

Embolization in abdominal pregnancy: A case report*

BY JAY IAN R. ARGEL, MD AND MA. CRISTINA P. CRISOLOGO, MD, FPOGS

Department of Obstetrics and Gynecology, Philippine General Hospital, University of the Philippines-Manila

ABSTRACT

Abdominal pregnancy is a rare form of ectopic pregnancy. This type of pregnancy poses a difficult situation since it can incur high morbidity to mother and the fetus. Diagnosis is often difficult and surgical management should be multidisciplinary in approach. This paper presents a case 29-year-old who presents as missed abortion, subsequently diagnosed with abdominal pregnancy. Embolization of major vessels prior to evacuation of products of conception in abdominal pregnancy is a management option to prevent catastrophic complications such as hemorrhage.

Keywords: Abdominal pregnancy, abortion, ectopic, embolization, laparotomy, hemorrhage

INTRODUCTION

Ectopic pregnancy is defined as pregnancy implantation elsewhere than in the lining of the uterine cavity.¹ Pregnancies of ectopic origin comprise about 1-2% of all pregnancies with majority of cases occurring at the fallopian tube.^{1,2} Even rarer, are abdominal pregnancies which comprise about 1% of all pregnancies.^{3,4}

In recent years there have been an increase incidence of ectopic pregnancies due to increased incidence in salpingitis caused by sexually transmitted infections like Chlamydia infection, and in part due to improved diagnostics wherein unruptured ectopic pregnancy are detected earlier.²

Ectopic pregnancies in general are the most common cause of maternal mortality in the first half of pregnancy.² Blood loss is the major cause of mortality in ectopic pregnancies.^{1,2} Maternal morbidity and mortality are high largely due to the hemorrhage as a consequence of the detachment of the extrauterine placenta which may be near to any major vessels in the pelvic cavity. Cornual and abdominal pregnancies have five times greater risk of being fatal.^{1,3}

CASE

A 29-year-old gravida 2 para 0 (0010) sought consult at the emergency room of tertiary hospital for abdominal pain. She has no known co-morbidities and was operated on for a previous ectopic pregnancy 5 years prior, at the same hospital, where she underwent exploratory

laparotomy, salpingectomy. Her family medical history was unremarkable. She is a high school graduate with a 5-pack year smoking history with occasional alcoholic beverage intake. She is currently unemployed. She had her first coitus at 20 years-old with 1 sexual partner with unknown sexual history.

She had her menarche at 14 years-old, with subsequent menstrual periods coming at irregular intervals, lasting for 5 days and soaking 2 pads per day with no associated dysmenorrhea. Her last menstrual period was on October 20, 2015 giving her an amenorrhea of 42 weeks at the time of consult since menses are irregular and unsure.

This is her second pregnancy, her first pregnancy was on 2011 which is a tubal pregnancy and she was operated on in the same hospital.

History started 2 months prior to consult when patient had missed menses. She did not have any prior prenatal consults nor any examinations. A transvaginal ultrasound was done which revealed an intrauterine gestation of about 24 2/7 weeks with findings consistent with an intrauterine fetal demise. She consulted at a local hospital wherein work-up such as blood tests were done which allegedly revealed normal result and she was sent home. She was advised to follow-up and await spontaneous passage of products of conception.

In the interim, patient was lost to follow up and had occasional abdominal pain but otherwise an unremarkable course. There was no vaginal bleeding nor passage of any placenta-like tissues.

She decided to seek consult because of prolonged undelivered fetal death in utero. At the obstetric admitting section, she had a blood pressure of 110/80, heart rate of 84 and respiratory rate of 20 with essentially normal systemic findings. Focusing on the abdomen, the fundic height is

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24 cm with an estimated fetal weight of 1.0-1.2 kg. Her abdomen is soft and nontender. On internal examination, she had normal external genitalia, nulliparous vagina, cervix is closed and firm, corpus seemed to be enlarged to 24 weeks' size, with no adnexal masses and tenderness appreciated.

