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Original Article

Obstetrics and Gynaecology Section

Evaluation of Maternal and Foetal Outcome in Patients with Incidentally Diagnosed Müllerian Anomaly during Caesarean Section: A Retrospective Descriptive Study

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ABSTRACT

Introduction: Congenital uterine anomalies, also known as Müllerian anomalies, have an overall prevalence rate of 0.06% to 38%, depending on the type of study population and diagnostic techniques used in various studies. Müllerian anomalies develop due to defective organogenesis of the genital tract. These anomalies can remain asymptomatic or present with a varied range of symptoms, including perinatal, maternal and foetal morbidities.

Aim: To study the maternal and foetal outcomes in patients with incidentally diagnosed Müllerian anomalies during caesarean section and to compare the perinatal outcomes with the type of Müllerian anomaly diagnosed.

Materials and Methods: A retrospective descriptive study was conducted in the Department of Obstetrics and Gynaecology, School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh, India. A retrospective review of the records of all patients who underwent Lower Segment Caesarean Section (LSCS) in the hospital from October 2017 to December 2022 was performed. The patients with intraoperatively documented incidental findings of Müllerian anomalies were selected.

Results: The mean age of study participants was 25.6 years. Among a total of 2186 patients, 40 women were found to have Müllerian anomalies intraoperatively, resulting in a prevalence of 1.83%. A septate uterus was present in 14 (35%) patients, making it the most common Müllerian anomaly. Malpresentation was noted in 22 (55%) patients and was the most common indication for caesarean section. Foetal complications, such as preterm birth, were observed in 10 (25%) patients and low birth weight was seen in 15 (37.5%) patients. On a positive note, no baby was born at extremely premature gestation (<28 weeks) and 75% of women were able to carry their pregnancies to term successfully. A total of 80% of the babies born did not require any Neonatal Intensive Care Unit (NICU) and no baby had an extremely low birth weight (<1000 grams).

Conclusion: Patients with known Müllerian anomalies can have an acceptable maternal and foetal outcome with vigilant obstetrical care.

Keywords: Bicornuate uterus, Congenital uterine anomaly, Didelphys uterus, Müllerian anomaly, Septate uterus, Unicornuate uterus

INTRODUCTION

The female genital tract develops from the müllerian or paramesonephric ducts. The cranial parts of the müllerian ducts give rise to the fallopian tubes, while the caudal parts form the uterus, cervix and upper two-thirds of the vagina. The lower two-thirds of the vagina, bulbourethral glands and vestibule are derived from the urogenital sinus. müllerian ducts develop in three phases: organogenesis, fusion and canalisation. Organogenesis is characterised by the formation of both müllerian ducts. Fusion involves the joining of the two müllerian ducts to form the uterus, while the third phase of canalisation entails the subsequent resorption of the central septum once the ducts have fused [1]. Any disruption during the normal development of the external or internal genitalia can give rise to a wide variety of müllerian anomalies. For example, failure of organogenesis results in uterine agenesis/hypoplasia or a unicornuate uterus, while failure of fusion leads to a bicornuate or didelphys uterus and canalisation defects result in a septate or arcuate uterus [2]. Congenital uterine anomalies have a prevalence rate varying between 0.06% and 38%, depending on the type of study population and diagnostic techniques used in various studies [3].

The American Society of Reproductive Medicine published a new müllerian Anomalies Classification in 2021, describing nine categories of müllerian anomalies: müllerian agenesis, cervical agenesis, unicornuate uterus, uterus didelphys, bicornuate uterus, septate uterus, longitudinal vaginal septum, transverse vaginal septum and complex anomalies [4]. These malformations present with a range of symptoms, from infertility and menstrual symptoms to being entirely asymptomatic. The antenatal period for some of these women may be complicated by recurrent abortions, preterm labour, Foetal Growth Restriction (FGR), malpresentations and premature membrane rupture [2]. Therefore, pregnancies in these patients need to be carefully monitored. The present study aimed to evaluate the perinatal outcomes in patients with previously unknown müllerian anomalies diagnosed incidentally during caesarean section and to correlate the perinatal outcomes with the type of müllerian anomaly diagnosed.

