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## Fetal and neonatal ovarian cysts: What's their real meaning?

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### Summary

**Purpose of investigation:** The management of fetal ovarian cysts is still controversial despite the improvement in prenatal diagnosis with ultrasonography. Some studies suggest an aggressive management, while others opt for a conservative one. The prognosis of the majority of congenital ovarian cysts is good since they have a benign origin. Sometimes, however, complications such as torsion or rupture can occur which often require surgical intervention after delivery. In this paper we report our experience and a brief review of the literature.

**Methods:** The authors report on 32 pregnant women in whom ultrasonography revealed the presence of an echo-rare or echo-free area in the fetal abdomen suggestive of an ovarian cyst. All women were followed-up during pregnancy with serial ultrasound examinations. Postnatal ultrasound controls confirmed the prenatal diagnosis in all cases. The diameters of the cysts ranged from 2.7 to 7.5 cm.

**Results:** In the 16 cases (50%) in which the cyst diameter was below 4 cm, periodic ultrasound examinations revealed a tendency towards spontaneous regression of the cysts. In the other 16 cases (50%) in which the cyst diameter exceeded 4 cm, cystectomy was necessary due to subsequent complications (torsion in 6 cases, 37.5%, and intracystic hemorrhage in the other 10, 62.5%).

**Conclusion:** The most appropriate clinical approach in the management of benign fetoneonatal ovarian cysts is to adopt a wait-and-see policy, assessing the course of the condition by means of periodic ultrasound monitoring.

Only when tumefactions measure more than 4 cm in diameter with attendant complications is surgical therapy indicated. Without complications, however, aspiration of the cystic contents is possible even in ovarian cysts exceeding 4 cm in diameter.

**Key words:** Fetal ovarian cysts; Prenatal diagnosis; Ultrasonography; Management.

### Introduction

The widespread use of pre- and postnatal ultrasonography has enabled physicians to detect pathological features which, in the absence of clinical symptomatology, used to pass unnoticed or were detected later, only when complications arose.

Recently, with the introduction of routine ultrasound examinations in prenatal diagnosis, the individuation of fetal ovarian cysts has increased [1, 2].

The diagnosis of fetal ovarian cysts is based on three ultrasonographic criteria [3]:

1. presence of a cystic structure of regular size which is located in the lower and lateral side of the abdomen;
2. integrity of urinary and gastrointestinal tracts;
3. female sex of the fetus.

The evolution of such pathology in the uterus is variable: cysts can grow or decrease and, although rare, torsion with endocystic hemorrhage or breaking is possible. Moreover, the larger ones can cause compression of the organs, such as the urinary and gastrointestinal tracts, or can provoke respiratory distress due to diaphragmatic lifting [1].

Ovarian torsion causing the loss of an ovary is the most common complication of fetal ovarian cysts and occurs more frequently before than after birth. Thus, treatment of fetal simple ovarian cysts should be performed antenatally; however, criteria for prenatal decompression still need to be evaluated previous study showed that large

simple cysts have a poor outcome, whereas preliminary attempts of their "in utero" aspiration were all successful and uneventful [4].

Review of the clinical attitude towards benign ovarian cysts warrants even greater attention in those cases in which this type of pathology is encountered in the fetus and/or newborn.

As for delivery, mechanical dystocia is not a frequent occurrence like a cyst breaking at the moment of birth. Spontaneous resolution of ovarian cysts ranges from one to eight months of post-natal life [1].

The aim of the present study was to highlight the problems posed by prenatal diagnoses of benign ovarian cysts in order to outline, on the basis of our experience, the most appropriate therapeutic approach to be adopted in such cases.

### Materials and Methods

The patient sample which came under our observation between January 1996 and December 2003 consisted of 32 pregnant women. In these patients ultrasonography had revealed the presence of an echo-rare or echo-free area in the fetal abdomen suggestive of an ovarian cyst.

The ultrasonographic aspect of such abdominal masses is suggestive of a fetal ovarian cyst in a female fetus with normal anatomy of the gastrointestinal and urinary tracts.

The diagnosis was made using real time, high resolution scanning with a 3.5 MHz convex probe and adaptor.

Evaluation of the persistence of the cystic formations called for periodic ultrasound examination up to delivery. The evolution of the disease, indeed, is extremely variable and serial

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ultrasound examinations performed every 15 days are suggested by most authors as a useful prognostic index, as they can allow us to detect any structural change of the mass.

### Results

Gestational age at diagnosis ranged between 32 and 37 weeks with a mean gestational age of 34 weeks. In all cases, pregnancy resulted in spontaneous birth at term.

Prenatal evaluation of the amount of amniotic fluid showed normal values in 20 cases (62.6%), oligohydramnios in six cases (18.7%), and polyhydramnios in six cases (18.7%).

Placental weight ranged from 470 to 620 g, corresponding to 15-20% of neonatal birth weight.

At birth all the 32 newborn infants were in good clinical condition and the right weight for gestational age. None of them presented associated neonatal pathologies. Mean birth weight was 2950 g and mean Apgar scores at one and five minutes were 9. In ten cases (31.2%) palpation revealed the presence of a painless, mobile mass of firm yet elastic consistency in the lower abdominal quadrants.

None of the cystic formations presented septations or echo-refractive features. Cyst diameters ranged from 2.7 to 7.5 cm. Twenty of the cysts (62.5%) were detected in the left ovary, and 12 (37.5%) in the right ovary. In ten fetuses (31.2%), the contralateral ovary presented a grossly microcystic structure. The uterus, which was visualized in all cases, was characterized by the presence of a highly echo-dense line of vacuity accompanied by thickening and early maturation phenomena.

