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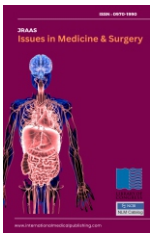

Research Article

Section: Obstetrics & Gynaecology

Mullerian Anomalies & Delivery Outcome - A Case Seriesn

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HIGHLIGHTS

- Müllerian anomalies affected outcomes
- Arcuate uterus predominated
- Breech presentation common
- Universal caesarean delivery
- Neonatal survival achieved

Key Words:
Müllerian anomalies
Pregnancy outcome
Caesarean section
Malpresentation
Perinatal outcome

ABSTRACT

Introduction: Müllerian anomalies are congenital malformations of the female genital tract resulting from abnormal development, fusion, or resorption of the paramesonephric ducts. Though uncommon, they are clinically important because they are associated with malpresentation, preterm delivery, operative intervention, and adverse perinatal outcomes. Evaluating their impact on pregnancy and delivery is essential for improving antenatal surveillance and obstetric management. **Aim & Objective:** To evaluate the spectrum of Müllerian anomalies and their impact on delivery outcome, and to correlate anomaly type with obstetric complications, fetal presentation, preterm birth, low birth weight, and maternal and neonatal outcome. **Materials & Methods:** This retrospective case series was conducted at KIMS, Koppal, from March 2024 to March 2025 among 10 pregnant women with Müllerian anomalies diagnosed before pregnancy, antenatally, or intraoperatively. Pregnancies beyond 28 weeks were evaluated for demographic profile, anomaly type, clinical presentation, delivery details, intraoperative findings, and maternal and neonatal outcomes. **Results:** Equal proportions of women belonged to 20 to 24 years and 25 to 29 years age groups. Multigravida constituted 70%, previous abortion was noted in 40%, and hypertensive disorders in 30%. Arcuate uterus was the commonest anomaly (50%), followed by bicornuate uterus (20%). Breech/podalic presentation occurred in 70%, while 70% delivered after 37 weeks. Caesarean section was performed in all cases. Postpartum hemorrhage occurred in 30%, and blood transfusion was required in 10%. Low birth weight was seen in 30%, SNCU admission in 50%, and neonatal survival was 100%. **Conclusion:** Müllerian anomalies significantly influence delivery outcome by increasing malpresentation, operative delivery, and selected maternal and neonatal risks. Early diagnosis and careful obstetric management can improve fetomaternal outcome.

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INTRODUCTION

Müllerian anomalies are congenital malformations that arise from abnormal development, fusion, canalization, or resorption of the paired paramesonephric ducts during embryogenesis [1]. Because these ducts form the uterus, cervix, fallopian tubes, and upper vagina, any disturbance in their development can produce a wide spectrum of structural abnormalities, ranging from agenesis and unicornuate uterus to didelphys, bicornuate, and septate uterus [2]. Although individually uncommon, these anomalies are clinically important because they may remain undetected until adolescence, infertility evaluation, pregnancy, or delivery, and they have a recognized association with adverse reproductive and obstetric outcomes. Recent reviews emphasize that müllerian anomalies are not merely anatomic curiosities but important contributors to infertility, recurrent pregnancy loss, malpresentation, preterm birth, and operative delivery [3]. The reported prevalence of congenital uterine anomalies varies widely in the literature because of differences in study populations, imaging modalities, and classification systems [3]. A recent imaging review notes an overall prevalence of about 5.5% in the general population, with higher rates among women with infertility and those with recurrent miscarriage [4]. Similarly, systematic reviews have shown that prevalence estimates differ substantially across studies, reflecting not only true heterogeneity but also variation in diagnostic criteria and the historical lack of standardization in nomenclature.

This variability is especially relevant in clinical research, because the apparent burden of disease and its correlation with pregnancy outcome may depend heavily on how anomalies are defined and classified. Therefore, any study addressing delivery outcome in women with müllerian anomalies must be grounded in clear diagnostic and classification criteria [3].

