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Frequency and types of congenital uterine anomalies during caesarean section: A prospective cohort study

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ABSTRACT

Background: Congenital uterine anomalies are due to mal-development of the mullerian ducts. They can lead to adverse reproductive outcomes like recurrent miscarriage, preterm birth, foetal malpresentation and subfertility. Prevalence of congenital uterine anomalies is 5-7%.

Objective: To find the frequency and types of congenital uterine anomalies during caesarean section.

Materials and Methods: This is a prospective cohort study done at SDM College of Medical Sciences and Hospital, Dharwad, India from August 2020 to July 2021. 2932 women undergoing caesarean section participated in the study. The uterus was examined thoroughly. The type of uterine anomaly was noted.

Results: There were 22 cases of congenital uterine anomalies (CUAs) during caesarean section. Prevalence of CUA was 0.75%. There was increased incidence of miscarriage(27%), pre-eclampsia (31.8%), foetal malpresentation (31.8%), foetal growth restriction (9%) and preterm caesarean section (40.9%) among women with a uterine anomaly. Commonest type of CUA was unicornuate uterus (31.8%), followed by septate (27.2%), arcuate (22.7%) and bicornuate uterus (18.1%). Poorest outcomes were seen with septate and unicornuate uteri.

Conclusion: Caesarean section provides an opportunity to diagnose congenital uterine anomalies. This information can be used to plan their future reproductive life. Exploring the uterus to look for uterine anomalies after delivery of the fetus and placenta has to be done and documented.

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1. Introduction

Congenital uterine anomalies (CUAs) are due to mal-development of the mullerian ducts. CUAs are not uncommon and can have serious reproductive consequences for the woman like recurrent miscarriage, infertility, foetal mal-presentation and caesarean section. Diagnosis before a pregnancy is challenging. Incidental diagnosis at the time of caesarean section is an opportunity to document and find the prevalence. Women diagnosed with a CUA can be counselled about their future gynaecological and obstetric management, like use of intrauterine contraceptive device¹

as studied by Gerkowicz S A and colleagues in 2019, insertion of cervical cerclage during subsequent pregnancy, and being cautious during evacuation of miscarriages. Cunnigham F and co-workers (2018) have noted a prevalence of 5% among the general population,² while Prior M and co-workers (2018) noted a prevalence of 18.2% among subfertile women.³

There are two main classification systems for CUAs. The American Society for Reproductive Medicine classification(ASRM, 1988) is user friendly. In 2016, ASRM introduced a guideline for differentiating septate from bicornuate uteri.⁴ The ASRM Mullerian Anomalies Classification 2021 (MAC 2021) by Samantha Pfeifer and co-workers classifies mullerian anomalies into nine

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categories.⁵ The ESHRE/ESGE classification (European Society of Human Reproduction and Embryology/European Society for Gynaecological Endoscopy, 2013) uses 3D ultrasound to define the anomaly. Ludwin A and Ludwin I opined that with the use of ESHRE/ESGE classification, there is significantly increased frequency of septate uterus recognition.⁶ Some newer classifications which have emerged are vagina cervix uterus adnexa-associated malformation (VCUAM) classification, and the Congenital Uterine Malformation Experts group (CUME) classification.⁷

2D transvaginal sonography and hysterosalpingography (HSG) are screening tools for CUA, while 3D TVS is considered the gold standard. MRI and hysteroscopy are other methods to look for mullerian anomalies. El Huseiny and co-workers (2014) compared 3D ultrasound with laparoscopy and hysteroscopy to diagnose uterine anomalies. They found 3D ultrasound and laparoscopy and hysteroscopy to be comparable in differentiating between various types of mullerian anomalies.⁸

CUAs can cause poor reproductive outcomes like infertility, recurrent miscarriage, preterm delivery, foetal mal-presentation, foetal growth restriction, pre-eclampsia and stillbirth.⁹ The aim of CUA management is to prevent complications during pregnancy and delivery. Monica Krishnan and colleagues (2021) found that hysteroscopic septal resection reduces miscarriage rates (OR 0.25, 95% CI 0.07–0.88) and foetal malpresentations during labour (OR 0.22, 95% CI 0.06–0.73), while it had no effect on live birth, clinical pregnancy rate or preterm delivery.¹⁰

The aim of conducting this study was to find the frequency and types of congenital uterine anomalies during caesarean section. The diagnosis can help to improve their future reproductive outcomes.

