

# Ectopic pregnancy in Non-communicating Horn of Unicornuate uterus: 3D-Ultrasound and Primary Laparoscopic management

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## Abstract

Unicornuate uterus with pregnancy in the non-communicating rudimentary horn is extremely rare. Diagnosis requires awareness, high suspicion index, 3D ultrasound and MRI. If missed, it can be catastrophic. Treatment varies across literature. We present a case where detection was done by 3D ultrasound and primary laparoscopic surgery done for treatment.

## Keywords

Unicornuate uterus, rudimentary horn pregnancy, 3D ultrasound, Laparoscopy

## Key Clinical Message

All pregnant women should be eyed with suspicion of a mullerian anomaly and ectopic pregnancy. Being aware is the key to avoid catastrophes. A good ultrasound, 2D with 3D confirms diagnosis. Laparoscopic intervention is a good treatment choice.

## Introduction

Prevalence of unicornuate uterus is 0.1% in the population, with 74% of unicornuate uterus having a rudimentary horn, which is present due to partial development of one mullerian duct. Rudimentary horn can be communicating or non-communicating depending on their fusion with the larger horn. When rudimentary horn fuses, it has a communication with the larger uterine horn, and when fusion fails, there is no communication between the rudimentary horn and the larger horn, with 70-90% of the times, rudimentary horn not communicating with the main horn [1]. Mullerian anomalies lead to multiple problems like infertility, endometriosis, dysmenorrhoea, recurrent mis-carriages, preterm birth, fetal growth restriction, placental abnormalities, increase caesarean section rates which affect morbidity and mortality of women[2][1][3]. Sometimes, unicornuate uterus has been associated with other malformations like musculoskeletal malformations, auditory defects, Hirschprung disease, absent gall bladder [2] and VACTERL anomalies [4].

Diagnosing uterine anomalies early, if possible during adolescents, and later during early pregnancy period will help to reduce morbidity and mortality with uterine rupture being as high as 80% [5], most uterine horn rupture occurring at 10-15 weeks of gestation [6][7]. There has been reports of pregnancy in rudimentary horn up till term, live [8, 9] and with fetal demise [3] but such conditions are extremely rare and should be avoided. If the clinician has an ectopic mind, and is suspicious that he's dealing with ectopic pregnancy, he should keep in mind that he may be dealing with a uterine anomaly, else diagnosis may be missed. Detecting

it is of utmost importance, because if not detected in time, pregnancy will progress to a stage where rupture is inevitable, and this will be detrimental for the woman.

We present a case where we detected pregnancy in the rudimentary horn of unicornuate uterus early by 3D vaginal ultrasound. Treatment was primarily surgical with laparoscopy being the mode of surgery.

## Case report:

23 years old, married woman, primigravida, walked into the outpatient clinic with right sided lower abdominal pain for a day. No other positive complaints. She had missed her periods that month. Per abdomen was soft, with mild tenderness on the right lower abdomen. Per speculum examination showed a single normal looking cervix, with no discharge or bleeding. Per vaginal examination, cervix was closed, with mobile uterus, portio-sliding pain absent and no palpable vaginal septum. A 2D ultrasound was done, which showed an enlarged uterus with thickened endometrium. Extrauterine pregnancy was seen with live embryo of 6 weeks and 4 days, which was completely surrounded by a thick wall. An ectopic pregnancy was suspected, but the thick wall did not look like a fallopian tube. Hence, in 3D vaginal ultrasound, two uterine horns could be separated with both the horns connected only with a small strip of tissue. There was no endometrial connection of the pregnant horn with the cervix, or the main horn (**Figure 1**). Both ovaries appeared normal. There was no free fluid in the pouch of Douglas. We were expecting her Bhcg to be of normal pregnancy range which was found to be 4737IU/l.

