

: Ovary, Cysts
 Ovary, neoplasms
 Ovary, US

가

가

: 1999 3 2 , : 1999 7 12 , : 1999 10 18 , : 2000 3 20
 : (442-749) 5,
 Tel. (331)219-5856 Fax. (331)219-5862

가

가

1994 6 1998 10

가

[1-3].

49

가

49

가

Ultramark 9 HDI(Advanced Technology Laboratories, Bothell, WA, USA) 5.0 MHz
2-4 MHz

2-4 MHz, spatial peak and temporal

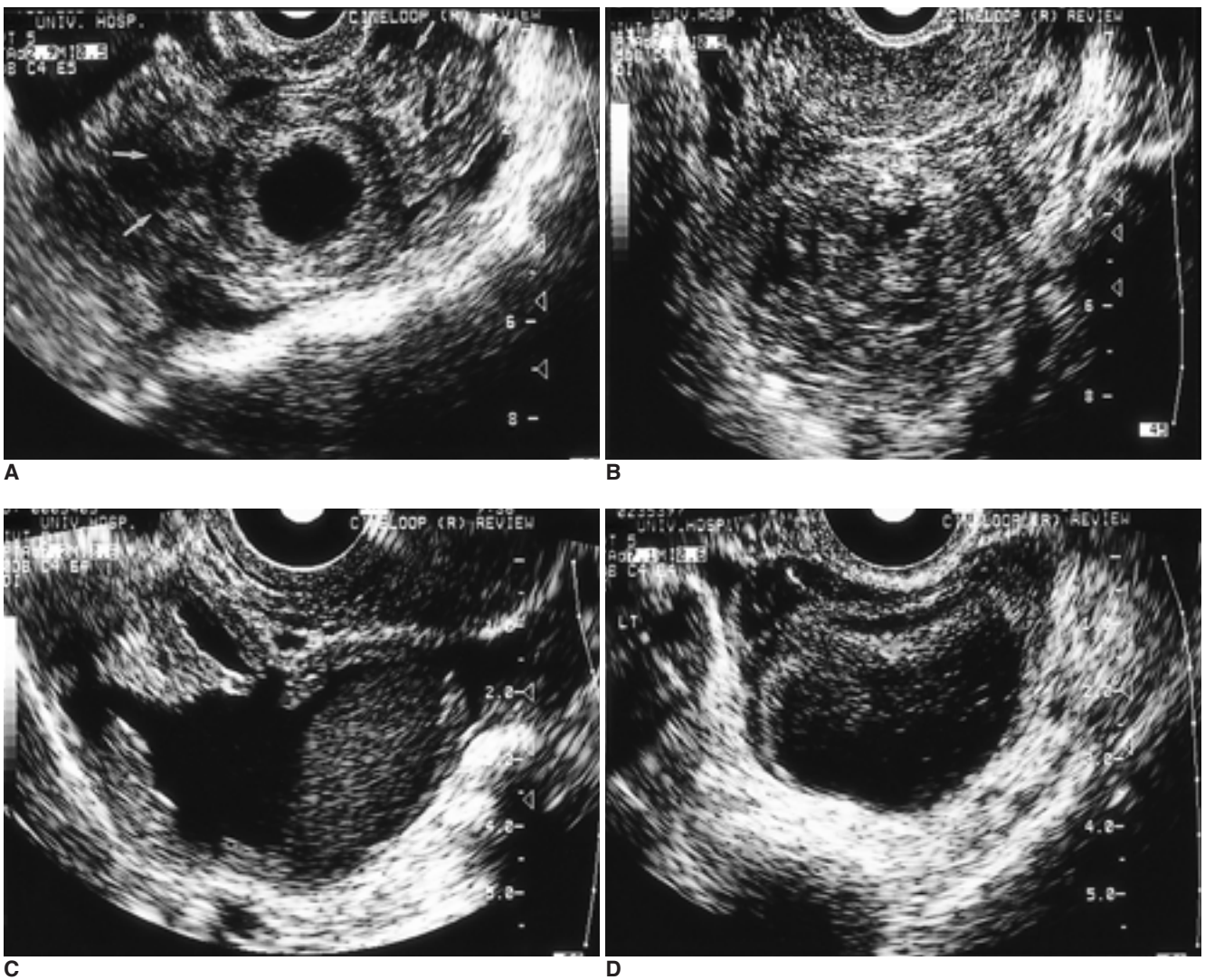


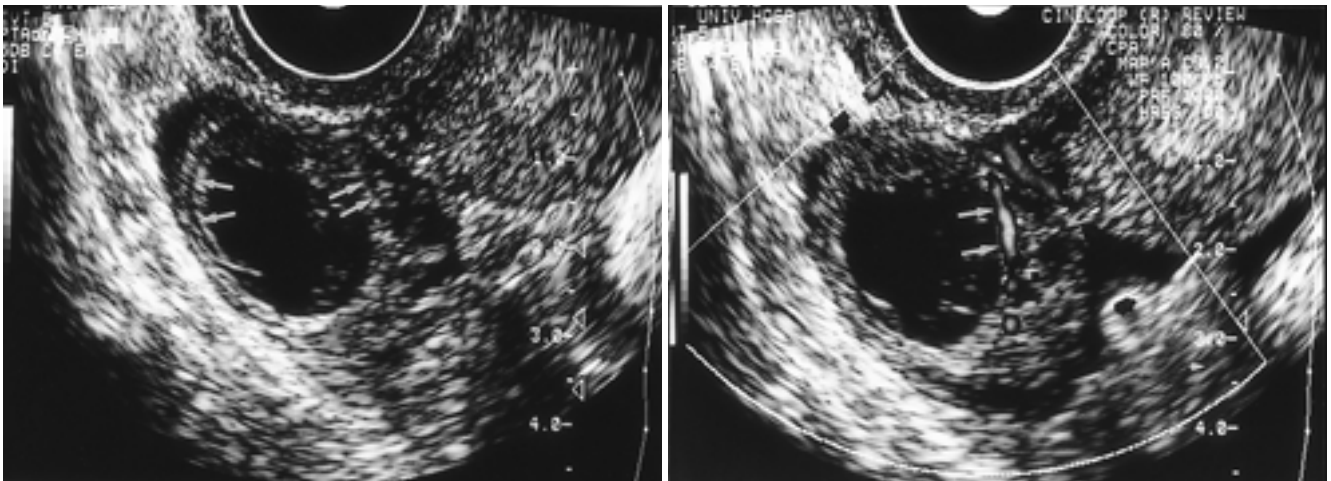
Fig. 1. Transvaginal ultrasonography (TVS) of ovarian hemorrhages. **A.** Longitudinal scan of TVS shows a 8.5 cm sized anechoic cystic mass in the right ovary with irregular margin (arrows). **B.** Transverse scan of TVS shows a 6 cm sized mixed echoic solid mass in the right adnexa. **C.** Transverse scan of TVS shows a 6.5 cm sized collapsed cystic mass with heterogeneous echogenicity and thick irregular wall in the left ovary, which was proved by laparoscopic treatment. **D.** Transverses scan of TVS shows a 5.7 cm sized cystic mass with heterogeneous internal echogenicity in the left adnexa.

average intensity 40 - 92 mW/cm², (pulse repetition frequency) 2 - 8 KHz, wall filter 50 - 100 Hz, 4 - 20 cm/sec, 2 - 3 mm, 30 - 60 (hemoglobin < 10.6 mg/dL) hCG (collapsed) 가 3 mm 3mm (halo sign) 가 arc), (spotty) 가 38 (27) (11) 5 14 (echogenic portion) . 11 (hemoglobin < 9 mg/dL) 24 , 6 (2 , 4), 5 6 (ruptured hemorrhagic corpus luteum cysts) 4 , (theca lutein cyst) (simple cyst) 1 . 21 41 29 . , 6 14~30 가 41 (84%), 31~42

