■ Original Article

How Often Do We Discover an Abnormality of The Uterus at Delivery? Single Center Experience

Uterin Bir Anormalliği Ne Sıklıkla Doğum Sırasında Keşfediyoruz? Tek Merkez Deneyimi

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Abstract

Objective: In this study, we aimed to determine the incidence of incidental uterine anomalies in the patient population who gave birth in our centre and to evaluate the perinatal outcomes.

Methods: We conducted a retrospective analysis of outcomes of patients with incidental uterine anomalies who delivered at a tertiary care center between January 2023 and December 2023. Patient data were obtained by searching hospital records.

Results: The data of 782 pregnant women who had given birth in the last eleven months were analyzed retrospectively. Three patients were found who could be included in the classification of uterine anomaly and who had not received prior diagnosis and treatment. The mean age was 30.0 years and the mean body mass index was 25.6 kg/m^2. The mean gestational age of the patients was 37+0 weeks.

Conclusion: In this study, we found uterine abnormalities in 3 patients during cesarean delivery. It is important to note that these uterine abnormalities correlate least with pregnancy complications or fertilization success.

Keywords: Congenital uterine anomalies; malpresentation; miscarriage; Müllerian anomalies; birth

Öz

Amaç: Bu çalışma ile merkezimizde doğum yapan hasta popülasyonunda insidental uterin anomali insidansını belirlemek ve perinatal sonuçlarını değerlendirmeyi amaçladık.

Gereç ve Yöntem: Ocak 2023 ile Aralık 2023 tarihleri arasında üçüncü basamak bir merkezde doğum yapan ve tesadüfi uterin anomalisi olan hastaların sonuçları retrospektif olarak analiz edilmiştir. Hastaların verileri hastane kayıtları taranarak tespit edilmiştir.

Bulgular: Son on bir ay içinde doğum yapmış 782 gebenin verileri retrospektif olarak analiz edildi. Uterin anomali sınıflamasına dahil edilebilecek ve daha önce tanı ve tedavi almamış üç hasta bulundu. Ortalama yaş 30.0 yıl ve ortalama vücut kitle indeksi 25.6 kg/m^2 idi. Hastaların ortalama gebelik yaşı 37+0 hafta idi.

Sonuç: Bu çalışmada, sezaryen doğum sırasında 3 hastada uterus anomalileri saptadık. Bu uterus anormalliklerinin gebelik komplikasyonları veya fertilizasyon başarısı ile en az korelasyon gösterdiğine dikkat etmek önemlidir.

Anahtar Kelimeler: Konjenital uterus anomalileri; malprezentasyon; düşük; Müllerian anomalileri; doğum

1. Introduction

Congenital malformations of the female reproductive tract affect about 5.5 to 7% of girls (1). Although some of these malformations are asymptomatic and may go unnoticed, obstructive malformations cause a variety of symptoms that manifest as early as the onset of puberty (2). The etiology of congenital malformations is still unclear and the effects of genetic and environmental factors are currently being analyzed. Animal studies suggest the presence of genetic mutations that may lead to arrest or maldevelopment of the female reproductive tract during fetal life (3). The lower genital tract arises from both the urogenital sinus and the mullerian duct: the lower vagina and hymen arise from the urogenital sinus, while the fallopian tube, uterus, cervix and upper vagina arise from the mullerian duct. During fetal life, the vaginal plate grows at the fused end of the mullerian duct and then joins the urogenital sinus as the tuberous sinus. Due to their common embryologic origin, anomalies of the mullerian duct may be associated with anomalies of the urinary tract (4).

Due to the heterogeneity of congenital anomalies of the reproductive system, different classification systems have been proposed. The American Society of Reproductive Medicine (ASRM) classification system is one of the most widely accepted classifications: Mullerian anomalies are divided into six categories based on the degree of disruption to normal development. However, some rare anomalies may not fit into one of the ASRM categories (5). For these rare anomalies, the European Society of Human Reproduction and Embryology/ European Society for Gynecologic Endoscopy Consensus (ESHRE/ESGE) classification system for female genital anomalies is used (6).

The aim of this study was to determine the incidence of incidental uterine anomalies in the population of patients delivering at our center. Secondarily, we wanted to assess the perinatal outcome of incidental uterine anomalies.

