Peritoneal pregnancy with massive hemoperitoneum in early gestation: two case reports
Azumi Miyauchi, Mitsutoshi Yamada, Masataka Furuya, Satoko Matsumura, Shinji Murayama, Yasunori Yoshimura & Mamoru Tanaka
1Department of Obstetrics and Gynecology, Keio University School of Medicine, 35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan
2Department of Obstetrics and Gynecology, Eiju General Hospital, 2-23-16 Higashiueno, Taito-ku, Tokyo 110-0015, Japan

Correspondence
Mitsutoshi Yamada, Department of Obstetrics and Gynecology, Keio University School of Medicine, 35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan. Tel: +81 3 5363 3581; Fax: +81 3 3226 1667; E-mail: mitsutoshi.yamada@gmail.com

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Key Clinical Message
Peritoneal pregnancy may cause severe abdominal bleeding without genital bleeding as early as the fifth week of gestation. Awareness that pregnancy can exist in unusual locations is imperative.

Keywords
Diagnosis, early pregnancy, human, primary peritoneal pregnancy.

Introduction
Peritoneal pregnancy is a rare and serious type of extra-uterine pregnancy with an incidence of approximately one in 10,000 pregnancies [1]. It is a life-threatening condition that leads to high maternal morbidity and mortality rates, the latter reaching 0.5–18.0% [2]. Although a primary peritoneal pregnancy is defined as an ectopic pregnancy usually involving implantation on a peritoneal surface, most peritoneal pregnancies are thought to follow early tubal rupture or abortion [3]. Peritoneal pregnancy is classified as either primary or secondary. In 1942, Studdiford established three criteria for diagnosis of a primary peritoneal pregnancy: (1) the presence of normal tubes and ovaries, (2) no evidence of an uteroperitoneal fistula, and (3) the presence of a pregnancy related exclusively to the peritoneal surface and early enough in gestation to eliminate the possibility of secondary implantation after primary nidation of the tube [4]. Watrowski et al. [5] recently expanded the classic Studdiford criteria. They reported a case of an omental pregnancy invading the peritoneum of the Douglas pouch. Thus, secondary peritoneal pregnancy implantation can occur not only after tubal rupture or expulsion of a tubal ectopic pregnancy, but also after primary implantation at any other ectopic site.

Management of a peritoneal pregnancy must be meticulous because of the high risk of fetal and maternal morbidity and mortality. This is true despite the fact that appropriate preoperative planning has decreased the mortality rate associated with peritoneal pregnancy from approximately 20% to <5% during the past 20 years [6]. Early diagnosis of peritoneal pregnancy is difficult but important because of the life-threatening nature of this complication. Several recent reports have demonstrated the effectiveness of laparoscopy in the diagnosis and treatment of peritoneal pregnancy [5, 7–15].

Until 7 weeks of gestation, massive hemoperitoneum is rare in tubal pregnancies, which is the most common implantation site among ectopic pregnancies [16]. There are no reported cases of massive hemoperitoneum associated with peritoneal pregnancy at 5 weeks of gestation.
except in the omentum [17] and the uterosacral ligament [10, 11]. We recently encountered two unique cases of primary peritoneal pregnancy with severe bleeding at a very early gestational age. These cases suggest that the implantation site may affect the onset of bleeding. This is the first report to discuss the relationship between the onset of bleeding and the implantation site. We herein report these two cases with a brief review of the literature.

Case Presentation

Case 1

A 43-year-old woman (gravida 1, para 1) was admitted to the emergency department with a 5-week history of amenorrhea and a 3-day history of lower abdominal pain. Her menstrual cycle had been regular with a length of 30 days. The patient had an obstetric history of a cesarean delivery and was negative for fertility treatments, use of intrauterine devices, and sexually transmitted diseases. She was afebrile and lucid, although her blood pressure was 80/20 mmHg. Diffuse abdominal tenderness, guarding, and rebound tenderness were present on physical examination. The result of a urine-based pregnancy test that could identify the presence of human chorionic gonadotropin (hCG) with serum concentrations as low as 25 mIU/mL was positive. The patient’s uterine size was normal with no genital bleeding seen on pelvic examination. Ultrasonography demonstrated massive intraperitoneal bleeding and a left luteal cyst with no gestational sac in the uterine cavity and no adnexal lesions. The patient’s hemoglobin level and hematocrit (Hct) were 8.2 g/dL and 25.6%, respectively. Emergency laparotomy was performed under suspicion of a ruptured ectopic pregnancy.

