Italian Journal of
Gynæcology & Obstetrics
December 2017 - Vol. 29 - N. 4 - Quarterly - ISSN 2385 - 0868

Heterotopic pregnancy: intrauterine and omental implantation. Case report

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ABSTRACT

Heterotopic pregnancy (HP) is defined as the simultaneous presence of intrauterine and extrauterine pregnancy. This is a rare obstetrical condition, first described by Duverney in 1708, potentially very dangerous for mother and for pregnancy. The incidence of HP, in spontaneous pregnancies, is around 1:15000 to 1:30000 but it is higher in assisted pregnancy. 98% of all extrauterine pregnancy are intratubal, 1% is ovarian, the rest are primary or secondary peritoneal implantations. The implantation can occur anywhere in the abdomen including ligaments, liver, omentum, spleen. Omental pregnancy is the least common form of abdominal pregnancy. More than 50% of all HP cases can remain totally asymptomatic till it is discovered occasionally by a routine first trimester ultrasound. The most important risk factors are assisted pregnancy, previous tubal pregnancy and pelvic inflammatory disease. We report a very rare case of HP with primary omental implantation of the extrauterine pregnancy after spontaneous conception. We performed a laparoscopy to diagnose and treat the HP and then obtaining, for the intrauterine pregnancy, a term live baby born by spontaneous vaginal delivery. We suggest, after a discussion on physiopathology and diagnosis, the laparoscopic management of HP especially in early abdominal implantation: in this case the mininvasive approach is safe and feasible permitting to preserve mother health and intrauterine fetus.

Key words: heterotopic pregnancy, abdominal pregnancy, diagnosis, laparoscopic surgery.

SOMMARIO

Per gravidanza eterotopica (GE) si intende una gravidanza insorta simultaneamente in sede intra ed extrauterina. Si tratta di una rara condizione ostetrica, descritta per primo da Duverney nel 1708, potenzialmente molto pericolosa per la madre e per la gravidanza stessa. L'incidenza di GE, in gravidanze spontanee, è compresa tra 1: 15000 e 1: 30000 ma è ben più elevata nelle gravidanze assistite. Il 98% di tutte le gravidanze extrauterine è in sede intratubarica, 1% in sede ovarica, le restanti sono impianti peritoneali primari o secondari. L'impianto può verificarsi in qualsiasi parte dell'addome compresi legamenti, fegato, omento e milza. La gravidanza omentale è la forma meno comune di gravidanza addominale. Più del 50% di tutti i casi di GE decorre in modo totalmente asintomatico sino a quando non è diagnosticata occasionalmente durante una ecografia di routine del I trimestre. I più importanti fattori di rischio sono una gravidanza assistita, una precedente gravidanza tubarica e la malattia infiammatoria pelvica. Riportiamo un caso molto raro di GE con impianto primitivo omentale della gravidanza extrauterina dopo concepimento spontaneo. Abbiamo eseguito una laparoscopia per diagnosticare e trattare la GE ottenendo poi, per la gravidanza intrauterina, la nascita, con parto spontaneo, di un neonato vivo a termine. Dopo una discussione su fisiopatologia e diagnosi della GE, proponiamo un approccio laparoscopico per questa patologia, soprattutto negli impianti precoci, in cui la gestione minivasiva si è dimostrata sicura e fattibile permettendo la preservazione della salute della madre e del feto in sede intrauterina.

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DOI: 10.14660/2385-0868-76

INTRODUCTION

Heterotopic pregnancy (HP) is defined as the simultaneous intrauterine and extrauterine pregnancy. HP is a rare obstetrical condition first described by Duverney [1] in 1708 during an autopsy on a patient who had died of a ruptured ectopic pregnancy. DeVoe and Pratt [2] were the first to determine the incidence of this pathology: it was, in spontaneous pregnancies, around 1:15000 to 1:30000. In the western world, the incidence was increased to 1:10000 due to ovulation-induction therapy and medical assisted procreation (MAP) with superovulation and relative increased incidence of ectopic pregnancies [3].