Classification of müllerian anomalies has evolved considerably over time. The older American Fertility Society system was widely used because of its simplicity, but it was criticized for limited coverage of cervical and vaginal anomalies and for insufficient clarity in complex cases [5]. To address these gaps, the ASRM Müllerian Anomalies Classification 2021 updated terminology and organized anomalies into nine broad categories, improving uniformity in reporting and communication [6]. In parallel, the ESHRE/ESGE system provided an anatomy based approach with specific morphometric criteria, especially for differentiating a septate and bicornuate uterus. The current shift toward standardized classification is important because obstetric risk is not uniform across anomaly types. Septate uterus is more strongly linked to early pregnancy loss, whereas fusion defects such as bicornuate, unicornuate, and didelphys uterus are more often associated with late obstetric complications including preterm labor, malpresentation, fetal growth restriction, and cesarean birth [5].

From a pathophysiological perspective, abnormal uterine morphology can compromise pregnancy through several

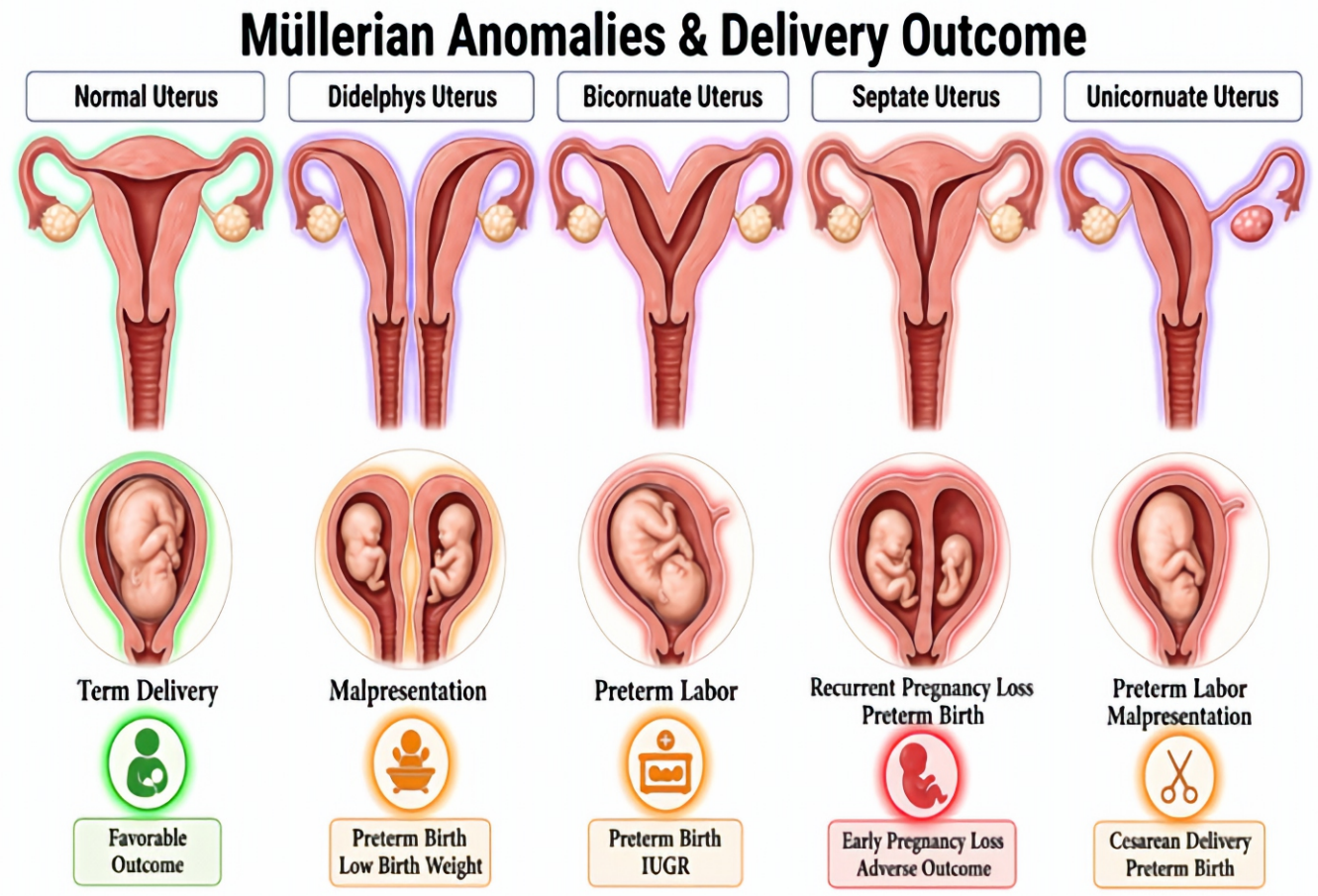

Figure 1: Types of Müllerian anomalies and their associated obstetric and perinatal outcomes.