Case 2

A 36-year-old woman (gravida 1, para 1) was admitted to the emergency department with a 5-week 3-day history of amenorrhea and lower abdominal pain that had started on the afternoon of admission. Her menstrual cycle had been regular with a length of 28 days. Her medical history included a spontaneous delivery 1 year previously, and she was negative for fertility treatments, use of intrauterine devices, sexually transmitted diseases, and previous surgery. The patient was afebrile and lucid with a blood pressure of 92/52 mmHg. Diffuse abdominal tenderness, guarding, and rebound tenderness were present on physical examination. The result of a urine-based pregnancy test that could identify the presence of human chorionic gonadotropin (hCG) with serum concentrations as low as 25 mIU/mL was positive. The patient’s uterine size was normal with no genital bleeding seen on pelvic examination. Ultrasonography demonstrated massive intraperitoneal bleeding and a left luteal cyst with no gestational sac in the uterine cavity and no adnexal lesions. The patient’s hemoglobin level and hematocrit (Hct) were 8.2 g/dL and 25.6%, respectively. Emergency laparotomy was performed under suspicion of a ruptured ectopic pregnancy.

Outcome and Follow-Up

Case 1

The abdominal cavity was opened by a vertical incision of the lower abdomen with the patient under general endotracheal anesthesia. After aspiration of 1900 mL of hemoperitoneal fluid, exploration of the abdominal cavity revealed no signs of uterine perforation or ectopic pregnancy around the bilateral adnexae or pouch of Douglas. After further exploration, bleeding tissue was found on the vesicouterine peritoneum and resected (Fig. 1). The patient received an intraoperative blood transfusion of 8 U of packed red blood cells. Because both the aPTT and PT-INR were reasonable (20.7 sec and 0.97, respectively), fresh frozen plasma was not indicated. Although the existence of villi within the excised tissue was macroscopically unclear, the operation was finished with confirmation of no other bleeding lesions in the abdominal cavity.

Case 2

The abdominal cavity was opened by a vertical incision of the lower abdomen with the patient under general endotracheal anesthesia. After aspiration of 1900 mL of hemoperitoneal fluid, exploration of the abdominal cavity revealed no signs of uterine perforation or ectopic pregnancy around the bilateral adnexae or pouch of Douglas. After further exploration, bleeding tissue was found on the vesicouterine peritoneum and resected (Fig. 1). The patient received an intraoperative blood transfusion of 8 U of packed red blood cells. Because both the aPTT and PT-INR were reasonable (20.7 sec and 0.97, respectively), fresh frozen plasma was not indicated. Although the existence of villi within the excised tissue was macroscopically unclear, the operation was finished with confirmation of no other bleeding lesions in the abdominal cavity.

Figure 1. In Case 1, a peritoneal pregnancy was diagnosed by laparotomy. Intraoperative findings showed a reddish mass with active bleeding on the peritoneum of the vesicouterine pouch.
cavity. The postoperative course proceeded uneventfully. The hCG level in the serum preserved on the operative day was 3531 mIU/mL and decreased to 1601 mIU/mL on postoperative day 1 and to 171 mIU/mL on postoperative day 6. The serum Hb level and Hct were 10.2 g/dL and 30.0%, respectively, immediately after surgery and had increased to 11.6 g/dL and 33.8% by postoperative day 6. Histopathological examination of the excised tissue revealed the presence of trophoblastic and decidual tissues within blood clots.

