

A Case of Abdominal Pregnancy, Primary vs Secondary – Radiological Workup

Dr. Mohd Kamran Siddiqui, Dr. Pramod Setty J., Dr. Bhagyavathi M. Kulkarni,
Dr. Jeevika M.U., Dr. Sindu P. Gowdar.

I. Introduction

Ectopic pregnancy was first recognised by Busiere in 1663 on examining the body of an executed prisoner in Paris. Gifford made a more complete report in 1731 in England, describing the condition in which the fertilised ovum was implanted anywhere outside the uterine cavity [1]. During this decade the number of hospitalisations for ectopic pregnancy has tripled and ectopic pregnancy has emerged as a leading cause of maternal morbidity [2,3]. Fortunately the risk of death has declined despite increasing incidence of the disease. The incidence of ectopic pregnancy in non-white patients is approx. 12/1000. Out of all ectopic pregnancies, 98.5% are singleton tubal pregnancies and rest is at other sites, which create diagnostic problems and have been associated with greater morbidity and mortality than tubal pregnancies. Pregnancy in the rudimentary horn of a bicornuate uterus is a very rare condition and Johnsen reported the incidence of this pregnancy at approximately one in one lakh pregnancies [4].

Abdominal pregnancy, with a diagnosis of one per 10000 births, is an extremely rare and serious form of extrauterine gestation [5]. Abdominal pregnancy is classified as primary or secondary. The diagnosis of primary abdominal pregnancy was confirmed according to Studdiford's criteria [6]. In these criteria, the diagnosis of primary abdominal pregnancy is based on the following anatomic conditions: 1) normal tubes and ovaries, 2) absence of an uteroplacental fistula, and 3) attachment exclusively to a peritoneal surface early enough in gestation to eliminate the likelihood of secondary implantation. The placenta sits on the intraabdominal organs generally the bowel or mesentery, or the peritoneum, and has sufficient blood supply. Sonography is considered the front-line diagnostic imaging method, with magnetic resonance imaging (MRI) serving as an adjunct in cases when sonography is equivocal and in cases when the delineation of anatomic relationships may alter the surgical approach [7].

Mullerian duct anomalies result from defective fusion, canalization or absorption of the median septum of the female reproductive system during embryonic development [8]. A working classification depending on the degree of failure of normal development was proposed by Buttram and Gibbons in 1979 and modified in 1988 by American Society of Reproductive Medicine [8]. The prevalence of uterine malformation is estimated to be 6.7% in the general population, slightly higher (7.3%) in the infertility population, and significantly higher in a population of women with a history of recurrent miscarriages (16%) [9]. Presence of bicornuate uterus predisposes to lower fertility, high risk of abortions, preterm births. IUGR, malpresentations and lower fetal survival rate. However after corrective surgery successful pregnancy with good outcome is achieved in 80% of cases [8]. Ruptured horn poses a life threatening situation to the pregnant woman.

MRI is accepted as a highly accurate tool for the evaluation of müllerian duct anomalies [10-15] and thus is commonly used in clinical practice. In clinical practice, the results of the MRI examination are used by the clinician in the context of a comprehensive clinical assessment scheme to reach the final clinical diagnosis. Information obtained from pelvic examination, laparoscopy, office hysteroscopy, or other imaging examinations such as sonography, sonohysterography, and hysterosalpingography differs from the type of information provided by MRI, but these imaging techniques provide added information that complements the information gained from MRI.

Here we present an interesting radiological workup of a case of 20 year old woman with abdominal pregnancy.

II. Case Report

A 20 year old P1L1 female who presented to our emergency medicine department with severe anaemia associated with generalised weakness, abdominal distension and fatigue for evaluation. The patient gives a history of 4 months of amenorrhoea. She gives a past history of previous full term normal delivery. She was referred to the Radiology department for abdominal sonography.