The patient was initially managed as a case of abortion and was admitted for induction of labor to allow spontaneous passage of products of conception. Due to failed induction and high index of suspicion, a repeat transvaginal ultrasound was done.

On transvaginal ultrasound, the sonographic impression showed the possibility of an extra-uterine pregnancy probably abdominal with normal sized uterus with thin endometrium, and normal ovaries. (Figures 1 and 2). The fetus had no cardiac activity, and biometric parameters were consistent with 23 4/7 weeks' age of gestation.

An abdominal computed tomography scan with triple contrast was also done which was signed out as extrauterine pregnancy. Findings were described as an extrauterine pregnancy described large complex mass in

the right abdominopelvic region measuring 14.7 x 13.1 x 10.4 cm with a single extrauterine fetus demonstrating overlapping calvarial sutures. A heterogeneously-enhancing soft tissue component with a maximum thickness of 3.6 cm was seen at the superior wall of the mass likely representative of the placenta. It appeared to be supplied by the uterine vessels as well as distal branches of the right internal iliac artery. The uterus and adnexae were unremarkable.

Further description of the mass is that it is intimately related to but maintains a clear plane of differentiation from the right aspect of the uterine fundus and corpus, and the right fallopian tube inferiorly. Superiorly, it displaces the adjacent bowel loops without subsequent bowel obstruction. Posteriorly, it compresses the inferior vena cava and intimately related to the abdominal aorta. Anteriorly, it abuts muscular layer of the abdominopelvic wall. The final impression by CT scan is extrauterine pregnancy.

A multidisciplinary consultation was done with other services and the plan for the patient is for pre-operative embolization to be followed by exploratory laparotomy, adhesiolysis, and evacuation of products of conception.

The patient was referred to Thoracovascular surgery service for the involvement of the major vessel. She was also seen by the Interventional Radiology service for pre-operative embolization to minimize blood loss prior to the evacuation of the products of conception through laparotomy.

Patient underwent pre-operative embolization of feeding vessels a day prior to exploratory laparotomy. The patient was under intravenous sedation of midazolam and fentanyl. Abdominal aortogram was performed to assess all the possible feeding vessels to the placenta using a pigtail French 5 catheter. Lumbar 4 on the right was embolized using contour embolization particles 355-500 microns mixed with Ultravist 370 mg and gel foam injection. (Figure 3)

After embolization of the right Lumbar 4 artery, another abdominal aortogram was done and right ovarian artery was assessed to be involved. The right ovarian artery was embolized using Contour size 355-500 microns followed by gelfoam. Additional vortex pushable coil size 4 x 4 millimeter inserted through Progreat microcatheter advanced to the depth of the right ovarian artery. (Figure 4).

Total operative time during embolization was 4 hours and pressure dressing and sandbag was applied to the left femoral artery for several hours post procedure. Patient tolerated procedure well and there were no bleeding or hematoma noted.

Preoperatively blood products were made available, a total of 6 units of packed red blood cells were prepared. Surgery was performed under general anesthesia a day

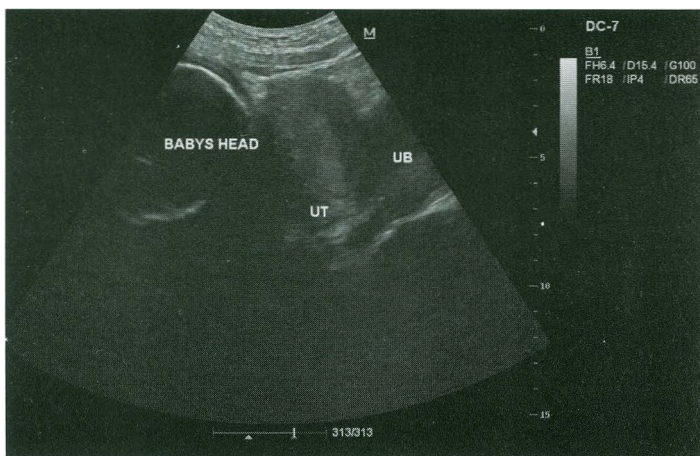


Figure 1. Transvaginal Ultrasound showing the empty uterus alongside the fetal head.