**Case 2**

A 30-mm actively bleeding mass of tissue was observed on the left side of the vesicouterine pouch peritoneum (Fig. 2A). There were no other findings suggesting an ectopic pregnancy anywhere in the pelvis. Although a right luteal cyst was identified, no ovarian hemorrhage was present. The mass was resected together with the adjacent peritoneum. We aspirated 910 mL of blood and reinfused 433 mL by an intraoperative autologous blood transfusion, eliminating the need for an allogeneic blood transfusion. The operative findings fulfilled Studdiford’s criteria of a primary peritoneal pregnancy [4]. The patient’s postoperative course was uneventful. The patient’s serum hCG level decreased to 1384 mIU/mL on postoperative day 1 and to 92 mIU/mL on postoperative day 7. The serum hemoglobin level and Hct were 10.1 g/dL and 30.5%, respectively, on postoperative day 1 and had increased to 10.2 g/dL and 31.6% by postoperative day 7. Histopathological examination of the excised tissue revealed trophoblastic villi and decidual tissue within blood clots (Fig. 2B).

**Discussion**

We have reported two cases of peritoneal pregnancy associated with massive hemoperitoneum at 5 weeks of gestation. Hemoperitoneum at 5 weeks of gestation is an unusual symptom of peritoneal pregnancy and is rare in tubal pregnancies before 7 weeks of gestation. Peritoneal pregnancy is a rare event, occurring in approximately 0.6–1.6% of all ectopic pregnancies [18]. Peritoneal pregnancy is associated with a maternal mortality rate eight times higher than that associated with other types of ectopic pregnancies [9]. Because of the high maternal and fetal morbidity and mortality rates, such a pregnancy should be terminated as soon as it is diagnosed.

The diagnosis of peritoneal pregnancy is usually made intraoperatively during diagnostic laparoscopy or laparotomy [19]. Because of advances in various imaging techniques, computed tomography, high-resolution ultrasonography, or magnetic resonance imaging may play roles in early diagnosis. Advanced peritoneal pregnancy may be caused by fetal malpresentation, malformation, or oligohydramnios [20, 21]. Lateral-projection ultrasonography and radiography are helpful in such cases. Serum beta hCG concentrations of >6475 mIU/mL reportedly have high sensitivity and specificity for predicting trophoblastic invasion [22]. Although many diagnostic techniques are available for peritoneal pregnancy, diagnosis of a peritoneal pregnancy during early gestation remains difficult. Many diagnostic pitfalls have been described [23–25], with the main drawback being that neither clinicians nor ultrasonographers readily bear in mind the possibility of this rare condition. In our patients, substantial bleeding began at 5 weeks of gestation, a time at which the rupture of a tubal pregnancy is uncommon [16]. It was
Table 1. Summary of clinical features of primary abdominal pregnancies showing severe abdominal bleeding of more than 300 mL during early pregnancy (up to 11 gestational weeks).

