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REVIEW ARTICLE

Pregnancy and Uterine Anomalies

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ABSTRACT

Congenital uterine malformations are known to have a higher incidence of infertility, repeated first trimester spontaneous miscarriages, fetal intrauterine growth restriction, fetal malposition, preterm labor, retained placenta and increased cesarean section rate. The actual incidence of uterine malformation is unknown, since many women do not have any symptoms. They are estimated to occur in 0.4% (0.1-3%) of the general population and in 4% of infertile women, and in patients with repeated spontaneous miscarriages the figures fluctuate between 3 and 38%. The discrepancy among different publications stems from their use of different diagnostic techniques, heterogenous population samples and clinical diversity of Mullerian anomalies.

Keywords: Uterine malformation, Pregnancy.

INTRODUCTION

The most widely accepted classification of uterine malformation is established in 1988 by The American Fertility Society, based on the previous work of Buttram and Gibbons.[1,2] The classification is into groups according to the degree of failure of normal development with similar clinical manifestations, treatment and possible prognoses for their reproductive performance.[3] The various Mullerian anomalies are the consequence of four major disturbances in the development of the female genital system during fetal life:

1. Failure of one or more Mullerian ducts to develop (agenesis, unicornuate uterus without rudimentary horn)
2. Failure of the ducts to canalize (unicornuate uterus with rudimentary horn without proper cavitation)
3. Failure to fuse or abnormal fusion of the ducts (uterus didelphys, bicornuate uterus)
4. Failure of resorption of the midline uterine septum (septate uterus, arcuate uterus).

Uterine malformations with pregnancy are often revealed at the time of the first sonographic examination in early pregnancy. Although the prevalence of certain type of uterine malformations is difficult to estimate, however, the arcuate uterus seems to be the most frequent anomaly accounting for 30 to 50% of all the cases, followed by the bicornuate and septate uteruses respectively.[4-6]

Ultrasound Diagnosis of Uterine Malformations

Abdominal and vaginal ultrasonography represent the main diagnostic methods of uterine anomalies. The most precise investigation of uterine morphology can be done during the second half of the menstrual cycle or at the beginning of pregnancy (the thick and echoic endometrium has a better contrast with the adjacent myometrium). Two-dimensional ultrasonography allows us to detect many type of uterine malformations (Fig. 1) . However, unicornuate uterus certainly will be missed.[7] To differentiate between septate, subseptate and arcuate using 2D ultrasonography is difficult, but applying

Fig. 1: 2D of thick septate uterus in 23 weeks pregnancy

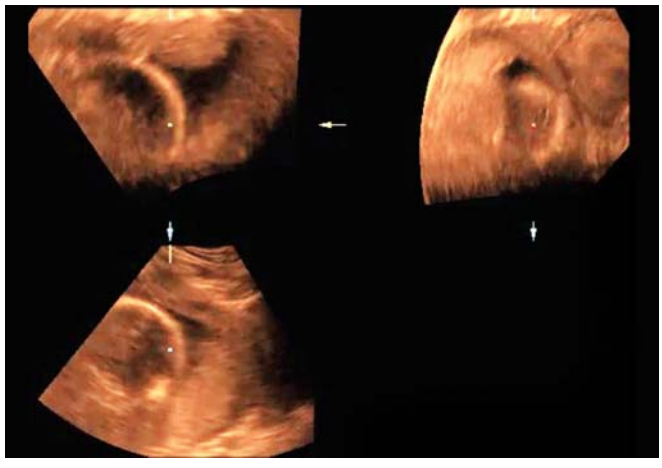


Fig. 2: 3D multiplanar view of septate uterus (arrow) in 17 weeks pregnancy

3D multiplanar, the diagnosis can be surely established. An ideal method of imaging seems to be 3D ultrasonography (Figs 2 and 3). The evaluation of the uterine malformations

