

The Rarest Form of Ectopic Pregnancy: Intramural Ectopic Pregnancy and Medical Treatment

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Abstract

This case report shows the successful use of early medical treatment in an intramural ectopic pregnancy which occurred after ovulation induction and artificial intrauterine insemination (IUI). In the 5th week of the IUI, transvaginal ultrasound revealed an asymmetrically enlarged uterus and a gestational sac within the myometrium. The diagnosis of intramural pregnancy was confirmed by MRI. The delineation of a gestational sac within the myometrium can be best achieved by MR imaging which also obviates the hazardous effects of X-ray imaging. After methotrexate treatment, the blood β -hCG concentration decreased gradually. Early diagnosis and treatment are crucial to prevent the massive bleeding resulting from the rupture of the distended sac.

Keywords: intramural ectopic pregnancy, magnetic resonance imaging, medical treatment, ultrasound

Özet

Dış Gebeliğin En Nadir Formu: İnamüral Dış Gebelik ve Tıbbi Tedavi

Bu olgu sunumu, ovülasyon indüksiyonu ve intrauterin inseminasyon (IUI) sonrası gebe kalmış ancak intramüral dış gebelik oluşmuş bir gebede tıbbi tedavinin başarısını göstermektedir. IUI sonrası 5. haftada, transvajinal ultrasonda uterusda asimetric bir büyüme ve miyometriyum içinde gestasyonel kese izlendi. İnamüral gebelik tanısı MR ile doğrulandı. Miyometriyumdaki gestasyonel kese en iyi MR ile görüntülenebilir ve X ışınının potansiyel risklerini taşımaz. Metotreksat tedavisinden sonra kanda β -hCG konsantrasyonu tedrici olarak düştü. Erken tanı ve tedavi kese yırtılmasına bağlı masif kanamayı önlemek için çok önemlidir.

Anahtar sözcükler: intramüral dış gebelik, manyetik rezonans görüntüleme, tıbbi tedavi, ultrason

Introduction

The most common ectopic pregnancy site is the ampullary part of the oviduct, and it can be seen less frequently in other localizations such as the ovary, abdominal cavity, uterine cervix, cornual part of the oviduct and intramural region of the uterus (1). Intramural ectopic pregnancy is the rarest form of ectopic pregnancy (2). Although, the estimated incidence of ectopic pregnancy is 16 per 1000 reported pregnancies (3), intramural ectopic pregnancy is rather rare. In 2001, Bernstein et al. mentioned only 25 cases worldwide in literature (4).

Though, the rate of ectopic pregnancy gradually increases, maternal mortality due to ectopic pregnancy decreases. It has been reported that while maternal mortality rate was 72-90% in 1880, this rate decreased to 35.5 maternal deaths per 10 000 ectopic pregnancies in 1970 and to only 3.8 maternal deaths per 10 000 ectopic pregnancies in 1989 (5). The causes of intramural pregnancy remain unclear, however, uterine trauma and disease are considered to increase the risk of the incidence (4). Early diagnosis and treatment in intramural ectopic pregnancy are very important. If this disease is not treated at the early gestational age, rupture and finally massive bleeding will inevitably take place.

In this paper, we have aimed to introduce a new case of intramural ectopic pregnancy observed after infertility treatment and the results of medical treatment with methotrexate (Mtx) in accordance with previous literature.

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Case Report

A 38-year-old woman (gravity 2, parity 0) was admitted to our infertility department with secondary infertility, and a history of spontaneous pregnancy loss at the 10th week, 8 years previously. Ovulation induction and artificial intrauterine insemination (IUI) were applied for unexplained secondary infertility. Performance of IUI in our clinic is as follows: 36 hours after administration of hCG, 0.5 ml ejaculate, which is prepared with swim-up technique, is administered via Wallace catheter, into uterine cavity at a distance about 1 cm to the uterine fundal wall, slowly within 1 minute. The patient's history there was no data to suspect endometriosis, no record of past laparoscopy to evaluate endometriosis or of any operation involving the uterus.

After a positive pregnancy test, she was examined via ultrasound at the 35th day of IUI and a 7-weeks of pregnancy, according to gestational sac measurement, was diagnosed. Asymmetrically enlarged uterus, 12 mm endometrial thickness, and a separate gestational sac was seen within the myometrium at transvaginal ultrasound. Gestational sac including the yolk sac was measured as 22 mm at transvaginal ultrasound (US) (Shimadzu, Tokyo, Japan) (Figure 1). Due to the patient's strong desire for continuation of the pregnancy, she was also evaluated by magnetic resonance imaging (MRI) to confirm the diagnosis. MRI was performed with 1.5 T MRI Unit (Siemens, Symphony, Erlangen, Germany). Axial T2-weighted MR images best showed gestational sac, endometrium and myometrium. MRI sections also confirmed the diagnosis of intramural pregnancy (Figure 2).