| Case no. | Authors | Year | Age | GA (weeks, days) at first treatment | Lower abdominal pain | Vaginal bleeding | Operative method | Blood loss containing abdominal fluid (mL) | Implantation site | hCG level (mIU/mL) | Note |
|----------|---------|------|-----|------------------------------------|----------------------|------------------|---------------|--------------------------------|------------------|-----------------|------|
| 1        | Present report, Case 1 | 2014 | 43  | 5 weeks                            | Present              | Undetectable     | Laparotomy     | 2070                                         | Vesicouterine peritoneum | 3531ting |                   |
| 2        | Present report, Case 2 | 2014 | 36  | 5 weeks, 3 days                    | Present              | Undetectable     | Laparoscopy     | 910                                          | Vesicouterine peritoneum | 2046            |                   |
| 3        | Hornemann et al. [28]  | 2009 | 25  | Day 24 of menstrual period         | Present              | Undetectable     | Laparoscopy     | 500                                          | Omentum           | 857             | Current IUD use |
| 4        | Tanase et al. [10]     | 2013 | 32  | Day 31 of menstrual period         | Present              | Undetectable     | Laparoscopy     | 300                                          | Uterosacral ligament | 8160            | Operative history, 5-month history of secondary infertility |
| 5        | Gundabattula et al. [11]| 2014 | 30  | No preceding amenorrhea            | Present              | Not defined      | Laparoscopy     | ~1000                                        | Uterosacral ligament | 5699            |                   |
| 6        | Martelli et al. [17]   | 2013 | 34  | 5 weeks, 3 days                    | Present              | Undetectable     | Laparoscopy + laparotomy | 200 (laparoscopy) + 1500 (laparotomy 3 days after laparoscopy) | Uterosacral ligament | 15,620          |                   |
| 7        | Shaw et al. [29]       | 1996 | 27  | 6 weeks                            | Present              | Not defined      | Laparotomy      | 475                                          | Cul-de-sac Paracolic sulcus | Not defined |                   |
| 8        | Chang et al. [12]      | 2008 | 33  | Last menstruation 2 weeks previously | Present              | Not defined      | Laparoscopy     | 1700                                         | Not defined         |                   |
| 9        | Chopra et al. [30]     | 2008 | 29  | 6 weeks                            | Present              | Undetectable     | Laparotomy      | 1000                                         | Uterosacral ligament | Not defined | Oral contraceptive pills for last 3 years Endometriosis, 6-months GnRHa |
| 10       | Lo and Lau [13]        | 1997 | 33  | 6 weeks                            | Present              | Undetectable     | Laparoscopy + laparotomy | 1000                                        | Uterosacral ligament | Not defined |                   |
| 11       | Lo and Lau [13]        | 1997 | 32  | 7 weeks                            | Present              | Small amount     | Laparoscopy     | 1000                                         | Uterosacral ligament | Not defined |                   |
| 12       | Hong et al. [14]       | 2008 | 25  | 8 weeks                            | Present              | Undetectable     | Laparoscopy     | 500                                          | Omentum           | 19,213         |                   |
| 13       | Shaw et al. [29]       | 1994 | 29  | 8 weeks                            | Present              | Not defined      | Laparotomy      | 950                                          | Cul-de-sac         | Not defined |                   |
| 14       | Watrowski et al. [5]   | 2014 | 25  | 8 weeks                            | Present              | Undetectable     | Laparoscopy     | 500                                          | Omentum           | 33,600         |                   |
| 15       | Shin et al. [31]       | 2000 | 28  | 8 weeks                            | Present              | Not defined      | Laparotomy      | 1000                                         | Uterosacral ligament | Not defined |                   |
| 16       | Nakamura et al. [32]   | 2001 | 27  | 8 weeks                            | Present              | Undetectable     | Laparotomy      | 1000                                         | Rectum wall        | 6400            | Complicated by ovarian hyperstimulation syndrome, urinary hCG titer |
| 17       | Dasari and Devi [33]   | 2000 | 22  | Day 58 of menstrual period         | Present              | Present          | Laparotomy      | More than 2000                               | Uterosacral ligament | Not defined | Current IUD use |
| 18       | Shaw et al. [29]       | 1995 | 39  | 9 weeks                            | Present              | Not defined      | Laparotomy      | 1400                                         | Cul-de-sac         | Not defined | Laparoscopic operation was performed twice |
| 19       | Yi et al. [15]         | 2007 | 28  | 9 weeks                            | Present              | Not defined      | Laparoscopy     | 1500                                         | Omentum           | 15,814         |                   |
| 20       | Shaw et al. [29]       | 1995 | 30  | 11 weeks                           | Present              | Not defined      | Laparotomy      | 1900                                         | Omentum           | Not defined |                   |

GA, gestational age; IUD, intrauterine device; GnRHa, gonadotrophin-releasing hormone analog.
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difficult to identify the location of the ectopic implantation because of the small size of the mass and the presence of hemoperitoneum with blood clots. Neither pregnancy was diagnosed preoperatively.