MATERIALS AND METHODS

A retrospective descriptive study was conducted in the Department of Obstetrics and Gynaecology, School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh, India. A retrospective review of the records of all patients who underwent LSCS in the hospital from October 2017 to December 2022 was performed. Data analysis was conducted from January to March 2023. Approval from the Institutional Research Ethics Committee was obtained before commencing the study (Ref no. SU/SMS&R/76-A/2022/148).

Inclusion and Exclusion criteria: Patients with intraoperatively documented incidental findings of müllerian anomalies were selected. Patients with already known müllerian anomalies or without müllerian anomalies were excluded.

Study Procedure

Age, obstetric history, any co-morbidities and the type of anomaly found were recorded. Neonatal factors such as Appearance, Pulse, Grimace, Activity, Respiration (APGAR) score at birth, NICU admissions, preterm birth and low birth weight were also documented.

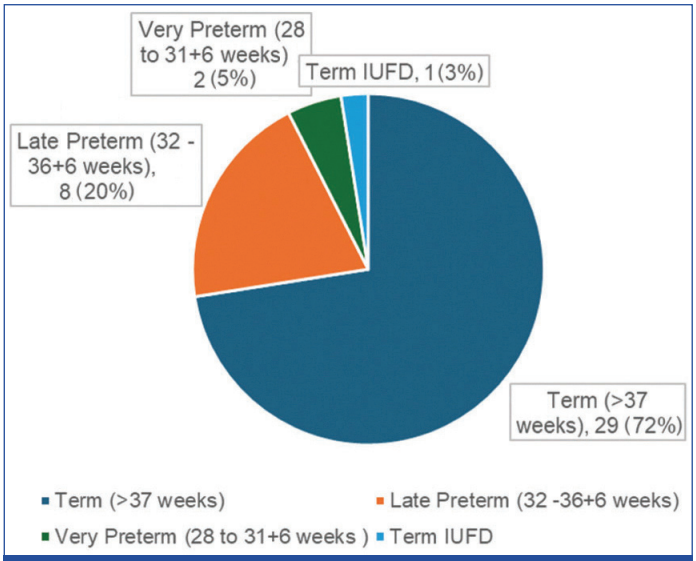
STATISTICAL ANALYSIS

The collected data was systematically analysed using Microsoft Excel 2007. Descriptive statistical methods were employed to derive meaningful insights from the dataset. The analysis included the calculation of frequencies, averages/means and percentages.

RESULTS

Among a total of 2,186 patients, 40 women were found to have müllerian anomalies intraoperatively, resulting in a prevalence of 1.83%. The age of the women with these anomalies ranged from 20 to 35 years, with a mean age of 25.6 years. Gestational age at the time of delivery ranged from 29 weeks and 3 days to 40 weeks and 3 days. Eight out of the 40 patients had a previous history of one or two spontaneous first-trimester abortions. No patients with a second-trimester abortion could be identified. A total of 19 patients had previous successful term pregnancies, while 21 patients were nulliparous. Of the total 19 women who had previous successful pregnancies, all had vaginal deliveries and none had undergone LSCS previously.

Out of the 40 women, 30 were able to successfully carry their pregnancy to term [Table/Fig-1]. Among the total 40 patients, the anomalies found included a septate uterus in 14, an arcuate uterus in 10, a bicornuate uterus in seven and a unicornuate uterus with a rudimentary horn in nine [Table/Fig-2].