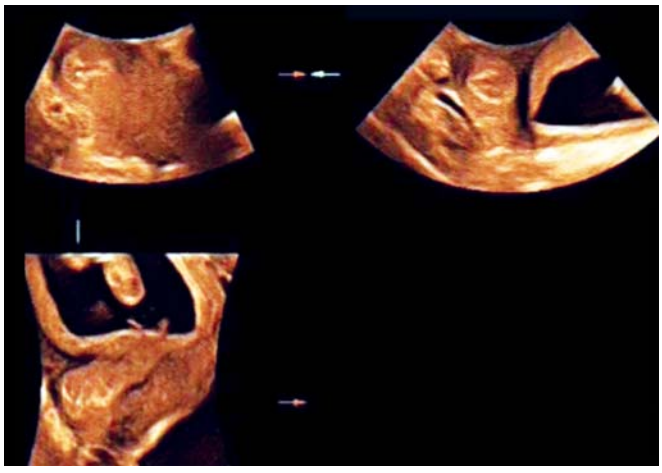


Fig. 3: 3D of bicornuate uterus unicollis with 10 weeks fetus in multiplanar view

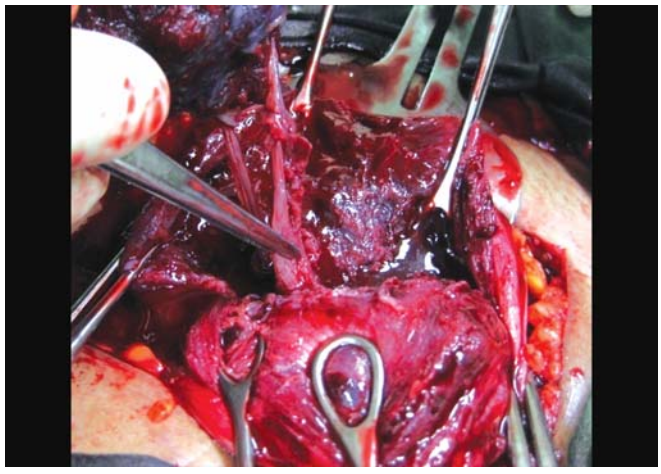


Fig. 5: Septum of the uterus during cesarean section (hold by pinset)

Figs 4A and B: During cesarean section, after delivering the baby. The appearance of arcuate uterus from anterior and posterior view

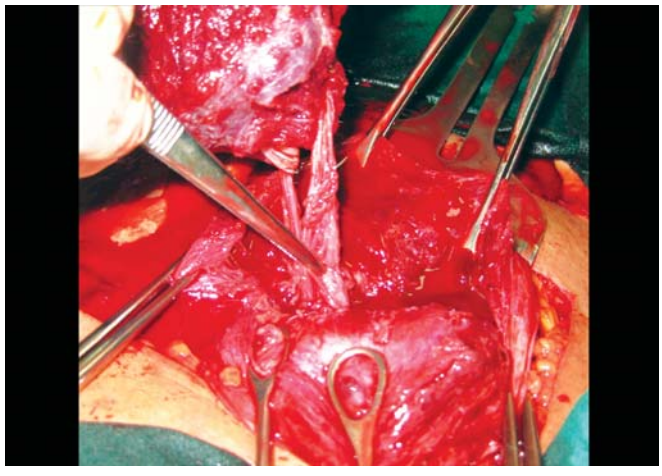


Fig. 6: Small part of the placenta still attached to the uterus septum when separating placenta from the implantation site

Fig. 7: Bicornuate uterus with triplet pregnancy. One cavity contains monochorionic diamniotic (two females) and the other cavity with singleton male fetus. Surgery performed at 31 weeks due to severe pre-eclampsia

