

## Clinical Experiences of Fetal Ovarian Cyst: Diagnosis and Consequence

Ovarian cysts are the most frequent, prenatally diagnosed intra-abdominal cysts. Fetal ovarian cyst often presents complication such as torsion and seems to be an indication for surgical intervention. In this study, we reviewed pre- and post-natal medical records and ultrasonography of 17 fetuses that were diagnosed with ovarian cysts. In a total of 17 cases, postnatal surgery was performed in 7 infants. Of these cases, four cases of ovarian cyst torsion were confirmed. In the remaining 10 fetuses, one case regressed completely during pregnancy, and the other nine cases including two complex cysts resolve spontaneously after birth. Postnatal symptomatic cysts or cysts with a diameter greater than 5 cm that do not regress or enlarge should be treated, but uncomplicated asymptomatic cysts less than 5 cm in diameter should only be observed and reassessed by serial ultrasonography. If they regress spontaneously, no surgical intervention is necessary independent of their sonographic findings.

Key Words : Ovarian Cysts; Ultrasonography, Prenatal; Abnormalities

Dong Wook Kwak, Yong Seok Sohn,  
Sei Kwang Kim, In Kyu Kim,  
Yong Won Park, Young Han Kim

Department of Obstetrics and Gynecology, Yonsei  
University College of Medicine, Seoul, Korea

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### Address for correspondence

Young Han Kim, M.D.  
Department of Obstetrics and Gynecology, Yonsei  
University College of Medicine, 134 Sinchon-dong,  
Seodaemun-gu, Seoul 120-752, Korea  
Tel : +82.2-2228-2243, Fax : +82.2-313-8357  
E-mail : yhkim522@yumc.yonsei.ac.kr

### INTRODUCTION

In female newborns, ovarian cysts are the most frequent type of abdominal tumor (1). The incidence of ovarian cysts has been estimated at more than 30% (this estimate is based on an investigation of stillborns or infants who died within 28 days of birth) (2). In the most of cases, the size of ovarian cyst is small, seeming to resolve spontaneously and are of no clinical significance. However ovarian cyst often presents complication such as torsion and seems to be an indication for surgical intervention. According to the common use of antenatal ultrasonography, the incidence of ovarian cysts have been increased both in utero and in the female newborn. There is some debate about the appropriate treatment of fetal ovarian cysts. Here we presented 17 clinical cases and the relation between pre- and post-natal sonographic findings and post-natal course of fetal ovarian cysts.

### MATERIALS AND METHODS

Between November 1990 and May 2005, 17 cases of fetal ovarian cysts were diagnosed at the Yonsei University College of Medicine, Seoul, Korea. We retrospectively analysed pre- and post-natal medical records and ultrasonography of 17 infants. Prenatal transabdominal ultrasound scans were performed and the maximum diameter of all cysts was measured. When completely anechoic and with a thin wall, the cyst was defined simple (3). Cysts, which presented them-

selves echogenic, with a fluid-debris level, a retraction clot or a septation were defined complex (Fig. 1, 3) (3-6). The data was analyzed with respect to the age of gestation at the point of diagnosis, sonographic findings, accompanying malformations, and postnatal outcome. With regard to postnatal outcome, we were interested in confirming the prenatal diagnosis, as well as frequency of surgery, the indications leading to surgery, the surgical methods employed and pathologic findings. In post-operative cases, the patients were brought in for follow up at 1, 4 months after surgery and rest of the cases, follow up was done at 1, 4, 10, 16, 24 months with transabdominal sonography. The diagnostic status was 'suspicion of ovarian cyst' as other differential diagnosis could not be completely excluded.

### RESULTS

In a total of 17 cases, 10 fetuses (60%) had an ovarian cyst on the right side, 5 (29%) on the left side, and 2 (11%) had bilateral cysts. The mean gestational age at the time of initial diagnosis was 33.5 weeks (range 30-38 weeks). Maternal diabetes, fetal hypothyroidism or accompanying malformation was not observed in all cases.

