Diagnosis and Treatment of Rudimentary Horn Pregnancy: Analysis of Eleven Cases

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To the Editor: The unicornuate uterus arises from the anastomotic failure of the paired Mullerian ducts in which simultaneously either of them is underdeveloped or absent, termed the "rudimentary horn". The horn is connected to the unicorticate side by either a minimally connected narrow fibrous band of tissue or a broad, firm muscular attachment; the muscular layer of the horn varies from thick and strong to thin and malformed. The rarest and most severe complication is rudimentary horn pregnancy (RHP), usually results in catastrophic consequences. We refer to 11 RHP cases from Peking Union Medical College Hospital (PUMCH) since 1980.

This research was approved by the Ethics Committee of PUMCH. We searched medical records from January 01, 1980 to December 31, 2017 and used "rudimentary horn pregnancy", "horn pregnancy", "uterine horn excision", and "rudimentary horn excision" as the index words for searching. Ultimately, we identified 11 cases conforming to RHP [Table 1].

The average age of 11 patients was 26.9 years. Three women had delivered before; however, none of them had known they have uterine anomalies. The average gestational age was 12.1 weeks. Six patients came for acute abdominal pain, and five had already suffered from shock. Two women were referred because their artificial abortions were unsuccessful. Two women were suspected to have an ectopic pregnancy. One patient was misdiagnosed with choriocarcinoma. The adnexal mass was resistant to chemotherapy; hence, the patient came for further evaluation. Importantly, none of these 11 patients were aware of RHP when they first came to the hospital.

After ultrasound examination on administration, there was only one patient who was diagnosed with RHP correctly. Four reports showed an intrauterine pregnancy with two cases of uterine rupture and one of placental abruption. Four cases were reported to be adnexal pregnancies. One patient was diagnosed with abdominal pregnancy. The patient treated for choriocarcinoma was thought to have an adnexal mass after the scan.

All patients received surgery, and eight (8/11) underwent emergency surgery because of unstable hemodynamics. Six of the procedures (6/11) were laparotomies, and 5 of these patients’ vital signs (5/11) deteriorate to shock. Five received laparoscopy whereas two changed to laparotomy. Five patients (5/11), 16.4 weeks on average, were found to have horn rupture in operation. In addition, the blood loss volume ranged from 5 to 3000 ml. The average amount of bleeding was 2500 ml for the five ruptured RHP patients (5/11); however, it was only 72.5 ml for other patients (6/11). One case of rupture was found to be placenta percreta.

In the follow-up, we made contact with six patients (6/11). They all conceived with the left unicornuate uterus. Two women chose abortion and four delivered babies, two were term cesarean deliveries, one was a preterm cesarean delivery, and one was a vaginal delivery.

We reviewed literatures within the recent 6 years and found 18 case reports published. The minimal gestation duration was 7 weeks, and the longest was 42 weeks. Most cases (10/18) manifested before 20 weeks. Four cases were termed pregnancies and one postterm. Abdominal pain occurring at any time during gestation is common. Once the contents exert significant tension on the muscular layer, pain deteriorates into severe, sustained cramping. Five ruptured cases experienced unstable hemodynamics. However, none of our patients showed signs of RHP by bimanual examination. Vaginal bleeding, unlike tubal pregnancy, is not typical because of the relatively better trophoblast development. Notably, the fetus tends to be breech or transverse presentations because of the abnormal horn cavity or the placenta. For women with a previous normal delivery, the identification of RHPs is more obscure and difficult.

The sensitivity of sonography for detecting RHP is only 26% and decreases as the pregnancy advances. Occasionally, RHP can be confused with other forms of ectopic pregnancy. Absent visual continuity between tissue surrounding the gestation sac and the uterine cervix may be the most significant criteria. Saline infusion sonography has been suggested to have relatively good accuracy.

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for diagnosing RHP.\(^1\) If ultrasonography is inconclusive, magnetic resonance imaging (MRI) is capable of accurate diagnosis of without the hazard of radiation.

Seventy percent to 80% RHP cases rupture before 20 weeks whereas 10% of gestations reach term, with only a 2% fetal salvage rate.\(^2\) The chance of rupture depends on the horn musculature, variable thickness, the distension of the myometrium, and the invasion of trophoblast tissues. In our cases, more than 30 times blood loss was for ruptured cases compared to cases without rupture. Besides, we should avoid iatrogenic rupture of RHP. Buntugu et al.\(^3\) reported a woman in a sixth gravida who had vaginal delivery for five times. This sixth gestation resulted in intrauterine fetal demise; induction with misoprostol failed to lead to the suspicion of RHP. Abnormal placentation is another complication of RHP. The endometrium of the rudimentary horn has been shown to be thinner and malfunctioned, predisposing to penetrative placenta. The prevalence tends to be greater than 10%.\(^4\) Besides, abnormal placentation increases the chance of rupture because of myometrium damage.