2. Materials and Methods

For our retrospective cross-sectional observational study, patients with incidental uterine anomalies who delivered at University of Health Sciences Etlik Zubeyde Hanim Women's Health Training and Research Hospital between January 1, 2023 and December 1, 2023 were analyzed. Patients who agreed to participate in the study and whose treatment was continued in our hospital were included in the study. The patients' data were analyzed retrospectively from the patient record system. We analyzed 782 patients whose demographic data we could access and whose delivery took place in the maternity ward of
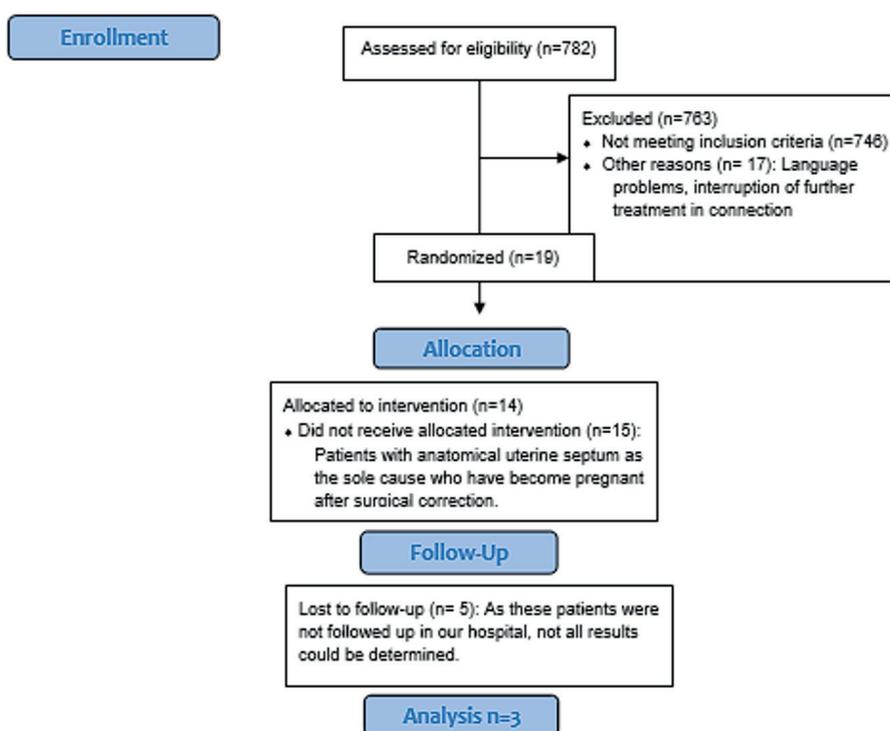
CONSORT 2010 Flow Diagram

Figure 1. Flow diagram of the study

our hospital. The study protocol was approved by University of Health Sciences Etlik Zubeyde Hanim Women's Health Training and Research Hospital Medical Speciality Education Board (Decision No.: 11/11 on 23/11/2023). All participants signed a written and verbal informed consent form and the principles of the Declaration of Helsinki were followed. Demographic characteristics, maternal age, gestational age, parity, concomitant anomalies and consanguinity were obtained from hospital records.

Exclusion criteria were known uterine anomalies, previous uterine surgery and inaccessibility of medical records. According to the classification system updated by the European Society of Human Reproduction and Embryology (ESHRE) and the European Society of Gynecological Endoscopy (ESGE) as part of the Delphi process, patients with uterine anomalies discovered incidentally during delivery at our tertiary center were included in the study (6). Accordingly, uterine anomalies were incidentally detected in 3 patients in 11 months at our center (Figure 1).

Uterine anomalies are categorized into seven main types based on anatomical deviations from the same embryological origin: U0, normal uterus; U1, dysmorphic uterus (infantile or T-shaped); U2, septate uterus; U3, bicorporeal uterus (bicornuate and didelphys); U4, hemi-uterus (unicornuate); U5, aplastic uterus; U6 is defined for unclassified cases (6).