The incidence of HP is 400 times greater in assisted pregnancy than in natural pregnancies [4]. In the last decades a 3-fold increase of incidence of bilateral tubal pregnancy as well as HP has been observed mainly related to assisted reproduction technique [5]. In 2015, Perkins and Al. [6] believed in an incidence up to 1:100 in patients who have MAP. In assisted pregnancy with unreasonable transfer of more then four embryos, the risk of HP has been reported as high as 1:45 [7,8]. 98% of all extrauterine pregnancy are intratubal, 1% is ovarian, the rest are primary or secondary peritoneal implantations. Implantation can occur anywhere in the abdomen including ligaments, liver, omentum, spleen. The omental pregnancy is the least common form of abdominal pregnancy.

A review of literature based on medline search for period 1958-2012 reported 16 cases of omental pregnancy [9] and for period 2013-2016 we founded only 8 new cases. Very few of all reported cases have been treated using laparoscopy [10]. Secondary peritoneal ectopic pregnancy implantation can occur not only after tubal rupture or expulsion of tubal ectopic pregnancy but also after primary implantation [10].

General agreement exists as the possibility of human superfecundation (two ovulations and conceptions in the same menstrual cycle) and superfetation (two conceptions in two different cycles). Winer et Al. [11] suggested that the pathogenesis of HP could be due to modification of tubal peristalsis caused by hormonal changes. Another possibility mentioned by the same Authors was a transperitoneal migration due to the condition that the impregnated ovum becomes too large for the tubal lumen. Pelvic inflammatory disease (PID) and its sequelae can play an important role in the etiology of HP, particularly Chlamydia infection as well as the widespread use of IUD, because PID can change the tubal lumen and tubal peristalsis and can stop the ovum progression. Black women have more risk of HP probably because of their high incidence of ectopic pregnancy and more frequent occurence of twin pregnancies. The high incidence of PID in this population group can play also a role in the higher occurance rate. Other important risk factors are previous tubal pregnancy, tubal sterilization, tubal infertility, tubal reconstructive surgery and progesterone contraceptive pill. Endometriosis has also been associated with the development of HP because it can inhibit tubal motility, it can cause adhesions and persistent endometrial deposits. High estrogen concentrations after ovulation induction may also disturb the tubal transport.

Ectopic pregnancy remains the leading cause of maternal death in the first trimester and accounts for 10% to 15% of all maternal deaths [12] but, in abdominal pregnancy, maternal mortality is higher with a range between 0.5 and 30% and with a significant fetal morbidity and mortality [13]. The risk of maternal death in an abdominal pregnancy (AP) is 7.7 times higher than tubal pregnancy and 90 times higher than intrauterine pregnancy [14,15] and this is principally because of the risk of massive hemorrhage from incomplete or entire placental separation.

Nowadays in AP the maternal mortality rate has decreased due to earlier diagnosis of HP instead of the perinatal mortality that registers a higher value of about 40% up until 83-95%. However, with advanced pregnancy and if the fetus is surrounded by a normal volume of amniotic fluid, fetal outcome tends to be better and thanks to the progress of neonatology, the survival rate of fetuses over 30 weeks has grown at about 78-80% [13,16]. The most common cause of fetus death is massive hemorrhage caused by partial or total placental separation which can occure anytime during pregnancy. Furthermore, in AP there is a very high percentage of fetal malformations, retarded physical and mental development. A literature review of HP showed a survival rate of 50 to 66% for intrauterine fetus [16].

CASE REPORT

A 29-year-old black women, coming from Nigeria, was admitted to our Emergency Department of Obstetrics & Gynaecology for persistent abdominal pain. She was gravida 5, para 3013, at 7 weeks and 5 days of gestation. She came ten days early to our Department for pelvic pain and she has been diagnosed with

intrauterine pregnancy corresponding to period of amenorrhea.

