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Research Article

Obstetric outcomes in women with mullerian duct malformations

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ABSTRACT

Background: Congenital uterine anomalies are associated with the highest incidence of reproductive failure and obstetric complications. This study aims to summarize the clinical characteristics and prenatal outcome of pregnancy in women with congenital uterine malformations.
Methods: This retrospective study evaluates the obstetric outcome of 24 in patients with uterine malformations with pregnancy in Sapthagiri Hospital from August 2010 to August 2013. A total of 60 randomly selected pregnant women with a previously confirmed normally shaped uterus were taken as a control group.
Results: A total of 2595 women were admitted for various obstetric reasons during August 2010-2013 (period of 3 years). Of them 24 cases had uterine anomaly, the rate of anomaly being 9.2 per 1000 pregnant women. A bicornuate uterus was present in 7 (29%) septate uterus in 6 (25%) arcuate in 5 (20.8%), and unicornuate with rudimentary horn in 2 (8.4%). Unicornuate uterus without rudimentary horn in 1 (4.2%) and uterus didelphys in 1 (4.2%). Transverse vaginal septum was seen in 2 (8.4%) patients. The rate of malpresentation was high in uterus didelphys, arcuate and bicornuate uterus. Abortion rates were equal in both septate and bicornuate uterus. A comparison of mode of presentation and termination of pregnancy is illustrated. Preterm deliveries (33.4%) and miscarriage rates (20.8%) were more common compared to controls. Less than half the women (45.8%) had term deliveries compared to controls where pregnancies which reached term were 86.7%. An assessment of mode of delivery, termination, period of gestation at delivery and birth weight between study group and control group is given.
Conclusions: Women with congenital uterine malformation usually have higher incidence of complications during pregnancy and delivery. Early diagnosis and treatment can improve obstetric outcomes.

Keywords: Congenital, Mullerian anomalies, Obstetric outcome

INTRODUCTION

Congenital uterine anomalies result from failure of or incomplete development, fusion or canalisation of one or both Mullerian ducts during foetal life.[1] These anomalies have been associated with an increased rate of miscarriage, preterm delivery and other adverse foetal outcomes.[2] They represent a rather common benign condition with a wide ranging incidence. The true pervasiveness of uterine anomalies in the population is unknown. It is insufficient to consult the older medical literature because of inconsistent diagnostic techniques used in the earlier studies, and the heterogeneity of the subject populations that were studied. The prevalence ranges from 4 to 7 % among the general population and much higher among high risk population such as recurrent aborters.[3] Apart from their effect on the live pregnancy rate it can occasionally cause life threatening

complications in women and severe health problems in the adolescence.[4] Uterine anomalies were first noted in 19th Century by Strassman who described the septate and bicornuate uterus. However, it was only in 1988 that the American Fertility Society came out with the first classification based on work of Buttram and Gibbons. Until now, three systems have been proposed for the classification of female genital tract anomalies, the American Fertility Society(currently American Society of Reproductive Medicine system, ASRM),[5] the embryological-clinical classification system of genito-urinary malformations[6] and the Vagina, Cervix, Uterus, Adnexae and associated Malformations system based on the Tumour, Nodes, Metastases principle in oncology.[7] In an attempt to provide clinicians with a tool to better document the actual anomaly, European Society of Human Reproduction and Embryology (ESHRE) and European Society of Gynaecological Endoscopy (ESGE) is coming out with a new classification based on anatomy as the basic characteristic. The proposed classification has six classes, spanning from normal uterus, dysmorphic uterus, septate, unilaterally formed uterus, aplastic or dysplastic uterus and unclassified malformation. Co existent sub classes comprise cervical and vaginal anomalies. Cervical anomalies have four classes, normal, septate, double normal, unilateral aplasia or dysplasia and aplasia or dysplasia. Vaginal abnormalities include normal vagina, longitudinal non obstructing vaginal septum, longitudinal obstructing vaginal septum, transverse vaginal septum or imperforate hymen and vaginal aplasia.[8] There are various severities of uterine anomalies that range from complete agenesis to different phenotypes. These abnormalities can be diagnosed using a combination of gynaecological examination, 2 dimensional (2D) and particularly 3 dimensional ultrasound (3DUS), sonohysterogram, hysteroscopy and/or laparoscopy. Normal pregnancies can occur in patients with mullerian duct anomalies, but obstetric complications are frequent. Adequate assessment is essential in these patients which could further improve their prenatal outcome. In the present study, we evaluated the pregnancy outcome of patients with uterine malformations in comparison with normal uteri. This study aimed to improve our comprehension of the inadequately understood outcome of pregnancies in patients with uterine anomalies that could be used in the counselling of women confronting potentially worrisome confinements.