She did not have vaginal bleeding or abdominal discomfort; her initial blood pressure was 130/85 mmHg and pulse rate was 78 beats per minute. The patient having been informed about the treatment types and risks, was given multidose Methotrexate (Mtx) and folic acid treatments. After screening the patient

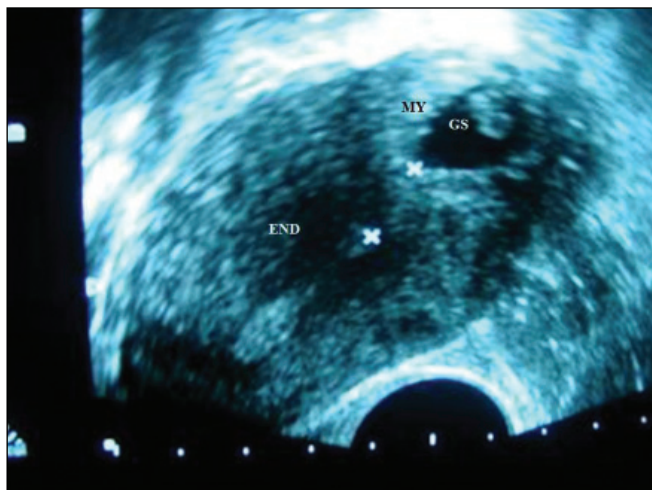


Figure 1. Transvaginal ultrasound view shows gestational sac within the myometrium

for hepatic, hematological and renal diseases, 1 mg/kg methotrexate (Emthexate-S, 2 ml, 50 mg, Pharmechemie B.V., Haarlem, Netherlands) was applied in 1st, 3rd, 5th, 7th days, and 0.1 mg/kg folic acid (Rescuvolin flakon, Er-Kim, Istanbul, Turkey) was applied in the 2nd, 4th, 6th, 8th days. Blood β -hCG concentration was 16 974 mIU/ml just before the Mtx treatment. After this first measurement, the weekly recorded consecutive β -hCG level results were 14 040, 9827, 5000, 1127, 369, 25.4, 1.0 mIU/ml, respectively.

Discussion

Since the arrival and implantation of an embryo into the myometrium is very difficult, incidence of intramural ectopic pregnancy is rather rare. There are a few etiological factors in occurrence of intramural ectopic pregnancy such as cesarean section, microscopic sinus tract associated with adenomyosis, invasion of uterine wall by placenta accreta and subsequent growth of the fetus deep within the myometrium or external migration and implantation of the embryo on the serosal surface of the uterus (2,6). The pathological confirmative diagnosis should demonstrate the myometrium surrounding the gestation product, which is completely separated from the endometrial cavity and the fallopian tubes (4,7). Preoperative diagnosis of ectopic pregnancy can be made with more confidence by the combination of ultrasound (US) and magnetic resonance imaging (MRI) findings. The differential diagnosis can also be performed on the basis of imaging findings among intrauterine, tubal and corneal (interstitial) ectopic pregnancies. Intrauterine pregnancies can be seen as a gestational sac within the endometrial cavity.

Intramural ectopic pregnancy refers to a uterine conceptus within the myometrium without connection with the fallopian tubes and endometrial cavity, so both US and MRI demonstrates an asymmetrically enlarge uterus and an eccentrically located gestational sac within the myometrial

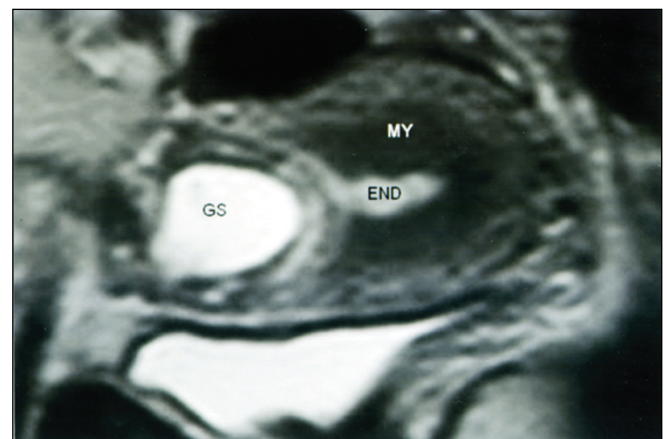


Figure 2. T2-weighted fat saturated axial MR image shows gestational sac within the myometrium. Note its close proximity to the endometrial cavity (MY: Myometrium, END: endometrium, GS: gestational sac and YS: yolk sac)

