

RUPTURED CORPUS LUTEUM WITH HEMOPERITONEUM: CASE CHARACTERISTICS AND DEMOGRAPHIC CHANGES OVER TIME

Wen-Kuang Ho¹, Ya-Fen Wang^{2,3†}, Hsin-Hung Wu², Horng-Der Tsai²,
Tze-Ho Chen^{2,4}, Ming Chen^{2,4,5*}

¹Department of Obstetrics and Gynecology, Kuang-Tien General Hospital, Taichung, Departments of

²Obstetrics and Gynecology, ³Nursing and ⁴Genomic Medicine, Changhua Christian Hospital, Changhua, and

⁵Department of Obstetrics and Gynecology, College of Medicine, National Taiwan University, Taipei, Taiwan.

SUMMARY

Objective: Women of reproductive age are at risk of ruptured corpus luteum with hemoperitoneum. We identified the clinical and demographic features of patients recently treated in our institution and compared the findings with those from an earlier series, to detect any changes in disease identity that have occurred over the past 20 years.

Materials and Methods: Charts of patients treated between January 2001 and December 2003 at Changhua Christian Hospital were reviewed. Clinical parameters were compared with those from our previous study in the 1980s.

Results: A total of 91 women were diagnosed with ruptured corpus luteum and hemoperitoneum (mean age, 26 years; range, 15–42 years). Most ruptures (60.4%) occurred during the secretory phase and most women (57.1%) reported recent sexual intercourse prior to the onset of pain. Most patients (81.3%) required laparoscopic intervention to achieve hemostasis. No obvious differences were found between the results of this study and those from the 1985 series, except that our patients were younger, were more often unmarried, chose laparoscopic interventions rather than laparotomy, and that there was an emerging trend towards conservative treatment.

Conclusion: The manifestations of corpus luteum hemorrhage in this study were similar to those observed in the 1980s at the same medical center. However, the demographic parameters (age, marital status) and the modalities of treatment (conservative treatment, mode of surgical interventions) had changed in line with the evolution of society, culture, and the progress of medical science over the past 20 years. [*Taiwan J Obstet Gynecol* 2009;48(2):108–112]

Key Words: corpus luteum hemorrhage, demographics, hemoperitoneum

Introduction

Prompt and appropriate evaluation of acute abdomen is always a priority because of the potential need for emergent surgery. In women of reproductive age, the

differential diagnosis includes a number of gynecologic conditions, in addition to spontaneous loss of pregnancy. Rupture of the corpus luteum (with or without early pregnancy), with bleeding and hemoperitoneum, accounts for a significant proportion of these female patients [1,2]. Most previous studies have focused on the clinical characteristics indicative of this condition and on noninvasive or minimally invasive means of diagnosis and treatment.

We conducted a retrospective review of patients treated at our institution between 2001 and 2003 for ruptured corpus luteum with hemoperitoneum.



ELSEVIER

*Correspondence to: Dr Ming Chen, Department of Genomic Medicine, Changhua Christian Hospital, Changhua 500, Taiwan.

E-mail: mchen_cch@yahoo.com

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†Co-first author

We aimed to identify the clinical and demographic features of patients and compare these with those from a similar chart review conducted in 1985 [3]. Identification of characteristics should help physicians and health educators to be alerted when encountering high-risk patients, enabling more patients to be promptly evaluated and treated.

Materials and Methods

From January 2001 to December 2003, 91 patients were diagnosed with hemoperitoneum secondary to ruptured corpus luteum at our medical center in central Taiwan. All data were obtained from a retrospective review of the hospitalization and operation database using the International Classification of Diseases, 9th revision code, 620.1. Chart reviews were performed for all candidate cases, and data on clinical and demographic characteristics were compiled to identify the general diagnostic and treatment strategies used in these patients.

All patients included in the study had diagnoses confirmed by serial ultrasound examinations and positive response to empirical tranexamic acid therapy, as well as gross findings or/and pathologic study if the patient underwent a surgical procedure. Patients were excluded if the final diagnosis involved a gastrointestinal or urinary tract disorder, or if there was a systemic blood dyscrasia.