Ultrasound revealed a dead fetus of about 17 weeks gestation seen in the right iliac fossa. The uterus was found intact with thick endometrium. Bilateral tubes and ovaries were separately identified. The placenta however could not be localised, instead a vague heterogenous mass was localized in left iliac fossa displacing the sigmoid colon to the right side, which was considered as placenta probably attaching to mesentery. There

was moderate intraperitoneal free fluid collection. A diagnosis of primary abdominal pregnancy was made out based on the Studdiford's criteria.

MRI of abdomen was done for localisation and evaluation of attachment of placenta. It revealed a bicornuate uterus with ruptured left horn. Fetus of around 17 weeks was identified towards the right of maternal spine. The placenta was seen attached to the sigmoid colon mesentery with large proportion resting on the ruptured horn, pushing the bowel loops towards the right side. The final diagnosis was secondary abdominal pregnancy following rupture of left horn of bicornuate uterus with foetal demise.

The patient underwent emergency explorative laparotomy. The rudimentary left horn of uterus was removed and sent for histopathological analysis. Bilateral tubes and ovaries were found intact on surgical table. The histopathological examination revealed placental elements within the rudimentary horn confirming the diagnosis of secondary abdominal pregnancy.

The postoperative period was uneventful. Regular follow up was done with no further complications.



(1)

(2)

Figure 1. Axial ultrasonogram image in the region of left lower abdomen demonstrates vague abdominal mass with echogenicity similar to placenta, attached to the abdominal wall anteriorly, displacing bowel loops surrounding it.

Figure 2. Sagittal ultrasonogram image demonstrates normal uterus with endometrium and dead foetus in the peritoneal cavity lying above it.

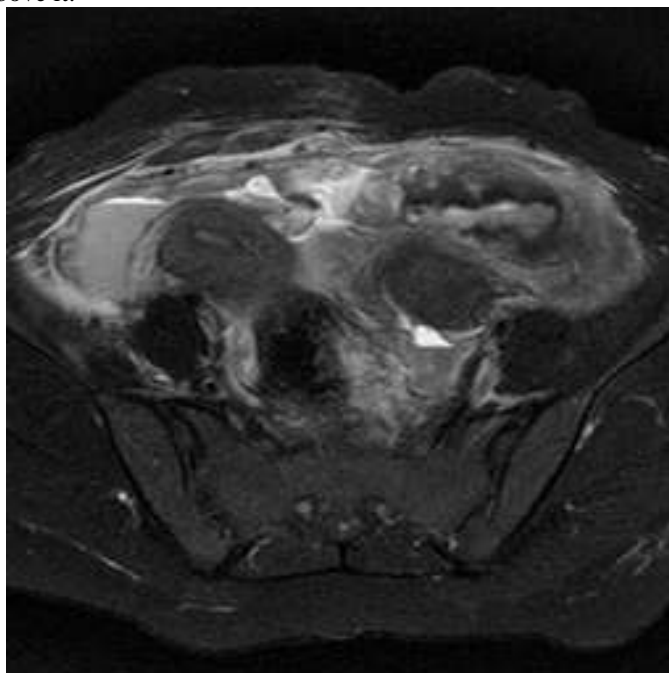
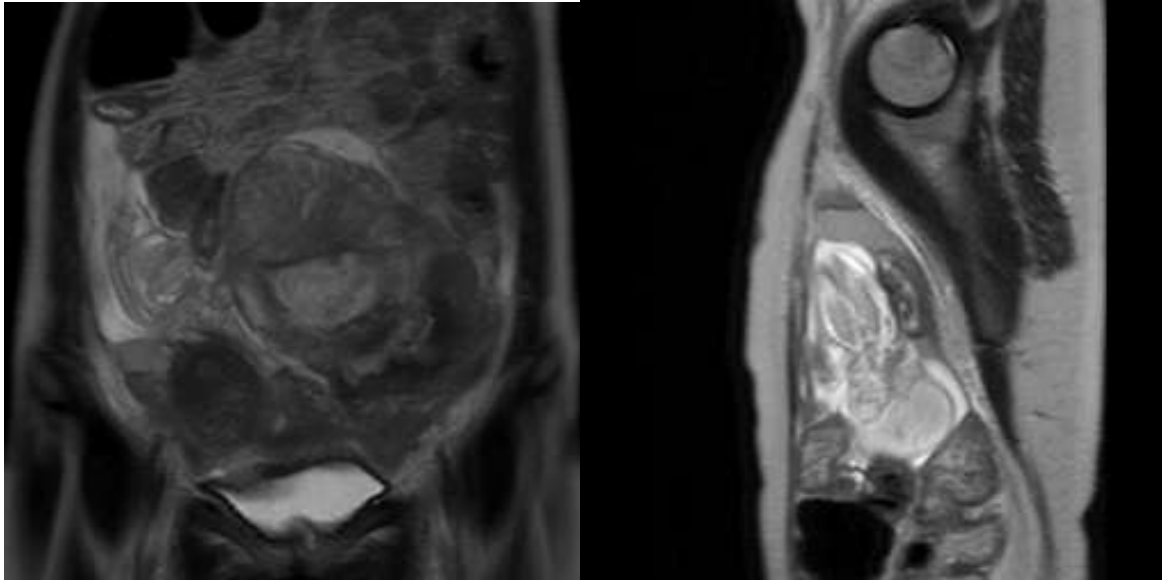