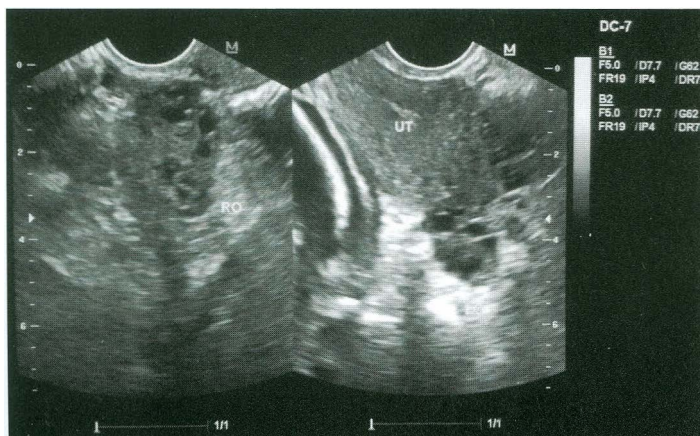


Figure 2. Transvaginal Ultrasound showing bilateral ovaries to rule out ovarian pregnancy.



Figure 3. Lumbar 4 on the right was embolized using contour embolization particles 355-500 microns mixed with Ultravist 370 mg and gel foam injection.

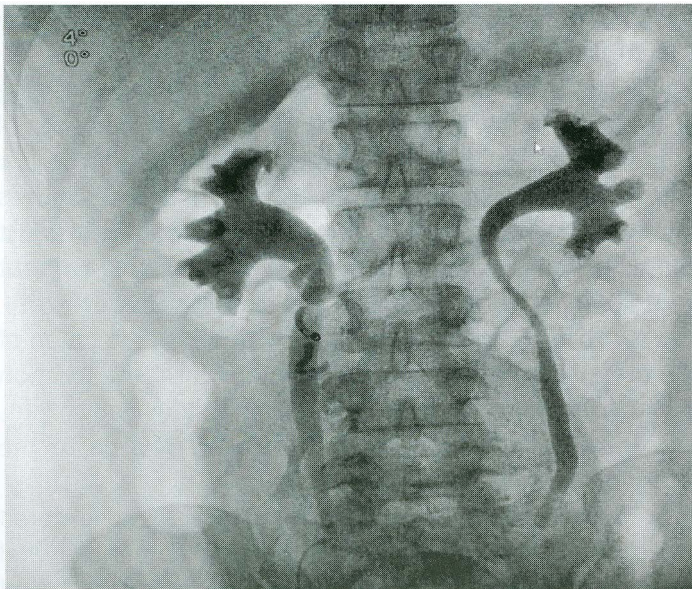


Figure 4. Right ovarian artery was embolized using Contour size 355-500 microns followed by gelfoam. Additional vortex pushable coil was also used.

after the embolization. The procedure was exploratory laparotomy, evacuation of products of conception, left fimbrioplasty under general anesthesia. Intraoperatively there was no hemoperitoneum and both ovaries were grossly normal. (Figure 5)

Double Kelly clamping of the right tuboovarian ligament was performed to separate the right ovary from the uterus and products of conception. The product of conception was removed from the broad ligament by opening up the broad ligament and doing series of double Kelly clamping and suture ligation circumferentially until