METHODS

Patients and clinical data

This is a single-centre study that presents a descriptive analysis of the results. Medical charts of all patients with uterine anomalies admitted for delivery to the Department of Obstetrics and Gynaecology, Sapthagiri Hospital, Bangalore, between August 2010 and August 2013 were retrospectively reviewed. Uterine anomalies were analysed after they were classified according to ASRM, either during present or previous surgery or on hysterosalpingogram (HSG) evaluation or ultrasound (USG). A total of 60 randomly selected women with a previously confirmed normally shaped uterus (based on pelvic surgery, USG or endoscopy for various indications were included as a control group). Abortion was defined as expulsion of products of conception before 22 weeks of gestation or weight less than 500 grams. Premature delivery was defined as delivery before 37 weeks of gestation. Intrauterine growth retardation was defined as birth weight (g) two standard deviations (SD) below the population mean for gestational age and sex. Live birth was defined as the delivery of a baby after 28 weeks gestational age. Pre eclampsia was defined as elevated blood pressure of more than 140/90 mmHg (mild) and greater than 160/110mmHg (severe) and presence of proteinuria. Oligohydramnios was defined as amniotic fluid index of less than 5 cm. Indication for cervical cerclage was clinical done if the uterine cervix was shortened and the internal ostium opened before the 28th week of pregnancy.

RESULTS

A case control study was conducted on 24 cases with various uterine anomalies admitted to Sapthagiri hospital for Obstetric care and 60 controls selected randomly admitted during the same period.

Incidence and distribution of anomalies

A total of 2595 women were admitted for various obstetric reasons during August 2010-2013 (period of 3 years). Of them 24 cases had uterine anomaly, the rate of anomaly being 9.2 per 1000 pregnant women. A bicornuate uterus was present in 7 (29%) septate uterus in 6 (25%) arcuate in 5 (20.8%), and unicornuate with rudimentary horn in 2 (8.4%). Unicornuate uterus without rudimentary horn in 1(4.2%) and uterus didelphys in 1 (4.2%).Transverse vaginal septum was seen in 2 (8.4%) patients (Figure 1).

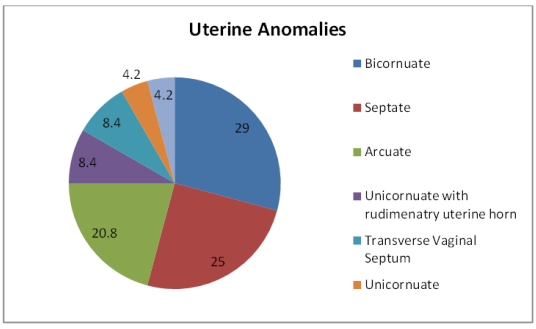

Figure 1: Distribution of subjects according to uterine anomaly.

Mode of presentation

Patients with uterine anomalies had higher rates of malpresentation (65%) compared to controls (5%),

breech presentation being the most common followed by transverse lie. In the control group 95% had cephalic presentation with only 1.7% presenting as breech (Figure 2).

The rate of malpresentation was high in uterus didelphys, arcuate and bicornuate uterus. Abortion rates were equal in both septate and bicornuate uterus.

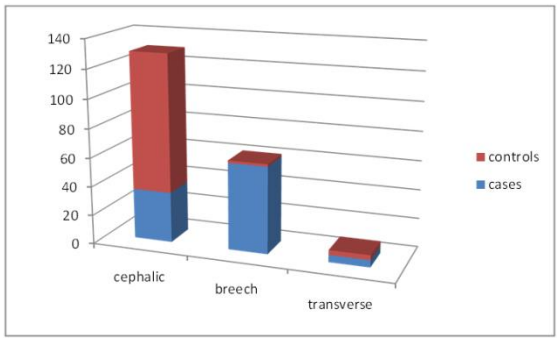

Figure 2: Comparison of mode of presentation between cases and controls.