mechanisms [7]. Reduced uterine cavity volume, asymmetry of the uterine horns, abnormal myometrial architecture, impaired uteroplacental perfusion, and cervical incompetence may each contribute to poor implantation, restricted fetal accommodation, abnormal placentation, and ineffective uterine distension during gestation [8]. As pregnancy advances, these structural constraints can translate into clinically significant complications such as spontaneous abortion, preterm premature rupture of membranes, preterm delivery, fetal malpresentation, intrauterine growth restriction, placental abruption, and increased perinatal morbidity. These mechanisms also help explain why women with certain anomalies often require closer antenatal surveillance and more individualized planning for the timing and mode of delivery [9].

The effect of müllerian anomalies on pregnancy does not end with conception; rather, their greatest clinical relevance is often seen in the second half of gestation and during delivery [10]. A recent systematic review and meta-analysis confirmed that congenital uterine anomalies are associated with impairments in both early and late pregnancy events. Another meta-analysis observed that canalization defects tend to show poorer early reproductive performance, while unification defects more consistently influence obstetric and neonatal outcomes throughout pregnancy. In practical obstetrics, this means that a woman with a uterine anomaly may present with breech or transverse lie, preterm labor, retained placenta, dysfunctional labor, or a need for cesarean section even when conception has occurred successfully. Thus, delivery outcome forms a crucial endpoint in understanding the real clinical burden of these anomalies [11].

Accurate diagnosis is central to both clinical care and research on müllerian anomalies. Modern imaging has improved recognition substantially [12]. Ultrasonography, particularly three-dimensional ultrasonography, is widely used as a first-line tool for evaluating uterine morphology, while MRI is regarded as the preferred modality for detailed delineation of complex anomalies and for distinguishing fusion from resorption defects. Better imaging allows improved antenatal counseling, helps anticipate obstetric complications, and guides decisions regarding route of delivery and the need for referral to higher centers [13]. It also reduces misclassification, which is a major reason for inconsistencies in earlier literature. In a case series evaluating delivery outcome, careful radiologic characterization is therefore essential for correlating a specific anomaly pattern with maternal and fetal outcome at birth [14]. Despite growing awareness, the literature on müllerian anomalies and delivery outcome still has important gaps. Many published studies combine heterogeneous anomaly types, mix infertility and obstetric populations, or emphasize reproductive loss more than labor and delivery endpoints [15].Smaller institutional series remain valuable because they capture real-world clinical presentations, local diagnostic practices, intrapartum decision-making, & neonatal outcome patterns that may not be fully represented in pooled analyses. A case series on müllerian anomalies and delivery outcome is therefore relevant because it provides focused clinical insight into how these congenital uterine malformations behave in actual pregnancies reaching viability and delivery [16]. Such work contributes to a better understanding of antenatal risk stratification, expected mode of delivery, maternal complications, and neonatal outcome, and it strengthens the evidence base for individualized obstetric management in women with these structurally abnormal uteri [11,16]. Types of Müllerian anomalies and related obstetric outcomes **(Figure 1)**.

The aim and objectives of the study were to evaluate the spectrum of Müllerian anomalies and their impact on delivery outcomes, to correlate different types of uterine anomalies with obstetric complications such as malpresentation, preterm delivery, and low birth weight, and to assess maternal and neonatal outcomes to determine the clinical significance of early diagnosis and appropriate obstetric management.

MATERIALS & METHODS

This retrospective case series was conducted at KIMS, Koppal, from March 2024 to March 2025 and included 10 pregnant women with Müllerian anomalies diagnosed either before pregnancy, during antenatal ultrasonography, or incidentally at lower segment caesarean section. All pregnancies beyond 28 weeks of gestation with uterine anomalies were included. Detailed clinical data regarding age, obstetric history, presenting complaints, gestational age, examination findings, intraoperative diagnosis, mode of delivery, and maternal and neonatal outcomes were collected and analyzed. The study primarily assessed the types of uterine anomalies and their association with obstetric complications, fetal presentation, preterm delivery, low birth weight, and perinatal outcome.