Pre- and postnatal course of the cases with postnatal surgery (n=7)

The mean time of diagnosis was 34.4 (range, 30-37) weeks'

Table 1. Prenatally diagnosed ovarian cysts treated by surgery

Case No.	Weeks at Dx	Prenatal US		Postnatal US		Surgical indication	Operation	Pathology
		Size (cm)	Appearance	Size (cm)	Appearance			
1*	30	4.3	Simple	4.0	Complex	Suspicion of intracystic bleeding	Oophorectomy	Follicular cyst
2	35	4.9	Simple	6.5	Complex	Suspicion of torsion & Large size	Oophorectomy	Follicular cyst with torsion
3	35	5.3	Complex	7.1	Complex	Suspicion of torsion & Large size	Oophorectomy	Follicular cyst with torsion
4	34	4.0	Complex	5.0	Complex	Suspicion of torsion	Oophorectomy	Follicular cyst with torsion
5	36	5.0	Simple	5.0	Complex	Suspicion of torsion	Oophorectomy	Follicular cyst with torsion
6	37	4.6	Complex	4.3	Complex	Suspicion of intracystic bleeding	Cystectomy	Serous cyst-adenoma
7	34	7.8	Simple	7.0	Simple	Large size	Cystectomy	Follicular cyst

\*Case 1, Aspiration of ovarian cyst was performed prenatally; Dx, diagnosis; US, ultrasonography.



Fig. 1. Complex ovarian cyst: prenatal sonography of case 4 at 34 weeks.

gestation. For seven fetal ovarian cysts, which had a mean diameter of  $5.1 \pm 1.3$  cm at the time of diagnosis, postnatal surgical treatment was undertaken (Table 1, cases 1-7) between the 1st day and 3rd week after birth. A cystectomy with preservation of the ovary was performed in 2 cases (28%) and oophorectomy was done in 5 cases (72%). The histological result was follicular cyst in 6 cases, and serous cystadenoma in one case. Ovarian cyst torsion was confirmed in four cases (Table 1, Fig. 1).

In the case one,  $4.3 \times 4.1$  cm sized simple cyst was seen at prenatal sonography, and prenatal ovarian aspiration was performed. However,  $4.0 \times 3.0$  cm sized complex cyst was reformed. Oophorectomy was undertaken and its operative finding was follicular cyst with hemorrhage.

#### Pre- and postnatal course of the cases with spontaneous resolution (n=10)

The mean time of diagnosis was 32.9 (range, 30-38) weeks'

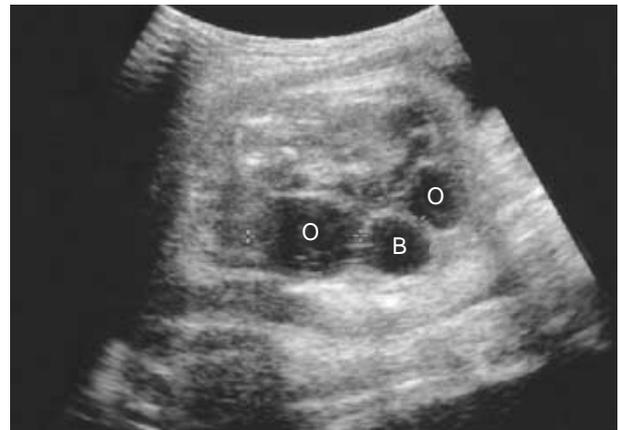


Fig. 2. Bilateral ovarian cyst: prenatal sonography at 33 weeks of case 14 which are spontaneously regression at 4 month after birth. B, bladder; O, ovary.