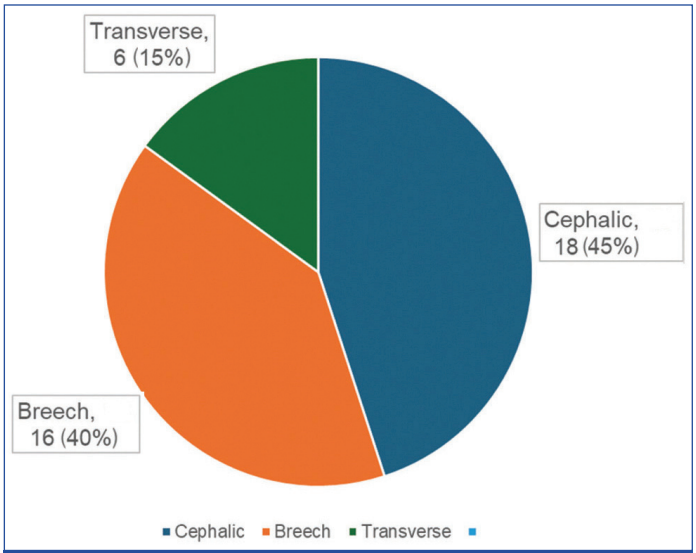


[Table/Fig-1]: Gestational age at delivery.

Uterine anomaly	n (%)
Septate uterus	14 (35.00)
Arcuate uterus	10 (25.00)
Unicornuate uterus with rudimentary/non communicating horn	09 (22.50)
Bicornuate uterus	07 (17.50)

[Table/Fig-2]: Number of uterine anomalies.

About 22 (55%) women had malpresentations, including breech (n=16) and transverse lie (n=6). A total of 18 women had a cephalic presentation [Table/Fig-3]. There were 39 live births and the babies weighed between 1.36 kg and 3.84 kg. One baby died in utero due to uterine rupture (weight 2.3 kg). A total of 25 babies had a birth weight of more than 2.5 kg, while 15 babies had a low birth weight of less than 2.5 kg (of these 15, one was very low birth weight, weighing 1.36 kg due to prematurity). Out of the 39 live-born babies, eight had an APGAR score of eight or below and eight babies needed NICU admission for either low birth weight or respiratory distress. The duration of ICU stay ranged from three to 28 days. All the neonates were eventually discharged in healthy condition. One baby, as mentioned earlier, died in utero due to obstructed labour in a case of arcuate uterus.



[Table/Fig-3]: Different type of foetal presentation during LSCS.

The association of Low Birth Weight (LBW), preterm birth, NICU admissions and APGAR scores at birth with different müllerian anomalies has been presented in [Table/Fig-4]. (Since these conditions are independent variables, a single case may contribute to multiple categories).

Anomaly (N=40)	LBW (n=15)	Preterm (n=10)	Malpre-sentations (n=22)	NICU admissions (n=8)	APGAR score <=8 (n=8)	IUFD (n=1)
Arcuate	5 (33.33%)	2 (20%)	3 (13.64%)	3 (37.5%)	4 (50%)	1 (100%)
Septate	5 (33.33%)	6 (60%)	11 (50%)	2 (25%)	2 (25%)	0 (0%)
Unicornuate	1 (6.66%)	0 (0%)	4 (18.18%)	1 (12.5%)	1 (12.5%)	0 (0%)
Bicornuate	4 (26.67%)	2 (20%)	4 (18.18%)	2 (25%)	1 (12.5%)	0 (0%)

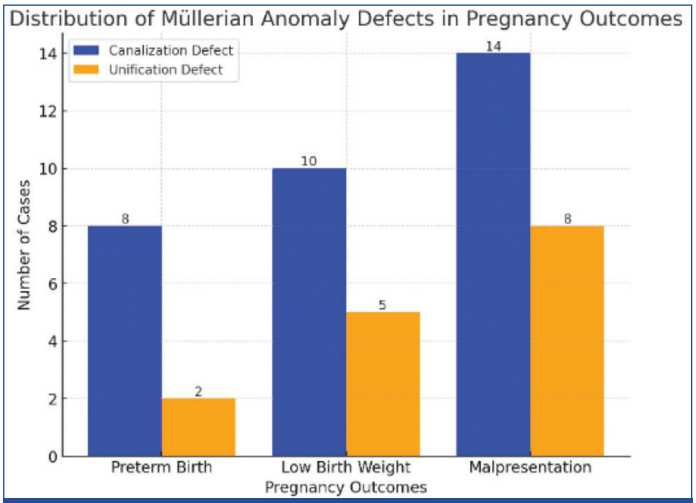
[Table/Fig-4]: Anomalies and their associated complications.

