to 17%, while the term birth rate increased from 0% to 61%. In SI, the rate of spontaneous abortion decreased from 96.6% to 17.1%, while the rate of term birth increased from 1.1% to 70.7%. A proportion of patients in both groups were unable to become pregnant (17). In our study, the rate of spontaneous abortion in PI increased from 0% to 11.7%, while the rate of term birth increased from 0% to 76.4%. In the SI group, the rate of spontaneous abortion decreased from 69.2% to 32%, while the rate of term birth increased from 20% to 54.8%. Nevertheless, the discrepancy in efficacy between the two groups and the fact that there were patients who were unable to become pregnant suggest that uterine anomalies are not the primary cause of infertility, but rather other factors that impede pregnancy. This discrepancy indicates that the underlying causes are multifactorial, including uterine anomalies. Furthermore, the observed increase in pregnancy rates among PI patients post-operatively is likely

attributable to a lack of awareness among these patients and their families regarding the processes involved in pregnancy. This lack of awareness is likely to have been addressed by the information provided by the researchers following the operation. In the context of uterine malformations, the low pregnancy rates can be attributed to the narrowing of the environment and the increase in intrauterine pressure. A study concluded that premature births may be caused by increased intrauterine pressure combined with relative cervical insufficiency (18). In a separate study, 556 patients, all of whom were twin pregnancies, were examined. During the follow-up period, it was observed that the patients gave birth earlier, had lower birth weights, and had a higher number of preterm births compared to twin pregnancies with normal uterine cavities (9). In our study, the number of spontaneous abortions in patients with a septum decreased from 40 to 8, while the number of term births increased from 10 to 28. The increase in the number of term births and the decrease in the number of spontaneous abortions after the operation lends support to the hypothesis that the cavity expands and intrauterine pressure decreases after the operation. Furthermore, the rise in pregnancy rates after the operation in women with uterine pathology, particularly in those who have experienced early pregnancy losses, suggests that this may be due to implantation failure caused by decreased vascularization in the septum (19). In our study, the high number of spontaneous abortions before the operation lends support to this hypothesis.

The retrospective nature of the study and the relatively small number of cases were the limitations of our study. The strength of our study is that all cases were performed by the same experienced surgical team at our hospital, which is a tertiary center, and subsequent pregnancy follow-up of the patients was performed at our clinic.

CONCLUSION

The study revealed that the number of live pregnancies increased during the follow-up period in the patients who were followed up after the operation. In light of the data obtained at the conclusion of the study, it was concluded that it is beneficial to evaluate the uterine cavity with hysteroscopy in infertile patients, even in the absence of an abnormal HSG result. Furthermore, it was determined that intervention in the uterine cavity, for any reason, positively affects pregnancy outcomes. Finally, the first two years following the operation were identified as the optimal period for couples to conceive.

Ethics Committee Approval
The study was approved by the Dicle University Faculty of Medicine Ethics Committee (date: 13.07.2016 and approval number: 2016/262).

Conflict of Interest
Authors declared no conflict of interest.

Financial Disclosure
Authors declared no financial support.

Author Contributions
Idea/Concept: HK, FMF; Design: HK, AÖ; Supervision: FMF; Data Collection/Processing: HK, AÖ; Analysis/Interpretation: FMF, MSİ; Literature Review: FMF, MSİ; Drafting/Writing: HK, AÖ, FMF.

REFERENCES

1. Carson SA, Kallen AN. Diagnosis and management of infertility: a review. Jama. 2021;326(1):65-76.
2. Medicine PCotASfR. Definitions of infertility and recurrent pregnancy loss: a committee opinion. Fertility and sterility. 2020;113(3):533-5.
3. Evers JL, Collins JA. Assessment of efficacy of varicocele repair for male subfertility: a systematic review. The Lancet. 2003;361(9372):1849-52.
4. Dunson DB, Colombo B, Baird DD. Changes with age in the level and duration of fertility in the menstrual cycle. Human reproduction. 2002;17(5):1399-403.
5. Snow M, Vranich TM, Perin J, Trent M. Estimates of infertility in the United States: 1995–2019. Fertility and sterility. 2022;118(3):560-7.
6. Dykes TM, Siegel C, Dodson W. Imaging of congenital uterine anomalies: review and self-assessment module. American Journal of Roentgenology. 2007;189(3_supplement):S1-S10.
7. Breech LL, Laufer MR. Müllerian anomalies. Obstetrics and gynecology clinics of North America. 2009;36(1):47-68.
8. Grimbizis GF, Camus M, Tarlatzis BC, Bontis JN, Devroey P. Clinical implications of uterine malformations and hysteroscopic treatment results. Human reproduction update. 2001;7(2):161-74.
9. Fox NS, Roman AS, Saltzman DH, Klauser CK, Rebarber A. Twin pregnancy in patients with a uterine anomaly. The Journal of Maternal-Fetal & Neonatal Medicine. 2014;27(4):360-4.
10. Zhang Y, Zhao Y-y, Jie Q. Obstetric outcome of women with uterine anomalies in China. Chinese Medical Journal. 2010;123(4):418-22.
11. Seferli R, Tokmak A, Ersoy A, Yeşilyurt H, Çelen Ş. İntrauterin patoloji nedeniyle operatif histeroskopi uygulanan infertil hastalarda üreme sonuçlarının değerlendirilmesi. Journal of Clinical and Experimental Investigations. 2015;6(1):52-8.
12. Roy K, Singla S, Baruah J, Kumar S, Sharma J, Karmakar D. Reproductive outcome following hysteroscopic septal resection in patients with infertility and recurrent abortions. Archives of gynecology and obstetrics. 2011;283:273-9.
13. Tonguc EA, Var T, Batioglu S. Hysteroscopic metroplasty in patients with a uterine septum and otherwise unexplained infertility. International Journal of Gynecology & Obstetrics. 2011;113(2):128-30.
14. Sendag F, Mermer T, Yucebilgin S, Oztekin K, Bilgin O. Reproductive outcomes after hysteroscopic metroplasty for uterine septum. Clinical & Experimental Obstetrics & Gynecology. 2010;37(4):287.
15. Homer HA, Li T-C, Cooke ID. The septate uterus: a review of management and reproductive outcome. Fertility and sterility. 2000;73(1):1-14.
16. Gundabattula S, Joseph E, Marakani L, Dasari S, Nirmalan P. Reproductive outcomes after resection of intrauterine septum. Journal of Obstetrics and Gynaecology. 2014;34(3):235-7.
17. Ayas S, Gürbüz A, Tuna G, Sargin MA, Alkan A, Eren S. Hysteroscopic resection of uterine septum improves reproductive performance in women with unexplained infertility. Turkish Journal of Medical Sciences. 2011;41(4):595-601.
18. Rock JA, Murphy AA. Anatomic abnormalities. Clinical Obstetrics and Gynecology. 1986;29(4):886-911.
19. Burchell RC, Creed F, Rasoulpour M, Whitcomb M. Vascular anatomy of the human uterus and pregnancy wastage. BJOG: An International Journal of Obstetrics & Gynaecology. 1978;85(9):698-706.