In 16 cases (50%) the cysts measured more than 4 cm in diameter. Cystectomy was necessary in these neonates owing to complications occurring immediately after delivery, namely torsion in six cases (37.5%) and intracystic hemorrhage in ten cases (62.5%), respectively.

In the other 16 cases (50%) the cyst diameters were less than 4 cm; periodic ultrasound monitoring was performed in these patients and revealed a spontaneous regression of all 16 cystic formations. In six cases (37.5%) the cystic formation, initially measuring 3 cm in diameter, disappeared spontaneously within the second month of life, while the other ten cysts (62.5%) resolved spontaneously within six months after birth.

Postnatal ultrasound examinations confirmed the prenatal ultrasound diagnosis in all cases. The evaluation in the postnatal period was made with three pelvic ultrasonographic examinations after 15 days, 45 days, and five months from birth. Throughout the postnatal follow-up period, ranging from one to five years, clinical conditions were found to be normal in all the infants.

### Discussion

Prenatal sonography uncovers many fetal ovarian masses that previously would have gone unrecognized. This challenges clinicians to learn the natural history of these asymptomatic lesions in order to provide the best care postnatally. Spontaneous resolution of simple ovarian cysts is expected by about six months of age, which is attributed to predicted changes in the postnatal hormonal milieu. After birth, levels of human chorionic gonadotropin

and estrogen plummet. Follicle-stimulating hormone and luteinizing hormone rise until about three months of age and then fall as the "gonadostat" matures [5].

Thus, early ovarian cysts can be classified in two groups:

1. the so-called follicular cysts, originating as a response to stimuli produced by chorionic gonadotropin affecting the fetal ovary during pregnancy;

2. luteinic cysts, in which the etiopathogenesis is represented by maternal diseases such as diabetes, Rh alloimmunization and toxemia during pregnancy [6, 7].

The role of prematurity as a factor predisposing to cystic disease of the neonatal ovary is controversial. Nonetheless, a more pronounced sensitivity of the ovaries to chorionic gonadotropin has been demonstrated in premature newborns [8].

The logical consequence of the role of chorionic gonadotropin in the pathogenesis of fetoneonatal ovarian cysts is that such formations should be regarded as transitory; when the stimulus ceases, cyst growth is interrupted. This is the conclusion reached by authors [6, 9] who have demonstrated spontaneous resolution of neonatal ovarian cysts within four months from birth and with whom our results are in agreement.

Other interesting issues are the questions of bilateralism and neoplastic transformation of the cysts. In our patient sample bilateralism was encountered in the form of microcysts in the contralateral ovary in five patients.

With regards to neoplastic transformation, it occurs in 9.6% of girls in pre-menarchal age [10]. We should stress that the association of fluid or echo-free cysts and malignant neoplasms is extremely rare [11]. The ultrasound features characteristic of a neoplastic process are highly complex (septa, septation, or diffuse echo-refraction). Such features, however, were not observed in any of our cases.

Nonetheless, one must take into account the tumor triggering process usually induced in the earliest stages of neoplastic development by high-expressivity genic and polygenic abnormalities capable of severely altering the embryogenetic process.

Some authors suggest surgical treatment of ovarian cysts to prevent complications such as torsion, intracystic or abdominal hemorrhage, and ruptured cysts [11-15]. In our experience, such complications did not occur in cysts measuring less than 4 cm in diameter.

An association between ovarian cysts and polyhydramnios [6, 16, 17] and between ovarian cysts and pulmonary hypoplasia [18] was reported in our patient sample only by six cases of polyhydramnios. These associations can be explained by the presence of large-volume, expanding cystic formations which reduce the fetal intra-abdominal space, thus causing intestinal obstruction and compression of the diaphragm (supradiaphragmatic tumefactions or hernias).

When surgical treatment is decided on, it must be as conservative as possible, since the root cause of benign ovarian cysts is a purely functional factor. The pediatric surgeon should avoid removal of normal ovarian tissue [10], especially in the presence of bilateral cysts. In this connection, the experience of Widdowson *et al.* confirms

that the cystectomy specimens analyzed in their case series all contained normal ovarian tissue [19].

However, in the absence of complications (torsion, compression of adjacent organs), a less aggressive approach is possible even in cysts of greater diameter by assessment of the advisability of needle aspiration of the cystic contents [18-21]. The presence of high levels of estradiol in the cystic fluid proves the ovarian origin of the tumefaction [22]. It is advisable, however, that the cystic fluid should not be contaminated by fetal blood rich in estradiol of adrenal origin. Aspiration of an ovarian cyst requires periodic ultrasound follow-up examinations over a period at least two years after aspiration [23, 24].

Moreover, recently, it has become possible to treat neonatal ovarian cysts in an effective and safe way with the laparoscopic technique [25-27].

The application of laparoendoscopic procedures in infants and children, in fact, continues to evolve with the availability of microinstrumentation and increasing experience among pediatric surgeons. This approach may prove valuable in the diagnosis and management of prenatally diagnosed ovarian cysts. In addition, further insight into the etiology of congenital ovarian cysts may be obtained [28].

#### Conclusion

In conclusion, our cases suggest that a good clinical approach to adopt in cases of benign neonatal ovarian cysts is to wait and to see their development by periodic ultrasound monitoring.

Delivery should take place in a perinatal center. The prenatal findings should also be checked postnatally by ultrasound. Prenatal aspiration of the cyst seems to be of no advantage and should be carried out only in special individual cases [29-31].

Surgical treatment is indicated only in the presence of cysts measuring more than 4 cm in diameter in order to avoid complications (torsion, intracystic or abdominal hemorrhage, and ruptured cysts) [32-34].

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