When the patient was admitted to the Hospital, she was in stable condition: blood pressure was 120/80 mmHg, heart frequency was 80 beats/minute, temperature was 36.5°C, hemoglobin was 11.5 g/dl, white blood cells were 6.51 x 10^3/ml. Abdominal examination revealed pain in the sovrapubic region with a Blumberg sign ++- and, during vaginal examination, the patient felt pain at pouch of Douglas. No adnexal masses were appreciated, no pain revealed at cervical mobilization and vaginal bleeding was absent. Transvaginal ultrasonography showed an HP with a vital intrauterine pregnancy (crown rump length 14 mm.) and an ectopic empty gestational sac (mean diameter 28 mm.) probably located in the right Fallopian tube. Free liquid fluid was also seen in the pouch of the Douglas. 45 minutes after hospital admission, the patient underwent to a laparoscopy. The intraoperative vision (**Figure 1**) showed about 400cc. of hemoperitoneum, both ovaries and Fallopian tubes were normal without any sign of ectopic pregnancy and the uterine size was corresponding to amenorrhea but on the omental border we founded a dark bleeding mass of 4 cm. in size: the ectopic pregnancy! (**Figure 2**).

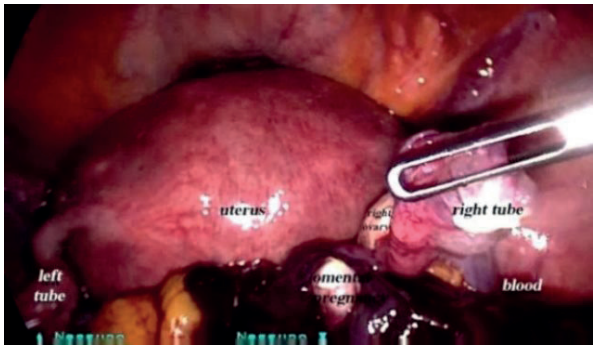

Figure 1.
Intraoperative view.

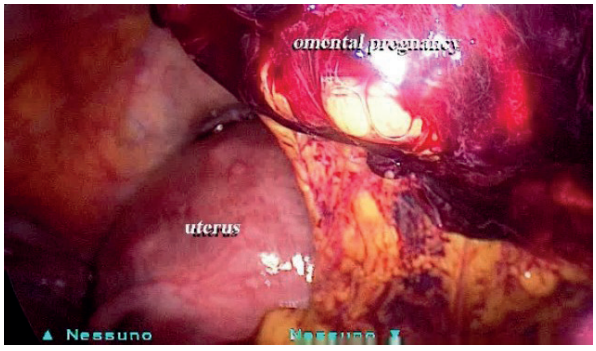

Figure 2.
Omental heterotopic pregnancy.

We performed, after the aspiration of hemoperitoneum, a partial omentectomy using harmonic scalpel. The specimen was extracted with an endobag and a Jackson-Pratt drainage was placed into the Douglas pouch. The total operative time was 47 minutes (**Figure 3**).

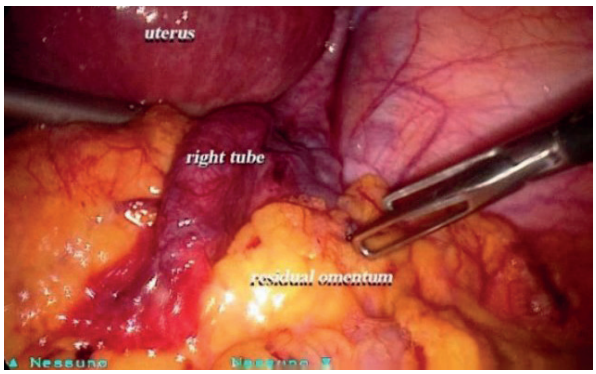

Figure 3.
Postoperative view.
Detail of intact right tube and residual omentum.