2. Materials and Methods

This was a prospective cohort study at SDM College of Medical Sciences and Hospital, Dharwad, India. The objective of the study was to find the frequency and types of congenital uterine anomalies during caesarean section. Study period was one year from August 2020 to March 2021. Ethical clearance was obtained from the institutional ethics committee. Informed written consent was obtained from the patients. Inclusion criteria were women who underwent caesarean section during the study period. Exclusion criteria were individual's refusal or dense adhesions preventing proper examination of the uterus. 2932 women participated in the study. After the delivery of the baby and the placenta, the uterus was examined thoroughly. Examination included checking the uterus both externally and internally. The uterus was exteriorised and contour and shape of the uterine fundus, presence of rudimentary horn, attachment of the fallopian tubes, and unicornuate or bicornuate uterus was noted. Uterine

cavity was checked for presence of partial or complete septum, bicornuate uterus with 2 communicating cavities or rudimentary horn with no communication was noted. The American Society for Reproductive Medicine (ASRM) classification was used to classify the uterine anomaly.⁵ The findings were recorded on a proforma with drawings and photos. The women were counselled post-operatively. Their future reproductive options were discussed. Appropriate contraception was advised. Primary outcome measured was the frequency of uterine anomaly. Secondary outcomes measured were the type of uterine anomaly, indication for caesarean section, rate of preterm caesarean section, foetal malpresentation, pre-eclampsia and foetal growth restriction. Primary and secondary outcomes were analysed by percentage to determine frequency.

3. Results

There were 2932 participants. All participants were of south Asian ethnicity. Age of the participants ranged from 21 to 35 years (average 24 years). They had been married for 1-7 years. Data was obtained from caesarean section notes and obstetric records. There were 5298 deliveries during the study period. The number of caesarean sections performed was 2932. The rate of caesarean sections was 55.34%. Ours being a university hospital and a tertiary referral centre, a high rate of caesarean sections is expected. This mimicks the increased trend towards caesarean section globally. All caesarean sections (2932) were included in our study. Congenital uterine anomalies were found in 22 women (0.75%) as seen in Table 1.

Table 1: Prevalence of CUA during caesarean section

Caesarean section	Normal uterus	Uterine anomaly	Total cases
Number	2910	22	2932
Percentage	99.25	0.75	100

Frequency is shown as percentage of uterine anomalies.

Majority of the women had conceived spontaneously. Two women had conceived with ovulation induction. Eight women (36.3%) had history of poor reproductive outcomes like recurrent miscarriage, preterm birth and stillbirth. They had septate (3), unicornuate (2), bicornuate (1) and arcuate (2) uteri. Eight women had a scarred uterus due to previous caesarean section (Table 2).

Nine women (40.9%) underwent preterm caesarean section before 37 weeks (Table 3). Four women among them underwent preterm caesarean section before 34 weeks. Complete uterine septum was noted in two of them. 13 women had caesarean section at term. Two women had cervical cerclage, one with bicornuate uterus and the other with unicornuate uterus. They had cervical cerclage inserted at 16 and 17 weeks respectively. Seven women (31.8%) developed preeclampsia and foetal growth

restriction was seen in 2 babies (9%). Commonest indication for caesarean section was suspected foetal distress, followed by scarred uterus due to previous caesarean section and foetal malpresentation (Table 4). The incidence of foetal malpresentations was 31.8%. All the malpresentations were breech.

Table 2: Parity

Parity	Number	Percentage
Primigravida	14	63.7
Multigravida(scarred uterus)	8	36.3

Scarred uterus due to previous caesarean section.

Table 3: Gestation at the time of caesarean section

Gestation	Number	Percentage
Preterm(<37 weeks)	9	40.9
Term	13	59.1

Incidence of preterm caesarean sections

Table 4: Indications for caesarean section

Indication	Number
Suspected Foetal distress	7
Previous CS	5
Breech	5
Premature rupture of membranes	3
Bicornuate uterus	1
IUD abruption (previous CS)	1

IUD- Intrauterine death. CS- Caesarean section

Commonest type of CUA in our study was unicornuate uterus (31.8%), followed by septate uterus (27.2%). Two women had complete uterine septum. Arcuate uterus was seen in 22.7% of women and bicornuate uterus in 18.1% (Table 5).

Table 5: Type of CUA at caesarean section

Type of CUA	Number	%
Unicornuate	7	31.8
Septate	6	27.2
Arcuate	5	22.7
Bicornuate	4	18.1

CUA- Congenital uterine anomaly

There was one perinatal loss due to intrauterine foetal death at 29+5 weeks secondary to abruptio placentae and associated with a complete uterine septum. There were no intra-operative complications.