Statistical analysis

SPSS 20 (IBM Corp. published 2011. IBM SPSS Statistics for Windows, version 20.0, Armonk, NY: IBM Corp.) was used to analyze the data. The data were analyzed using visual (histograms, probability plots) and analytical methods (Kolmogorov–Smirnov/ Shapiro–Wilk tests) to determine their normal distribution. A one-way ANOVA and the Kruskal–Wallis test were used to compare continuous variables with normal and non-normal distributions, respectively. The relationships between categorical variables were analyzed using a chi-square test. A p-value < 0.05 was considered an indication of statistical significance.

3. Results

The data of 782 pregnant women who had given birth in the last eleven months were analyzed retrospectively. Three patients were found who could be included in the classification of uterine anomaly and who had not received prior diagnosis and treatment. The demographic characteristics of the patients are shown in Table 1. The mean age was 30.0 years and the mean body mass index was 25.6 kg/m². The mean gestational age of the patients was 37+0 weeks.

Table 1. Demographic characteristics of the study group

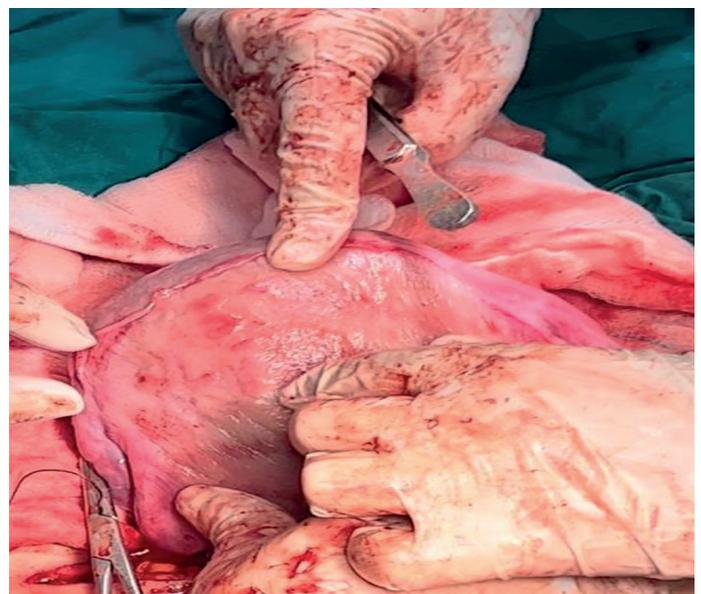| Characteristics	Study Group n=3
Age (years)	30.0 ± 5,48
Gravida (min-max)	3 (1-3)
Parity (min-max)	2 (0-2)
Living births (n)	2 (0-2)
Previous birth (n, %)	
None	1 (33.3%)
Vaginal delivery	2 (67.7%)
Ceserean section	0
Weeks of gestation (weeks)	37.22 ± 1.46
Body mass index (kg/m²)	28.8 ± 4.45
Smoking (n, %)	
No	3 (100%)
Yes	0
Birth weight (grams)	2985.36 ± 245.80

Figure 2. An image of a uterine anomaly discovered during surgery

The number and percentage of patients are shown in Table 2. Accordingly, one of the 3 patients was found to have a uterine septum, one patient had a bicornuate uterus and one patient had a fibrotic band on the uterus (Figure 2). All patients were admitted to our hospital in labor and a cesarean section was decided in all of them due to fetal distress during labor. In all of these patients, labor started in the latency phase. In all cases, labor was in the vertex presentation. No additional uterine anomaly was detected. The postpartum ultrasound examination

revealed no abnormalities of the urinary tract. All patients were delivered by cesarean section. All babies were born weighing less than 3000 grams. None of the babies were admitted to the neonatal unit. No assisted reproduction methods were used in any of the patients. Anemia was diagnosed as a postnatal complication in only one mother. The patient received 1 unit of erythrocyte suspension as a replacement.