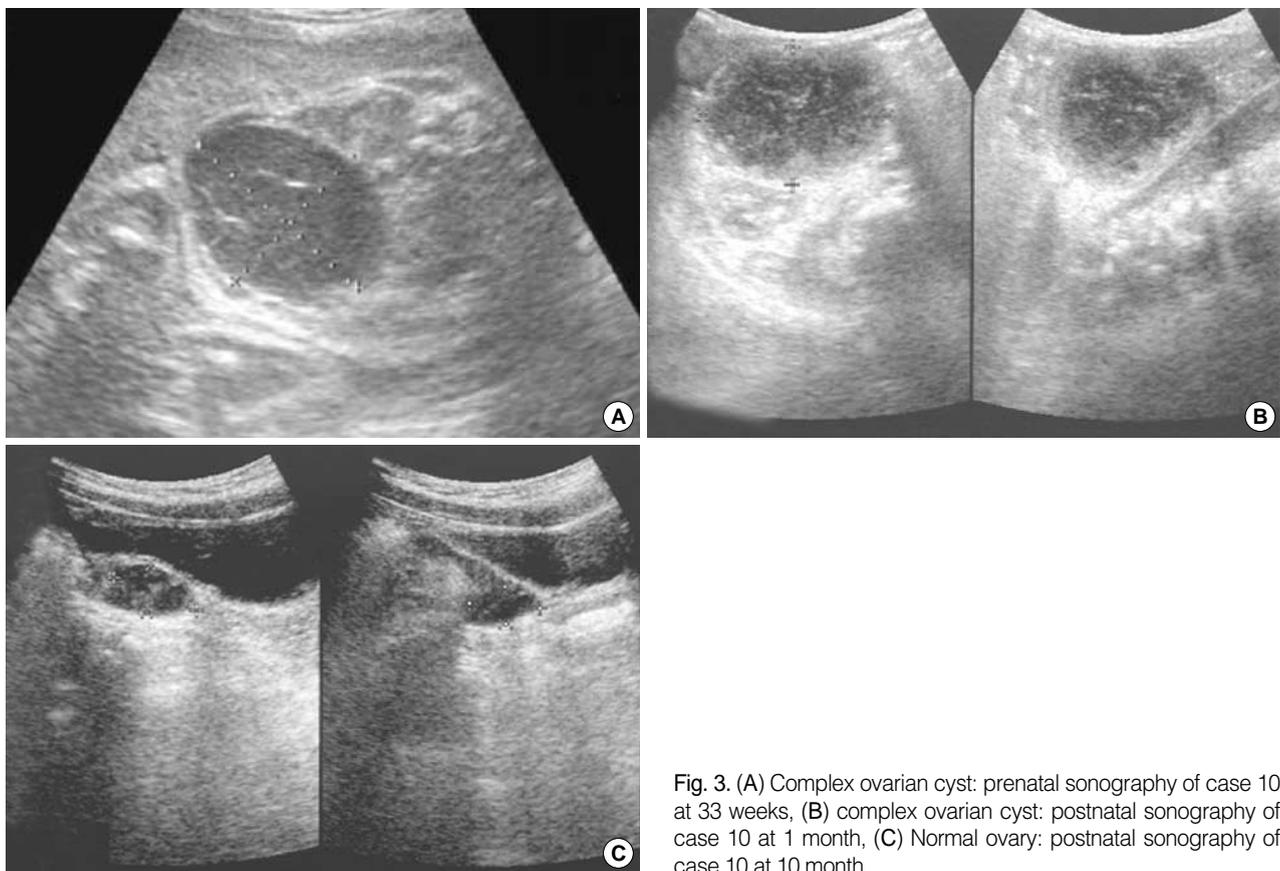
gestation. The mean cyst diameter was  $4.6 \pm 1.2$  cm. Eight cases were simple cyst and two were complex. One cyst regressed completely during pregnancy, the other nine cases including complex cyst regressed spontaneous resolution after birth. The time of postnatal resolution ranged from 1 month to 16 months (Table 2, Fig. 2-4).

## DISCUSSION

Ovarian cysts are the most frequent, prenatally diagnosed intra-abdominal cysts (1). The etiology of fetal ovarian cysts is still unknown, but hormonal stimulation is generally considered to be responsible for the disease (fetal gonadotrophins, maternal estrogen and placental human chorionic gonadotrophin) (1). The association of fetal ovarian cysts with maternal diabetes or fetal hypothyroidism has been described (7, 8). However, we observed no such diseases in our patients.

**Table 2.** Pre- and postnatally diagnosed ovarian cysts with spontaneous regression

Case No.	Week at Dx	Prenatal US		Postnatal US		Clinical course
		Size (cm)	Appearance	Size (cm)	Appearance	
8	34	3.3	Simple	2.0	Simple	Lost to follow up
9	31	5.7	Simple	1.0	Simple	Spontaneous regression within 1 month
10	38	6.4	Complex	3.8	Complex	Spontaneous regression within 10 months
11	33	4.0	Simple (bilateral)	4.5	Simple	Spontaneous regression within 10 months
12	30	5.6	Simple	Not visible		Spontaneous regression during pregnancy
13	31	3.3	Simple	2.8	Simple	Spontaneous regression within 10 months
14	33	3.8	Simple (bilateral)	1.4	Simple	Spontaneous regression within 4 months
15	32	5.8	Simple	4.7	Simple	Spontaneous regression within 4 months
16	30	4.0	Complex	4.8	Complex	Spontaneous regression within 16 months
17	37	3.9	Simple	2.5	Simple	Spontaneous regression within 4 months



**Fig. 3.** (A) Complex ovarian cyst: prenatal sonography of case 10 at 33 weeks, (B) complex ovarian cyst: postnatal sonography of case 10 at 1 month, (C) Normal ovary: postnatal sonography of case 10 at 10 month.

When a cystic abdominal mass is diagnosed in the female fetus, differential diagnosis should be established for mesenteric and urachal cysts, intestinal duplication anomalies, cystic teratoma, and intestinal obstruction (9-11). A differential diagnosis between ovarian cysts and one of these conditions cannot be made with intrauterine sonography. Because ovarian cysts are almost always functional and benign tumors, the question of malignancy is not important in prenatal diagnosis (12). Also accompanying malformations are extremely rare. As a result, the question of emergence and nature of any complications, such as torsion, plays a significant role, as these

can be an indication for surgical intervention in what would otherwise be an instance of an inconspicuous cyst. In addition, polyhydramnios or ascites (the result of transudation), as a result of partial obstruction of the gastrointestinal tract, may be present (1, 13, 14). However we observed no such complications or accompanying malformation in our patients.