After the surgery, an ultrasound examination was performed to evaluate fetal viability and placenta status of the intrauterine pregnancy.

The postoperative course of the patient was uneventful: she was always apyretic and blood transfusion wasn't necessary. 12 hours after laparoscopy we removed the Foley catheter. The patient was discharged 3 days later. The hysto-pathological examination of the partial omentectomy specimen confirmed the diagnosis of primary omental ectopic pregnancy with trophoblastic cells invasion into omental tissue (**Figure 4**).

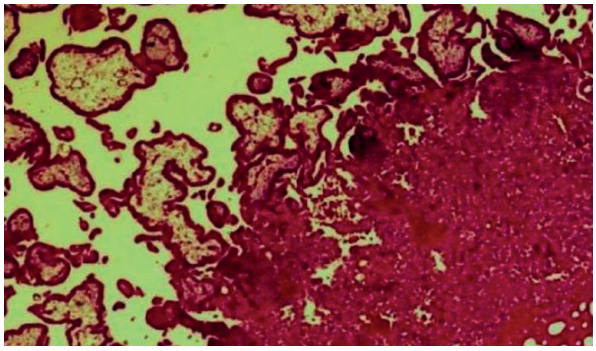

Figure 4.
Histo-pathological examination of omental tissue showed trophoblastic cells implantation.

With regards to the intrauterine pregnancy, the patient has delivered vaginally a healthy live baby at term.

DISCUSSION

In 1942 Studdiford [17] defined the criteria for primary diagnosis of abdominal pregnancy: normal bilateral fallopian tubes and ovaries, absence of uteroperitoneal fistula and presence of a pregnancy on peritoneal surface exclusively. In 1968 Friedrich and Rankin [18] proposed modifying Studdiford's criteria to a presence of a pregnancy of less than 12 histological gestational week (g.w.) in order to limit the cases of primary abdominal pregnancy.

The diagnosis of early HP remains nowadays a clinical problem. Most cases of HP are diagnosed between the 5th and 34th g.w.: 70% of cases are diagnosed between the 5th and 8th g.w., 20% between 9th and 10th g.w. and the remaining 10% after 10th g.w. [19,20]. More than 50% of all HP cases can remain totally asymptomatic till it is discovered occasionally by a routine first trimester ultrasound. Early diagnosis is very difficult and it can happen more frequently if the clinician has a high index of suspicion [5]. Reece et Al. [3] defined four common symptoms and findings: abdominal pain, adnexal mass, peritoneal irritation and increase size of uterus. The symptoms of HP are various and not pathognomic: the pre-operative diagnosis was made only in 2.6 – 9.9% of all cases [13,21]. Vaginal bleeding is more frequent in tubal pregnancy versus HP due of intact endometrium of intrauterine pregnancy [21].

We can observe four main clinical situations:

1) the diagnosis of HP is made during the surgery or later;
2) after an abortion we have an unexpected rupture of an ectopic pregnancy, very dangerous group;
3) simultaneous interruption of both extra and intrauterine pregnancy and in this case, the abortion symptoms are dominant;
4) both pregnancies grow up, very rare.

B-hcg serum level measurement is not useful for diagnosis because the intrauterine pregnancy will be producing normal and increasing levels of serum B-hcg and then, the B-hcg serum level, can be unreliable and mislead the diagnosis [4,5,22]. A higher than expected level of serum B-hcg, in relation to gestational age, may be suspicious of HP although the presence of a complete or partial mole must also be considered.

