

가 가
130 147
(1) 85 97
가 (2) 10 10 , 가 (3) 35 40
(echogenic wall foci),
: 1 가 (63),
(76) 10 cm 가 (86%),
3 mm 가 (63 , 65%) 3 mm 35%
(echogenic wall foci),
(3),
(15),
(85%) (79%)

(endometriosis) 가
(functional endometrial glands and stroma) (microscopic endometriotic endometrioma)
가 implants)
(1, 2).
5 - 10% 20 - 40%,
4 - 65% (1 - 6). 가

가

가

4

34 (19 - 62) .

ATL (Advanced Technology

Laboratories, Bothell, WA) HDI 5000 3.5 - 5 MHz

7 - 10 MHz

32

(, 1) 85 97 ,

, 68

30

(가 , 2) 10 10 ,

3

(가 , 3) 35

2

40 , 130 147

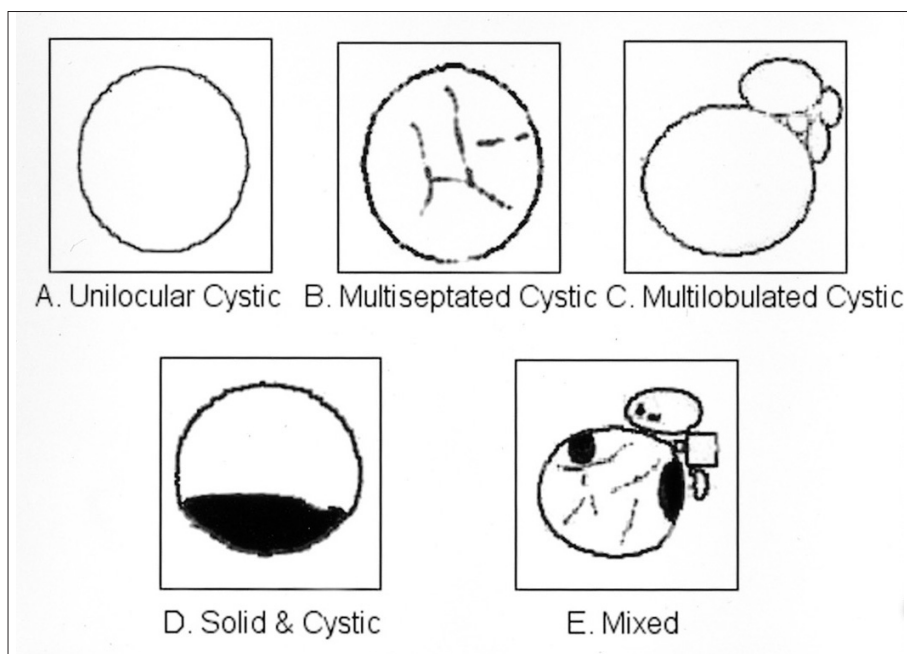


Fig. 1. US classification according to morphology.



Fig. 2. Endometrioma of the right ovary in a 30-year-old woman with typical features. Transvaginal ultrasonogram shows a thin-walled, unilocular cystic lesion with homogeneous fine low-level internal echoes.



Fig. 3. Endometrioma in a 28-year-old woman. Transabdominal ultrasonogram shows a multiseptated cystic mass in the right ovary. Note variable internal echogenicity of different locules (arrows).

(Fig. 1A, 2), (Fig. 1B, 3), (Fig. 1C, 4),
(Fig. 1D, 5), (Fig. 1E, 6)
(Fig. 2, 7A),
(Fig. 7B), (Fig. 7C), (Fig. 6, 7D)
(7).

(1) 가
(63 , 65%)
(19 , 20%) (Table 1), 가



Fig. 4. Endometrioma of the left ovary in a 43-year-old woman. Transvaginal ultrasonogram shows a lobulated mass. The echogenicities of each locules are different.

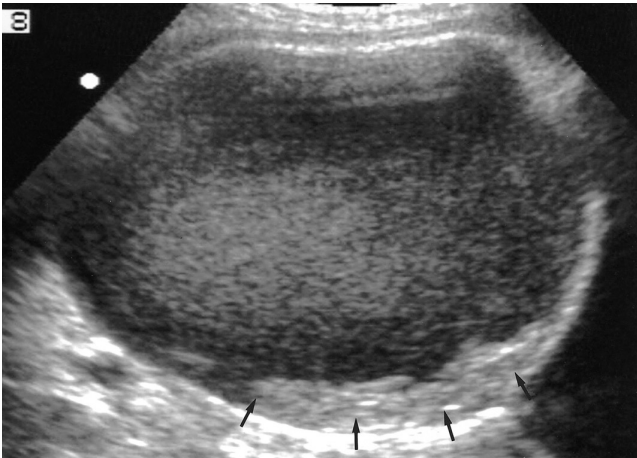


Fig. 5. Endometrioma of the left ovary in a 22-year-old woman. Longitudinal transabdominal ultrasonogram shows diffuse fine internal echoes and solid component in posterior wall (arrows).

