IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

BICORNUATE UTERUS- A LITERATURE REVIEW

DR.V. HEMAVATHY M.SC.(N), MA, M.Phil,P.hd 1

DR. SATHIYALATHA SARATHY M.SC(N),Phd 2

M. GAYATHRI M.SC(N) 3

1 PRINCIPAL SREE BALAJI COLLEGE OF NURSING

2 HOD, OBG DEPT, SBCN, CHROMPET CHENNAI

3 M.SC. NURSING SREE BALAJI OF NURSING CHROMPET CHENNAI

ABSTRACT

Bicornuate uterus (BU) is a rare uterine anomaly result from incomplete fusion of the two Müllerian ducts during embryogenesis. BU very rarely can lead to rupture of the uterus during the early pregnancy with high mortality and morbidity rates. Uterine malformation in general population is around 7% - 8%. Abnormal fusion of the para-mesonephric duct (mullerian duct) during embryonic life results in a variety of congenital uterine malformations, such as uterus didelphys, uterus bicornis bicollis, uterus bicornis unicollis, uterus arcuatus, uterus unicorns. The bicornuate uterus accounts for approximately 10% of the mullerian anomalies. Women with bicornuate uterus have no extra uterine infertility issues. The uterine malformations are known to be associated with spontaneous miscarriages, intrauterine growth restriction, preterm deliveries, preterm prelabour rupture of membranes, breech presentation and increased rate of caesarean delivery. The rates of spontaneous abortion and premature delivery have been reported to reflect the degree of non-fusion of the horns. The common complications and adverse reproductive outcomes associated with bicornuate uterus are recurrent pregnancy loss (25%), preterm birth (15% - 25%) and cervical insufficiency (38%).

KEYWORDS:

Bicornuate Uterus, Genitourinary, Pregnancy, malformation,

INTRODUCTION

Congenital malformations of the uterus are the consequence of an anomaly in combination, canalization, and resorption of the septum during the development of Mullerian ducts. Buttram and Gibbons initially classified Mullerian duct anomalies depending on the degree of failure of Mullerian duct development in 1979. This classification was received and revised by the American Society of Reproductive Medicine in 1988, and they classified Mullerian duct anomalies into seven classes.

- Class I- Agenesis/hypoplasia
- Class II- Unicornuate uterus,

  II a with a rudimentary communicating horn

  II b with a rudimentary non-communicating horn

  II c with a rudimentary horn without a cavity

  II d without a rudimentary horn
- Class III- Didelphys uterus
- Class IV- Bicornuate uterus (IV a is complete, IV b is partial)
- Class V- Septate uterus
- Class VI- Arcuate uterus
- Class VII- Diethylstilbesterol-related anomalies.

American Society of Reproductive Medicine further reorganized the classification in 2016 and included arcuate uterus and healthy uterus in a single class.

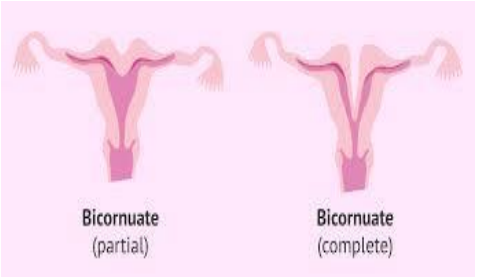
BICORNUATE UTERUS

A bicornuate uterus is a result of a partial fusion of Mullerian ducts resulting in a heart-shaped uterus instead of a pear shape. It is further segregated into two types depending upon the partition of the cervix:

1. Bicornuate unicollis
2. Bicornuate bicollis

TYPES

- **Partial bicornuate uterus**: A partial bicornuate uterus describes a lesser degree of separation between the two cavities. Your uterus is still heart-shaped, but the indentation that divides your uterus is not as severe.
- **Complete bicornuate uterus:** A complete bicornuate uterus is when the indentation at the top of your uterus is severe, making the separation of the uterine cavity more distinct