Mode of termination

Caesarean section rate was nearly 60% in the study group, about 20% higher than the control group. There were no instrumental deliveries in the study group. Outlet forceps was used in four and ventouse in one delivery in the control cases. Abortions accounted for five in the study cases, with no pregnancy termination before period of viability in the controls (Figure 3).

One case with cervical incompetence came in second trimester with inevitable abortion. She had previous history of three abortions. HSG and USG done eight weeks later revealed a septate uterus. Another known case of septate uterus was a habitual aborter with a miscarriage in the present conception as well. One more case of septate uterus had two previous abortions although the present pregnancy ended with normal vaginal delivery. This makes septate uterus the most common cause for recurrent miscarriage**.** A comparison of mode of presentation and termination of pregnancy is illustrated in Table 1.

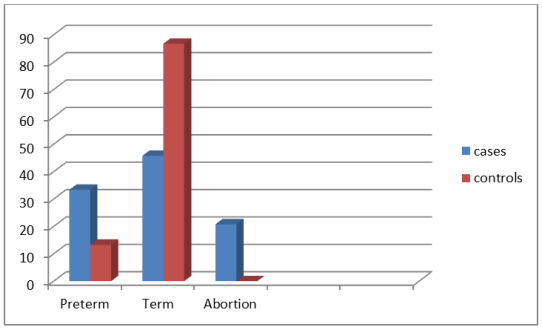

Figure 3: Comparison of mode of termination of pregnancy.

Table 1: Comparison of mode of presentation & termination of pregnancy according to uterine anomaly.

Uterine anomaly	Total		Mode of termination			Mode of presentation		
	No.	%	Term	No.	%	Term	No.	%
Bicornuate uterus	7	29	3 (42.8)	2 (28.6)	2(28.6)	3 (42.8)	2 (28.6)	0 (00)
Arcuate uterus	5	20.8	3 (60)	2 (40)	0 (00)	4 (80)	1 (20)	0 (00)
Septate uterus	6	25	2 (33.4)	2 (33.3)	2 (33.3)	2 (28.6)	2 (28.6)	1 (14.2)*
Unicornuate uterus	1	4.2	0	0	1 (100)	0	0	0 (00)
Transverse vaginal septum	2	8.4	1 (50)	1(50)	0 (00)	1 (50)	1 (50)	0 (00)
Uterus didelphys	1	4.2	1 (100)	0	0 (00)	1 (100)	0	0 (00)
Unicornuate with rudimentary horn	2	8.4	1 (50)	1 (50)	0 (00)	1 (50)	1 (50)	0 (00)
Total	24	100	11	8	5	12	7	1

*One of the twins was transverse lie

Perinatal outcomes in women with uterine anomalies

Preterm deliveries (33.4%) and miscarriage rates (20.8%) were more common compared to controls. Less than half the women (45.8%) had term deliveries compared to controls where pregnancies which reached term were 86.7%.

Preterm deliveries were seen more often with arcuate and septate uteri. The only preterm delivery in a transverse vaginal septum was due to recurrent urinary tract infection rather than the anomaly per se. Two babies had intrauterine growth retardation (IUGR), one in a septate and another in a unicornuate uterus. A further two patients had oligohydramnios, one in arcuate and another

in bicornuate uterus. Other associated medical complications were diabetes mellitus, hypothyroidism, bronchial asthma and dengue fever in one each of the patients.

Birth weight

We found more than half the babies weighed less than 2.5kg. One case went into preterm labour despite a cervical encerclage and required a caesarean section due to breech presentation. The baby weighed 880gms and ended in perinatal mortality.

An assessment of mode of delivery, termination, period of gestation at delivery and birth weight between study group and control group is given below in Table 2.

Table 2: Comparison between cases and controls of mode of presentation, delivery, time of delivery and birth weight (in kg).