Comparison was made between current findings and those from a previous study performed at our institution [3]. Statistical analysis was completed using Fisher's exact test. A *p* value < 0.05 was considered statistically significant.

Results

Demographic data are shown in Table 1. The mean age was 26 years (range, 15–42 years). Seventy patients (77.0%) were ≤ 29 years old, 45 patients (49.5%) were ≤ 24 years old, and 14 patients (15.4%) were ≤ 19 years old. In comparison, most women (52.8%) in the 1985 series had onset ages between 25–29 years old. In addition, the vast majority of the patients in the 1985 series were married (94.4%), whereas almost half of the patients in the present study were unmarried (44%) (Table 2).

Signs and symptoms at presentation are shown in Table 3. All patients were presented with lower abdominal pain. The majority also had fluid in the cul-de-sac and rebound pain (96.7% and 84.6%, respectively).

Table 1. Demographic characteristics of patients treated for ruptured corpus luteum with hemoperitoneum

Characteristic	Treatment period	
	2001–2003 (<i>n</i> = 91)	1981–1984 (<i>n</i> = 72)
Age, mean (range) (yr)	26 (15–42)	28.5 (18–37)
Distribution of age at onset, <i>n</i> (%)		
15–19*	14 (15.4)	1 (1.4)
20–24*	31 (34.1)	11 (15.3)
25–29*	25 (27.5)	38 (52.8)
30–34*	11 (12.1)	21 (29.2)
35–39	7 (7.7)	1 (1.4)
40–44	2 (2.2)	0 (0)
45–49	1 (1.1)	0 (0)

**p* < 0.05 by Fisher's exact test.

Clinicopathologic features are summarized in Table 2. When asked if there had been a specific event within the 24 hours prior to the onset of pain, over half (57.1%) mentioned sexual intercourse and only 1.1% mentioned other sorts of exercise. Of 52 patients who mentioned very recent sexual activity, 24 (46.2%) were not married. Almost two-thirds of patients (60/91, 65.9%) had ruptures from the right adnexa, whereas 29 women (31.9%) had a left-sided rupture, and two (2.2%) had bilateral ruptures. The mean maximum diameter of the corpus luteum, determined by ultrasonography, intraoperative examination, or both, was 3.9 cm (range, 2–8 cm).

In terms of the phase of the menstrual cycle during which the corpus luteum hemorrhage occurred, 60.4% of patients experienced rupture during the secretory phase (days 14–30), including four women found to be pregnant. An additional 24.2% of women ruptured during cycle days 31–60, with four of these women found to be pregnant. Only 5.5% of women reported rupture during the follicular phase (cycle days 1–14). The remaining women either had a markedly delayed period (day 60 or longer) or did not know the date of their last menstrual period. Of the 91 women, 10 (11.0%) found to be pregnant, two had ectopic pregnancies, one had a spontaneous abortion, four underwent elective dilation and curettage, one took mifepristone to terminate pregnancy, and two had normal pregnancies after receiving medical or laparoscopic electrocauterization (one each) to achieve hemostasis.

Estimated blood loss ranged from 30–1,400 mL (Table 2). Of the 91 women, 74 patients (81.3%) required surgical treatment for hemostasis (all treated laparoscopically; Table 4). The remaining 17 patients received medical treatment only. Almost two-thirds of patients (58/91, 63.8%) had an estimated blood loss

Table 2. Clinicopathologic characteristics of patients treated for ruptured corpus luteum with hemoperitoneum

Characteristic	Treatment period	
	2001–2003 (n = 91)	1981–1984 (n = 72)
Obstetric history, n (%)		
Married*	51 (56.0)	68 (94.4)
Nulliparous	8/51 (15.7)	9/68 (13.2)
Primiparous	15/51 (29.4)	20/68 (29.4)
Multiparous	28/51 (54.9)	39/68 (57.3)
Unmarried*	40 (44.0)	4 (5.6)
Nulliparous	40/40 (100.0)	4 (5.6)
Sexual experience	24/40 (60.0)	N/A
No sexual experience	16/40 (40.0)	N/A
Antecedent to pain, n (%)		
Intercourse	52 (57.1)	N/A
Exercise	1 (1.1)	N/A
Unknown	38 (41.8)	N/A
Side of rupture, n (%)		
Right ovary	60 (65.9)	41 (57.0)
Left ovary	29 (31.9)	31 (43.0)
Bilateral	2 (2.2)	
Size, mean (range) (cm)	3.9 (2–8)	N/A
Phase of menstrual cycle (%)		
Days 14–30	60.4	52.8
Days 31–60	24.2	30.5
Blood loss		
Approximate range (mL)	30–1,400	50 to >1,000
Transfusion, n (%)	19 (20.9%)	20 (27.8%)