For an early diagnosis of HP we suggest to make a careful anamnesis in order to highlight risk factors (black race, previous ectopic pregnancy, PMA, etc.) and to perform an accurate abdominal and vaginal examination and also an ultrasonography with abdominal and vaginal probes. Ultrasound when coupled with clinical evaluation has approximately a 50% success rate in the diagnosis [23]. Transvaginal pelvic ultrasonography makes a correct diagnosis in 88.9% of cases and differential diagnosis should be made with ovarian cyst, pedunculated uterine fibroid undergoing necrobiosis, hydrosalpinx, twisted adnexa, ovarian tumor or hemorrhagic corpus luteum. The ultrasound diagnosis of early abdominal pregnancy is more difficult versus tubal pregnancy and the reported diagnostic error rates, in different series, have ranged from 50 to 90% [24]. The abdominal localization of the ectopic pregnancy is very rare, particularly on the omental site, and it is very difficult to diagnose only with abdominal ultrasound examination especially if it is in an early gestational age. It can be useful to perform a computed tomography (CT) or a magnetic resonance (MR) scan. Pregnant women generally do not undergo CT examination due to radiation. On CT scan, an intrabdominal extrauterine gestational saclike structure with an enhancing rim can be seen but, in any case, CT generally provides a less detailed placental evaluation [25]. MR can be more useful because it can diagnose an abdominal pregnancy but also locate the position of the placenta and it can assess placental adherence to surrounding organs which will significantly contribute to the development of treatment plan [26,27]. MR, also, has many advantages over ultrasound as bone, gas-filled structures and maternal obesity provides no hindrance to imaging.

Whenever a diagnosis remains unclear, laparoscopy is very useful for a correct diagnosis of HP with a low risk for the intrauterine pregnancy permitting, in the same time, the treatment of the pathology. Clinicians should mantain a high index of suspicion in all patients presenting amenorrhea, abdominal pains, adnexal mass, peritoneal irritation, enlarged uterus and suspicion of HP should be higher in women with risk factors and/or MAP. A delayed diagnosis could cause serious complications for both women and pregnancy.

The goal of any treatment of HP is preserving mother health and intrauterine fetus. In the management of HP, particularly in the abdominal pregnancy, we must consider many factors such as maternal hemodynamic status, fetal viability or congenital abnormality, gestational age and the wish of the woman regarding its final outcome [18]. Expectant management is an option

in HP where the ultrasound findings are of a non viable pregnancy. Various clinicians recommend a period of observation of 3 to 8 weeks to allow atrophy of placental vessels [28]. For Shafi et Al. [29], if the extrauterine fetus is dead, surgical intervention is generally indicated owing the risk of infection and/or disseminated intravascular coagulation. If the fetus is alive, regardless gestational age and fetal condition, a laparotomy should be performed. An alternative management is a medical treatment using local injection of potassium chloride or hyperosmolar glucose into the gestation sac either during laparoscopy or under ultrasound guidance. This approach has been described also for cervical, interstitial and caesarean scar pregnancies. Goldstein et Al. [30] reviewed 11 cases of heterotopic pregnancies treated with potassium chloride injection and reported that 6 of the 11 cases failed to respond to treatment and required a surgical intervention. Systemic methotrexate (MTX) or local injection of MTX cannot be used in a heterotopic pregnancy owing to its toxicity although some Authors have used instillation of a small dose [31].

In the surgical management of HP, laparoscopy is preferable to laparotomy because of minimal manipulation of uterus and drying from open exposure which can cause uterine irritability and postoperative abortion. Furthermore the laparoscopic approach resulting in less blood loss, less postoperative pain, lower analgesic requirements, shorter hospital stay. To reduce the risk of persistent HP during laparoscopy it's advisable aspiration of all the blood clots and tissue fragments, minimize the degree of the Trendelenburg position, perform a meticulous extraction of the trophoblastic tissue from the Fallopian tube in case of salpyngotomy and use of a tissue retrieval bag. We can preserve intrauterine pregnancy also by shortest time under general anesthesia, appropriate handling of the uterus during surgery and supplementation with progesterone after surgery.