After thorough counselling of the couple, and pre-anaesthetic checkup and consent, she was posted for explorative laparoscopy and removal of the ectopic pregnancy. After placing all the ports, thorough examination of the abdomen was done, which showed two horns of the uterus, with a non-communicating horn being vascular, two fallopian tubes arising from each horn, with two normal ovaries. Both the horns were connected with a fibrous band. A schematic diagram illustrates a better understanding of the condition (**Figure 2**). We were dealing with an unruptured live ectopic pregnancy of rudimentary non-communicating horn of unicornuate uterus. No free fluid present Rest of the abdomen looked normal (**Figure 3**).

The fibrous band, along with the base of the pregnant horn cauterised using bipolar, and cut with scissors laparoscopically. Ipsilateral salpingectomy was done. Both the horn and the ipsilateral tube were removed using endobag (**Video 1**). There was no haemorrhage during surgery. Patient was discharged the next day with advice to follow up with renal ultrasound. Macroscopically, the uterine horn was about size of 4\*4cm, which was dissected. It had a myometrium, and the products of conception well implanted into the endometrium. Histology revealed the ectopic pregnancy in the rudimentary horn, and not in a fallopian tube (**Figure 4 A,B**).

## Discussion:

Amongst mullerian anomalies, unicornuate uterus accounts for 2.4-13% [7][2]. Pregnancy in rudimentary horn of unicornuate uterus is rare, incidence being 1 in 76.000 - 1 in 150.000 [5]. Here we report pregnancy in ASRM classification type A1b of unicornuate uterus/ ESHRE-ESGE classification U4a [10]. The pregnancy in non-communicating horn which has no connection with cervix, or the main horn bears the growing fetus. It is due to transperitoneal migration of sperm to the contralateral rudimentary horn, fertilizing the ova on that side [1] or migration of fertilized ovum, which probably could have fertilized in the pouch of Douglas [5]. Diagnosis of such a case requires high suspicion index. Diagnosis can be made on 2D ultrasound with accuracy being only 26% [2], Other reported literature mentions ultrasound sensitivity to be around 29-33% [11]. It should be supplemented with 3D ultrasound, which improves accuracy rates. MRI also confirms the diagnosis, it is an excellent tool for diagnosing uterine anomalies and any other anomalies associated like urological anomalies, but it is expensive and not available globally under emergency circumstances. It can be done when expert ultrasound imaging is not present [2]. Tsafirir suggested a criteria to diagnose

early pregnancy in the rudimentary horn via ultrasound: pseudopattern of assymetrical bicornuate uterus, absent visual continuity between cervical canal and lumen of pregnant horn and presence of myometrial tissue around the gestational sac, hypervascularisation typical of placenta accreta[12]. Similar criteria was proposed by Marvelos and it requires identification of empty uterus with single interstitial portion of fallopian tube, a gestational sac surrounded by myometrial tissue separate from uterus and a vascular pedicle connecting the unicornuate uterus to the G-sac [13]. Our patient, was first subjected to 2D USG, pregnancy was confirmed, and when we suspected that we were dealing with a uterine anomaly, 3D configurations were made to confirm the uterine anomaly. There was one cervix, which was communicating with the left uterine horn , the right horn had no communication with the cervix or the left horn. There was a live embryo, and G-sac was surrounded by myometrium. Differential diagnosis of ectopic in fallopian tube and pregnancy in an anomalous uterus should be ruled out, because treatment differs. 3D ultrasound configurations help in differentiating when in doubt. Transverse sections of the normal uterus and anomalous uterus with ectopic pregnancy may look the same, but with 3D configurations, they can be easily differentiated (**Figure1** ). A table to help differentiate between them by ultrasound has been made (**Table 1** ).