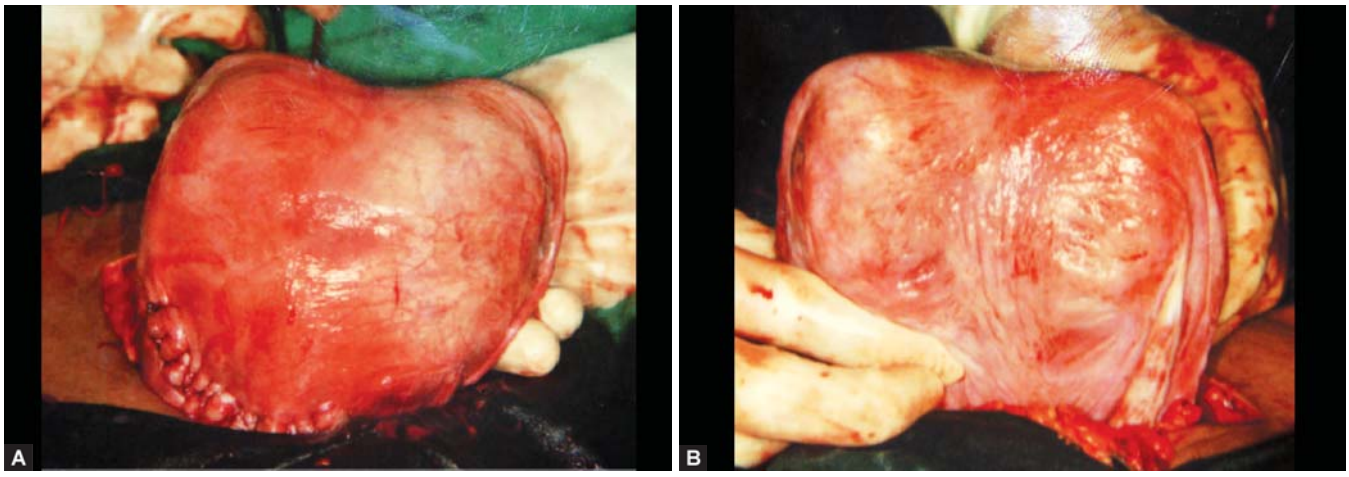
should be accompanied by the renal investigation in effort to find some associated anomalies.

The introduction of 3D ultrasonography to identify the congenital uterine anomalies reach 100% sensitivity and specificity respectively.[8-10]

We report case series of women with congenital uterine anomalies diagnosed in our department using three-dimensional ultrasound who subsequently conceive with or without correction (Figs 4A to 8B).

METHODS

All women were examined using Voluson 730 Expert or E8 (GE Medical Systems, Zipf, Austria) ultrasound machines, equipped with convex transabdominal (4 to 8 MHz) and transvaginal (5 to 9 MHz) probe. Transvaginal ultrasound



Figs 8A and B: Septate uterus view from anterior and posterior after delivering the baby during cesarean section

examinations were performed in pregnancy less than 14 weeks gestational age. Pregnancies more than 14 weeks were examined transabdominally.

The datasets were saved and analyzed using the 4D view software. All patients were followed up until the final outcome.

RESULTS

During the last 7 years of study (2002-2009), the total women with uterine anomalies and reproductive problems are 29 (Table 1). It consists of 12 cases of arcuate uterus, eight cases with bicornuate uterus, seven cases of septate uterus and two cases of unicornuate uterus. In 12 cases of arcuate uterus (Table 2), four women never succeeded to conceive, three cases had one miscarriage and two patients had miscarriage twice. One woman was three times pregnant having two children and one miscarriage. The rest two women had one child respectively.

Eight women diagnosed with bicornuate uterus (Table 3). Four women having one child, one case had triplet, two women have two children, one case had three times pregnancy having two children and one *in utero* fetal death of 17 weeks gestational age. In the septate uterus group, there were seven patients. Two women had one child respectively, one case had two times miscarriage, two women had two children and the rest of two had one child each with once preterm labor at 32 and 34 weeks gestational age respectively (Table 4).

Unicornuate uterus was detected in two women. One case has undergone three times IVF and miscarriage occurred at 6 and 7 weeks gestational age and one failed procedure. The other woman never conceived.