Table 2. Perinatal clinical characteristics of the study population	
	Study Group n=3
Type of uterine anomaly (n, %)	
Septum (n)	1 (33.3%)
Bicornu (n)	1 (33.3%)
Fibrotic ligament (n)	1 (33.3%)
In vitro fertilization (n, %)	0
Way of delivery (n, %)	
Vaginal delivery	0
Ceserean section	3 (100%)
Cause of caesarean section (n, %)	
Fetal distress	3 (100%)
Cephalopelvic discordance	0
Breech presentation	0
Fetal macrosomia	0
Non-progressive labor	0
Other uterine anomaly (n, %)	
No	3 (100%)
Yes	0
Urinary anomaly (n, %)	
No	3 (100%)
Yes	0
Admission to the neonatal intensive care unit (n, %)	
No	3 (100%)
Yes	0
Maternal complications (n, %)	
Postpartum haemorrhage	0
Hysterectomy	0
Re-operation	0
Infection	0
Blood transfusion	1 (33.3%)

4. Discussion

The female reproductive tract develops from the mullerian ducts, which form on both sides and are completed around the 12th to 14th week of pregnancy (7). When fusion is complete, canalization and absorption of the medial part leads to the formation of a normal uterine cavity and vagina. A defect in the fusion of the Muellerian ducts leads to many abnormalities of the uterus. The actual prevalence of congenital anomalies of the uterus in the population is generally unknown. It is estimated to be about 3.5 percent, which means that they occur in about one in 30 women (1). The most common uterine abnormality is uterine septum, followed by bicornuate uterus and didelphic uterus (8). Transvaginal ultrasound is a very valuable imaging technique for detecting abnormalities of the uterus, especially in early pregnancy. Magnetic resonance imaging (MRI) and hysterosalpingography (HSG) can also be used for diagnosis. In addition, laparoscopy and laparotomy may be preferred as they offer both diagnostic and therapeutic advantages. Early diagnosis of uterine abnormalities is important for clinical follow-up. The incidence of recurrent pregnancy loss, preterm labor, spontaneous abortion and premature rupture of membranes is increasing (9). In unmonitored pregnancies, diagnosis is delayed and the diagnosis can be made at the time of delivery. To prevent obstetric complications, it is important to perform a detailed ultrasound scan and pelvic examination before pregnancy and to perform any necessary surgical interventions if they can be detected and corrected early.

Stagnation or maldevelopment at any stage of embryonic development leads to heterogeneous and complex anomalies of the congenital genital tract. Congenital anomalies leading to obstruction of menstrual flow include, in particular, an imperfore hymen, a transverse vaginal septum, partial agenesis of the vagina and agenesis of the cervix (10). An obstructive anomaly is manifested by primary amenorrhea and cyclic pain due to the formation of hematocolpos and hematometra.

Uterine abnormalities are often found in women with a history of reproductive problems. While 2D ultrasound and HSG are suitable for screening for uterine abnormalities, 3D ultrasound, MRI and combined laparoscopy and hysteroscopy can correctly classify the type of uterine abnormality as they can show both the external and internal contours of the uterus (11,12). While 3D ultrasound is now considered the gold standard in the diagnosis of uterine anomalies due to its high diagnostic accuracy, less invasive nature and comparatively low cost, MRI is reserved for the diagnosis of complex Mullerian anomalies or when a diagnostic dilemma arises. Laparoscopy and hysteroscopy are invasive procedures for diagnostic purposes

and should only be offered in conjunction with concomitant surgical treatment after a thorough non-invasive evaluation of a Mullerian anomaly (11). If a uterine abnormality is diagnosed, imaging for renal abnormalities is recommended (13).

The incidence of congenital uterine anomalies appears to be higher than previously thought thanks to improved diagnostic imaging techniques (12). Studies conducted with regard to reproductive outcomes show that the number of first and second trimester abortions is significantly higher in women with congenital uterine anomalies compared to the general/fertile population. Acquired uterine malformations (submucosal fibroids, endometrial polyps and uterine adhesions) are common in women with pregnancy loss, but their clinical significance is uncertain. Hysteroscopic metroplasty is the preferred treatment option for uterine septum. Hysteroscopic septal resection has been shown to reduce the rate of pregnancy loss, but there is insufficient evidence to support this. While the ASRM recommends septal resection, the ESHRE advises against septal resection due to insufficient evidence.

Thus, in contrast to previous studies, the rate of anomalies occurring at birth is much lower. However, it is important to note that these incidental uterine anomalies have the least association with pregnancy complications or fertilization success. Nevertheless, these and similar studies are important to know the true incidence of uterine anomalies in the population. In any case, multicenter studies with more participants would be appropriate.