* $p < 0.05$ by Fisher's exact test. N/A = not available.

Table 3. Symptoms and signs of patients presenting with ruptured corpus luteum with hemoperitoneum

Characteristic	Treatment period	
	2001–2003 (n = 91)	1981–1984 (n = 72)
Lower abdominal pain	91 (100.0)	72 (100.0)
Faintness	22 (24.2)	9 (12.5)
Nausea/vomiting	6 (6.6)	8 (11.1)
Vaginal spotting	1 (1.1)	23 (30.5)
Diarrhea	1 (1.1)	3 (4.2)
Abdominal tenderness	91 (100.0)	58 (80.5)
Rebound pain	77 (84.6)	30 (41.7)
Pain on lifting cervix	35 (38.5)	32 (44.4)
Fluid in cul-de-sac	88 (96.7)	N/A
Fluid in Morison's pouch	42 (46.2)	N/A
Shock	0 (0)	3 (4.2)
Culdocentesis*		
Positive	4 (100.0)	58 (89.2)
Negative	0 (0)	7 (10.8)

*This procedure was not given to 87 patients (95.6%) in the current series, and seven (9.7%) in the earlier series. N/A = data not available.

Table 4. Treatment for ruptured corpus luteum with hemoperitoneum*

	Treatment period	
	2001–2003 (n = 91)	1981–1984 (n = 72)
Surgical		
Laparoscopy	74 [†] (81.3)	15 (20.8)
Laparotomy	0 (0)	57 (79.2)
Medical		
Medical treatment only	17 (18.7)	0 (0)

*Data are presented as n (%); [†]of 74 cases, 67 patients received ovarian cystectomy, six received electrocauterization, and one received laparoscopic simple suture. N/A = not available.

of ≤ 500 mL, with only 14 patients (15.4%) having an estimated blood $> 1,000$ mL (data not shown). Of the 91 patients, 19 (20.9%) required a transfusion.

In addition to patient data, chart review identified the common diagnostic and treatment strategies. After initial evaluation, patients with a suspected gynecologic diagnosis underwent abdominal and/or vaginal ultrasonography using a Toshiba ultrasound SSA-260A machine

(Toshiba, Tokyo, Japan) at 3.5 and 5 MHz. Corpus luteum rupture with bleeding was diagnosed based on ultrasound criteria of appropriate ovarian cystic image with blood clots; size was mainly determined by ultrasound, but was confirmed by laparoscopy with normal saline irrigation in patients who required surgical intervention. Bleeding within the abdomen (secondary hemoperitoneum) was diagnosed based on vital signs and abdominal cavity fluid over the posterior cul-de-sac, or fluid in the Morison's pouch on ultrasonography, with or without confirmatory culdocentesis.

Patients with a clear-cut ultrasound diagnosis who were hemodynamically stable were treated conservatively by serial physical examination, laboratory testing of hematologic parameters and ultrasound, as well as with intravenous fluid supplementation and tranexamic acid therapy (500 mg intravenous loading dose, 250 mg intravenous maintenance dose every 6 hours). Blood transfusion was given if needed.

Patients who required surgical intervention were treated via laparoscopy. No patients in this series required laparotomy. Laparoscopy was performed in the dorsal lithotomy position under general anesthesia. The skin was disinfected with alcohol and aqueous povidone-iodine, and the vagina was disinfected with aqueous povidone-iodine. A 16F Foley catheter was placed in the urethra to collect urine. A carbon dioxide pneumoperitoneum was created by step insufflation after inserting a 5-mm trocar subumbilically and maintaining intra-abdominal pressure below 15 mmHg. After switching to a 10-mm trocar, the laparoscope was introduced. Bilateral 5-mm ports were placed under laparoscopic guidance.