Pregnancy-related complications like eclampsia, Prelabour Rupture of Membranes (PROM), Gestational Diabetes Mellitus (GDM), hypothyroidism and placenta previa were seen in 19 patients. There were two patients with eclampsia at term, one patient had placenta previa, five patients had PROM and one patient had Preterm Prelabour Rupture of Membranes (PPROM). One case of abruptio placentae and one case of rupture of an unscarred uterus were identified. Three women had FGR. Two patients had gestational diabetes, which was managed with dietary control, two patients had intrahepatic cholestasis of pregnancy and three had hypothyroidism, which was well-controlled with thyroxine supplementation.

The most common indication for caesarean section was found to be malpresentation (55%), followed by elective caesarean sections performed for a history of 1 or 2 previous caesareans (20%) [Table/Fig-5]. One of the 40 patients had a uterine rupture at term, which resulted in intrauterine foetal death. For this, an emergency laparotomy with LSCS and repair of the ruptured uterus had to be performed. All patients were discharged within five to seven days of delivery and had an uneventful postoperative recovery. Canalisation and unification/unilateral dysgenesis defects are seen in [Table/Fig-6].

Indications for LSCS	n (%)
Malpresentation (Breech+transverse lie)	22 (55.00)
Elective for previous one or two caesarean sections	08 (20.00)
Acute foetal distress	03 (7.50)
Previous caesarean with PROM	02 (5.00)
Antepartum eclampsia	02 (5.00)
Abruption	01 (2.50)
Placenta previa (with FGR with severe oligohydramnios)	01 (2.50)
Rupture uterus	01 (2.50)

[Table/Fig-5]: Indication for LSCS.



[Table/Fig-6]: Difference in canalisation and unification/unilateral dysgenesis defects.

DISCUSSION

Müllerian anomalies are not very common, with incidence rates varying from 0.1% to 3.4% in the general population across various studies and the rate is even higher in patients with infertility and recurrent pregnancy loss [5]. In the present study, the incidence of müllerian anomalies was found to be 1.83%. Hua M et al., conducted a retrospective cohort study on 66,956 singleton pregnancies undergoing routine anatomic surveys from 1990 through 2008 and they found the incidence to be around 0.3% [6]. Another recently published retrospective study by Wang S et al., which included 457 cases of congenital uterine anomalies over 12 years, also reported an incidence of 0.4% [7].

Müllerian anomalies are often associated with recurrent miscarriages and infertility. In the infertile population, the prevalence of congenital uterine anomalies has been estimated to range between 3.4% and 8.0%. In women with a history of recurrent abortions, this figure has been reported to be between 12.6% and 18.2% [8]. None of the patients had a history of difficulty conceiving or the use of artificial reproductive techniques. Nine patients had a history of one or two previous abortions, all of which were spontaneous first-trimester losses.

Many women have undiagnosed müllerian abnormalities as they are largely asymptomatic and difficult to diagnose through routine 2D ultrasound, which has a sensitivity of only about 60% [9,10]. The gravid uterus makes it even more challenging to visualise the anomaly on routine obstetric ultrasound scans. Hysterosalpingography (HSG) can provide a view of the endometrial cavity when conducted in women with infertility or recurrent abortions, but it does not visualise the fundus and the uterine contour and is contraindicated during pregnancy. While 3D ultrasound and Magnetic Resonance Imaging (MRI) have higher accuracy and sensitivities ranging from 80% to 100% [9,11], both modalities are expensive and not widely available. Most of the patients were booked patients from our own hospital with documented first-trimester scans and the referred patients also had previous records of adequate antenatal check-ups, yet no uterine anomaly could be detected in any of their antenatal ultrasounds.