RESULTS

The study population demonstrates a uniform age distribution within the reproductive period, with equal representation in the 20-24 years (50%) and 25-29 years (50%) groups, indicating that Müllerian anomalies in this series predominantly affect women in early to mid-reproductive age. This balanced distribution suggests no age predilection within this limited cohort but highlights that these anomalies are commonly encountered during peak fertility years, thereby having direct implications on obstetric outcomes and delivery planning **(Table 1)**. The obstetric profile shows a predominance of multigravida women (70%) compared to primigravida (30%), indicating that Müllerian anomalies are more frequently encountered in women with prior reproductive exposure. A notable proportion had a history of previous abortion (40%), suggesting a potential association between uterine anomalies and adverse reproductive outcomes. Additionally, 30% of cases had a previous LSCS, reflecting increased operative delivery rates, likely due to altered uterine anatomy & associated obstetric complications **(Table 2)**. The clinical presentation is predominantly characterized by pain abdomen (70 %), indicating

that symptomatic uterine activity is the most common mode of admission, while combined symptoms with PV leak (20%) and isolated PV leak (10%) reflect associated membrane complications. Most patients were admitted in latent labour (70%), suggesting early hospital presentation, whereas 30% were in active labour. Additionally, hypertensive disorders were present in 30% of cases, highlighting a significant association of Müllerian anomalies with obstetric comorbidities that may influence delivery outcomes **(Table 3)**. The distribution of Müllerian anomalies shows a clear predominance of arcuate uterus (50%), indicating it as the most common variant in this series, followed by bicornuate uterus (20%), while septate, unicornuate uterus, and uterus didelphys each accounted for 10%. This pattern suggests that milder structural anomalies are more frequently encountered, whereas complex fusion defects are relatively less common. The variability in anomaly types reflects differing degrees of uterine maldevelopment, which can have differential impacts on pregnancy course and delivery outcomes **(Table 4)**. The fetal outcome profile demonstrates a predominance of malpresentation, with breech/podalic presentation in 70% of cases compared to cephalic in 30%, indicating a strong association of Müllerian anomalies with abnormal fetal lie due to altered uterine cavity shape. Despite this, most deliveries occurred at term (>37 weeks, 70%), while 30% were preterm (34–37 weeks), suggesting that although malpresentation is common, satisfactory gestational duration can still be achieved in a significant proportion of cases **(Table 5)**.The intraoperative and maternal outcome profile shows a predominance of breech extraction (60%) over cephalic (40%), consistent with the high rate of malpresentation associated with Müllerian anomalies. All patients underwent caesarean section (100%), reflecting the need for operative delivery due to altered uterine anatomy and obstetric risk. Postpartum hemorrhage occurred in 30% of cases, indicating a notable hemorrhagic risk, although blood transfusion was required in only 10%. Importantly, maternal outcome was favorable in all cases (100%), suggesting effective perioperative management despite increased obstetric complexity **(Table 6)**. The neonatal outcome profile indicates that most neonates had normal birth weight (≥2.5 kg, 70 %), while 30 % were low birth weight, reflecting a moderate impact of Müllerian anomalies on fetal growth. Half of the neonates required SNCU admission (50%), suggesting increased perinatal surveillance needs despite relatively preserved birth weights in most cases. Importantly, neonatal survival was 100%, demonstrating that with appropriate obstetric and neonatal care, favorable perinatal outcomes can be achieved even in high-risk pregnancies associated with uterine anomalies **(Table 7 A & B)**. The anomaly-wise perinatal outcome demonstrates that arcuate uterus cases had uniformly favorable outcomes with all deliveries at term (>37 weeks) and no PPROM or preterm births, indicating minimal adverse impact. In contrast, a bicornuate uterus showed mixed outcomes with the occurrence of PPROM and both preterm and term deliveries, reflecting higher obstetric risk. Septate and unicornuate uterus were associated with term deliveries without complications, while uterus didelphys showed preterm delivery (34–37 weeks), suggesting variable perinatal outcomes depending on the type and severity of Müllerian anomaly **(Figure 2)**.

