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CLINICAL ARTICLE

Pregnancy outcomes after surgical treatment of ovarian pregnancy

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ABSTRACT

Objective: To investigate pregnancy outcomes subsequent to ovarian pregnancy treated by surgery. *Methods:* A retrospective analysis was conducted of ovarian pregnancies that were treated by surgery at a hospital in Korea between January 1996 and December 2009. *Results:* Forty-nine women with ovarian pregnancies (1.6% of all ectopic pregnancies) were treated; 28 of these patients who were followed-up for more than a year were included in the study. The most common risk factor for ovarian pregnancy was endometriosis (42.9%). Accurate diagnosis of ovarian pregnancy was made preoperatively in 7 patients (25%). Of the 28 patients, 16 (57.1%) had subsequent pregnancies: 13 (46.4%) were intrauterine pregnancies and 3 (10.7%) were tubal pregnancies. However, no subsequent ovarian pregnancies occurred. In addition, only 1 patient had secondary infertility after surgery for ovarian pregnancy. *Conclusions:* After an ovarian pregnancy treated by surgery, the outcome of a subsequent pregnancy is reasonable; there is a high rate of successful subsequent pregnancy and a low rate of subsequent ectopic pregnancy or of infertility.

1. Introduction

Ovarian pregnancy is a rare type of extrauterine pregnancy. Primary ovarian pregnancy is defined as a pregnancy implanted within an ovary that results from failure of follicular extrusion or release of an ovum, and secondary ovarian pregnancy is defined as a secondary ovarian implantation after endometrial or tubal implantation.

The incidence of primary ovarian pregnancy after natural conception ranges from 1 in 2000 to 1 in 60000 deliveries, and it accounts for 0.5% to 3% of all ectopic pregnancies [1,2]. However, the incidence of primary ovarian pregnancy is thought to be increasing owing to improvements in diagnostic techniques and assisted reproductive technologies (ART) [3]; the incidence of primary ovarian pregnancy after in vitro fertilization (IVF) was reported to be 0.3% [4]. In addition, because of the availability of sensitive assays for human chorionic gonadotropin (hCG) and the development of ultrasonography, early diagnosis of ovarian pregnancy has become more feasible. Nevertheless, because of its rarity many surgeons may have no experience of treating ovarian pregnancy.

The traditional treatment for ovarian pregnancy was oophorectomy or salpingo-oophorectomy by laparotomy. However, because of the continued development of laparoscopic techniques, conservative laparoscopic surgery is preferred now. In particular, if patients are young and desire children, conservative laparoscopic techniques, such as wedge resection or removal of gestational products, should be performed as a first choice of treatment [5]. However, because some cases are misdiagnosed as adnexal tumors, more invasive surgery may be performed. Therefore, practicing clinicians need to be aware of ovarian pregnancy and its characteristics. Few studies have analyzed the clinical outcomes, particularly subsequent pregnancies; therefore, clinical data are needed to provide advice regarding future pregnancy to women with a history of ovarian pregnancy. The aim of the present study was to review 28 cases of ovarian pregnancy and to describe the outcome of pregnancies that occurred subsequent to ovarian pregnancy that was treated by surgery.

2. Materials and methods

In total, 3081 women with ectopic pregnancies were treated at Cheil General Hospital and Women's Healthcare Center between January 1996 and December 2009. In total 49 (1.6%) patients were treated with surgery and confirmed to have an ovarian pregnancy by pathology. Only 28 of these 49 patients were followed-up for more than 12 months after receiving treatment for ovarian pregnancy; these 28 patients were included in the present study so that the outcomes of subsequent pregnancies could be assessed. The study was approved by the Institutional Review Board of the Cheil General Hospital and Women's Healthcare Center, and the informed consent of the patients enrolled in the study was obtained for collecting and using the data.

Data were collected retrospectively on patient age, parity, main symptoms, duration of pregnancy, antecedent risk factors, ultrasonographic findings, preoperative diagnosis, surgical modalities, and the outcome of a subsequent pregnancy by reviewing medical charts. All

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slides were reviewed by expert pathologists from the hospital, and the diagnosis of ovarian pregnancy was confirmed using histopathologic examination based on the criteria of Spiegelberg [6].

3. Results

The mean age of the 28 patients at diagnosis of ovarian pregnancy was 31.8 years; 7 (25%) of the patients were older than 35 years. The mean gravidity and parity of the patients were 2.3 and 0.6, respectively. The most common symptoms were abdominal pain (46.4%) and vaginal bleeding (17.9%), but in 5 patients (17.9%) who were being monitored after using IVF, the pregnancies were detected before the occurrence of clinical symptoms. The mean follow-up was 36.8 months (Table 1).

A history of endometriosis (42.9%) and abdominal surgery (35.7%) were the most commonly associated risk factors for ovarian pregnancy. Only 2 (7.1%) patients had previously used an intrauterine device (IUD) (Table 2). Four patients (14.3%) had experienced a previous ectopic pregnancy. However, no antecedent risk factors were identified in 5 patients (17.9%). A definitive diagnosis of ovarian pregnancy was made by ultrasonography in 7 patients (25%), but 2 patients (7.1%) were misdiagnosed with adnexal tumors (Table 3). On ultrasonography, 20 patients (71.4%) had a unilateral enlarged ovary (mean, 4.7 cm; range, 3.1–8.5 cm in diameter), and 16 patients (57.1%) had fluid collection around an ovary (data not shown).