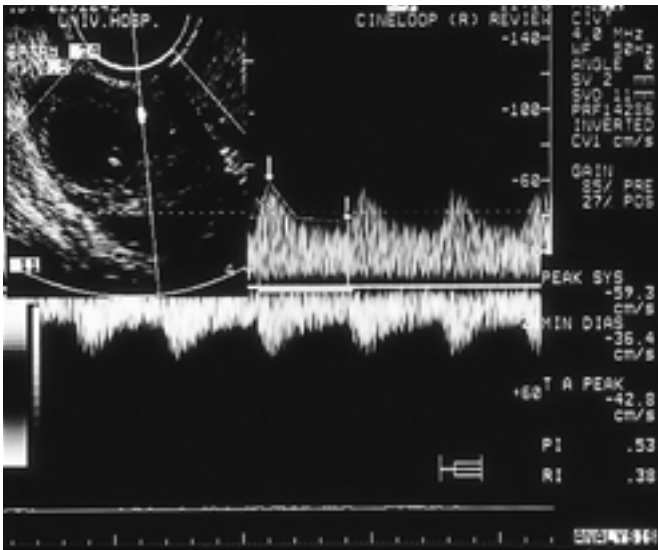
가 8 (16%) . 30 72 , 43 1 , 23 6 20 6 34 , 4 hCG 가 4 (8.2%) . 32 , 17 2.5~10.6 cm (5.1 cm) , 13 , 36 (Fig. 1A). 1.2~10.6 cm (3.95 cm) , 6 (Fig. 1B), 43 가 38 , 5 (Fig. 1C), 가 21 가 (Fig. 1D), 10 , 7 , 4 , 1 가 4 39 22 , 17 , 17 (Fig. 2A). 22 , 9 37 가 , 29 (Fig. 2B), 8

Table 1. Sonographic Findings of Ovarian Masses in Ovarian Hemorrhage

Findings	Case No.
Pattern and echogenicity of masses mass	
Solid, mixed echoic	6(12%)
Cystic, heterogeneous	21(43%)
Anechoic	10(20%)
Septated	7(15%)
Hyperechogenic	4(8%)
Hypoechoic	1(2%)
Shape of cystic masses(43)	
Round or oval	38(88%)
Collapsed	5(12%)
Wall of cystic masses(39)	
Irregular, thick	22(56%)
Smooth, thin	17(44%)
Halo	
Halo	17(35%)
Blood flow(37)	
Rim, arc	29(79%)
Spotty	8(21%)
Hemoperitoneum	
Small	18(37%)
Moderate	22(45%)
Large	9(18%)



A **B**



C

Fig. 2. A 21 year-old woman with ovarian hemorrhage in the right ovary.

A. Transverse scan of TVS demonstrates a 4cm sized cystic mass with heterogeneous echogenicity and a peripheral low-echoic halo (arrows) in the right ovary. **B.** Color flow imaging shows a rim-like blood flow pattern (arrows) which corresponds to halo in gray scale image. **C.** Spectral waveform reveals a low resistant blood flow (RI= 0.38).

.17 0.28~054 (0.41)

가 S-

[1].

, 6 43 24 1

가

가

5%

가

가
가 2 cm

[1], 4 (8.2%)

2 cm

hCG가

[4].

가

가 14-30 가가
. 32 (65%)

transmission)가
 가 (sound through -
 [5], 12%
 [6]. [1].
 [7],
 가 (strand)
 (echogenic) 가 (dermoid
 5.1 cm cyst)
 (hematosalpinx)
 (43, 88%) [2, 14].
 6 가
 (12%) 가
 2 가
 가 , 가 hCG
 가
 [8,9], 가 (43%)
 6 (12%)
 가
 (halo sign)
 (14/17, 82%). 가
 가 가
 0.28~0.54 (0.41)
 (bleeding artery)
 0.46~0.59 (0.51) [10].
 hCG 가
 가 (pseudogestation
 sac), 가
 hCG
 가 hCG
 가 (echogenic fluid)가
 [11, 12],
 가 (culdocentesis)
 [13].

- Hallatt JG, Steele CH, Snyder M. Ruptured corpus luteum with hemoperitoneum: a study of 173 surgical cases. *Am J Obstet Gynecol* 1984;149(1):5-9
- Okai T, Kobayashi K, Ryo E, Kagawa H, Kozuma S, Taketani Y. Transvaginal sonographic appearance of hemorrhagic functional ovarian cysts and their spontaneous regression. *Int J Gynaecol Obstet* 1994;44(1):47-52
- Raziel A, Ron-El R, Pansky M, Arieli S, Bukovsky I, Caspi E. Current management of ruptured corpus luteum. *Eur J Obstet Gynecol Reprod Biol* 1993;50(1):77-81
- McColgin SW, Williams LM, Sorrells TL, Morrison JC. Hemoperitoneum as a result of coital injury without associated vaginal injury. *Am J Obstet Gynecol* 1990;163:1503-1505
- Baltarowich OH, Kurtz AB, Pasto ME, Rifkin MD, Needleman L, Goldberg BB. The spectrum of sonographic findings in hemorrhagic ovarian cysts. *AJR* 1987;148:901-905
- Ryenolds T, Hill MC, Glassman LM. Sonography of hemorrhagic ovarian cysts. *JCU* 1986;14(6):449-453
- Hertzberg BS, Kliewer MA, Paulson EK. Ovarian cyst rupture causing hemoperitoneum: imaging features and the potential for misdiagnosis. *Abdom Imaging* 1999;24:304-308
- Wicks JD, Silver TM, Bree RL. Gray scale features of hematoma: an ultrasonic spectrum. *AJR* 1978;131:977-980
- Jeffrey RB, Laing FC. Echogenic clot: a useful sign of pelvic he-

