Fetal ovarian cysts: report of two cases and literature review

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Summary

In the present study we report two cases of fetal ovarian cysts. In the first case the cyst was initially discovered during prenatal ultrasound examination, while in the second case the cyst was identified during autopsy examination of a stillborn fetus. Pathologic examination of both specimens revealed similar histology, which was mainly characterized by the presence of an ovarian cortex comprising several maturing and primordial follicles which were occasionally biovular, and a focal lining of luteinized theca cells. Another prominent feature was the presence of multiple deposits of dystrophic calcifications within the cyst wall. Both cysts were diagnosed as follicular in origin.

Key words: Fetal; Ovarian cysts; Follicular; Pathologic.

Introduction

Since the introduction of prenatal sonography in routine clinical practice, a significant increase in the detection and reporting of fetal ovarian cysts has been noted [1]. However, the overwhelming majority of all relative literature has focused mainly on the diagnosis, sonographic appearance and management of these lesions, with only sporadic studies commenting on their pathologic features [2]. Although hormonal parameters, of both fetal and maternal derivation are, reportedly, considered to be responsible for ovarian hyperstimulation in the fetus, the exact etiology of fetal ovarian cysts remains unknown [3]. Nevertheless, a correlation of the pathologic findings with the remaining clinical and laboratory data may significantly contribute to further elucidate the pathogenetic mechanism leading to the *in utero* formation of an ovarian cyst.

In the present study we report two cases of fetal ovarian cysts with emphasis on their pathologic features and compare our findings with those of previously published cases or series. A concise review of the existing literature has also been attempted, focusing on the particular difficulties and diagnostic pitfalls associated with the pathology of fetal and neonatal ovarian cysts.

Case Reports

Case 1

Prenatal ultrasound (US) examination of a 32-year-old pregnant woman at 37 weeks' gestation revealed the presence of a fetal ovarian cyst: the cyst measured 4 cm in the largest diameter and was further characterized by features of a retracting clot pattern, suggesting cyst torsion. No other pathology was found. Two days after birth, the infant was submitted to cystectomy, after a repeat US confirmation of the torsion pattern of the cyst. On gross examination the specimen appeared as a cystic mass measuring 4 x 3 cm and was filled with hemorrhagic contents (Figure 1). Its surfaces were smooth and the thickness of the walls ranged from 0.3-0.5 cm . The entire specimen was subsequently serially sectioned and studied histopathologically. Microscopic examination showed a cyst containing liquid and organized hematoma. The cyst wall was composed of ovarian cortex with some maturing and several primordial follicles which were occasionally biovular, and was focally lined by luteinized theca cells (Figure 2). Elements of past and recent hemorrhage as well as multiple deposits of dystrophic calcifications were also observed covering the cyst wall to a large extent. On the basis of these findings the diagnosis of hemorrhagic follicular ovarian cyst was rendered .

Our little patient had a fine postoperative course and is now a healthy baby, two months after surgery.

Case 2

During autopsy examination of a female stillborn infant (gestation age: 36 wks) a cyst was found in the right ovary. The cyst measured 2.7 cm in the largest diameter and was filled with clear serous fluid. Its surfaces were smooth and the thickness of the walls ranged from 0.2-0.4 cm. Histological examination of the specimen showed that the cyst wall was composed of ovarian cortex with maturing and primordial follicles, and contained several deposits of microcalcifications (Figure 3). The diagnosis of a follicular ovarian cyst was rendered.

Discussion

The presence of small cystic structures is not a rare finding in fetal and neonatal ovaries. Routine prenatal US imaging as well as autopsy studies have demonstrated that an extremely high percentage (up to 34%) of neonates harbor these lesions [4-6]. However, in most cases these findings simply represent normal cystic ovarian follicles which tend to regress spontaneously within the first months of age and are therefore considered to be

