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Research Article

Paratubal/Paraovarian Masses: A Study of Surgical and Non-Surgical Outcomes

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Keywords

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Abstract

Objective: The purpose of this study was to investigate the natural history of paratubal and paraovarian masses, and to identify indications for surgical intervention.

Study design: Women who underwent transvaginal ultrasound at Duke University Hospital between 2002 and 2012 for the indication of pelvic mass, fullness, or pelvic pain were identified through a radiology database. Individuals noted to have a paratubal or paraovarian mass on ultrasound, or were found to have a paratubal/paraovarian mass on pathology, were included.

Results: Of the 229 patients who underwent transvaginal ultrasound with the indication pelvic/abdominal mass, fullness or pelvic pain, 12 were identified with paraovarian cystic structures. Eight women were asymptomatic, while four women presented with pain. Ultrasound was the initial imaging modality in ten. All women were ultimately imaged with ultrasound. Five were recommended to have Magnetic Resonance Imaging (MRI) after initial ultrasound, (4of 5 of these patients had complex features to their cysts). 6 of 12 patients ultimately underwent surgery. The average diameter of the cyst in these women was 9.3cm (4-19.7cm range). Four of six patients underwent laparoscopy; three had concomitant removal of tubes and ovaries. The other six women were managed expectantly. The average cyst diameter of this group was 4.8cm (1.9-8.6cm). All had interval decrease in cyst size at follow up ultrasound; two patients had complete cyst resolution by a third follow up ultrasound.

Conclusion: Large or complex paratubal/paraovarian cysts are best managed surgically. Simple cysts can be expected to regress and may be managed expectantly.

INTRODUCTION

Paratubal and paraovarian cysts are a relatively common entity, representing 4.7-20% of all adnexal masses [1-3]. Paratubal cysts, including Hydatid cysts of Morgagni, are of Mesonephric origin, while paraovarian cysts are of Wolffian origin [4,5]. Both can grow to be quite large. The majority of these cysts are benign, though rare cases borderline tumors and carcinomas have been reported arising from paratubal and paraovarian masses, (1-2% of cases) [6-9]. These masses are often identified incidentally on imaging for other reasons. However, they may also present with pain or pressure symptoms. Additionally, like other adnexal pathology, these cysts can torse or rupture [5,10]. Despite the relative frequency of these masses; there is very little data on the management of paratubal and paraovarian cysts. The series reviewed the surgical and non-surgical outcomes for patients with paratubal/paraovarian cysts.

MATERIALS AND METHODS

The medical records of 229 women who underwent transvaginal ultrasound for indication of adnexal mass, pelvic mass, or pelvic fullness in a single institution between January 2002 and January 2011 were reviewed. Cases were identified using ICD-9 codes from computerized database of radiology patients seen at Duke University Medical Center. Patients that were under age 18 were excluded. From those 229 patients, twelve cases of paraovarian/paratubal cysts were identified based on pathologic diagnosis at the time of surgery or radiologic conclusion. Radiologic conclusion of paraovarian or paratubal cyst was defined as cystic structures separate from but adjacent to the tube or ovary [11]. All images were re-reviewed by a radiologist at the time of data analysis.

Individual demographics, clinical presentations, radiologic

data, operative reports and pathologic diagnosis from each case were analyzed. Clinical presentation was defined as the initial reason the patient presented to care. We defined "palpable mass on exam" as patients with mass or fullness as described above, but also patients who presented with symptoms or incidentally found masses who then subsequently underwent exam where fullness or mass was documented. Incidentally found masses on imaging were defined as masses noted on CT scan or MRI performed for separate indications. Masses found on exam were defined on chart review in patients who presented for routine annual exams, and were noted to have a mass or fullness during the exam, but had no clinical complaints. The largest dimension of the cyst was used for documenting change in cyst size over time. Complex features on imaging included: septations, mural nodules, papillary nodules, hemorrhagic components, and thickened walls. Additional imaging was defined as further non-ultrasonographic imaging used by the provider to obtain a diagnosis and assist in surgical decision making. In contrast, follow-up imaging was defined as imaging used to follow the mass over time.