Figure 3. T2 weighted SPAIR axial MRI image at the level of lower abdomen demonstrates normal cornu of uterus on right side and heterogeneous placenta with internal haemorrhage appearing dark with hyperintense areas within on left side, attached to the ruptured left horn and sigmoid mesentery. Peritoneal collection also noted.



(4)

(5)

Figure 4. Coronal T2W image clearly demonstrates the foetus lying in the peritoneal cavity with fluid surrounding it and mass consisting of placenta and ruptured left horn on left side which appears heterogeneous containing areas of haemorrhage appearing hyper intense in centre.

Figure 5. T2W sagittal image showing the dead foetus in the peritoneal cavity on the right side.



Figure 6. Gross specimen of foetus, left ruptured horn and placenta

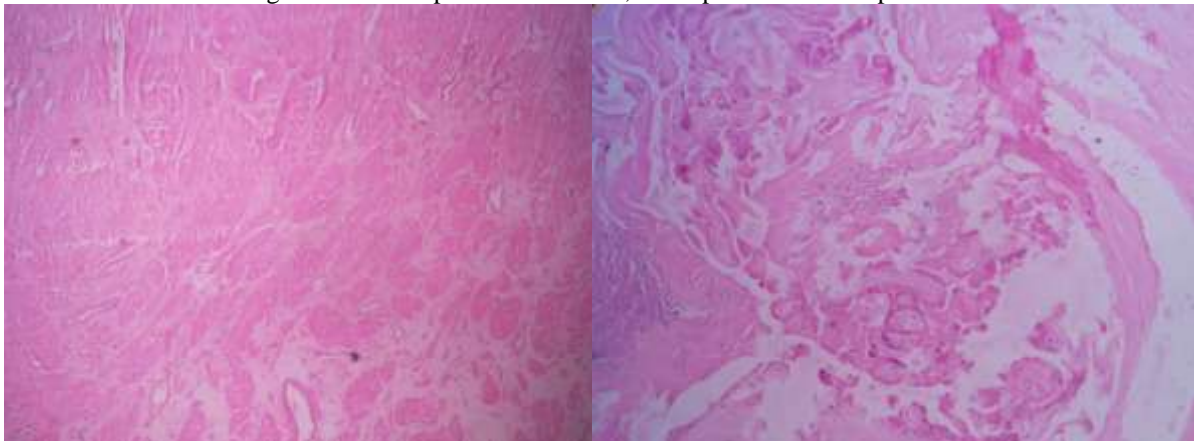


Figure 1. Histopathological analysis correlated well with imaging findings and demonstrated smooth muscle infiltrated by mixed inflammatory cell infiltrates and eosinophilic fibrin material. Chorionic villi are seen adherent directly to the smooth muscle bundles and at places seen invading it.