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Fig. 1

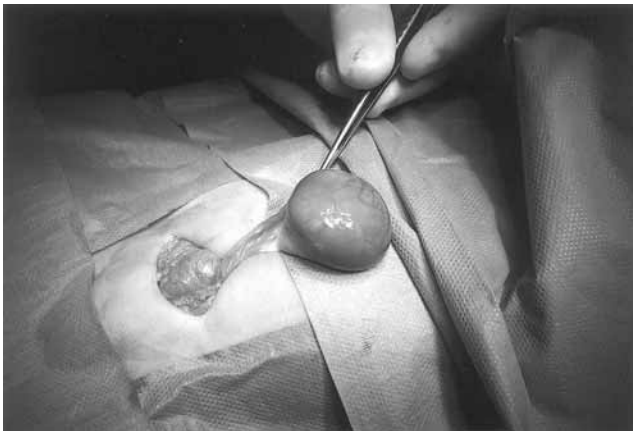

Fig. 2

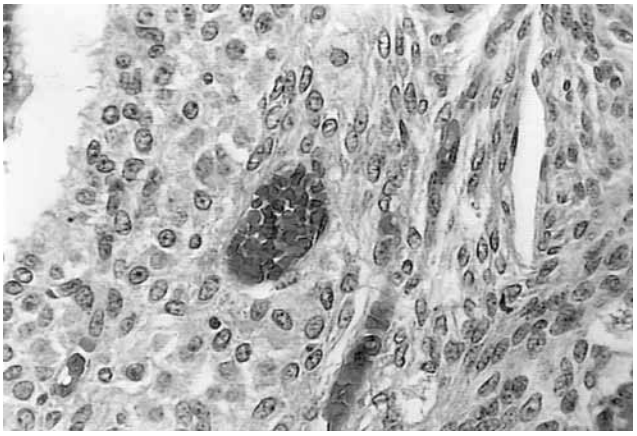

Fig. 3

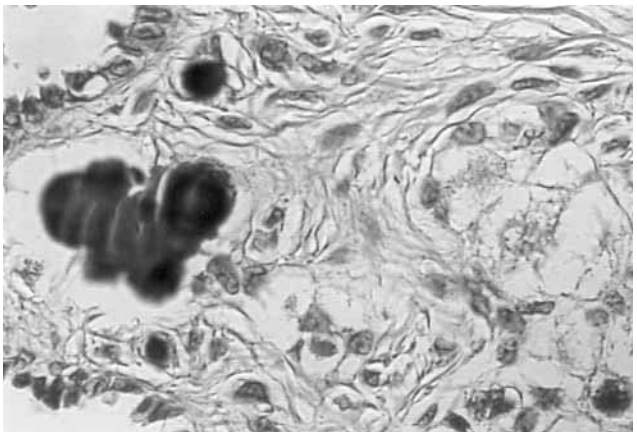

Figure 1. — Ovarian cyst of a female newborn (operative image, case 1). The smooth external surface and the hemorrhagic content of the cyst are evident.

Figure 2. — Histological section of the cyst wall (case 1) showing luteinized cells (hematoxylin-eosin x 250).

Figure 3. — Microcalcifications at the cortex of a fetal ovarian cyst (case 2) (hematoxylin-eosin x 250).

of limited clinical significance [2, 4, 7, 8]. In contrast, pathological ovarian cysts are associated with several potential complications of variable severity, ranging from intracystic hemorrhage or cyst rupture to ovarian torsion which may further lead to intestinal obstruction or perforation, urinary obstruction and even sudden death of the infant [3, 9]. In rare cases of extremely large cysts , respiratory distress or pulmonary hypoplasia and polyhydramnios have also been described [10]. The distinction between a maturing cystic follicle and a true ovarian cyst is therefore extremely important from the clinical point of view and is mainly based on the size of the lesion, with cystic follicular structures designated as normal follicles when measuring less than 2-2.5 cm and as follicular cysts when they are larger than the above diameter [1, 11].

The pathologic features of fetal and neonatal ovarian cysts have been thus far described – to our knowledge – in very few studies [2]. An interesting histological finding in both of our cases was the presence of multiple deposits of dystrophic calcifications which were covering the cyst walls to a large extent. Extended calcification has been previously described in neonates and children in association with ovarian torsion and subsequent autoamputation and necrosis [12, 13]. Nussbaum *et al.* in their study of 17 neonatal ovarian cysts found dystrophic calcifications in the walls of nine out of ten twisted follicular ovarian cysts, and presumed that this finding was most likely the result of infarction [2]. The presence of calcifications within the wall of a fetal ovarian cyst may give rise to a suspicion of a gonadoblastoma. However, the absence of the remaining histological features of this rare neoplasm (nests containing a mixture of germ cells and sex cord derivatives resembling immature Sertoli and granulosa cells) [14], and the history of cyst torsion and hemorrhage are the decisive diagnostic clues .

Although rarely reaching the preovulatory follicular stage, folliculogenesis and atresia also occur prenatally [15]. Thus, the wall of a follicular ovarian cyst in a neonate usually consists of ovarian cortex with several primordial and maturing follicles. Some of these follicles may contain multiple oocytes. Gougeon reported a frequent occurrence of multiovular follicles and multinuclear oocytes in the adult human ovary, which was independent of age, hormonal status or ovarian pathology [16]. In contrast to these findings, Manivel *et al.* in their autopsy study of 310 ovaries, reported that the occurrence of multiovular follicles is a much more frequent finding in children in comparison to older individuals, probably reflecting an abnormal folliculogenesis which disappears as the child matures, and should not be mistaken for a neoplastic process [17]. Interestingly, previous investigators observed an increased detection of structures mimicking neoplasms such as gonadoblastomas and sex-cord stromal tumors in association with follicular ovarian cysts in autopsy material obtained from stillbirths, infants and children, and further explained this phenomenon as the

result of the massive physiological reduction of oocytes which normally occurs during the initial developmental stages of the ovary [18].

With regard to the therapeutic approach of fetal and neonatal ovarian cysts, it should be emphasized that the decision of surgical intervention should be made on the basis of several parameters including not only the cyst size but also other parameters, such as the presence and type of symptoms and the US imaging findings [1, 3]. Although the optimal management of these lesions remains a controversial issue, it is generally agreed that asymptomatic cysts, with a diameter of less than 4 cm and a simple, non-complex US pattern may be conservatively observed with periodic ultrasound or aspirated in utero [1-3]. In the presence of larger, symptomatic or ultrasonographically complex cysts, surgery must be performed immediately after birth because of the significant risk of life-threatening complications, and all efforts should be made to preserve as much ovarian tissue as possible [1, 3, 7].

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