PATHOPHYSIOLOGY

Two genital ducts lead to the formation of the female genital tract, one is the mesonephric duct/Wolffian duct, and the other is the paramesonephric duct/ Mullerian duct. The entire procedure happens in three phases-

1. **Morphogenesis**- The development of a mesonephric duct occurs at around the sixth week of gestation. Paramesonephric duct is formed in the seventh-week as an invagination in celomic mesothelium in the upper lateral portion of the intermediate cell mass.
2. **Differentiation**- SRY gene situated on the Y chromosome produces the antimullerian hormone, which is liable for the relapse of the Mullerian duct in males. The Mullerian duct of both sides grows in a caudal direction parallel to the mesonephric duct. These ducts then cross the Wolffian conduit and fuse in the midline in their caudal end. The central combined portion frames the uterus, and the lower part of the fused portion forms the upper third of the vagina. The cranial portion of the Mullerian ducts stay unfused and gives rise to oviducts in the future.
3. **Resorption of the septum**- The uterus assumes its shape at around 12 weeks; however, the middle-fused portion of the ducts is persisting. During the third stage, this central septum gets resorbed, transforming the uterovaginal canal into a single cavity.

The lower fifth of the vagina has its origin from the endoderm of urogenital sinus instead of Mullerian ducts. The caudal tip of fused Mullerian tubes is called Mullerian tubercle. This tubercle interacts with urogenital sinus and prompts the proliferation of endodermal cells of the urogenital sinus. These are called sinovaginal bulbs, which, along with the uterovaginal canal, form a vaginal plate. This plate canalizes to frame the vaginal canal.

If there is impedance during the second stage-fusion of Mullerian ducts leading to partial fusion of the ducts, it results in the bicornuate uterus. This combination can vary. On the off chance that the outcome is a solitary vagina yet separate cervix with separate uterine cavities, it is called bicornuate bicollis. However, it is termed as bicornuate unicollis uterus; the uterine cavities are discrete, but the cervix and vagina are single.

The origins of ovaries are from the genital ridge and are independent of the Mullerian ducts; ovaries are generally not engaged in Mullerian duct anomalies.

SIGNS AND SYMPTOMS

- Frequent miscarriages (usually more than three).
- Vaginal bleeding.
- Painful menstruation.
- Painful intercourse (dyspareunia).
- Pelvic pain.

DIAGNOSIS

Imaging plays an essential role in the diagnosis and management of bicornuate uterus. There are multiple modalities available for this purpose which are as follows-

- ### HYSTEROSALPINGOGRAPHY

  This is the most seasoned and most broadly utilized method for assessment of an instance of infertility. During hysterosalpingography, an oil or water-based contrast is infused through an endocervical catheter into the uterine cavity.

- **ULTRASOUND**

An ultrasound is usually the first diagnostic test used to detect a heart-shaped uterus. After it's detected, your healthcare provider may use more advanced diagnostics to get a better view of the shape of your uterus. 3D ultrasound can also be very helpful.

- **MRI (MAGNETIC RESONANCE IMAGING)**

This produces the most detailed images of the uterus because it can show multiple dimensions and angles.

TREATMENT AND MANAGEMENT

The decision to manage a patient with the bicornuate uterus is pertinent to the presentation of the patient. A patient can present to a facility in 2 different ways:

If a woman presents for a routine evaluation during her pregnancy gets diagnosed with a bicornuate uterus, then aggressive prenatal monitoring is indicated to prevent obstetric complications. Pay attention to the signs of preterm labor, malpresentation.

A patient can additionally present with a history of recurrent abortions or preterm labor in preceding pregnancies. The presentation mentioned above is an indication for the surgical unification of uterus, Strassman metroplasty.

The procedure was first illustrated in 1907 by Strassman in 4 stages. The procedure initiates by making a transverse incision over the fundus of the uterus, staying away from uterotubal junctions to avoid injury. Subsequently, the uterine cavity is opened, and the septum is removed after splitting the partition. Thus, the procedure transforms the double cavity into a single cavity. Ultimately the cavity is closed by vertical suturing to prevent endometrial adhesions.

