



Management of Neonatal Ovarian Cysts and its Effect on Ovarian Preservation



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ARTICLE INFO

Article history:

Received 25 January 2014

Accepted 27 January 2014

Key words:

Neonate
Ovarian cyst
Ovarian preservation
Ovarian salvage

ABSTRACT

Background/Purpose: Management of asymptomatic neonatal ovarian cysts varies. Some surgeons advocate initial observation, while others recommend immediate operation depending on cyst size and complexity. This study aims to compare outcomes of initial observation versus primary surgery, focusing on incidence of postnatal torsion and ovarian preservation.

Methods: A retrospective study (1997–2012) of neonates with an ovarian mass was performed. Data on cyst size, ultrasound characteristics, clinical course, complications, and pathology were extracted.

Results: Thirty-seven neonates with asymptomatic ovarian cysts were identified (N = 25 observed, N = 12 primary surgery). Overall, 12/25 (48%) observed had successful cyst regression, including 3/8 (38%) cysts ≥ 50 mm and 6/15 (40%) complex. 13/25 patients (52%) underwent surgery for failure of cyst regression (11/13) or concern for interval torsion (2/13). Postnatal torsion occurred in 1/25 observation patients (4%), or 1/8 (13%) with cysts ≥ 50 mm. Overall rate of ovarian preservation between groups was not statistically different [6/8 (75%) observed versus 8/9 (89%) primary surgery; $P = 0.577$]. Pathology found viable ovarian tissue in all oophorectomy specimens (N = 3).

Conclusions: Postnatal torsion is rare. A period of observation spares half of neonates from an operation, without decreasing ovarian salvage. Initial management should consist of observation, regardless of size or complex characteristics. If operative intervention is necessary, ovary preserving techniques should be utilized.

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The routine use of prenatal ultrasound has led to a significant increase in the identification of neonatal ovarian cysts. The estimated incidence of clinically significant ovarian cysts is 1/2500 live births, [1] making it the most common cystic abdominal mass in newborn girls [2]. Thought to form as a result of exposure to maternal estrogens, placental HCG, and fetal gonadotropins, most neonatal ovarian cysts spontaneously resolve during the first year of life [3].

Early studies suggested aggressive surgical treatment for all neonatal ovarian cysts due to the risks of torsion, intestinal obstruction, and case reports of infant deaths [4,5]. More recent studies have shown that simple cysts less than 50 mm on postnatal imaging will likely spontaneously resolve and can be observed [6,7]. Management of asymptomatic cysts greater than 50 mm is controversial. Some studies have suggested that simple cysts larger than 50 mm pose an increased risk of ovarian torsion and that early

operative management may lead to improved ovarian preservation [7,8]. However, this concept is based on small case series in which the incidence of postnatal torsion is not clear. In a review by Brandt et al. [9], 92% of neonatal ovaries with torsion had evidence of torsion present on the first postnatal ultrasound, suggesting that a majority of such events occur in utero.

Some studies have also recommended early operation for neonatal cysts with complex characteristics, due to the risk of bleeding, rupture, or intestinal obstruction [10–12]. Other reports, however, suggest a high incidence of spontaneous resolution of complex cysts without complication [13,14]. Complex cysts are those with echogenic appearance on ultrasound and may contain septa, debris-fluid level, or clot. These findings may represent neonatal ovarian torsion or hemorrhage from cyst lining [15]. Ovarian malignancies are extremely rare in this age group, so tumor markers are not routinely evaluated during the work-up of complex neonatal cysts [3].

Based on evidence that a majority of neonatal torsion occurs antenatally and that both large and complex cysts can resolve, we question whether it is necessary to operate immediately on asymptomatic cysts >50 mm or those with a complex appearance. The aims of this study are to characterize the relative risks of a

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period of initial observation versus early operation, focusing on the incidence of postnatal torsion, rate of ovarian preservation, and surgical complications.

1. Methods

The study was conducted with approval from the Indiana University Institutional Review Board (IRB #1205008814). Neonates with ovarian cysts ≥ 20 mm managed at a single tertiary care children's hospital from January 1997 to June 2012 were retrospectively identified by ICD-9 codes (183, 220, 620). Patients' medical records were reviewed, extracting information on age at diagnosis, cyst size and appearance at each postnatal ultrasound, duration to cyst resolution, surgical procedure, complications, and pathology. Cysts were classified based on ultrasound appearance as simple, complex (septations or debris present), or solid. Size was defined as the largest diameter seen on ultrasound. For the patient with no ultrasound available, pathology reports and surgeon descriptions were used. Pathology reports of patients treated with oophorectomy were reviewed to determine if normal ovarian tissue was present.

Patients were categorized into two groups based on the intended initial treatment as observation (group 1) or primary surgery (group 2). There was no standardized management protocol during the study period. Cyst management was based on surgeons' preference. Patients presenting with symptomatic ovarian cysts (e.g. intestinal obstruction) were excluded from statistical analysis as they were not candidates for observation. Clinical characteristics and outcomes including ovarian preservation rates and complications were compared between groups. Ovarian preservation rates were calculated excluding ovaries found to be auto-amputated as these were not candidates for ovarian salvage. Mean sizes were compared using 2 sample t-test, while nominal data were analyzed using χ^2 test. P values less than 0.05 were considered significant. All analyses were performed using SPSS version 20 (SPSS Inc. IBM Company, Chicago IL).

