Prevalence Of Congenital Cervical Malformation Diagnosed With Three Dimensional Ultrasound

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Abstract

Objective: To estimate the incidence of cervical anomalies and its association with uterine and vaginal anomalies .

Methods: This is retrospective study. All patients with infertility subjected to 3D ultrasonography through the period January 2016 to June 2021. All data were evaluated for cervical septum or double cervix diagnosed by 3D ultrasound. The 3D ultrasound volume acquisition was done in the luteal phase between cycle day 17 – 24 of the cycle.

Results: 47 cases with cervical anomalies were found from 3325 patient with infertility (1.4 %). 12 /47 case with double cervix (25.5%). 35/47 case with cervical septum (74.5%) .15 of them partial cervical septum (31.9%) and 20 complete cervical septum (42.6%). 22/47 case with vaginal septum (2 oblique and 20 longitudinal) 46.8%.

Conclusion: Cervical anomalies is not uncommon with uterine anomalies. The cervical septum is more common than double cervix but both can be present with bicorporeal or septate uterus. A separate 3D ultrasound volume for diagnosis of cervical anomalies is important in cases of uterine anomalies.

INTRODUCTION

Mullerian anomalies are a result from abnormality in formation, fusion or resorption of the Mullerian duct in fetal life (1). The prevalence of congenital uterine anomalies in unselected patient, infertile women, women with history of miscarriage and in those with miscarriage and infertility are 5.5%, 8.0%, 13.3% and 24.5% respectively (2) .

A systematic review reported that all uterine anomalies increase the risk of fetal malpresentation, increase the risk for miscarriage and preterm labor and decrease the conception rate in case of canalization defect (3). While many diagnostic tools could be used for diagnosis of Mullerian anomalies as HSG , 2D ultrasound , combined laparoscopy and hysteroscopy and MRI , 3D ultrasound is now considered as the standard of diagnosis of female genital anomalies (4) while at least 30 classification were published for Mullerian anomalies , AFS and the ESHRE /ESGE are the most widely used in clinical practice (5) one of the limitation of the AFS classification is that it focused mainly on the uterine anomalies and so many complex anomalies that include the cervix and vagina remain unclassified by the AFS classification (6) one of the advantages of ESHRE/ESGE classification is the presence of supplemental classification for the cervix and vagina (7)

The incidence of the cervical anomalies and its association with uterine and vaginal anomalies is not well studies

The aim of our study to estimate the incidence of cervical anomalies and its association with uterine and vaginal anomalies.

METHODS

This is retrospective study. Local ethical approval was obtained . All records of patients with infertility subjected to 3D ultrasonography through the period Jan 2016 till june 2021 were evaluated for cervical septum or double cervix diagnosed by 3D .

3D volume acquisition

All the 3d ultrasound volume acquisition was done in the luteal phase between cycle day 17 – 24 of the cycle. Examination were performed using clearVue 650ultrasound system (Philips) equipped with 3D9-3v 3-9 MHz 4D

endocavity transducer by the same operator. We started by real time 2d ultrasound to obtain the midsagittal plane then we acquired the volume in both the sagittal and transverse plane using volumetric transvaginal Probe.

Then we used the Z technique described by Abuhamad to obtain the coronal plane (8). We display the surface rendered image by decreasing the size of the region of interest box. We ask our patient not to move during acquiring the volume

The volume was then obtained using a sweep angle of 85 figure 1 show example for multiplaner view of the uterus.

A separate volume of the cervix was acquired in case of suspected Mullerian uterine anomalies followed by manipulation of the volume using the Z technique to obtain the coronal plane of the cervix figure 2 show example of multiplaner plane of the cervix

Gynecological examination was done in lithotomy position, in the form of inspection of genital area and introitus then digital vaginal examination were done in all cases of uterine anomalies to diagnose vaginal anomalies.

Diagnosis of cervical anomalies

We used the ESHRE /ESGE classification for cervical anomalies in which C1 is a septate cervix either partial or complete, C2 is double cervix (9).

With 3D volume ultrasound we use the divergence of cervical canal to differentiate between the double cervix and septate cervix (10).

Figure 3 shows the difference between normal, partial septate, complete septate and double cervix

Diagnosis of uterine anomalies

We use the ESHRE/ESGE criteria to diagnose uterine anomalies in which U2 is a septate uterus either partial or complete and U3 is bicorproial uterus (9) .

Figure 4 shows example of difference between uterine septum with partial septate cervix, uterine septum with complete septate cervix and uterine septum with double cervix

Figure 1

Multiplanar view of the uterus showing the transverse, longitudinal, coronal planes and surface rendering view of the uterus.