Early diagnosis of peritoneal pregnancy in early gestation is very difficult. The mean gestational age at the time of treatment of peritoneal pregnancy is reportedly 10 weeks [26]. Each of our patients was diagnosed with massive hemoperitoneum at 5 weeks of gestation. In contrast, Saxon et al. [16] reported that the mean gestational age of tubal pregnancies at the time of treatment was 6.9 ± 1.9 weeks (unruptured) and 7.2 ± 2.2 weeks (ruptured). Mol et al. [20] reported that patients with a gestational age of >7 weeks showed an increased risk of tubal rupture and/or active bleeding.

There are no previous reports of tubal pregnancy causing massive bleeding at five gestational weeks. Rupture of a tubal pregnancy at five gestational weeks is unusual, with a probability of 0.14 [27]. Both of our patients exhibited massive hemoperitoneum at 5 weeks of gestation; in particular, the patient in Case 1 exhibited more than 2000 mL of bleeding. Omental pregnancy and peritoneal pregnancy implanted on the uterosacral ligamentum are also known to cause massive bleeding at 5 gestational weeks, even at day 24 of menstruation (Table 1, Cases 3, 4 and 5) [10, 11, 28]. Thus, massive bleeding in early gestation, such as at 5 weeks in the present cases, may imply the presence of a peritoneal pregnancy.

Expectant management might be acceptable at such an early stage of ectopic pregnancy if the patient is hemodynamically stable. However, peritoneal pregnancy could cause sudden and serious bleeding even at earlier stages of pregnancy when a tubal pregnancy does not cause massive bleeding. Therefore, we reviewed the literature to evaluate the common symptoms of peritoneal pregnancy at 5 weeks of gestation [11–15, 17, 28–33]. Consistent with previous reports, we observed no genital bleeding or gestational sac within the uterus in spite of massive intra-peritoneal bleeding and abdominal pain (Table 1). Thus, these symptoms provide a clue to the early diagnosis of a peritoneal pregnancy in early gestation.

Surgical management of a primary peritoneal pregnancy is standard. Laparoscopy is preferred for hemodynamically stable patients with peritoneal pregnancy whose implantation site does not involve a vascular area that may lead to uncontrolled bleeding [9, 29]. Laparoscopy for hemodynamically unstable patients with peritoneal pregnancy, however, remains controversial because of limited evidence. Recently Odejinmi et al. [34] reported a prospective cohort study of laparoscopic surgery in hemodynamically unstable patients with ectopic pregnancy. Although the laparoscopy group required more blood transfusions (laparoscopy, 22 U of packed red blood cells; laparotomy, 10 U of packed red blood cells), they had a shorter length of hospital stay than did the laparotomy group (mean, 3.3 vs. 7.5 days), and experienced operators had a 100% success rate at operative laparoscopy. Increasing advances in technology, laparoscopic instrumentation, hemodynamic monitoring, and operator skill could enable safer laparoscopy, leading to expansion of its indications.

The increase in the performance of assisted reproduction techniques increases the risk of ectopic pregnancies and thus implantation at unusual sites, which are associated with a difficult diagnosis and a high risk of life-threatening complications [35, 36]. The implantation site may also be missed by laparoscopy, and a secondary operation is required in such cases (Table 1, Case 6 and Case 19) [15, 17]. Such secondary operations are highly invasive and cause a diagnostic delay, potentially resulting in more bleeding. Although peritoneal pregnancy is a very rare condition, unusual locations such as the peritoneum should be carefully examined in patients with massive abdominal bleeding during early pregnancy when both the uterus and adnexa are normal on laparoscopic or laparotomic exploration.

Our experience shows that abundant abdominal fluid with low hCG levels and no genital bleeding in very early gestation are signs of a possible peritoneal pregnancy. Implantation into the peritoneum may cause massive bleeding even in the face of low hCG levels and very early gestation. Clinicians should always bear in mind that a pregnancy can exist in unusual locations and ensure thorough inspection of the abdominal cavity.