Table 1: Number of cases found during ultrasound examination

Type of anomaly	*Number*	*Total*
Arcuate	12	12
Bicornuate	8	8
Septate	7	7
Unicornuate	2	2
Total		29

Table 2: Number of cases with arcuate uterus and reproductive outcomes

Pregnant(freq)	*Miscarriage once*	*Miscarriage twice*	*Miscarriage three times*	*Living children*	*Total*
Never(0)			—	—	4
1	0	—	—	1	2
1	1	—	—	—	3
2	—	2	—	—	2
3	1	—	—	2	1
Total	4	2	—	4	12

Table 3: Number of bicornuate uterus cases and reproductive outcomes

Pregnancy (freq)	*Miscarriage*	*In utero fetal death*	*Living children*	*Total*
1	–	–	1	4
1	–	–	3	1
2	–	–	2	2
3	–	1	2	1
Total		1	13	8

Table 4: Number of cases of septate uterus and reproductive outcomes

Pregnancy (freq)	*Miscarriage once*	*Miscarriage three times*	*Living children*	*Total*
1	–	–	1	4 (Note: 2 cases of preterm 32 and 34 weeks)
2	–	–	2	2
3	–	1	–	1
Total	–	1	8	7

We do not include patients with primary amenorrhea in our study.

DISCUSSION

Since the introduction of 3D ultrasonography in our daily clinical work, more and more uterine anomalies can be detected. It is due to the capability of 3D ultrasonography to get a certain view of the uterus which is impossible using 2D ultrasound tool. In three-dimensional ultrasonography, volume data can be stored and analyzed anytime when needed. Possibility to make a wrong diagnosis has very little chance as the dataset can be retrieved and reanalyzed by another examiner using the software 4D View.

Our result shows that the arcuate uterus group has a poor outcome. Of 12 cases, two women succesfully conceived with living child respectively. Three of them had one miscarriage and never succeeded in having a child. But, according to Raga,[11] the live-birth rate of arcuate uterus achieved was 82%, higher than the bicornuate and septate uterus (62%). Infertility and first trimester miscarriage dominate our arcuate uterus patients. One-third of the arcuate patients never succeed to conceive and four (30%) women had one and two had miscarriages twice. Comparing our result with previous author, it is quite disappointing. Perhaps, due to our small number of patients, it can not represent correctly.

In our bicornuate group results were quite good; there was one woman with mors fetus *in utero* of 17 weeks, but she succeeded to have two living children. Suprisingly, one case of bicornuate uterus conceives spontaneously triplet, where the left uterine cavity with one male fetus and inside of the right uterine cavity, monochorionic diamniotic twin of female fetuses. Due to her worsen severe pre-eclampsia, we delivered the babies at 31 weeks gestational age. Preterm delivery in bicornuate uterus has been reported between 12 and 25%,[12-15] but in our case due to medical reason.

All bicornuate uterus groups were delivered by cesarean section. It means the cesarean rate was 100%, some authors reported between 36 and 83%. All of them were managed as high-risk patients.

Of the septate uterus group, preterm deliveries occurred in two patients from total seven women. Sanja[16] reported the obstetrical complication due to morphology and vascularity of the septum. According to her, the thickness of the septum has no influence in relating to obstetrical complication. But vascularized septum had a significantly higher prevalence of early pregnancy failure and late pregnancy complications than those with avascularized septa. Most publications reported poor reproductive outcome in septate uterus, miscarriage as high as 67%, prematurity 33% and live birth rate 28%.[17]

But with introduction of hysteroscopy, resection of the septa improves significantly the reproductive outcome. Some authors suggest to do hysteroscopy once the women has two or three miscarriage. According to them, they found incomplete septa in one quarter of the cases.[18]

Of unicornuate uterus group, two women failed to conceive. One never conceived, the other woman underwent IVF three cycle, one failed, another two cycle succeeded until six and seven weeks gestational age.[19]

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