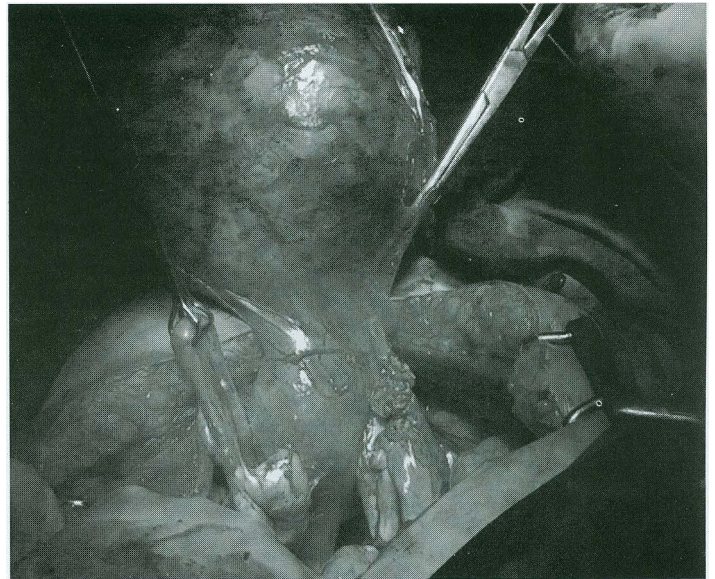


Figure 5. Grossly normal bilateral ovaries and encapsulated mass at the right broad ligament.

completely separated. There was a 13 x 12 x 9 cm well-circumscribed encapsulated mass (Figure 6) at the right broad ligament which on cut section revealed a stillbirth macerated baby boy, 624 grams. The placenta measured 12 x 10 x 7 centimeter with a 3 vessel umbilical cord measuring 23 x 1 cm. (Figure 7)

The right fallopian tube was surgically absent. The left fallopian tube had an obstructed fimbriated end which was surgically corrected by doing left fimbrioplasty by everting the edges of the obstructed fimbriated end and doing simple interrupted sutures on the edge using Chromic 4-0 sutures. Patient tolerated procedure well and estimated blood loss was only 300 milliliters.



Figure 6. Encapsulated mass at the right broad ligament measuring 13 x 12 x 9 cm.

Patient had an unremarkable course at the wards and was discharged on day 3 post-operative day.



Figure 5. Cut section of the encapsulated mass showed macerated stillbirth baby boy.



Figure 5. Postsurgery showing the normal bilateral ovaries, surgically absent right fallopian tube, and normal uterus.

DISCUSSION

Ectopic pregnancy is a rare event with most occurring at the fallopian tube. Since the site of fertilization is the fallopian tube various tubal pathologies such as salpingitis can cause agglutination of the folds of the endosalpinx thereby allowing passage of sperm, but prevents the normal transport of the larger morula.¹ Abdominal

pregnancy is a rare event with an estimated incidence of about 1 in 402 pregnancies in developing countries and 1 in 10,000 pregnancies in industrialized countries.⁵ The higher incidence in non-industrialized countries can be explained by reduced diagnostic options.⁶

Abdominal pregnancies can be classified as primary when the pregnancy occurs as a direct implantation on the peritoneum, and is associated with normal fallopian tubes, normal ovaries, and no tubal fistula. It may, more commonly, be a secondary abdominal pregnancy wherein the pathology occurs either as a result of tubal abortion or rupture.¹

The clinical symptoms of an uncomplicated abdominal pregnancy described in literature are rather unspecific, among which the most frequently encountered: persistent abdominal or suprapubic pain (100%), no delay in menstruation, bloody vaginal discharge, gastrointestinal symptoms like nausea and vomiting (70%), painful fetal movements (40%), general malaise (40%), altered bowel movements.⁶ In this case, the presenting symptom is only non-specific abdominal pain which occurs intermittently. Thus, the suspicion of an abdominal pregnancy based on these non-specific signs may be missed out in the early part of the pregnancy.