Mode of Presentation	Cases		Controls	
	No.	%	No.	%
Cephalic	7	35	57	95
Breech	12	60	1	1.7
Transverse	1	5	2	3.3
Total	20	100	60	100
Mode of delivery				
Normal vaginal	5	20.8	32	53.3
LSCS	14	58.4	23	38.3
Vacuum	0	0	1	1.7
Forceps	0	0	4	6.7
Abortion	5	20.8	0	00
Time of delivery				
Preterm	8	33.4	8	13.3
Term	11	45.8	52	86.7
Birth weight				
<1.5	2	8	5	8.3
1.5-2.5	7	28	16	26.7
2.5-3.0	7	28	26	43.3
3.0-3.5	4	16	11	18.3
>3.5	0	00	2	3.3

DISCUSSION

Congenital mullerian defects are a fascinating clinical problem encountered by obstetricians. The true prevalence of these uterine anomalies is difficult to assess partly because there are no universally agreed standardized classification systems and partly because the best diagnostic techniques are invasive and, therefore, rarely applied to low-risk study populations. As a result, reported population prevalence rates have varied between 0.06% and 38%.[9] This wide variation is likely to be linked to the assessment of different patient populace and the use of different diagnostic techniques with variable test accuracy as well as reliance on non-standardized classification systems. Most data are derived from studies of patients presenting with reproductive problems and accurate diagnosis and complete assessment of the uterine morphology has not always been performed. In addition an analysis of the reproductive performance of the malformed uteri needs to take into account not only those presenting with reproductive failures, but also those asymptomatic with normal reproductive outcome. Tangentially, at our hospital, we have often found the presence of congenital malformations in perimenopausal women who were undergoing hysterectomy for a gynaecological cause. These women have had a normal obstetric career without complications and had been unaware of the malformation till surgery.

Patients with uterine anomalies have higher incidence of preterm birth as well as lower mean birth-weight neonates. Mullerian malformations have been suggested as one potential cause for preterm labour. Putative mechanisms include cervical incompetence,[10] abnormal uterine contractions[11] and reduced uterine volume.[12] Cervical cerclage is a valuable procedure in bicornuate and unicornuate uterus for the prevention of preterm delivery, but it has no effect on the outcome of pregnancy in arcuate uterus.[13]

Historically the most common malformation has been the bicornuate uterus. However, most studies in unselected population note that arcuate uterus is the most common anomaly. It is defined as any fundal protrusion into the uterine cavity with an apical angle of more than 90 degrees. It is rarely the cause for infertility or recurrent miscarriage.[14] This finding is corroborated by Raga et al. in their study on uterine anomalies.[15] It is probably the safest anomaly as it has the least effect on reproduction and comes close to a normal pregnancy. Nevertheless, a few views maintain that this condition is associated with increased foetal loss and obstetrical complications.[16,17] Our study showed the arcuate uterus to be the third most common anomaly after bicornuate and septate uterus. One case of arcuate uterus underwent an emergency caesarean section for abruption placentae due to severe pre eclampsia and was found to have a couvelaire uterus intra operatively resulting in post-partum haemorrhage. Pre eclampsia was the precipitating reason rather than the anomaly, which was an incidental finding. Surprisingly, four out the five arcuate uteri had a podalic presentation, two of which were preterm.

A bicornuate uterus is a fusion defect and can be partial or complete. It is associated with high risk of complications. Recurrent pregnancy loss, preterm birth and mal presentation are a few worries of this anomaly.[18] Some studies associate bicornuate uterus with infertility.[19] Pregnancies can occur in one or both horns, infrequently resulting in multiple pregnancy.[20] An untoward side effect of this anomaly is rupture of a gravid uterine horn occurring either in first or second trimester of pregnancy sometimes mimicking an ectopic pregnancy.[21] These undesirable consequences can be reduced by surgical correction (metroplasty) after which successful pregnancies have been reported.[22] A recent study demonstrates a genetic inheritance with progeny of

mothers with bicornuate uterus showing the presence of uterine malformations, disruptions and deformities.[23] This could add to one more populace which requires early evaluation. In our study bicornuate uterus was the most common anomaly. Most of the patients had breech presentation and one transverse presentation. There was one twin pregnancy in a partial bicornuate horn. One patient who had a vaginal birth after caesarean (VBAC) had a failed tubal ligation as only one fallopian tube was identified at time of surgery. During repeat caesarean section she was found to have uterus didelphys which would explain the failure to identify both tubes during the prior family planning procedure. Another patient with unicornuate uterus and a rudimentary horn had a rupture of the uterus in her previous pregnancy at 28 weeks. She also had an ectopic kidney. Renal and Skel et al. anomalies are associated with uterine abnormalities, with one study showing 80% of patients with a uterus didelphys suffering from renal agenesis.[24] Consequently, the detection of a congenital renal abnormality should alert the physician to look for associated genital anomalies and vice versa.[25]