The standard treatment is surgical excision of the pregnancy together with the rudimentary horn. Only 29% of RHP diagnoses are made before surgery; thus, the surgery is both cure and diagnostic strategy for RHP. If pregnancy in the rudimentary horn occurs in the first trimester, excision should be performed by laparoscopy.\(^5\) Adequate attention should be paid to avoid ureter injury in those with urinary abnormalities or abnormal ureter arrangement. Since RHP is a potentially life-threatening complication of the functional rudimentary horn, its routine excision should be undertaken during the nonpregnant state. However, the women, who reject surgery, should be adequately counseled regarding complications.\(^5\)

In conclusion, RHP is a rare, but severe disease. Most patients present with symptoms such as acute abdominal pain, and it is extremely difficult to distinguish the RHP from other acute abdominal or gestational complications because of a high misdiagnosis rate using ultrasound. Rupture can occur at any time but primarily occurs during the first or early second trimester. Once the horn is ruptured, patients go into shock because of massive bleeding. Therefore, recognizing this scenario correctly before rupture and obtaining timely surgical treatment are of fundamental importance. An emergency MRI or laparoscopic exploration should be considered without delay if the diagnosis is obscure or the hemodynamics is unstable.

### Table 1: Cases diagnosed at the PUMCH (1980–2016)

| Case number | Admission date (Y/M) | Maternal age (years) | G and P | Gestational weeks | Presentation | PE | US findings | Conservative treatment | Surgery | Ruptured | Blood loss (ml) | Communicating |
|-------------|----------------------|----------------------|---------|------------------|--------------|----|-------------|------------------------|---------|----------|----------------|---------------|
| 1           | 2003.09              | 29                   | G3P1    | 7                | Relapsed choriocarcinoma | Normal | GTD? Right adnexal mass? | Chemotherapy | L       | No       | 100           | No           |
| 2           | 1999.07              | 26                   | G1P0    | 8                | Routine antenatal care | Right lower abdominal mass | No | No         | chemotherapy | L       | No       | 10            | No           |
| 3           | 2014.03              | 32                   | G1P0    | 8                | EP            | Normal | Right adnexal pregnancy | No         | L       | No       | 20           | No           |
| 4           | 2013.02              | 27                   | G3P0    | 9                | Amenorrhea     | Normal | RHP | No         | Drug-induced abortion | O       | Yes      | 2500          | No           |
| 5           | 2000.05              | 25                   | G1P0    | 9                | Irregular vaginal bleeding and abdominal pain | Hypovolemic shock | No | No         | Drug-induced abortion and curettage | L→O     | Yes      | 100           | No           |
| 6           | 2003.04              | 24                   | G1P0    | 10               | 15 days after drug-induced abortion and vaginal bleeding | Normal | Double uterus and early intrauterine pregnancy | Drug-induced abortion and curettage | L→O     | Yes      | 200           | No           |
| 7           | 2000.11              | 26                   | G2P0    | 11               | Abdominal pain, nausea, and vomiting | Hypovolemic shock | No | No         | Drug-induced abortion and curettage | L→O     | Yes      | 2500          | No           |
| 8           | 1993.08              | 25                   | G1P0    | 12               | Abdominal pain, nausea, and vomiting | Hypovolemic shock | No | No         | Drug-induced abortion and curettage | L→O     | Yes      | 2500          | No           |
| 9           | 2013.01              | 25                   | G1P0    | 14               | Abdominal pain and peritoneal irritation | Hypovolemic shock and shifting dullness | No | No         | Drug-induced abortion and curettage | L→O     | Yes      | 2000          | No           |
| 10          | 2011.02              | 26                   | G3P1    | 22               | Abdominal pain | Hypovolemic shock and fetal demise | No | Yes        | Drug-induced abortion and curettage | L→O     | Yes      | 2500          | Yes          |
| 11          | 1983.07              | 31                   | G3P1    | 23               | Abdominal pain | Hypovolemic shock and fetal demise | No | Yes        | Drug-induced abortion and curettage | L→O     | Yes      | 2000          | Yes          |

G: Gravity; L: Laparoscopic surgery; O: Open surgery; P: Parity; PUMCH: Peking Union Medical College Hospital; RHP: Rudimentary horn pregnancy; GTD: Gestational trophoblastic disease; US: Ultrasound; EP: Ectopic pregnancy; PE: Physical examination.
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Conflicts of interest
There are no conflicts of interest.

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