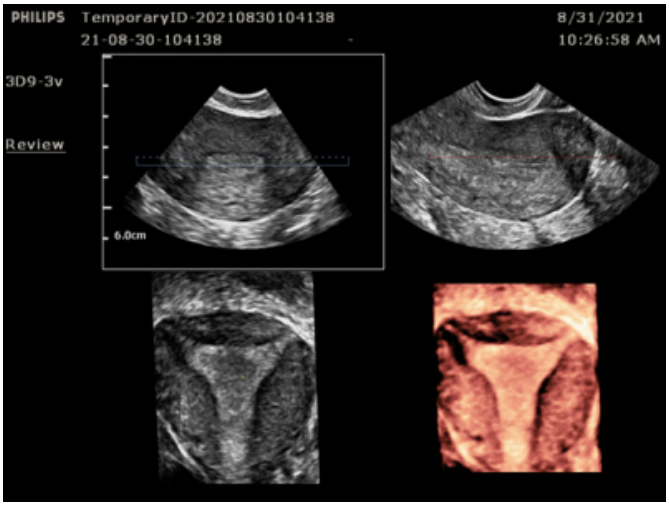


Figure 2

multiplanar view of the normal cervix showing the transverse, longitudinal, coronal planes and surface rendering view of the cervix.

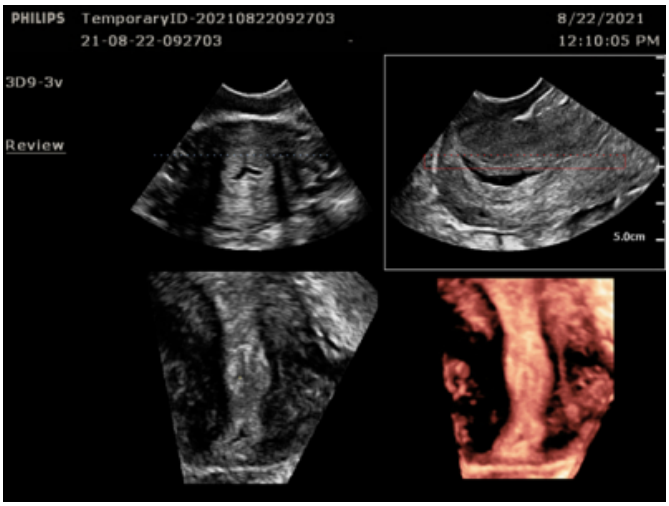


Figure 3

A normal cervix (ESHRE /ESGE C 0), B partial septate cervix (ESHRE /ESGE C 1), C complete septate cervix (ESHRE /ESGE C1), D double cervix (ESHRE /ESGE C 2).

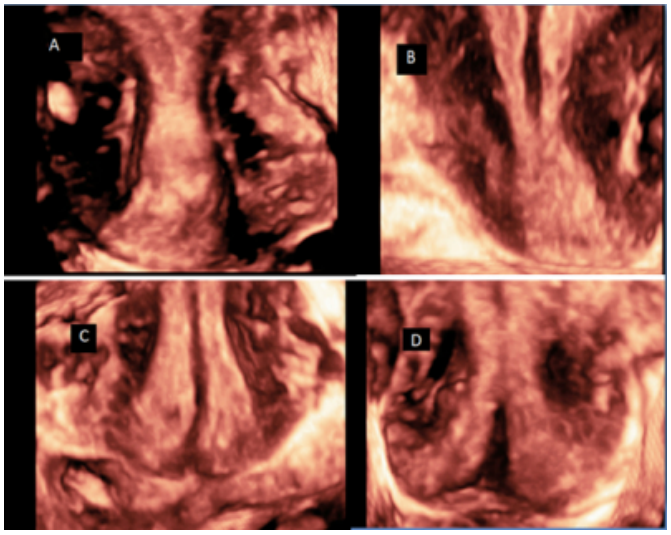
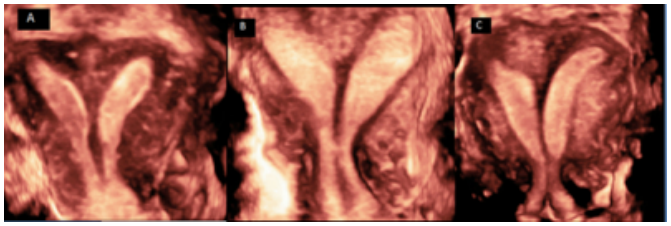


Figure 4

A uterine septum with partial cervical septum (ESHRE /ESGE U2b C1), B uterine septum with complete cervical septum (ESHRE /ESGE U2b C1), C uterine septum with double cervix (ESHRE /ESGE U2b C2)



RESULTS

47 cases with cervical anomalies were found from 3325 patient with infertility (1.4 %). The mean age of our patient is 27.4 years, The mean duration of infertility 5.1 years, with 63% 1-year infertility.