Table 1: Age Distribution of Cases (n = 10)

Age group (years)	n	%
20 to 24	5	50%
25 to 29	5	50%
Total	**10**	**100%**

Table 2: Obstetric Profile of Cases (n = 10)

Variable	Category	n	%
Gravidity	Primigravida	3	30%
	Multigravida	7	70%
Previous abortion	Present	4	40%
	Absent	6	60%
Previous LSCS	Present	3	30%
	Absent	7	70%

Table 3: Clinical Presentation at Admission (n = 10)

Variable	Category	n	%
Presenting complaint	Pain in the abdomen only	7	70%
	Pain in the abdomen with PV leak	2	20%
	PV leak only	1	10%
Labour status on admission	Latent labour	7	70%
	Active labour	3	30%
Hypertensive disorder in pregnancy	Present	3	30%
	Absent	7	70%

Table 4: Distribution of Müllerian Anomalies (n = 10)

Type of anomaly	n	%
Arcuate uterus	5	50%
Bicornuate uterus	2	20%
Septate uterus	1	10%
Unicornuate uterus	1	10%
Uterus didelphys	1	10%
Total	**10**	**100%**

Table 5: Fetal Presentation and Gestational Age at Delivery (n = 10)

Variable	Category	n	%
Fetal presentation	Breech / podalic	7	70%
	Cephalic	3	30%
Gestational age at delivery	34 to 37 weeks	3	30%
	More than 37 weeks	7	70%

Table 6: Intraoperative and Maternal Outcome Profile (n = 10)

Variable	Category	n	%
Type of extraction	Breech extraction	6	60%
	Cephalic extraction	4	40%
Mode of delivery	Caesarean section	10	100%
Postpartum hemorrhage	Present	3	30%
	Absent	7	70%
Blood transfusion	Present	1	10%
	Absent / not documented	9	90%
Maternal outcome	Mother stable/good	10	100%

Table 7: Neonatal Outcome and Anomaly-wise Perinatal Outcome (n = 10) (A) Overall neonatal outcome

Variable	Category	n	%
Birth weight	Low birth weight (<2.5 kg)	3	30%
	Normal birth weight (≥2.5 kg)	7	70%
SNCU admission	Yes	5	50%
	No	5	50%
Neonatal survival	Alive	10	100%

Table 7: (B) Anomaly-wise perinatal outcome

Type of anomaly	PPROM	34 to 37 weeks	>37 weeks
Arcuate uterus	0	0	5
Bicornuate uterus	1	1	1
Septate uterus	0	0	1
Unicornuate uterus	0	0	1
Uterus didelphys	0	1	0

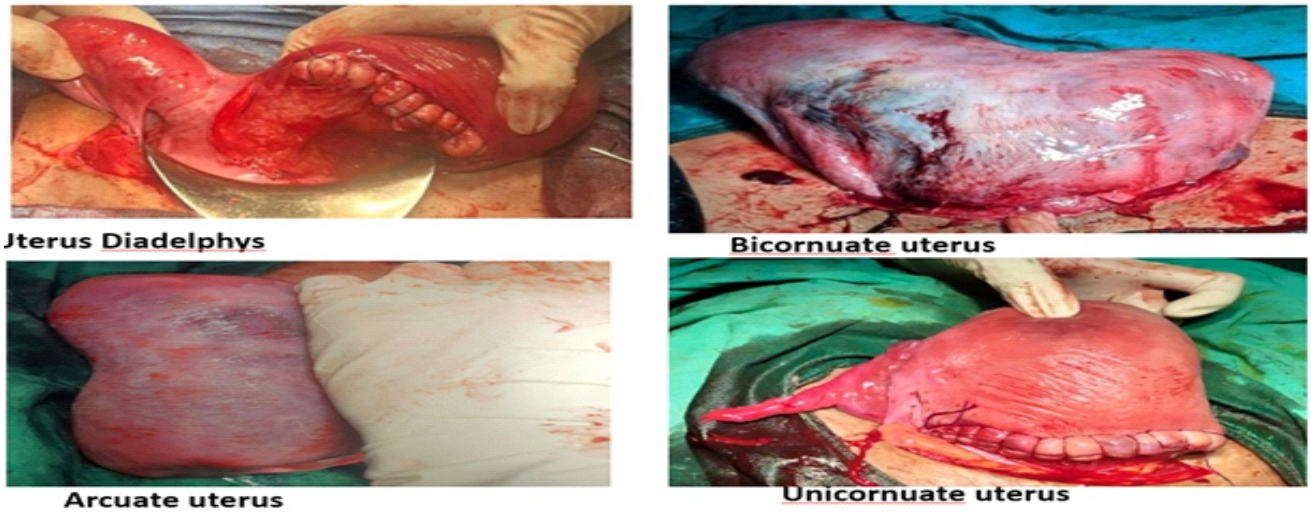

Figure 2: Intraoperative photographs showing different types of Müllerian anomalies encountered in the study, including uterus didelphys, bicornuate uterus, arcuate uterus, and unicornuate uterus.