Once the prenatal diagnosis of a probable ovarian cyst has been made, it is most important to perform serial ultrasound examinations to detect any structural change (size, appearance) in the mass or complications (hydramnios, ascites, torsion). A normal ovarian cyst has a smooth border and is without

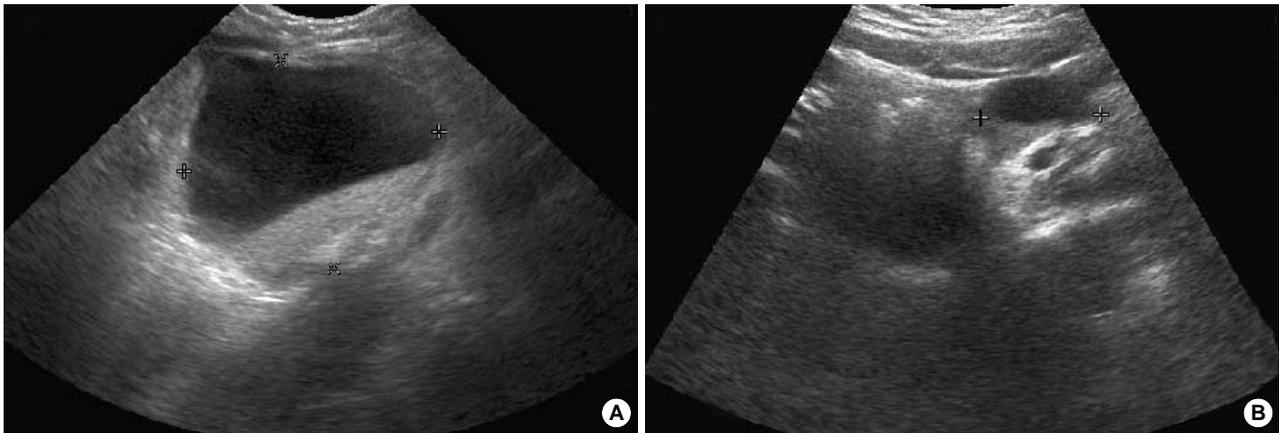


Fig. 4. (A) Complex ovarian cyst: postnatal sonography of case 16 at 1 month, (B) Complex ovarian cyst: postnatal sonography of case 16 at 10 month.

an internal structure. If there is intracystic bleeding or torsion, the cyst acquires a heterogeneous structure, in part with internal septa. Bleeding within an ovarian cyst usually arises in connection with torsion. For that reason, postnatal surgery for all fetal ovarian cysts which are complex, irrespective of their size, has been recommended (15, 16). Sonographic findings of adnexal torsion are not specific (17). If the cyst did not induce the symptoms, no intervention was necessary, because the cyst regressed spontaneously (18, 19). We observed spontaneous resolution in both cases complex ovarian cysts which were managed conservatively even when the size increased at birth.

As to uncomplicated cysts, the data describe a high risk of torsion for cysts with a diameter greater than 5 cm (15, 20). Aspiration of the cyst to reduce its size (and so that one can investigate its contents) can be performed prenatally. However, the value of cyst aspiration is a point of controversy. Ultrasonic guided puncture may not only prevent torsion, but it may also eliminate the need for newborn laparotomy (1, 10, 20). However, it can result in intracystic bleeding and lead to subsequent diagnostic difficulties (2). Sometimes, the hole produced by aspiration closes again and the cyst reforms. In our patient, one case of cyst aspiration was performed successfully, but oophorectomy was done after birth because the cyst with internal septum had reformed. In addition, there is a small risk of infection of the amniotic cavity and premature labor. Aspiration of the cysts is recommended only if it is huge enough to impair spontaneous delivery or cause distension of the fetal abdomen.

In summary, an ovarian cyst is not a life-threatening condition, so that further diagnostic procedures can be carried out in the first few days of life. It is natural that postnatal symptomatic cysts demand intervention. Postnatally asymptomatic fetal ovarian cysts smaller than 5 cm in diameter, even exceeding 5 cm at initial diagnosis, with tendency to regress should be closely monitored pre- and postnatally until spontaneous resolution. If they regress spontaneously, no sur-

gical intervention is necessary independent of their sonographic appearances.

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