With the advent and easy access to imaging procedures, ultrasound in particular, such abnormal pregnancies should be more readily picked up. In our index case, although a second trimester ultrasound was done, it may have been missed because the sinologist just concentrated on the measurement of the fetus, without correlation to the other pelvic and abdominal structures.

With the aid of various diagnostics, exact location of the pregnancy can be described, in our case, the location is in the the right aspect of the uterine fundus and corpus, and the right fallopian tube and closely related to the inferior vena cava and aorta.

Numerous implantation sites have been encountered in literature among which are uterine, omental, vital organs, large vessels, cul de sac, bowel, appendix, broad ligament, pelvic sidewall, peritoneum and spleen.⁶

Diagnosis can be confirmed by imaging, and it can show details like vascularization, placental attachment and its relationship to adjacent organs. On ultrasound, findings of abdominal pregnancy include the following: (1) presence of fetus outside the uterus, (2) absence of the uterine wall between the bladder and the fetus, (3) extra uterine location of the placenta, (4) poor visualization of the placenta, (5) pseudo-placenta previa appearance, oligohydramnios, fetal parts adjacent to the mother's abdominal contents, abnormal fetal presentation, and the absence of amniotic fluid volume.⁸ In this index case, the suspicion of an abdominal pregnancy was made on the basis of the finding of an empty uterus with thin

endometrium lateral to the fetus.

More advanced imaging such as magnetic resonance imaging and computed tomographic scan are now readily available. These imaging techniques provide the advantage of giving clearer appearances of the subject of focus in multiple planes. More importantly, it provides a clearer definition of the placenta and its vascularization and its relationship to the adjacent organs in the abdominal cavity.⁸

Management option is surgical through laparotomy due to the risk of hemorrhage. It is for this reason that surgery should be carefully planned and properly crossmatched blood products should be readily available for blood transfusion.

Removal of the placenta poses a big challenge. The question whether to remove it or not depends whether preoperatively its blood supply can be secured. Removing the placenta results in less morbidity such as fewer complications like septicemia, fewer repeat hospitalizations and surgery, bowel obstruction, fistula or disseminated intravascular coagulation, however it is associated with increased mortality rate.^{4,5} If placenta is not removed, it is recommended to monitor human chorionic gonadotrophin.⁴

Preoperatively angiography is done to identify all sources of blood supply to the placenta and to embolize vessels that could be difficult to ligate during surgery. Routine angiographic evaluation should include abdominal aortography with renal evaluation, selective celiac and superior mesenteric arteriography, and selective internal iliac arteriography including the hypogastric vessels.⁸

Embolization can play a great role before and after

exploratory laparotomy. Embolization can be defined as any endoluminal procedure, vascular or nonvascular, to occlude a vessel to obtain therapeutic benefit. Angiographic arterial embolization is a technique that can be utilized to manage abdominal pregnancy which involves blockage of feeding blood vessels using synthetic materials such as microcatheter and gelfoam or coils.⁹

For this particular case, embolization is warranted since there are major feeding vessels seen on abdominal CT scan that may cause hemorrhage and would likely to reduce the vascularity of the placenta, hence it will facilitate complete removal of the placenta and products of conception during surgery. Postoperative embolization can also be done using same technique to prevent bleeding of retained placenta.⁸ Data on morbidity and mortality of pre or post operative embolization is limited, however, complications include vessel puncture causing hematoma, pseudoaneurysm, arteriovenous fistula, dissection, intraluminal thrombosis and embolus which can be attributed to the use of microcatheters, microguides, and use of embolization agents such as coils and polymerizing materials.⁹

Methotrexate therapy could be added to surgical treatment. It can be used in postoperative period to aid in absorption of the retained placenta. It might increase infectious complications because of rapid tissue necrosis, but some authors argue for complete regression of the placenta. Methotrexate provides the advantage since it can quickly reduce the HCG level, however using it directly after surgery can lead to rapid placental lobular necrosis and likely cause intraabdominal bleeding.¹⁰

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