III. Discussion

Abdominal pregnancy refers to a pregnancy that has implanted within the peritoneal cavity, external to the uterine cavity and fallopian tubes. Bicornuate uterus results from non-fusion of the two cornua of the uterus. Estimated incidence of pregnancy in rudimentary horn is 1 in 10000 to 1 in 40000 [16]. Most likely mechanism of a pregnancy in a non-communicating rudimentary horn is transperitoneal migration of the spermatozoa or the fertilized ovum [17]. Depending on the ability of the horn to undergo hypertrophy and its musculature the rupture occurs between 5 weeks to 35 weeks. 80% of rupture occurs before 20 weeks. The haemorrhage occurring because of rupture is massive and life threatening if corrective measures are not taken immediately. The usual outcome of rupture in second trimester in 90% of cases is fetal demise. A routine USG examination in suspected cases of uterine anomaly or an MRI is also appropriate to prevent the catastrophe.

The classic abdominal pregnancy ultrasound findings of an empty uterine cavity with absence of myometrial tissue between the maternal urinary bladder and the pregnancy becomes more obvious on the larger FOV of CT or MRI [18]. MRI and CT can be helpful in confirming the diagnosis, determining anatomic relationships and potential vascular connections, and assessing placental adherence. On MRI, a gestational saclike structure associated with hematoma may, for example, be depicted in the pouch of Douglas. Enhancement of the peritoneum around the saclike structure may also be seen in abdominal pregnancies [19]. Attempted removal of a placenta that is adherent to abdominal organs can result in fatal hemorrhage. MRI is useful in the accurate localization of the placenta, detection of arterial feeders, and assessment of placental adherence to surrounding organs [20]. On CT, an intraabdominal extrauterine gestational saclike structure with an enhancing rim can be seen; however, CT generally provides a less detailed placental evaluation.

In the present case, we were able to demonstrate primary abdominal pregnancy according to Studdiford's criteria with the use of transvaginal and transabdominal ultrasound examination. We found both fallopian tubes and ovaries intact. With regard to the second criterion, we did not observe any uteroplacental fistulae in our case. Since abdominal pregnancy at less than 20 weeks of gestation is considered early [21], our case was regarded as early, and so we dismissed the possibility of secondary implantation.

Ultrasound examination is the usual diagnostic procedure of choice, but the findings are sometimes questionable. They are dependent on the examiner's experience and the quality of the ultrasound. Transvaginal ultrasound is superior to transabdominal ultrasound in the evaluation of ectopic pregnancy since it allows a better view of the adnexa and uterine cavity. MRI may help in surgical planning by evaluating the extent of mesenteric and uterine involvement [22]. Non-contrast MRI using T2-weighted imaging is a sensitive, specific, and accurate method for evaluating ectopic pregnancy [23], and we used it in our case.

Our patient had never taken antenatal visits and hence was unknown of her condition. We were able to demonstrate the abdominal pregnancy through ultrasonography but missed the bicornuate uterus and ruptured horn which was only possible through MRI.

IV. Conclusion

With the advancements made in radio-diagnosis it is possible to detect the Mullerian anomaly even in pregnancy. However the possibilities of missing them are higher in inexperienced hands. In absence of timely diagnosis or misdiagnosis the condition can be fatal. Although CT and MRI are not commonly used in the imaging of patients with a positive β -HCG test, various types of ectopic pregnancy are occasionally imaged with these modalities. There are certain CT and MRI features that may aid in the diagnosis of ectopic pregnancy, most of which are correlates of the classic sonographic imaging signs of this condition. Moreover, MRI may be a useful adjunct to ultrasound in the diagnosis and evaluation of various types of ectopic pregnancy as well as mullerian duct anomalies and complications when question still persists after ultrasonography or diagnosis is critical in patient's evaluation.