2. Results

A total of 39 female neonates with an ovarian cyst ≥ 20 mm were identified. 25 patients were diagnosed on prenatal ultrasound, 7 were diagnosed during work up for unrelated condition, 5 presented with

Table 1
Clinical characteristics of neonates with observation versus early operation for an ovarian cyst.

	Group 1 Observation	Group 2 No observation	P value
Number of patients	25	12	
Diagnosis			0.17
Antenatal	16 (64%)	9 (64%)	
Incidental	6 (24%)	1 (7%)	
Mass	3 (12%)	2 (14%)	
Mean size (mm) \pm SD	47 \pm 17.6	67 \pm 30.3	0.016
Cyst ≥ 50 mm	8 (32%)	9 (75%)	
Characteristic			0.514
Simple cyst	10 (40%)	5 (42%)	
Complex cyst	15 (60%)	6 (50%)	
Solid	0 (0%)	1 (8%)	
Surgery	13 (52%)	12 (100%)	
Auto-amputated	5/13 (38%)	3/12 (29%)	0.673
Ovarian preservation ^a	6/8 (75%)	8/9 (89%)	0.577
Complication			
Postnatal torsion	1 (4%)	NA	

^a Excluding auto-amputated ovaries.

Table 2

Clinical characteristics of neonates with successful versus failed observation of an ovarian cyst.

	Successful observation	Failed observation	P value
Number of patients	12	13	
Diagnosis			0.014
Antenatal	5 (31%)	11 (69%)	
Incidental	6 (100%)	0 (0%)	
Mass	1 (33%)	2 (66%)	
Obstruction	0	0	
Mean size (mm) \pm SD	41 \pm 16.1	52 \pm 17.9	0.127
Complex cyst	6 (40%)	9 (60%)	0.329
Mean observation (wks) \pm SD	27 \pm 14.4	12 \pm 16.0	0.03

palpable mass on newborn examination, and 2 patients presented with intestinal obstruction. One patient with obstruction was noted to have a simple cyst with mass effect, the other patient had antenatal torsion resulting in intestinal adhesions. These two patients were excluded from the analysis as they would not have been candidates for observation.

Group 1 consisted of 25 patients treated with initial observation, of which 12 (48%) showed favorable cyst regression, while 13 (52%) failed observation and eventually underwent surgery. Of those successfully observed, 10/12 had complete cyst resolution by 1 year with a mean time to resolution of 26.3 weeks (SD \pm 13.9), while ultrasounds were discontinued on the remaining 2 patients prior to complete resolution. A majority of patients in group 1 had complex cysts (15/25, 60%) versus simple (10/25, 40%). Of those with complex cysts, 6/15 (40%) resolved without an operation, compared to 6/10 (60%) patients with simple cysts ($p = 0.677$). There were 8 patients with cysts ≥ 50 mm observed, and 3/8 (38%) did not require an operation.

Group 2 consisted of 12 patients managed with immediate surgery and no observation period. Six of twelve (50%) patients had a complex cyst, 5/12 (42%) had a simple cyst, and one patient had a solid appearing mass. Average cyst size was smaller in patients treated with observation compared to those brought directly to surgery (47 mm, SD \pm 17.6 vs. 67 mm, SD \pm 30.3, $P = 0.016$) (Table 1).

Table 2 illustrates the clinical characteristics of patients treated with successful versus failed observation. Reaching statistical significance, patients successfully observed were more likely to have had the cyst diagnosed incidentally. Although not statistically significant, in patients successfully observed there was a trend to smaller average cyst size (41 mm vs 52 mm) and they were less likely to have a complex cyst compared to those who failed observation.

Indications to discontinue observation and manage surgically included failure of cyst resolution in 11/13 (84%) cases and concern for postnatal interval torsion in only 2 cases out of 13 (16%). Mean observation time prior to surgery was 12 weeks (range 3–64, SD \pm 16.0). While there were no standardized criteria for failure of cyst resolution, 10/11 (91%) cysts either increased in size or had less than a 10% reduction in size during the observation period. The concern for postnatal torsion was based on a change in cyst appearance from simple to complex between follow up postnatal ultrasounds. Both patients were asymptomatic. Torsion was found in just 1 of these patients (case 24; Table 3/appendix) and was treated with oophorectomy. Normal viable ovarian tissue was noted on the pathology report of this specimen, suggesting that this ovary could have been salvaged with an ovarian preserving approach. The other patient with suspected interval torsion (case 22) was explored and found to have hemorrhage into the cyst without torsion, which was treated with cystectomy. The overall postnatal torsion rate in the observation group was 1/25 (4%) overall, or 1/8 (13%) for cysts ≥ 50 mm.

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