The laparoscopic approach is being preferred in the present in place of abdominal metroplasty. The laparoscopic approach provides leverage in terms of less bleeding and decreased rate of infections. It also reports significantly reduced postoperative adhesion formation, which can be credited to a decrease in tissue handling and drying of tissues.

DIAGNOSIS

- A bicornuate uterus is with a longitudinal vaginal septum in some cases, which makes it difficult to differentiate from uterus didelphys. In such cases, look for the presence of soft tissue between 2 uterine cavities, which establishes the diagnosis of a bicornuate uterus.
- It is challenging to distinguish bicornuate uterus from the septate uterus on hysterosalpingography. The differentiation of bicornuate from the septate uterus is critical due to the contrast in their management approach. A septate uterus is managed via hysteroscopic resection as opposed to bicornuate, which requires a unification of uterus. In such a case, MRI helps differentiate fusion anomalies from resorption anomalies.

COMPLICATIONS

Patients with a bicornuate uterus can present with several unfortunate complications.

The most common complication associated with the bicornuate uterus is preterm labor. A cervical length of less than 25 mm on transvaginal ultrasound has 13 times higher risk of preterm delivery. Cervical cerclage is an effective method to prevent a non-viable preterm delivery in women.

A pregnancy in a bicornuate uterus can also be succeeded by postpartum haemorrhage. Postpartum haemorrhage is manageable by an assortment of surgical and nonsurgical alternatives. The nonsurgical methodology of utilizing Bakri Balloon is proved to be viable in the bicornuate uterus. However, the surgical approach, for instance, B lynch suturing, and conduit ligation can harm the neighbouring structures. Moreover, ligation may not be effective with the collateral blood supply of uterus in pregnancy.

A bicornuate uterus is a risk factor for rupture of the uterus even in a primigravida. The explanation could be an abnormal development of the lower fragment of the uterus or the presence of a fibrous band between the corpora of the uterus. This band restrains the uterus, unable to expand, and hence gets inclined to rupture.

Due to the association of uterine anomalies with renal anomalies, a woman is at high risk for pregnancy-induced hypertension during her gestational period. Thus, it is essential to monitor blood pressure during pregnancy in a woman with bicornuate uterus.

Although bicornuate uterus is not an independent risk factor for endometrial cancer but cancer in endometrium can go undetected. If taken from the healthy uterine cavity, a biopsy can give false-negative results, leading to a delay in diagnosis and worsening the prognosis of the patient. MRI can play an essential role in diagnosing the disease if a patient with bicornuate uterus presents with uterine bleeding.

CONCLUSIONS

The reproductive potential of the malformed uterus is assessed, with emphasis on problems of vertical and lateral fusion. With all the relevant discussion on the possibility of normal pregnancy in the bicornuate uterus, it is safe to say that the preferred method of conception is assisted reproductive techniques. Due to the reduced gestational capacity, the reproductive outcome is impaired. Uterine malformations can have a significant effect on the outcome of pregnancies. Misdiagnosis of uterine malformations may affect the outcome in pregnancy. There is a high prevalence of abortions, as seen in the above case. The likelihood of conceiving increases after consecutive failed pregnancies. However, after correction of anomaly by metroplasty, the first and second abortions decreased subsequently. Therefore, it is advisable to undergo surgery to avoid pregnancy wastage. One yet another procedure tried is cervical cerclage, which is effective in preventing second-trimester abortions and premature delivery but has no role in the first trimester. Most of the patients with bicornuate uterus do not have any symptoms in their adolescence. Therefore, metroplasty is always preferred. In patients more than 35 years of age, who are not far away from menopause, metroplasty should be done on time to prevent wastage of reproductive years. It is a laparotomy surgical procedure and can cause adhesions causing a reduction in fertility. In conclusion, an estimate of the chances of giving birth to a live-born infant can be increased by various interventions.

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