12/47 case with double cervix (25.5%), 2 double cervices with uterine septum and 10 double cervix with bicorporial.

35/47 case with cervical septum (74.5%) .15 of them partial cervical septum (31.9%) and 20 complete cervical septum (42.6%).

Table (1) shows different types of cervical anomalies and associated uterine anomalies.

Table 1

Different types of cervical anomalies and associated uterine anomalies.

	Uterine septum	Bicorporial	Bicorporial septate
Double 12	2	10	No
Partial 15	14	No	1
Complete 20	19	No	1

Associated vaginal Septum

22 /47 case with vaginal septum (2 oblique and 20 longitudinal) 46.8%

Longitudinal Vaginal septum in 10 cases with double cervix and 10 septate cervices.

Table 2 shows detailed uterine, cervical anomalies in cases of vaginal septum.

Table 2

Detailed uterine, cervical anomalies in cases of vaginal septum.

Detailed uterine, cervical and vaginal Anomalies	NO.
Uterine septum with double cervix with vaginal septum	2
Bicorporial with double cervix and vaginal septum	8
Uterine septum with cervical septum with vaginal septum	9
Bicorporial with septate cervix and vaginal septum	1
Obstructed Hemivagina and ipsilateral renal anomalies (OHVIRA) syndrome	2

DISCUSSION

While the prevalence of congenital uterine malformation is well reported in unselected and in high risk group (2), the prevalence of cervical malformation is unknown

In our study, we found that 1.4 % of patient with infertility evaluated by 3D ultrasound have cervical malformation.

The prevalence of cervical malformation is less than of uterine malformation. this result is logical because it is rare to find isolated cervical anomalies and not all uterine anomalies is associated with cervical anomalies. Lakshmy SR et reported only 8 cases with cervical anomalies in 44 patients with septate uterus 18 % (11).

We found that the septate cervix is more than double cervix and also this result can be explained by the unification anomalies is more than fusion anomalies of the uterus.

The result does not agree with the study of Bermejo et al. study the accuracy of three-dimensional ultrasound and MRI

to diagnose cervical and vaginal anomalies and they found 10 case of double cervix in 16 patient with cervical anomalies. the difference may be due to larger sample size in our study.

Double cervix is associated with bicorporial uterus more with septate uterus. this result does not agree with the study of Smith et al study the uterine anomalies associated with double cervix diagnosed with MRI. The cervix divergence was present in 34% (11/32) with septate uterus, 26% (7/27) with uterus didelphys (14).

The traditional embryological theory to explain the Mullerian anomalies was the unidirectional fusion in caudal cranial direction (12). Many cases report of complex Mullerian anomalies as spetate uterus with double cervix and longitudinal vaginal septum or normal uterus with double cervix and double vagina challenge this unidirectional theory. In 1967, Muller et al hypothesized the bidirectional theory in which the Mullerian duct fuse at the level of the isthmus and then fusion in both caudal and cephalic direction (13). the unclassified Mullerian anomalies cases and the bidirectional theory encourage the ESHRE/ESGE classification to report the cervical and vaginal anomalies in a separate part.

There is a debate about resection or preservation of the cervical septum during hysterescopic metroplasty for complete septum with tendency for preservation in case of double cervix. this case explain the need to differentiate between the septate cervix from double cervix.

Although the role of 3D ultrasound for diagnosis of uterine malformation is well established, its role in diagnosis of cervical anomalies is not well studied

Bermejo et al. studied the 3D ultrasound and MRI accuracy for diagnosis of cervical anomalies in comparison to clinical examination and found that both are highly efficient in diagnosis of cervical and vaginal anomalies. they also emphasis the importance of a separate volume for the cervix (12).

Bermejo et al. (12) study the accuracy of three-dimensional ultrasound and MRI to diagnose cervical and vaginal anomalies.4 / 16 case with double cervix with no vaginal anomalies, 2/16 case with double cervix with obstructed hemivagina, 4/16 case with double cervix and vaginal septum, 2 /16 complete cervical septum and 2/ 16 partial cervical septum. The merits of this study are in comparison to other study on Mullerian anomalies, it focus on the cervical anomalies

The limitation of the current study being retrospective so there were no MRI correlation nor hysteroscopic confirmation however 3D has 98.3% sensitivity and 99.4% specificity in diagnosis of Mullerian anomalies (4), also Hysteroscopy is an invasive procedure done under anesthesia whereas MRI is expensive, time consuming.

Conclusion: Cervical anomalies is not uncommon with uterine anomalies. The cervical septum is more common than double cervix but both can be present with bicorporeal or septate uterus. A separate 3D ultrasound volume for diagnosis of cervical anomalies is important in cases of uterine anomalies.

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