Surgery was predominantly by laparoscopy (23 patients, 82.1%), and wedge resection of the ovary was the most common surgical procedure (25 cases, 89.3%). During the operation, ovarian pregnancies were found equally in both ovaries; the right ovary was affected in 14 patients and the left ovary in 14 patients. The mean duration of the operation was 50.4 minutes, and the mean hospital stay was 4.8 days. Most patients (26 patients, 92.9%) had a single ovarian pregnancy, 1 patient (3.6%) had a heterotopic pregnancy, and 1 patient (3.6%) had a combined ovarian pregnancy (i.e. the coincidence of ovarian pregnancy and tubal pregnancy). The patient with the heterotopic pregnancy underwent laparoscopic ovarian wedge resection for the left ovarian pregnancy at 6.0 weeks of pregnancy. The intrauterine pregnancy was maintained to full term and delivery.

During the follow-up period, 16 (57.1%) patients experienced subsequent pregnancies: 8 patients (50%) had naturally conceived intrauterine pregnancies, 5 patients (31.3%) had intrauterine pregnancies after IVF, and 3 patients (18.8%) had ectopic tubal pregnancies. None of the patients had a subsequent ovarian pregnancy. Of the 11 patients who did not become pregnant within a year after surgery, 8 had already been diagnosed with infertility before the surgery, 2 became pregnant within 3 years, and only 1 was diagnosed with secondary infertility that occurred after the ovarian pregnancy.

Table 1
Clinical characteristics of 28 patients with ovarian pregnancy.

Patient No.	Age, y	Gravidity	Parity	Duration of pregnancy, wk	Main symptoms	Duration of follow-up, mo
1	31	1	0	5.5	Abdominal pain	49
2	37	4	2	6.1	Abdominal pain	23
3	33	1	0	8.1	Abdominal pain	13
4	29	1	0	6.0	Abdominal pain	14
5	30	2	0	6.0	Abdominal pain	13
6	34	2	0	6.1	Post IVF follow-up	28
7	38	1	0	8.1	Post IVF follow-up	86
8	26	3	1	5.3	Vaginal bleeding	16
9	28	1	0	5.4	Abdominal pain	37
10	30	2	1	5.5	Abdominal pain	160
11	25	3	0	5.6	Abdominal pain	32
12	26	2	0	5.6	Abdominal pain	15
13	32	5	1	6.5	Abdominal pain	49
14	30	2	1	6.6	Vaginal bleeding	69
15	27	1	0	8.2	Vaginal bleeding	73
16	32	1	0	7.6	Vaginal bleeding	29
17	34	4	2	5.3	Vaginal bleeding	23
18	31	1	0	4.6	Abdominal pain	19
19	31	3	1	5.6	Abdominal pain	62
20	32	4	2	7.3	Abdominal pain	75
21	38	5	2	3.5	Incidentally detected mass	23
22	35	3	0	4.2	Incidentally detected mass	12
23	37	2	1	5.5	Post IVF follow-up	12
24	36	1	0	5.6	Post IVF follow-up	18
25	37	1	0	8.6	Post IVF follow-up	12
26	32	4	0	6.2	Amenorrhea	36
27	34	2	1	6.0	Vomiting	19
28	26	2	1	6.3	Shock	13

Abbreviation: IVF, in vitro fertilization.

Table 2
Preceding factors of ovarian pregnancy in 28 patients.

Patient No.	Previous ectopic pregnancy	Previous abdominal surgery	Ovulation stimulation	IVF	History of PID	IUD use	Endometriosis
1				Yes			
2	Yes						
3							
4		Yes	Yes				
5	Yes						
6	Yes	Yes					
7							Yes
8		Yes					
9							Yes
10		Yes					
11							Yes
12				Yes			Yes
13			Yes				
14							
15		Yes	Yes				Yes
16		Yes		Yes	Yes		
17							
18		Yes		Yes			Yes
19							Yes
20		Yes		Yes			Yes
21	Yes						Yes
22		Yes				Yes	
23		Yes					Yes
24					Yes		
25						Yes	Yes
26							Yes
27							
28							

Abbreviations: IVF, in vitro fertilization; PID, pelvic inflammatory disease; IUD, intrauterine device.

4. Discussion

In the present study, a review of 28 patients with ovarian pregnancy treated with surgery, the subsequent pregnancy outcome was found to be reasonable, with a low rate of subsequent ectopic pregnancy and infertility.

Recently, the incidence of ectopic pregnancy, including ovarian pregnancy, has increased. A variety of reasons for this increase, such as the increasing ages of pregnant women, use of tubal reconstruction surgery, and use of ART, have been proposed. In the present study, the incidence of ovarian pregnancy was 1.59% over a 14-year period, which is consistent with that documented in previous reports (0.5%–3.0%) [1,2].

The etiology of ovarian pregnancy remains uncertain. Interference with the release of the ovum from the ruptured follicle, malfunction of the fallopian tubes, or inflammatory thickening of the tunica albuginea may lead to ovarian pregnancy [7]. Possible risk factors, including use of IUDs or ART, history of abdominal or laparoscopic surgery, endometriosis, pelvic inflammatory disease, and uterine