Management will depend upon the hemodynamic condition of the woman, her gestational age. Essentially, removal of uterine horn is the line of management. Earlier days, or in places where access to health care is difficult, when diagnosis is a problem, women often come with rupture of rudimentary horn with unstable hemodynamic condition. Emergency open surgery with multiple blood transfusions is the only option [14, 15]. But with advent of better diagnostics, and more women being diagnosed in first trimester scans, medical line of management with surgical removal being done on a later date has become possible [5]. There are no fixed guidelines to manage such ectopics, but like management of other ectopic pregnancy, in early hemodynamically stable pregnancy, intrauterine or intramuscular methotrexate, or intrauterine KCL can be injected. She is followed up with Bhcg. Once pregnancy completely resolves, she is advised to get the rudimentary horn and ipsilateral fallopian tube removed to prevent further ectopic pregnancy [5] . This method improves operative morbidity and chances of intraoperative haemorrhage but delays definitive management.

There are case reports in literature wherein they have removed the rudimentary pregnant horn successfully without prior medical management [16] similar to ours. We did a primary surgical excision of the uterine horn with live fetus insitu. No complications arose. In our case, medical line of management did not seem appropriate, because we had a live fetus of 6weeks 4 days with high Bhcg values (47371 IU/ml), which could lead to intravenous methotrexate treatment failure. Most literature predicts successful methotrexate treatment with Bhcg values less than 5000IU/ml.[17]Hence, we recommend primary laparoscopic surgical management, because it removes the chances of methotrexate failure all together, does not depend upon Bhcg values and is a causal treatment and not just a treatment to remove the pregnancy. Complete management with removal of pregnancy and correction of anomaly is done at one shot with complications being almost nil. Our patient and her husband were satisfied with treatment option given and hope to get pregnant again soon.

## Conclusion:

Pregnancy in rudimentary horn of unicornuate uterus is not something we see every day in our clinics, requires high suspicion to diagnose, and often increases morbidity of the patient if missed. But with prior knowledge of such cases and an alert mind, this can be detected early with a good ultrasound scan and adequate treatment can be done. We recommend laparoscopic surgical excision of the rudimentary pregnant horn for a one time proper definitive treatment of the patient.

## Future perspective:

A hypothetical treatment option could be this that product of conception is removed from the rudimentary horn laparoscopically, and the rudimentary horn and the main horn united by Laparoscopic Strassman's Metroplasty. This could increase the uterine cavity area for pregnancy and probably restore better reproductive outcome. But feasibility of surgery, and obstetrical morbidity of the patient will have to be seen, and will require great deal of counselling of the couple. Such procedures have been done before for treatment of hematometraand chronic pelvic pain with fairly good outcome [18].

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**Supplementary Material:** Video demonstrating the laparoscopic excision of pregnant rudimentary horn (Video 1).

## Authorship

Author 1: Researched the subject, collected data, drafted and revised the manuscript. Author 2: Researched the subject, collected data, edited the case video and figures. Author 3: Main pathologist involved in the case, provided the histopathological pictures. Author 4: Researched the subject, collected data, and revised the manuscript. Author 5: Researched the subject, collected data, and revised the manuscript. Author 6: Researched the subject, collected data, and revised the manuscript. Author 7: Researched the subject, did final editing of the manuscript. He is the treating surgeon. All authors have read the final version of the manuscript and approve the same.

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## Figure Legends

Figure 1: a) 2D ultrasound showing transverse view of unicornuate uterus on left side, pregnant rudimentary horn on right side. b) 3D configuration of the unicornuate uterus and pregnant rudimentary horn.

Figure 2: Schematic diagram representing unicornuate uterus on left side, pregnant rudimentary horn on the right side with no connection to the cervix, and a small band connecting both.

Figure 3: Laparoscopic overview of the abdomen, rudimentary pregnant horn on the right, and the unicornuate uterus on the left.

Figure 4A: Macroscopic picture of the excised rudimentary horn with the embryo.

Figure 4B: Histology of the rudimentary horn showing the secretory endometrium with placental implantation.

Video 1: Laparoscopic excision of the rudimentary pregnant horn.

Table 1: Ultrasound features to help differentiate between fallopian tube ectopic pregnancy, bicornuate uterus pregnancy and rudimentary horn pregnancy.

## Hosted file

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