DISCUSSION

Our finding that Müllerian anomalies were uniformly distributed between the 20 to 24 years and 25 to 29 years age groups, indicating presentation during peak reproductive life, is comparable with Mert et al. (2022), who studied women with uterus unicornis and reported a mean age of 28.65 ± 5.03 years (range 22 to 39 years); among those who conceived, the live birth rate was 85.7% and preterm delivery occurred in 21.4%, underscoring the obstetric relevance of these anomalies in reproductive-age women. Similar correlation was shown by Wang et al. (2023) in a larger cohort of 457 singleton pregnancies with Müllerian anomalies, where the mean maternal age was 29.82 ± 4.08 years (range 19 to 49 years), and adverse outcomes were frequent, including preterm delivery 27.4%, PPROM 29.1%, and malpresentation 34.4%. Thus, our age distribution is consistent with literature showing that Müllerian anomalies are chiefly encountered during active reproductive years, when their impact on pregnancy and delivery becomes clinically significant [17,18].

Our finding of predominance of multigravida women (70%), with substantial previous abortion (40%), previous LSCS (30%), frequent pain abdomen (70%), PV leak, latent-labour admission, and hypertensive disorders (30%), is consistent with contemporary literature showing that Müllerian anomalies are associated with adverse reproductive and obstetric outcomes. In the large cohort by Wang et al., women with Müllerian anomalies had significantly high rates of preterm delivery (27.4%), PPROM (29.1%), malpresentation (34.4%), and caesarean section (77.2%), confirming the strong tendency toward operative delivery and membrane-related complications in this group. Similarly, the meta-analysis by Kim et al. demonstrated significantly increased risks of first-trimester miscarriage (OR 1.79; 95% CI 1.34 to 2.40), second-trimester miscarriage (OR 2.92; 95% CI 1.35 to 6.32), preterm birth (OR 2.98; 95% CI 2.43 to 3.65), caesarean section (OR 2.87; 95% CI 1.56 to 5.26), preeclampsia (OR 1.25; 95% CI 1.07 to 1.46), and PPROM (OR 3.50; 95% CI 2.22 to 5.54), supporting our observed burden of abortion, LSCS, membrane complications, and hypertensive comorbidity[17,19].

Our finding that arcuate uterus was the commonest anomaly (50%), followed by bicornuate uterus (20%), with breech/podalic presentation in 70% and term delivery in 70%, is partly comparable with recent literature showing that obstetric risk varies by anomaly type. In the large cohort by Wang et al., the commonest subtype was septate uterus (38.7%), followed by unicornuate (27.8%), arcuate (10.9%), didelphys (5.9%), and bicornuate uterus (4.2%); overall malpresentation occurred in 34.4% and preterm delivery in 27.4%, while among arcuate uterus specifically, malpresentation was 30.0% and preterm birth 24.0%. This pattern is reinforced by the 2024 meta-analysis of 32 studies by Campo et al., which showed that congenital uterine anomalies significantly increased foetal malpresentation (OR 21.04, 95% CI 10.95 to 40.44) & preterm birth (OR 4.34, 95% CI 3.59 to 5.21); subtype analysis also confirmed elevated malpresentation risk for arcuate uterus (OR 11.38) and bicornuate uterus (OR 17.96). Thus, although our anomaly distribution differs, our high breech rate with largely term delivery remains biologically and clinically consistent with current evidence[11,17].

In the meta-analysis by Kim et al. (2021), congenital uterine anomalies were associated with significantly higher odds of malpresentation (OR 9.10, 95% CI 5.88 to 14.08), caesarean section (OR 2.87, 95% CI 1.56 to 5.26), preterm delivery (OR 2.98, 95% CI 2.43 to 3.65) and PPROM (OR 3.50, 95% CI 2.22 to 5.54), with even higher malpresentation and caesarean risks in bicornuate and didelphys uteri. Wang et al. (2023) similarly reported caesarean delivery in 77.2%, with breech baby as the commonest indication (33.4%), and lower mean birth weight (2924.06 ± 618.74 g) in affected pregnancies; subtype analysis showed arcuate uterus had relatively better outcomes, whereas didelphys and bicornuate uteri showed greater malpresentation or low-birth-weight burden. More recently, Campo et al. (2024) confirmed strongly increased risks of foetal malpresentation (OR 21.04, 95% CI 10.95 to 40.44) and caesarean delivery (adjusted OR 7.69, 95% CI 4.17 to 14.29), with bicornuate uterus showing the broadest adverse profile. Thus, our anomaly-wise pattern of favorable arcuate outcomes versus higher-risk bicornuate and didelphys cases is well supported[11,17,20].