In the omental HP, the least common form of abdominal pregnancy, especially in the early g.w., we can perform a total or partial omentectomy. Everden et Al. [32] treated an omental HP by a transvaginal endoscopic approach (Natural Orifice Translumenal Endoscopic Surgery: NOTES) with a partial omentectomy. In early abdominal HP laparoscopic approach is safe and feasible obtaining a good intraoperative hemostasis and a good prognosis for the mother and for the intrauterine pregnancy [10,33,34]. Patient should be advised that the incidence of recurrent ectopic pregnancy is similar (about 10%) to other forms of ectopic pregnancy.

In conclusion, heterotopic pregnancy (HP), especially omental implantation of the ectopic pregnancy, is a rare obstetrical condition potentially very dangerous to the mother and to the intrauterine pregnancy. It is important to remember the population at risk for HP and we also should be kept in mind the HP in differential diagnosis of any patient with an intrauterine pregnancy with abdominal pain and/or free fluid in the abdominal cavity. It is very useful for early diagnosis of HP to perform an ultrasonography and/or magnetic resonance and/or a laparoscopy. In abdominal-omental ectopic pregnancy, especially at low gestational age, we suggest a laparoscopic approach because it is safe and feasible preserving mother health and intrauterine fetus.

REFERENCES

1) Duverney JG. **Oeuvres anatomiques**. In: Jombert CA (ed) Oeuvres Anatomiques, Paris Bailliere; 1899: 355.
2) De Voe RW, Pratt JH. **Simultaneous extra and intrauterine pregnancy**. Am J Obstet Gynecol 1948; 56 (6):1119-26.
3) Reece EA, Petrie RH, Sirmans MF, Finster M, Todd WD. **Combined intrauterine and extrauterine gestations: a review**. Am J Obstet Gynecol 1983; 146 (3):323-30.
4) Walker DD, Clarke TC, Kennedy EC. **Heterotopic ectopic and intrauterine pregnancy after embryo replacement**. Br J Obstet Gynecol 1993; 100:1048-49.
5) Calagna G, Rossi C, Adile G, Manzone M, Perino A, Cucinella G. **Spontaneous bilateral tubal pregnancy in a nulliparous woman**. Laparoscopic diagnosis and treatment. It J Obstet Gynecol 2015; 27 (4):137-40.
6) Perkins KM, Boulet SL, Kissin DM, et Al. **Risk of ectopic pregnancy associated with assisted reproductive technology in the United States, 2001–2011**. Obstet Gynecol 2015; 125:70-78.
7) Dor J, Seidman DS, Levran D, Ben-Rafael Z, Ben-Shlomo I, Mashiach S. **The incidence of combined intrauterine and extrauterine pregnancy after in vitro fertilization and embryo transfer**. Fert Steril 1991; 55: 4833-34.
8) Thakur R, El-Menabawey M. **Combined intrauterine and extrauterine pregnancy associated with mild hyperstimulation syndrome after clomyphene ovulation induction**. Hum Reprod 1996; 11(7):1583-84.
9) Maiorana A, Incandela L, Giambanco L, Alio W, Alio L. **Omental pregnancy: case report and review of letterature**. Pan Afr Med J 2014; 19:244.
10) Watrowski R, Lange A, Mockel J. **Primary Omental Pregnancy With Secondary Implantation Into Posterior Cul-de-sac: Laparoscopic Treatment Using Hemostatic Matrix**. J Minim Invas Gyn 2015; 22(3):501-03.
11) Winer EA, Bergman WD, Fields C. **Combined intra and extrauterine pregnancy**. Am J Obstet Gynecol 1957; 74:170-78.
12) Lozeau AM, Potter B. **Diagnosis and management of ectopic pregnancy**. Am Fam Physician 2005; 72:1707-14, 1719-20.