Author contribution

Study conception and design: ZCA, ÖYÇ and RSK; data collection: ZCA; analysis and interpretation of results: ÖYÇ and RSK; draft manuscript preparation: ZCA, ÖYÇ and RSK. All authors reviewed the results and approved the final version of the manuscript.

Ethical approval

The study was approved by the Ethics Committee for Noninterventional Studies of University of Health Sciences Etlik Zubeyde Hanim Women's Health Training and Research Hospital (Protocol no. 11/11 23.11.2023).

Funding

The authors declare that the study received no funding.

Conflict of interest

The authors declare that there is no conflict of interest.

Yazar katkısı

Araştırma fikri ve tasarımı: ZCA, ÖYÇ ve RSK; veri toplama: ZCA; sonuçların analizi ve yorumlanması: ÖYÇ ve RSK; araştırma metnini hazırlama: ZCA, ÖYÇ ve RSK. Tüm yazarlar araştırma sonuçlarını gözden geçirdi ve araştırmanın son halini onayladı.

Etik kurul onayı

Bu araştırma için Etlik Zubeyde Hanım Kadın Sağlığı Eğitim ve Araştırma Hastanesi Girişimsel Olmayan Çalışmalar Etik Kurulundan onay alınmıştır (Karar no: 11/11 23.11.2023).

Finansal destek

Yazarlar araştırma için finansal bir destek almadıklarını beyan etmiştir.

Çıkar çatışması

Yazarlar herhangi bir çıkar çatışması olmadığını beyan etmiştir.

References

1. Kachhawa G, Kriplani A. Management of Reproductive Tract Anomalies. J Obstet Gynaecol India. 2017;67(3):162-7. **[Crossref]**

2. Chulani VL, Gordon LP. Adolescent growth and development. Prim Care. 2014;41(3):465-87. **[Crossref]**

3. Aplin JD, Myers JE, Timms K, Westwood M. Tracking placental development in health and disease. Nat Rev Endocrinol. 2020;16(9):479-94. **[Crossref]**

4. Dietrich JE, Millar DM, Quint EH. Non-obstructive müllerian anomalies. J Pediatr Adolesc Gynecol. 2014;27(6):386-95. **[Crossref]**

5. Pfeifer SM, Attaran M, Goldstein J, et al. ASRM müllerian anomalies classification 2021. Fertil Steril. 2021;116(5):1238-52. **[Crossref]**

6. Grimbizis GF, Di Spiezio Sardo A, Saravelos SH, et al. The Thessaloniki ESHRE/ESGE consensus on diagnosis of female genital anomalies. Hum Reprod. 2016;31(1):2-7. **[Crossref]**

7. Cunha GR, Robboy SJ, Kurita T, et al. Development of the human female reproductive tract. Differentiation. 2018;103:46-65. **[Crossref]**

8. Bhagavath B, Ellie G, Griffiths KM, et al. Uterine Malformations: An Update of Diagnosis, Management, and Outcomes. Obstet Gynecol Surv. 2017;72(6):377-92. **[Crossref]**

9. Hosny AEMS, Fakhry MN, El-Khayat W, Kashef MT. Risk factors associated with preterm labor, with special emphasis on preterm premature rupture of membranes and severe preterm labor. J Chin Med Assoc. 2020;83(3):280-7. **[Crossref]**

10. Mentessidou A, Mirilas P. Surgical disorders in pediatric and adolescent gynecology: Vaginal and uterine anomalies. Int J Gynaecol Obstet. 2023;160(3):762-70. **[Crossref]**

11. Jayaprakasan K, Ojha K. Diagnosis of Congenital Uterine Abnormalities: Practical Considerations. J Clin Med. 2022;11(5):1251. **[Crossref]**

12. Mørk N, Lauszus FF, Agha Krogh RH. Congenital uterine anomalies and their association with fertility and pregnancy outcomes. Ugeskr Laeger. 2018;180(40):V02180149.

13. Oppelt P, von Have M, Paulsen M, et al. Female genital malformations and their associated abnormalities. Fertil Steril. 2007;87(2):335-42. **[Crossref]**