Bibliography

- [1]. Rock JA, Thompson JD, Te Linde's Operative Gynaecology: Ectopic Pregnancy, Eighth edition. Philadelphia : J.B. Lippincott-Raven, 1997;501-27.
- [2]. Dorfman SF, Deaths from Ectopic Pregnancy, United States, 1979-80 *Obstet Gynaecol* 1983;62:334-42.
- [3]. Weinstein L, Marris MB, Dotters D, Christian CD. Ectopic Pregnancy- A new surgical epidemic 1983;61:698-701.
- [4]. Johnsen K. Pregnancy in a rudimentary horn, two case reports *Obstet Gynaecol* 1969;34:805-8.
- [5]. Martin JN, Sessums JK, Martin RW, Pryor JA, Morrison JC: Abdominal pregnancy: current concepts of management. *Obstet Gynecol* 1988, 71:549-557.
- [6]. Studdiford WE: Primary peritoneal pregnancy. *Am J Obstet Gynecol* 1942, 44:487-491.
- [7]. Wagner A, Burchardt A: MR imaging in advanced abdominal pregnancy. *Acta Radiol* 1995, 36:193-195.
- [8]. Padubidri VG, Daftary SN. Disorders of the Ovary and Benign Tumours. In: Howkins and Bourne, eds. *Textbook of Gynecology*. 15th ed. Haryana, India: Elsevier Print; 2013: 98-99.
- [9]. Sotirios H, Saravelos, Karen A, Cocksedge and Tin-Chiu Li. Prevalence and diagnosis of congenital uterine anomalies in women with reproductive failure: a critical appraisal. *Human Reproduction Update*. 2008; September-October;14(5):415-29.
- [10]. Troiano RN, McCarthy SM. Müllerian duct anomalies: imaging and clinical issues. *Radiology* 2004; 233:19-34.

- [11]. Carrington BM, Hricak H, Nuruddin RN, Secaf E, Laros RK Jr, Hill EC. Müllerian duct anomalies: MR imaging evaluation. *Radiology* 1990; 176:715–720.
- [12]. Pellerito JS, McCarthy SM, Doyle MB, Glickman MG, DeCherney AH. Diagnosis of uterine anomalies: relative accuracy of MR imaging, endovaginal sonography, and hysterosalpingography. *Radiology* 1992; 183:795–800.
- [13]. Fedele L, Dorta M, Brioschi D, Massari C, Candiani GB. Magnetic resonance evaluation of double uteri. *Obstet Gynecol* 1989; 74:844–847.
- [14]. Reinhold C, Hricak H, Forstner R, et al. Primary amenorrhea: evaluation with MR imaging. *Radiology* 1997; 203:383–390.
- [15]. Fedele L, Dorta M, Brioschi D, Giudici MN, Candiani GB. Magnetic resonance imaging in Mayer- Rokitansky-Küster-Hauser syndrome. *Obstet Gynecol* 1990; 76:593–596.
- [16]. Sfar E, Zine S, Bourghida S, Bettaieb A, Chelli H. Pregnancy in a rudimentary uterine horn: main clinical forms. 5 cases. *Rev Fr Gynecol Obstet*. 1994;89: 21-6.
- [17]. M. Scholtz. A full-time pregnancy in a rudimentary horn of the uterus. *British Journal of Obstetrics & Gynaecology*. 1951;58: 293-6.
- [18]. Ombelet W, Vandermerwe JV, van Assche FA. Advanced extrauterine pregnancy: description of 38 cases with literature survey. *Obstet Gynecol Surv* 1988; 43:386–397.
- [19]. Tamai K, Koyama T, Togashi K. MR features of ectopic pregnancy. *Eur Radiol* 2007; 17:3236–3246.
- [20]. Lockhat F, Corr P, Ramphal S, Moodley J. The value of magnetic resonance imaging in the diagnosis and management of extra-uterine abdominal pregnancy. *Clin Radiol* 2006; 61:264–269.
- [21]. Gaither K: Abdominal pregnancy-an obstetrical enigma. *South Med J* 2007, 100:347-348.
- [22]. Mahian V, Lee JH: MR imaging and MR angiography of an abdominal pregnancy with placental infarction. *AJR Am JRoentgenol* 2001, 177:1305-1306.
- [23]. Yoshigi J, Yashiro N, Kinoshito T, O’uchi T, Kitagaki H: Diagnosis of ectopic pregnancy with MRI: efficacy of T2-weighted imaging. *Magn Reson Med Sci* 2006, 5:25-32.