cavity. Myometrial mantle around the sac is thin (8,9). T2-weighted MR images can delineate endometrium and myometrium with better contrast resolution. In the diagnosis of intramural ectopic pregnancy, ultrasound usually shows an ectopic gestational sac that is distinct from the endometrial cavity (10). Although the cases of intramural pregnancies are usually diagnosed intraoperatively (10), in the present case, a separate gestational sac was demonstrated in the myometrium 12 mm away from the endometrial cavity wall by ultrasound and it was also verified by MR imaging.

Gestational sac within the dark myometrium is seen as bright signal intensity surrounded by a thin mantle of myometrium (9). Interstitial line sign was one of the findings described on US previously. The same finding can be applied to MRI and it is more sensitive and specific than sac eccentricity and myometrial thinning in the diagnosis of cornual ectopic pregnancy (8). The interstitial line is an echogenic or hyperintense line at US and MRI that abuts the center of gestational sac or the cornual mass. This line likely represents the endometrial canal when the gestational sac is large or the interstitial portion of the fallopian tube when the sac is smaller.

Tubal ectopic pregnancies can be detected by dilatation of tubes, hematoma surrounding the tubes in the absence of a gestational sac within the uterine cavity despite the increased level of blood β -hCG (9).

Adenomyosis is the most reasonable factor in the development of intramural ectopic pregnancy (2), because, deep adenomyosis has enough endometrial tissue and can respond to estrogen and progesterone, and demonstrate decidualization. This decidualized endometrium could be potential site for blastocyst implantation (2,7). Although adenomyosis has not been detected in MRI performed to verify intramural pregnancy, the diagnostic difficulty of adenomyosis in a pregnant uterus should be considered. Since determination of the risk factors, such as microscopic sinus tract and adenomyosis, are necessitated for hysterectomy, we could not define any specific risk factor as the case received medical treatment.

Although, there is only one report of a surviving fetus delivered by cesarean hysterectomy at 30th week of gestation (11), intramural ectopic pregnancy entails high risks in both fetal demise and maternal hypovolemic shock (12,13). Treatment of intramural ectopic pregnancy includes conservative method or surgical intervention. By preoperative diagnosis of unruptured intramural ectopic pregnancy, conservative treatments can be offered to patients to preserve the patient's fertility (10). The first step in the treatment approach to ectopic pregnancy depends on the time of diagnosis and the status of the patient. In case of uterine rupture or hemodynamic instability, hysterectomy will be

inevitable. Conservative approach or treatment may be suitable in case of early diagnosis.

Bernstein et al. (4) reported expectant management of intramural ectopic pregnancy, but initial β -hCG level was under 10 mIU/ml in their case. Lu et al. (2) reported another case in which total abdominal hysterectomy was performed via laparotomy. Systemic Mtx treatment, or local injection of KCl, prostaglandin, hyperosmolar glucose or Mtx has been successfully used for the management of intramural or cornual pregnancy (14,15).

We applied systemic Mtx in our case due to the strong fertility desire of the patient. In general, we use single dose Mtx treatment in unruptured tubal ectopic pregnancy patients in our clinic, but we chose multidose regimen of Mtx for this case as multidose Mtx treatment is more effective than single dose Mtx on ectopic pregnancy treatment (16). The most important hesitation was the presence of high β -hCG level before Mtx treatment. Initial β -hCG level was 16 974 mIU/ml. However, after Mtx treatment, β -hCG level gradually decreased and it was measured to be 1.0 mIU/ml on 49th day of the treatment.

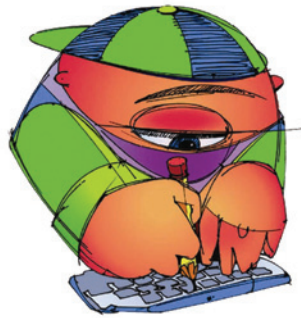
The diagnosis of intramural pregnancy in the early gestational age has great importance, because it can allow medical treatment, prevent severe morbidities and preserve uterine integrity and future fertility.

In conclusion; intramural ectopic pregnancy is the rarest form of ectopic pregnancy but it should be taken into account in the differential diagnosis. Medical treatment with Mtx could be used successfully, even if the initial β -hCG level is very high. MR imaging does not have the potential X-ray hazard and provides important information for the diagnosis. The delineations of gestational sac within the myometrium could be best achieved by MR imaging.

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