13) Martin JN, McCaul JF. **Emergent management of abdominal pregnancy**. Clin Obstet Gynecol 1990; 33:438-47.
14) Atrash HK, Friede A, Hogue CJ. **Abdominal pregnancy in the United States. Frequency and maternal mortality**. Obstet Gynecol 1987; 69:333-37.
15) Poole A, Haas D, Magann EF. **Early abdominal ectopic pregnancies: a systematic review of the literature**. Gynecol Obstet Invest 2012; 74:249-60.
16) Noor N, Bano I, Parveen S. **Heterotopic pregnancy with successful pregnancy outcome**. J Hum Reprod Sci 2012; 5(2):213-14.
17) Studdiford WE. **Primary peritoneal pregnancy**. Am J Obstet Gynecol 1942; 44(3):487-91.
18) Friedrich EG Jr, Rankin CA Jr. **Primary pelvic peritoneal pregnancy**. Obstet Gynecol 1968; 31(5):649-53.
19) Talbot K, Simpson R, Price N, Jackson SR. **Heterotopic pregnancy**. J Obstet Gynaecol 2011; 31:7-12.
20) Tal J, Haddad S, Gordon N, Timor-Tritsch I. **Heterotopic pregnancy after ovulation induction and assisted reproductive technologies: a literature review from 1971 to 1993**. Fertil Steril 1996; 66:1-12.
21) Tummon IS, Whitmore NA, Daniel SAJ, Nisker JA, Yuzpe AA. **Transferring more embryos increases risk of heterotopic pregnancy**. Fertil Steril 1994; 61:1065-67.
22) Roy M, Adrian S. **Controversies and problems in the current management of tubal pregnancy**. Hum Reprod Update 1996; 2:541-51.
23) Costa SD, Presley J, Bastert G. **Advanced abdominal pregnancy**. Obstet Gynecol Surv 1991; 46:515-25.
24) Allibone GW, Fagan CJ, Porter SC. **The sonography features of intrabdominal pregnancy**. J Clin Ultrasound 1981; 9:383-87.
25) Chen L, Qiu L, Diao X, Yue Q, Gong Q. **CT findings of omental pregnancy: a case report**. Jpn J Radiol 2015; 33(8):499-502.
26) Kao LY, Scheinfeld MH, Chernyak V, Rozenblit AM, Oh S, Dym RJ. **Beyond ultrasound: CT and MRI of ectopic pregnancy**. Am J Roentgenol 2014; 202(4): 904-11. doi: 10.2214/AJR.13.10644.
27) 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; 61:264-69.
28) Meinert J. **Advanced ectopic pregnancy including combined ectopic and intrauterine pregnancy**. Geburtshilfe Frauenheilkd 1981; 41:490-95.
29) Shafi SM, Malla MA, Salaam PA, Kirmani OS. **Abdominal pregnancy as a cause of hemoperitoneum**. J Emerg Trauma Shock 2009; 2(3):196-98. doi: 10.4103/0974-2700-55342.
30) Goldstein JS, Ratts VS, Philpott T, Dahan MH. **Risk of surgery after use of potassium chloride for treatment of tubal Heterotopic pregnancy**. Obstet Gynecol 2006; 107:506-08.
31) Oyawoyea S, Chander B, Pavlovic B, Hunter J, Gandir AA. **Heterotopic pregnancy: successful management with aspiration of cornual/interstitial gestational sac and installation of small dose of methotrexate**. Fetal Diagn Ther 2003; 18:1-4.
32) Everden C, El Sayed W, Sankaran S, Beynon DWG. **Rare case of primary omental ectopic pregnancy treated by transvaginal endoscopic appproach**.; E.P.U. conferences 2014. com/Abst/2014/OP24.
33) Chadee A, Rezai S, Kirby C, Chadwick E, Gottimukkala S, Hamaoui A, et Al. **Spontaneous Heterotopic Pregnancy: Dual Case Report and Review of Literature**. Case Rep Obstet Gynecol 2016. doi: 10.1155/2016/2145937.
34) Yu Y, Xu W, Xie Z, Huang Q, Li S. **Management and outcome of 25 heterotopic pregnancies in Zhejiang, China**. Eur J Obstet Gynecol Reprod Biol 2014; 180: 157–61. doi: 10.1016/j.ejogrb.2014.04.046.