A meta-analysis of comparative studies on the pregnancy outcomes of women with congenital uterine anomalies conducted by Venetis CA et al., suggested that the rates of low birth weight (RR 1.93, 95% CI 1.50 to 2.49), malpresentation at delivery (RR 4.75, 95% CI 3.29 to 6.84) and preterm delivery (RR 2.21, 95% CI 1.59 to 3.08) are significantly higher in women with müllerian anomalies [8]. In the present study, 22 (55%) of patients with müllerian anomalies had malpresentation at the time of delivery. The rate of preterm delivery at <37 weeks in the present study was 10 (25%), compared to a 39.3% preterm delivery rate reported by Hua M et al., and 27.4% reported by Wang S et al., [6,7]. The incidence of low birth weight (<2.5 kg) was 15 (37.5%) in the present study, which is significantly higher compared to only 3.1% as documented by Wang S et al., and comparable to 39.7% as calculated by Hua M et al., [6,7].

None of the nine patients with a unicornuate uterus in the present study experienced preterm delivery and only one had a low birth weight of 2.36 kg. In a systematic review of 20 studies on congenital uterine anomalies published by Reichman D et al., the incidence of preterm deliveries in unicornuate uterus was found to be around 20% [12]. In another study involving 80 women with a unicornuate uterus, there was no significant difference between the neonatal birth weight in the unicornuate uterus group and the control group. The study concluded that the perinatal outcomes of women with a unicornuate uterus are similar to those of women with non uterine abnormalities [13].

Typically, the arcuate uterus is considered to have the best prognosis and is sometimes regarded as a variation of normal uterine anatomy [14]. Ironically, in the present study, one of the patients with an arcuate uterus, referred to the present institute from elsewhere, experienced a uterine rupture (unscarred uterus) following obstructed labour. This patient required an emergency laparotomy, followed by the delivery of a dead foetus and subsequent repair of the uterus with bilateral tubal ligation.

Bicornuate uterus was the least common müllerian anomaly found in the present study. The common complications and adverse reproductive outcomes associated with bicornuate uterus include recurrent pregnancy loss (25%), preterm birth (15%-25%) and cervical insufficiency [15]. The authors identified seven patients with bicornuate uteri, of which four gave birth to babies with low birth weight, two had preterm deliveries and one had marginal placenta previa.

Septate uteri are known to have the poorest obstetric outcomes [16]. Women with subseptate and septate uteri have an increased risk of preterm birth (RR 2.01; 95% CI 1.16-3.51; p=0.01 and RR 2.30; 95% CI 1.46-3.62; p<0.001, respectively) and an increased rate of foetal malpresentation at delivery (RR 6.24; 95% CI 4.05-9.62; p<0.005) [17,18].

The same was reflected in the present study. A retrospective study conducted by Naeh A et al., evaluated the association between congenital anomalies of the uterus and adverse perinatal outcomes, stratified by type of anomaly. They concluded that while women with müllerian anomalies had a high prevalence of adverse pregnancy outcomes, the outcomes did not differ by the type of anomaly [19]. The present study is unique in that it examines the outcomes of incidentally diagnosed müllerian anomalies.

Limitation(s)

The limited number of cases represents a constraint of the study. Additionally, the retrospective nature of the study is an inherent limitation.

CONCLUSION(S)

Foetal malpresentation is the most common indication for caesarean delivery in patients with müllerian anomalies. The septate uterus seems to have the worst prognosis among all müllerian anomalies. Patients with known müllerian anomalies can be managed with

a watchful expectancy during the antenatal period, as many of them can have a good perinatal outcome. Proper counselling and regular antenatal surveillance are key to managing patients with any müllerian anomaly.

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