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Conflict of Interest

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References

1. Jazayeri, A., T. A. Davis, and D. N. Contreras. 2002. Diagnosis and management of abdominal pregnancy. A case report. J. Reprod. Med. 47:1047–1049.
2. Atrash, H. K., A. Friede, and C. J. Hogue. 1987. Abdominal pregnancy in the United States: frequency and maternal mortality. Obstet. Gynecol. 69(3 Pt 1):333–337.
3. Cunningham, F., K. Leveno, S. Bloom, J. Hauth, D. Rouse, and C. Spong. 2010. Williams obstetrics. 23rd ed. McGraw-Hill Professional, New York, NY.
4. Studdiford, W. E. 1942. Primary peritoneal pregnancy. Am. J. Obstet. Gynecol. 44:487–491.
5. Watrowski, R., A. Lange, and J. Mockel. 2015. Primary omental pregnancy with secondary implantation into posterior Cul-de-sac: laparoscopic treatment using hystomatic matrix. J. Minim. Invasive Gynecol. 501–503.
6. Stevens, C. A. 1993. Malformations and deformations in abdominal pregnancy. Am. J. Med. Genet. 47:1189–1195.
7. Tsudo, T., T. Harada, H. Yoshioka, and N. Terakawa. 1997. Laparoscopic management of early primary abdominal pregnancy. Obstet. Gynecol. 90(4 Pt 2):687–688.
8. Koo, H. S., J. Y. Bae, I. S. Kang, M. K. Koong, H. O. Kim, S. H. Cha, et al. 2011. Laparoscopic management of primary peritoneal pregnancy: a case report. Clin. Exp. Reprod. Med. 38:109–114.
9. Tulandi, T., and A. Saleh. 1999. Surgical management of ectopic pregnancy. Clin. Obstet. Gynecol. 42:31–38; quiz 55–6.
10. Tanase, Y., S. Yoshida, N. Furukawa, and H. Kobayashi. 2013. Successful laparoscopic management of a primary omental pregnancy: case report and review of literature. Asian J. Endosc. Surg. 6:327–329.
11. Gundabattula, S. R., and M. Pochiraju. 2014. Primary abdominal pregnancy in the uterosacral ligament with haemoperitoneum: a near miss. J. Clin. Diagn. Res. 8: Od08–Od09.
12. Chang, Y. L., P. C. Ko, and C. F. Yen. 2008. Retroperitoneal abdominal pregnancy at left paracolic sulcus. J. Minim. Invasive Gynecol. 15:660–661.
13. Lo, K. W., and T. K. Lau. 1997. Ectopic pregnancy in uterosacral ligament. J. Obstet. Gynaecol. Res. 23:415–419.
14. Hong, J. H., J. H. Shin, K. J. Song, H. J. Lee, I. S. Kim, J. K. Lee, et al. 2008. Laparoscopic management of primary omental pregnancy. J. Minim. Invasive Gynecol. 15:640–641.
15. Yi, K. W., M. K. Yeo, J. H. Shin, K. A. Kim, M. J. Oh, J. K. Lee, et al. 2008. Laparoscopic management of early omental pregnancy detected by magnetic resonance imaging. J. Minim. Invasive Gynecol. 15:231–234.
16. Saxon, D., T. Falcone, E. J. Mascha, T. Marino, M. Yao, and T. Tulandi. 1997. A study of ruptured tubal ectopic pregnancy. Obstet. Gynecol. 90:46–49.
17. Martelli, F., C. De Carolis, C. Parisi, and E. Piccione. 2013. Neglected primary omental pregnancy after laparoscopic and medical treatment: a difficult diagnosis? Case Rep. Obstet. Gynecol. 2013:207307.
18. Bouyer, J., J. Coste, H. Fernandez, J. L. Pouly, and N. Job-Spira. 2002. Sites of ectopic pregnancy: a 10 year population-based study of 1800 cases. Hum. Reprod. 17:3224–3230.
19. Dover, R. W., and M. C. Powell. 1995. Management of a primary abdominal pregnancy. Am. J. Obstet. Gynecol. 172:1603–1604.