2). 10 cm (76 , 79%) (Table
가 83 (86%)
3 mm 가 63
(65%) 31 ,
11 (11%)가
16 (16%) ,
8 (8%) (Table 3).
가 (group II) 3 ,
2 ,
1 . 가 (group
15 가



Fig. 6. Endometrioma of the right ovary in a 25-year-old woman. Transvaginal ultrasonogram demonstrates partly cystic and partly solid mass with internal septations and complex internal echo.

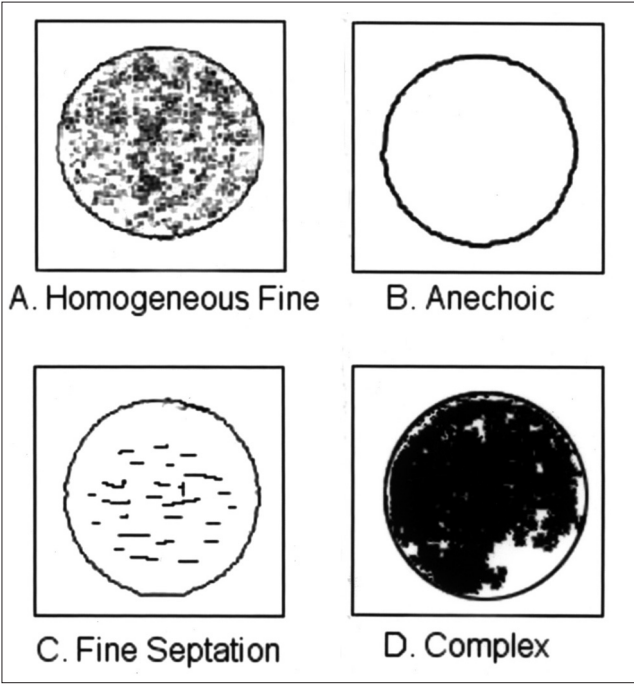


Fig. 7. US classification according to internal echo.

12 , 8 , 3 ,
1 .

가

. 가

가

가

가

(Table 3).

Table 1. Results According to Sonographic Morphologic Classifications in Each Groups

Type of Morphology	Group I (n = 97)	Group II (n = 10)	Group III (n = 40)
Unilocular	63 (65)	5 (50)	16 (40)
Multiseptated	19 (20)	2 (20)	12 (30)
Multilobulated	2 (2)	1 (10)	2 (5)
Solid & Cystic	4 (4)	2 (20)	4 (10)
Mixed	9 (9)		6 (15)

Numbers in parentheses are percentages.

Table 2. Results According to Sonographic Internal Echo in Each Groups

Type of Internal Echo	Group I (n = 97)	Group II (n = 10)	Group III (n = 40)
Homogeneous Fine	76 (79)	9 (90)	22 (55)
Anechoic	10 (10)	1 (10)	5 (12.5)
Fine Septation	2 (2)	5 (12.5)	
Complex	9 (9)		8 (20)

Numbers in parentheses are percentages.



Fig. 8. Hemorrhagic cyst of the right ovary in a 36-year-old woman.

Longitudinal transvaginal ultrasonogram shows diffuse fine internal echo and thin internal septation (arrow). It was misdiagnosed as endometrioma by reviewer.

가

82 - 89%

90 - 98%

가

(8 - 11).

, Fried (12) 51

3가

가 30%,

62%,

8%

(debri)

Table 3. Results According to Other Sonographic Findings in Each Groups

Sonographic Findings	Group I (n = 97)	Group II (n = 10)	Group III (n = 40)
Size(cm)			
10	83 (86)	8 (80)	35 (87.5)
> 10	14 (14)	2 (20)	5 (12.5)
Wall Thickness(mm)			
3	63 (65)	7 (70)	35 (87.5)
> 3	34 (35)	3 (30)	5 (12.5)
Septation	31 (32)	2 (20)	19 (48)
Wall Nodularity	11 (11)	2 (20)	5 (12.5)
Echogenic Wall Foci	16 (16)	3 (30)	1 (3)
Solid Area	8 (8)	2 (20)	4 (10)

Numbers in parentheses are percentages.



Fig. 9. Endometrioma of the right ovary in a 49-year-old woman. Transvaginal ultrasonogram shows large echogenic areas (asterisk) in a part of cystic mass. It was misdiagnosed as teratoma. Note the focal echogenic focus in the wall of the cyst (arrow).