- moperitoneum. *Radiology* 1982;145:139-141
10. Emoto M, Tamura R, Kawarabayashi T. Use of transvaginal color Doppler ultrasound in the diagnosis of ovarian bleeding: a report of 10 cases. *J Obstet Gynaecol Res* 1998;24(4):247-250
11. Wachsberg RH, Levine CD. Echogenic peritoneal fluid as an isolated sonographic finding: significance in patients at risk of ectopic pregnancy. *Clin Radiol* 1998;53(7):520-522
12. Sickler GK, Chen PC, Dubinsky TJ, Maklad N. Free echogenic pelvic fluid: correlation with hemoperitoneum. *J Ultrasound Med* 1998;17(7):431-435
13. Chen PC, Sickler GK, Dubinsky TJ, Maklad N, Jacobi RL, Weaver JE. Sonographic detection of echogenic fluid and correlation with culdocentesis in the evaluation of ectopic pregnancy. *AJR* 1998;170(5):1299-1302
14. Ishihara K, Nemoto Y. Sonographic appearance of hemorrhagic ovarian cyst with acute abdomen by transvaginal scan. *Nippon Ika Daigaku Zasshi* 1997;64(5):411-415

= Abstract =

Sonographic Findings of Ovarian Hemorrhage Presenting Acute Abdomen

Joo Sung Sun, M.D., Eun Ju Lee, M.D., Hae Jin Kang, M.D., Jung Ho Suh M.D.

Department of Diagnostic Radiology, Ajou University, School of Medicine

PURPOSE : To obtain the characteristic sonographic findings of ovarian hemorrhage and investigate the usefulness of ultrasonography in the diagnosis.

MATERIALS and METHODS : Forty-nine cases presenting acute abdomen diagnosed as ovarian hemorrhage by ultrasonography or surgicopathological confirmation. We observed the size and margin of the ovary, size, pattern, shape, wall and internal echogenicity of the masses and the amount of hemoperitoneum. We also performed a color Doppler study to evaluate the blood flow pattern and resistive index(RI).

RESULTS : The age of patients were between 21~41. Most symptoms occurred from days 14 to 30 of her menstrual cycle and were presented for less than 24 hours. Twenty patients had a history of intercourse shortly before the onset of the symptom. Thirty two cases involved the right ovary while the other 17 cases involved the left. All patients had a negative urine or serum hCG test except for 4 pregnant women. The size of the ovary was measured as mean 5.1 cm and marginal irregularity was noted in 36 cases. Mixed echoic solid masses were observed in 6 cases and variable echogenicity of cystic masses were seen in 43 cases. Maximal diameter of adnexal masses were measured as mean 3.95 cm. Internal echogenicity of cystic masses appeared as mainly heterogeneous(21). Twenty two cystic masses had a thick irregular wall and 17 had a thin smooth wall. Hypoechoic rim-like halo surrounding was noted in 17 cystic masses. 17 cases seemed to have a small amount of hemoperitoneum, a moderate amount in 22 cases and a large amount in 9 cases. The blood flow pattern of cystic masses showed a rim(29) and spotty(8) pattern in the color Doppler study. Measured RI was 0.41(mean).

CONCLUSION : Fertile women with the complaint of acute abdominal pain, who has the laboratory data of negative hCG test, ultrasonographic findings of enlargement of ovary with irregular margin, heterogeneous echoic cystic mass, peripheral halo surrounding the mass, hemoperitoneum and low resistance index of peripheral blood flow of the mass may be useful for the diagnosis of ovarian hemorrhage and differentiating it from other causes presenting acute abdomen.

Address for reprints : Eun Ju Lee, M.D., Department of Diagnostic Radiology, Ajou University, School of Medicine
San 5, Wonchon-dong, Paldalgu, Suwon 442-749, Korea.
Tel. 82-331-219-5856 Fax. 82-331-219-5862