4. Discussion

There were 22 patients with congenital uterine anomalies (CUAs) in our study. Prevalence of CUA was 0.75%.

There was increased incidence of miscarriage (27%), pre-eclampsia (31.8%), foetal malpresentation (31.8%), foetal growth restriction (9%) and preterm caesarean section (40.9%) among women with a uterine anomaly. Commonest type of CUA was unicornuate uterus (31.8%), followed by septate (27.2%), arcuate (22.7%) and bicornuate uterus (18.1%). Poorest outcomes were seen with septate and unicornuate uteri.

CUA can be associated with adverse obstetric outcomes. Prenatal diagnosis of CUA remains elusive. However, many cases of CUAs are diagnosed incidentally during caesarean section. Our study aimed to find the frequency and types of CUAs during caesarean sections.

The prevalence of CUA in our study was 0.75%, which is similar to a study by Mukta Jain and co-workers (2022).¹¹ They evaluated the prevalence of mullerian anomalies during caesarean section over a one-year period. Out of 1835 caesarean sections, 12 patients (0.65%) were found to have uterine anomaly. Prevalence in our study is less than reported by Magdy A and colleagues (2019)¹² They looked at 653 caesarean sections and found a prevalence of 4.75%. A low prevalence in our study can be attributed to lack of awareness. Another limitation of our study was the exclusion of vaginal deliveries.

There was an increased incidence of miscarriage (27%), pre-term caesarean section (40.9%), malpresentation (31.8%), pre-eclampsia (31.8%) and foetal growth restriction (9%) in our study. They were more commonly seen in septate and unicornuate uteri. These outcomes are similar to a study by Magdy A and colleagues (2019),¹² where history of miscarriages and preterm labour were higher in women with uterine anomalies and also lower gravidity when compared to women with normal uterus (58.1%, 35.5%, 2.6±1.26 vs 34.6%, 12.2%, 3.4±1.54 respectively). They also noted increased frequency of caesarean section due to malpresentation (32.3% vs 18%). A retrospective study by Fox and co-workers (2014)⁹ looked at pregnancy outcomes according to the type of uterine anomaly. They found that pregnancy outcomes worsened with minor fusion defects (arcuate, septate and T-shaped) and major fusion defects (unicornuate, bicornuate, didelphys). These included preterm birth, low birth weight, malpresentation, pre-eclampsia, caesarean section and still-birth. This is similar to our study where the poorest outcomes were seen in septate uteri. Another study with comparable outcomes is a meta-analysis by Panagiotopoulos and co-authors (2021).¹³ In their study, CUA were associated with increased incidence of preterm birth (25%), foetal malpresentation (40%), caesarean birth (64%), foetal growth restriction (15%), preeclampsia (5%) and cervical insufficiency (13%).

The commonest indication for caesarean section in our study was suspected foetal distress followed by scarred uterus and malpresentation. This differs from Magdy A et

al.¹² who had scarred uterus as the most frequent cause for caesarean section.

The common types of uterine anomaly found in our study were unicornuate (31.8%) and septate uteri (27.2%), followed by arcuate uteri (22.7%) and bicornuate uteri (18.1%). The incidence of unicornuate uterus was higher than that reported by Magdy et al.¹² who reported higher number of cases of septate and sub-septate uterus (71%), bicornuate uterus (19.4%), unicornuate uterus (6.4%) and uterine didelphis (3.2%). The reason could be due to their adverse pregnancy outcomes and increased incidence of caesarean sections. Another study with different outcome from our study is by Roy M and co-authors (2022).¹⁴ They looked at caesarean section done for abnormal presentations. They found an incidence of 13.63%. The commonest anomaly was arcuate uterus (45.83%), septate/subseptate uterus (20.83%), bicornuate uterus (20.83%) and unicornuate uterus (12.5%). Another comparable study is by Reyes-Munoz E (2019) who looked at the prevalence of mullerian anomalies in Mexican infertile women by hysteroscopy and laparoscopy.¹⁵ The prevalence was 4.4% and the commonest anomaly was septate uterus at 54.2%.

5. Limitations

We have excluded vaginal deliveries from our study as we felt that women with normal reproductive outcomes are more likely to have normal uteri. This could be one of the reasons for low prevalence of CUAs in our study. There was no comparison group of women with normal uteri.

6. Conclusions

Congenital uterine anomalies are sometimes associated with complications during pregnancy and delivery. Caesarean section is an opportunity to screen for such anomalies. Exploring the uterus to look for uterine anomalies after delivery of the fetus and placenta has to be done and documented.

7. Conflicts of Interest

None.

8. Acknowledgement

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