CONCLUSION

This case series demonstrates that congenital Müllerian anomalies significantly affect pregnancy and delivery outcomes. These anomalies were associated with increased rates of malpresentation, preterm delivery, and low birth weight babies, indicating considerable obstetric and perinatal risk. Arcuate uterus was the commonest anomaly and showed relatively favorable term outcomes, while bicornuate, septate, unicornuate uterus, and uterus didelphys were more often linked with adverse outcomes. Therefore, congenital uterine anomalies should be recognized as important risk factors during pregnancy. Early antenatal diagnosis, regular surveillance, and timely obstetric management are essential for reducing complications and improving maternal, fetal, and overall perinatal outcomes in such pregnancies.

LIMITATIONS & FUTURE PERSPECTIVES

The study's limitations include a single-centre setting, a relatively small sample size, and a short study duration, which may limit the broader applicability of the results. Future studies should incorporate multicentre designs with larger populations to enhance validity, assess long-term outcomes, and investigate advanced diagnostic and management approaches. Such efforts will improve overall patient care and help minimize complications.

CLINICAL SIGNIFICANCE

The clinical significance of this study lies in its potential to bridge the gap between research findings and practical healthcare applications. It emphasizes the importance of translating scienti-

fic observations into meaningful improvements in patient care diagnosis, and treatment outcomes. By highlighting real world relevance, the study contributes to evidence-based medical practice and supports informed clinical decision making. Ultimately, the findings aim to enhance patient quality of life, optimize therapeutic strategies, and promote better disease management in clinical settings.

ABBREVIATIONS

LSCS: Lower Segment Caesarean Section
PV leak: Per Vaginal Leak
PPROM: Preterm Premature Rupture of Membranes
PPH: Postpartum Hemorrhage
SNCU: Special Newborn Care Unit
OR: Odds Ratio
CI: Confidence Interval

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AUTHOR CONTRIBUTIONS

All authors significantly contributed to the study conception and design, data acquisition, or data analysis and interpretation. They participated in drafting the manuscript or critically revising it for important intellectual content, consented to its submission to the current journal, provided final approval for the version to be published, and accepted responsibility for all aspects of the work. Additionally, all authors meet the authorship criteria outlined by the International Committee of Medical Journal Editors (ICMJE) guidelines.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

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ETHICAL APPROVAL & CONSENT TO PARTICIPATE

All necessary consent & approval was obtained by authors.

CONSENT FOR PUBLICATION

All necessary consent for publication was obtained by authors.

DATA AVAILABILITY

All data generated and analyzed are included within this research article. The data sets utilized and/or analyzed in this study can be obtained from the corresponding author upon a reasonable request.

USE OF ARTIFICIAL INTELLIGENCE (AI) & LARGE LANGUAGE MODEL (LLM)

The authors confirm that no AI & LLM tools were used in thewriting or editing of the manuscript, and no images were altered or manipulated using AI & LLM.

AUTHOR'S NOTE

This article serves as an important educational tool for the scientific community, offering insights that may inspire future research diretions. However, they should not be relied upon independently when making treatment decisions or developing public health policies.

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REFERENCE

1. Passos IdMP e, Britto RL. Diagnosis and treatment of müllerian malformations. Taiwan J Obstet Gynecol. 2020;59 (2):183-188. doi:10.1016/j.tjog.2020.01.003.
2. Acién M, Acién P. Müllerian duct development. Early Pregnancy. 2017;90:1-278.
3. Dixit R, Duggireddy C S, Pradhan G S. Mullerian anomalies:

revisiting imaging and classification. Insights Imaging. 2025; 16(1):1-20. doi:10.1186/s13244-025-01857-4.