5. Olive DL, Schwartz LB. Endometriosis. *N Engl J Med* 1993;328:1759-1769
6. Lu PY, Ory SJ. Endometriosis: current management. *Mayo Clin Proc* 1995;70:453-463
7. Patel MD, Feldstein VA, Chen DC, Lipson SD, Filly RA. Endometriomas: diagnostic performance of US. *Radiology* 1999;210:739-745
8. Volpi E, De Grandis T, Zuccaro G, La Vista A, Sismondi P. Role of transvaginal sonography in the detection of endometriomata. *J Clin Ultrasound* 1995;23:163-167
9. Guerriero S, Mais V, Ajossa S, Paoletti AM, Angiolucci M, Melis GB. Transvaginal ultrasonography combined with CA-125 plasma levels in the diagnosis of endometrioma. *Fertil Steril* 1996;65:293-298
10. Alcazar JL, Laparte C, Jurado M, Lopez-Garcia G. The role of transvaginal ultrasonography combined with color velocity imaging and pulsed Doppler in the diagnosis of endometrioma. *Fertil Steril* 1997;67:487-491
11. Mais V, Guerriero S, Ajossa S, Angiolucci M, Paoletti AM, Melis GB. The efficiency of transvaginal ultrasonography in the diagnosis of endometrioma. *Fertil Steril* 1993;60:776-780
12. Fried AM, Rhodes RA, Morehouse IR. Endometrioma: analysis and sonographic classification of 51 documented cases. *South Med J* 1993;86:297-301
13. 1997;16:355-361
14. Kupfer MC, Schwimer SR, Lebovic J. Transvaginal sonographic appearance of endometriomata: spectrum of findings. *J Ultrasound Med* 1992;11:129-133
15. Fleisher AC, Entman SS. *Sonographic evaluation of pelvic masses with transabdominal and/or transvaginal sonography*. In: Fleischer AC, ed. *Sonography in obstetrics & gynecology: principles & practice*. 5th ed. New York: Appleton & Lange, 1996;767-790

The Ultrasonographic Features of Endometriomas: Morphologic Analysis and Differential Diagnosis¹

Mi Sung Kim, M.D., Cheol Min Park, M.D.², Bo-hyun Kim, M.D.³, Chan Sup Park, M.D.,
Soon Young Song, M.D., Eun Ja Lee, M.D., No Hyuck Park, M.D., Chan Kyo Kim, M.D.³

¹Department of Diagnostic Radiology, College of Medicine, Kwandong University

²Department of Diagnostic Radiology, College of Medicine, Korea University

³Department of Radiology, College of Medicine, Sung Kyun Kwan University

Purpose: To analyze the sonographic, morphologic, and internal echo patterns of endometriomas, and thus determine which ultrasonographic (US) findings assist diagnosis.

Materials and Methods: One hundred and forty-seven cases of pathologically proven adnexal masses in 130 women were divided into three groups: group I, in which endometriomas were diagnosed at both preoperative US and surgery (true positive) ($n=97$); group II, in which endometriomas were misdiagnosed at preoperative US, and were confirmed after surgery to be other pathologic entities (false positive) ($n=10$); group III, in which other adnexal masses were misdiagnosed at preoperative US, but were proven after surgery to be endometriomas (false negative) ($n=40$). The US findings in these cases were retrospectively reviewed in terms of (a) morphologic type: unilocular, multiseptated, multilobulated, solid and cystic, or mixed; (b) internal echo pattern: homogeneous fine, anechoic, fine septation, or complex; (c) size; (d) wall thickness; (e) the presence or absence of septation; (f) wall nodularity; (g) echogenic wall foci; and (h) a solid area.

Results: In group I, the most common morphological type was unilocular cyst ($n=63$; 65%). In lesions most commonly emitted homogeneous fine echoes ($n=76$; 78%). In this group, most masses (86%) were less than 10 cm in diameter and the wall thickness in 65% of cases was less than 3 mm. Additionally, internal septation, wall nodularity, focal echogenic wall foci, and a solid area were observed at US. Group II, cases were pathologically confirmed as mucinous cystadenoma ($n=3$), mucinous cystadenoma with borderline malignancy, hemorrhagic cyst, functional cyst, endometrioid carcinoma, and hematoma. In group III, cases were misdiagnosed as cystadenoma ($n=15$), hemorrhagic cyst, teratoma, ovarian cancer, functional cyst and ectopic pregnancy at preoperative US. There were no significant differences in size or wall thickness between groups II and III, and group I. At US, groups II and III also showed internal septation, wall nodularity, focal echogenic wall foci, and a solid area, all of which were also apparent in group I.

Conclusion: The US findings of endometriomas vary: the most common is homogeneous fine internal echoes (79%), found in 85% of unilocular or multiseptated cysts. Their appearance may also be atypical, however: namely solid and cystic or mixed type, with diverse internal echogenicity, and such masses should be differentiated from other adnexal masses such as cystic neoplasm, teratoma, hemorrhagic cyst, functional cyst and ovarian cancer.

Index words : Cyst

Endometriosis

Ovary

Ovary, US

Address reprint requests to : Mi Sung Kim, M.D., Department of Diagnostic Radiology, College of Medicine, Kwandong University,
697-24 Hwajung-dong, Dukyang-gu, Koyang, Kyunggi 412-270, Korea.
Tel. 82-31-810-7164 Fax. 82-31-962-4902 E-mail: misung@kwandong.ac.kr