All patients, whether treated conservatively or laparoscopically, were followed up for at least 1 year (cutoff in December 2004). No patients reported major problems during follow-up. In the two pregnant patients with corpus luteum hemorrhage, one was treated medically, and one underwent laparoscopic ovarian cystectomy. Only one woman was identified in the medical records of our hospital until 2004 as having experienced a recurrence of ruptured corpus luteum with hemoperitoneum.

Discussion

The characteristics of corpus luteum hemorrhage reported in most previous studies have been similar [1–3]. They include: (1) a patient age range throughout the child-bearing years, with the mean age being relatively young; (2) sharp and sudden-onset pain more often on the right than on the left side; (3) history of recent sexual intercourse or strenuous physical activity; (4)

a significant proportion of pregnant patients (either ectopic or intrauterine); and (5) a tendency of onset during the secretory phase of the menstrual cycle (days 14–30). The findings of this study verify these previous observations. Recent consensus also notes that women on anticoagulant therapy and women with a bleeding diathesis are at greater risk of rupture with significant hemorrhage, and are at greater risk of recurrent rupture [4]. We, therefore, excluded women on anticoagulants and those with underlying systemic blood dyscrasia from our series.

Ultrasound can effectively diagnose patients with corpus luteum hemorrhage, allowing physicians to conservatively manage patients who are hemodynamically stable and thus avoid surgery. Previous studies considered ultrasound to be a useful diagnostic modality, and focused mostly on the interpretation of images to maximize the benefit of earlier diagnosis [5–8], or on variations in image acquisition and processing techniques that could increase the specificity or sensitivity of diagnosis [9]. Although there is no consensus on treatment, a growing number of physicians prefer laparoscopy as the surgical diagnostic choice for many hemodynamically unstable patients [10].

We compared the results of the current series with those of a previous series studied at our institution during the 1980s. The age profile changed; mean age decreased from 28.5 to 26 years, and there was a statistically significant increase in the number of very young patients, aged ≤ 19 years (from 1.4% to 15.4%; $p=0.002$; Table 1). When patients in the current study were asked about possible antecedent events, over half (57.1%) mentioned very recent sexual intercourse. Of those 52 patients, 24 were not married. In the current series, 48 patients (52.7%) were nulliparous, another clear difference from the earlier series, in which only 13 patients (18.0%) were nulliparous.

The differences observed between the two series, which were 20 years apart, raise several concerns. First, almost half of the patients who reported recent intercourse were not married. This gives rise to questions about how many patients had experienced recent sexual activity in the previous series, but were unwilling to report it. It is difficult to take a reliable sexual history from a patient in pain in an emergency department setting, and the problem is compounded by the fact that extramarital sexual exposure has traditionally been regarded as a taboo in Taiwan, especially for females. The difficulty in obtaining a valid sexual history (regardless of location/culture) is even greater with very young patients. It is important to ask about sexual history and to test for pregnancy (human chorionic gonadotropin or ultrasound, or both). Irrespective of whether or not pregnancy

is desired, it is important to establish if the patient is pregnant, and if the pregnancy is ectopic or intrauterine. Given that the 1985 series was composed mainly of older, married women with children, the higher incidence of pregnancies was not surprising (21/72 [29.1%] compared with 10/91 [11.0%] for the current series).

We did not ask about contraception use in the current study, but it is possible that the decrease in pregnancy rate was related partially to sexual activity in women (many very young) who were using some form of contraception. Two patients in the current series later had normal pregnancies. One had been treated with laparoscopic electrocauterization for hemostasis, whereas the other received conservative therapy.

The clinical characteristics of the current cases were similar to those seen in earlier studies, with a predominance of right-sided ruptures: 60 of 91 (65.9%) in the current series versus 41 of 72 (57.0%) in our earlier series. One previous report noted a significantly higher incidence of right-sided rupture and speculated that differences in ovarian venous architecture created a higher intraluminal pressure on the right, making right-sided cysts more likely to rupture [11]. Another group hypothesized that the rectosigmoid cushions the left ovary, making it less vulnerable to trauma, such as that incurred during sexual intercourse [1]. A further possible explanation lies in human behavior; adolescents and young adults have long been taught that lower, right-sided pain may be indicative of appendicitis. It is, therefore, possible that a higher proportion of patients (especially younger ones) with right-sided pain present at the emergency department earlier and more often, particularly when pain is not very severe or has been present for only a short time.