Septate uterus is an absorption or canalisation defect, the exact cause for which is unknown. It can be partial or complete depending on how early the disturbance in absorption occurs. Septate uterus is strongly associated with an adverse pregnancy outcome. The use of transvaginal 3DUS has proved to be extremely accurate in the detection and classification of uterine anomalies[26] and seems to have replaced endoscopy as the gold standard technique for diagnosis of septate uterus.[27] Septate uterus is sonographically diagnosed when a septum dividing the endometrial cavity is demonstrated on the coronal plane and the external uterine surface is normal or shows a sagittal notch of <1 cm. Septate uterus is further classified as complete or incomplete (subseptate uterus) depending on whether the septum bridged or did not bridge the fundus to the internal os of the uterine cervix. In subseptate uterus, the fundal indentation at the central point of the septum appears as an acute angle.[28]

Mullerian duct anomalies may cause postpartum haemorrhage (PPH) and placental adhesion anomalies. Uterine compression suture is useful for controlling PPH (especially atony). Large septae with placenta accreta can be treated with B-Lynch suture and intrauterine gauze tampon.[29] In our study one patient had PPH which was controlled with a B-Lynch suture.

The exact aetiology and pathophysiological processes of how canalization defects may lead to miscarriage remain uncertain. It has been suggested that the endometrium overlying the septum is abnormal or at least suboptimal and this makes it a poor site for implantation.[30] Therefore, embryos that do implant on the septum are more likely to miscarry, because the septum has a disorderly and decreased blood supply, which is insufficient to support subsequent placentation and embryo growth. These hypotheses remain to be proven and there is evidence to contradict these theories. Some studies have found significantly more blood vessels in biopsy samples of the uterine septum, and established that patients with vascularised septum had significantly higher prevalence of early pregnancy failure and late pregnancy complications than those with avascularised septa.[31] Other authors have suggested that miscarriage may result from higher or uncoordinated uterine contractions or a reduced uterine capacity.[32]

Hysteroscopy and laparoscopy were considered the gold standard in diagnosis of mullerian anomalies. Office hysteroscopic metroplasty has been used, without analgesia, to differentiate bicornuate from septate uterus. Discriminating criteria being the presence of vascularised tissue, sensitive innervation, and the appearance of the tissue at the incision of a supposed septum.[33] With the advent of transvaginal (TVS) 3DUS which picks up malformations extremely accurately compared to endoscope or pelvic magnetic resonance imaging (MRI), a new benign gold standard has been introduced. 3D TVS may become the only mandatory step in assessment of uterine cavity in septate and bicornuate uterus.[34] The final diagnosis is, however, based on the subjective impression of the clinician performing the test. During laparoscopy and hysteroscopy simultaneous views of the external contour of the uterus and upper cavity are not achieved. It is also invasive and usually requires general anaesthesia. In comparison, 3DUS is a highly accurate yet non-invasive test, has the potential to emerge as the reference standard for the identification and differentiation of congenital uterine anomalies. Reports have shown that 3DUS has high sensitivity and specificity, nearing 100% in diagnosing uterine anomalies.[35] In addition; they offer the ability to assess the abdomen simultaneously, which is potentially important owing to increased frequency of renal anomalies in patients with uterine malformations. Three-dimensional ultrasound is preferred by some clinicians as a standard to diagnose congenital uterine anomalies over MRI as MRI is more time-consuming and expensive than ultrasound scanning.[36]

CONCLUSIONS

Mullerian anomalies are undeniably associated with adverse obstetric outcomes but it is obvious that only the tip of the iceberg has been addressed in terms of diagnosis of these defects. Favourable obstetric outcomes can be achieved if early diagnosis is made. An objective standardised classification and availability of reliable diagnostic tools is the need of the hour to address any disparities in diagnosis and treatment.

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