4. Liang C, Chung HF, Dobson AJ, Mishra GD. Infertility, miscarriage, stillbirth, and the risk of stroke among women: a systematic review and meta-analysis. Stroke. 2022;53(2) :328-337. doi:10.1161/STROKEAHA.121. 036151.
5. Pfeifer SM, Attaran M, Goldstein J, Lindheim SR, Petrozza JC, Rackow BW, et al. ASRM müllerian anomalies classification 2021. Fertil Steril. 2021;116(5):1238-1252. doi:10.1016/j.fertnstert.2021.09.160.
6. Ludwin A, Pfeifer SM. Reproductive surgery for müllerian anomalies: a review of progress in the last decade. Fertil Steril. 2019;112(3):408-416. doi:10.1016/j.fertnstert.2019.06.033.
7. Reichman DE, Laufer MR. Congenital uterine anomalies affecting reproduction. Best Pract Res Clin Obstet Gynaecol. 2010;24(2):193-208. doi:10.1016/j.bpobgyn.2009.09.004.
8. Ameer MA, Peterson DC. Anatomy, abdomen and pelvis: uterus. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025:1-10.
9. Li D, Na Z, Wang X. Ultrasound evaluation of reproduction-related gynecologic conditions. In: Ultrasonography of the Female Reproductive System. Springer; 2025:177-278.
10. Bortoletto P, Romanski PA, Pfeifer SM. Müllerian anomalies: presentation, diagnosis, and counseling. Obstet Gynecol. 2024;143(3):369-377. doi:10.1097/AOG.000000000005484.
11. Campo MC, Milán FP, Roig MC, Bartolomé EM, Arroyo JD, Zambrano JA, et al. Impact of congenital uterine anomalies on obstetric and perinatal outcomes: systematic review and meta-analysis. Facts Views Vis Obgyn. 2024;16(1):9-24. doi:10.52 054/FVVO.16.1.119.
12. Cekdemir YE, Mutlu U, Acar D, Altay C, Secil M, Dogan OE. The accuracy of three-dimensional ultrasonography in the diagnosis of Müllerian duct anomalies and its concordance with magnetic resonance imaging. J Obstet Gynaecol. 2022;42(1):67-73. doi:10.1080/01443615.2020.1867965.
13. Graupera B, Pascual M, Hereter L, Browne J, Úbeda B, Rodríguez I, et al. Accuracy of three-dimensional ultrasound compared with magnetic resonance imaging in diagnosis of Müllerian duct anomalies using ESHRE-ESGE consensus on the classification of congenital anomalies of the female genital tract. Ultrasound Obstet Gynecol. 2015;46(5):616-622. doi:10 .1002/uog.14814
14. Behr SC, Courtier JL, Qayyum A. Imaging of müllerian duct anomalies. Radiographics. 2012;32(6):233-250. doi:10.1148 /rg.326125515.
15. Santana González L, Artibani M, Ahmed AA. Studying Müllerian duct anomalies-from cataloguing phenotypes to discovering causation. Dis Model Mech. 2021;14(6):1-14. doi:10.1242/dmm.047977.
16. Akhtar M, Saravelos S, Li TC, Jayaprakasan K, Royal College of Obstetricians and Gynaecologists. Reproductive implicati-ons and management of congenital uterine anomalies: scientific impact paper No. 62 November 2019. BJOG. 2020; 127(5):1-13. doi:10.1111/1471-0528.15968.
17. Wang S, Wang K, Hu Q, Liao H, Wang X, Yu H. Perinatal outcomes of women with Müllerian anomalies. Arch Gynecol Obstet. 2023;307(4):1209-1216. doi:10.1007/s00404-022-06747-0.
18. Mert SA, Dilbaz B, Cukurova ES, Kose C, Ustun YE. Reproductive outcome of the patients with uterus unicornis: five year experience in a tertiary center. Acta Med Litu. 2022; 29(2):295-301. doi:10.15388/Amed.2022.29.2.9.
19. Kim MA, Kim HS, Kim YH. Reproductive, obstetric and neonatal outcomes in women with congenital uterine anomalies: a systematic review and meta-analysis. J Clin Med. 2021;10(21):1-23. doi:10.3390/jcm10214797.
20. Tellum T, Bracco B, De Braud L, Knez J, Ashton-Barnett R, Amin T, et al. Reproductive outcome in 326 women with unicornuate uterus. Ultrasound Obstet Gynecol. 2023;61(1): 99-108. doi:10.1002/uog.24894.