20. Cartwright, P. S., J. E. Brown, R. J. Davis, G. A. Thieme, and F. H. Boehm. 1986. Advanced abdominal pregnancy associated with fetal pulmonary hypoplasia: report of a case. Am. J. Obstet. Gynecol. 155:396–397.
21. Moessinger, A. C. 1986. Fetal lung growth in experimental utero-abdominal pregnancy. Obstet. Gynecol. 68:675–678.
22. Turgut, E. N., E. Celik, S. Celik, D. C. Arikan, H. Altuntas, C. Leblebici, et al. 2013. Could serum beta-hCG levels and gestational age be the indicative factors for the prediction of the degree of trophoblastic invasion into tubal wall in unruptured ampullary pregnancies? Arch. Gynecol. Obstet. 287:323–328.
23. Ali, V., L. R. Saldana, I. Y. Balat, and R. Katragadda. 1981. Pitfalls in sonographic diagnosis of abdominal pregnancy. South. Med. J. 74:477–479.
24. Brown, H. L., E. B. Linton, and L. A. Brabson. 1984. Abdominal pregnancy: a report of two cases and review of the pathogenesis, diagnosis and treatment. J. Tenn. Med. Assoc. 77:579–581.
25. Martin, J. N. Jr, J. K. Sessums, R. W. Martin, J. A. Pryor, and J. C. Morrison. 1988. Abdominal pregnancy: current concepts of management. Obstet. Gynecol. 71:549–557.
26. Poole, A., D. Haas, and E. F. Magann. 2012. Early abdominal ectopic pregnancies: a systematic review of the literature. Gynecol. Obstet. Invest. 74:249–260.
27. Mol, B. W., P. J. Hajenius, S. Engelsbel, W. M. Ankum, F. van der Veen, D. J. Hemrika, et al. 1999. Can noninvasive diagnostic tools predict tubal rupture or active bleeding in patients with tubal pregnancy? Fertil. Steril. 71:167–173.
28. Hornemann, A., K. Holl-Ulrich, D. Finas, C. Altgassen, K. Diedrich, and D. Hornung. 2008. Laparoscopic management of early primary omental pregnancy. Fertil. Steril. 89:991.e9–991.e11.
29. Shaw, S. W., J. J. Hsu, H. Y. Chueh, C. M. Han, F. C. Chen, Y. L. Chang, et al. 2007. Management of primary abdominal pregnancy: twelve years of experience in a medical centre. Acta Obstet. Gynecol. Scand. 86:1058–1062.
30. Chopra, S., A. Keepanasseril, V. Suri, and N. Gupta. 2009. Primary omental pregnancy: case report and review of literature. Arch. Gynecol. Obstet. 279:441–442.
31. Shin, J. S., Y. J. Moon, S. R. Kim, K. T. Kim, H. Moon, and Y. Y. Hwang. 2000. Primary peritoneal pregnancy implanted on the uterosacral ligament: a case report. J. Korean Med. Sci. 15:359–362.
32. Nakamura, Y., A. Muso, O. Tokuyama, T. Sumi, S. Yamamasu, O. Ishiko, et al. 2001. Primary abdominal pregnancy associated with severe ovarian hyperstimulation syndrome. Arch. Gynecol. Obstet. 265:233–235.
33. Dasari, P., and S. Devi. 2000. Primary peritoneal pregnancy: a case report. J. Obstet. Gynaecol. Res. 26:45–47.
34. Odejinmi, F., M. Sangrithi, and O. Olowu. 2011. Operative laparoscopy as the mainstay method in management of hemodynamically unstable patients with ectopic pregnancy. J. Minim. Invasive Gynecol. 18:179–183.

35. Iwama, H., S. Tsutsumi, H. Igarashi, K. Takahashi, K. Nakahara, and H. Kurachi. 2008. A case of retroperitoneal ectopic pregnancy following IVF-ET in a patient with previous bilateral salpingectomy. Am. J. Perinatol. 25:33–36.

36. Martinez-Varea, A., J. J. Hidalgo-Mora, V. Paya, I. Morcillo, E. Martin, and A. Pellicer. 2011. Retroperitoneal ectopic pregnancy after intrauterine insemination. Fertil. Steril. 95:2433.e1–2433.e3.