Eighteen patients in the current series (18.7%) were treated with only medical therapy, compared with no patients in the earlier series. This trend towards non-invasive or minimally invasive treatment for hemodynamically stable patients is also reflected in the choice of surgical procedure. All 74 surgical patients (81.3%) were treated successfully with laparoscopy. In the 1985 series, 15 surgical patients (21.0%) had an initial laparoscopic procedure, with eight requiring subsequent laparotomy.

The most obvious changes over time, i.e. towards younger patients with fewer pregnancies treated more conservatively, raises issues that should be addressed in future longitudinal studies, especially if institutions are able to pool data to produce a large enough sample size. Are adolescents and young women who have one (or more) episodes of ruptured corpus luteum with hemoperitoneum at greater risk of pelvic adhesions and

later infertility? If patients who are considered to have been successfully treated are at risk of long-term complications affecting fertility, it is important to confirm this possibility in a large prospective study and to explore alternative treatment options.

Efforts by health educators (doctors and nurses who see patients for routine gynecologic care, as well as school teachers and others) should aim to make women, especially adolescents and young women, more aware of ruptured corpus luteum. They should be encouraged to seek medical help as early as possible after the onset of lower abdominal pain (right- or left-sided) in order to maximize the number of treatment options still available to them.

References

1. Hallett JG, Steele CH Jr, Snyder M. Ruptured corpus luteum with hemoperitoneum: a study of 173 surgical cases. *Am J Obstet Gynecol* 1984;149:5-9.
2. Sivanesaratnam V, Singh A, Rachagan SP, Raman S. Intra-peritoneal haemorrhage from a ruptured corpus luteum: a cause of "acute abdomen" in women. *Med J Aust* 1986; 144:411-4.
3. Shiau HR, Shiau HJ, Wu CC. Ruptured corpus luteum with hemoperitoneum: analysis of 72 cases. *J Obstet Gynecol ROC* 1985;24:208-13.
4. Droegemueller W. Benign gynecologic lesions. In: Stenchever MA, Droegemueller W, Herbst AL, Mishell DR Jr, eds. *Comprehensive Gynecology*, 4th edition. St. Louis: Mosby, 2001: 506-9.
5. Jiang Y, Cheng Y, Chang X. Sonographic diagnosis of ruptured corpus luteum with hemoperitoneum. *Zhongguo Yi Xue Ke Xue Yuan Xue Bao* 1995;17:133-5. [In Chinese]
6. Hertzberg BS, Kliewer MA, Paulson EK. Ovarian cyst rupture causing hemoperitoneum: imaging features and the potential for misdiagnosis. *Abdom Imaging* 1999;24: 304-8.
7. Jain KA. Sonographic spectrum of hemorrhagic ovarian cysts. *J Ultrasound Med* 2002;21:879-86.
8. Nemoto Y, Ishihara K, Sekiya T, Konishi H, Araki T. Ultrasonographic and clinical appearance of hemorrhagic ovarian cyst diagnosed by transvaginal scan. *J Nippon Med Sch* 2003; 70:243-9.
9. Edwards A, Clarke L, Piessens S, Graham E, Shekleton P. Acoustic streaming: a new technique for assessing adnexal cysts. *Ultrasound Obstet Gynecol* 2003;22:74-8.
10. Teng SW, Tseng JY, Chang CK, Li CT, Chen YJ, Wang PH. Comparison of laparoscopy and laparotomy in managing hemodynamically stable patients with ruptured corpus luteum with hemoperitoneum. *J Am Assoc Gynecol Laparosc* 2003;10:474-7.
11. Tang LC, Cho HK, Chan SY, Wong VC. Dextroreponderance of corpus luteum rupture: a clinical study. *J Reprod Med* 1985;30:764-8.