We analyzed the data using descriptive statistics and comparisons of women who did and did not undergo surgery. T-tests were used to compare continuous variables, while chi-squares were used to describe categorical variables. This study was reviewed and approved by the Duke University Medical Center Internal Review Board.

RESULTS AND DISCUSSION

Of 229 women who had pelvic ultrasounds between 2002 and 2011, 136 had an adnexal mass identified. Of those, 12 were identified as paratubal/paraovarian masses, 6 based on radiologic conclusion and 6 based on pathologic diagnosis. The mean age of these women was 47.6 years, range 24-65. The mean age was lower in the patients managed conservatively, (41.8 versus 44.0). In this population, six women were Caucasian, one was Asian, and five were African American. The average BMI in women who were managed conservatively was 27.7 compared with 36 in the operative group, though this was not significant. Age, BMI, and race were not predictors of operative management. Ca-125 was measured in five of the patients and no abnormal values were noted. Further demographic data is presented in (Table 1).

Of the 12 women, three presented with pain. Five had a fullness or mass that was noted on a pelvic exam, but did not have clinical symptoms. The final four had masses that were found incidentally on imaging for other reasons. The initial imaging modality was ultrasound in 10 of 12. One patient's paraovarian mass was noted on a CT for hematuria and the other's was observed on an MRI during evaluation of her fibroids. The two women whose masses were found with imaging other than ultrasound both had their masses further characterized with ultrasound. Half of the patients who were managed operatively initially presented to a gynecologist, compared with only one of patients who was managed conservatively (Table 2). A gynecologist ordered the US in four of these women, an internist in three a family doctor in two and one woman was evaluated in the emergency department. After initial imaging, three women were referred to gynecologic oncology, two to general surgery and one to gynecology. Additional imaging occurred in 5 of the

Table 1: Demographic Data.

	Conservative management (N=6)	Operative Management (N=6)	P-value
Age	41.83 (+/-4.47)	44.0 (+/-17.2)	0.78
Race			0.45
White	3 (50)	3 (50)	
African American	2 (33.3)	3 (50)	
Other	1 (16.7)	0	
Menopausal	0	2 (33.3)	0.075
BMI	27.67 (+/-3.3)	36.0 (+/-10.4)	0.15
Parity	6 (+/- 3.67)	6 (+/-2.86)	0.29

Table 2: Cyst Characteristics.

	Conservative management (N=6)	Operative Management (N=6)	OR (95% CI)	P-value
Clinical Presentation				0.067
Symptoms	1 (16.7)	3 (50)	--	
Found on exam	2 (33.3)	0	--	
Incidental on imaging	3 (50)	3 (50)	--	
Palpable on exam	4 (80)	4 (66.7)	0.5 (0.03, 7.99)	0.62
Presented to Gyn	1 (16.7)	3 (50)	5 (0.34, 72.8)	0.21
Largest Mass dimension (mm)	47.67 (+/-28.6)	92.67 (+/-59.6)	--	0.14
Complex features	1 (16.7)	4 (66.7)	10 (0.65, 154.4)	0.07
Additional Imaging	1 (16.7)	5 (83.3)	25 (1.2, 520.7)	0.02

women who underwent surgery (83.3%), compared with only 1 who did not, (p-value 0.02). MRI was recommended in five of the 12 women for further evaluation. One of these women had a very large mass (197mm at largest dimension) while the other four had masses with complex features including multiple septations, mural undulations and/or papillary nodules. All masses with complex features were scheduled for surgery, though one mass resolved on follow up imaging and surgery was cancelled.

Half of the patients underwent surgery. Of note, there were no cases of cyst torsion or cyst rupture in the study group. Reasons for surgical management included complex features to the cyst (4/6), symptoms (3/6), and bilaterally (1/6). Some patients had more than one of these. They were taken to the operating room by gyn-oncology (3), general surgery [12], and general gynecology (1). All patients who had an US that recommended further imaging with MRI underwent surgery. Three of the four patients who presented with pain ultimately had surgery. The average cyst diameter of patients who underwent surgery was 92.7mm (Table 2). Patients taken to the operating room by general surgery had masses more than 2.5 times larger than those taken by gynecologic surgeons (Table 3). Four patients had minimally invasive approaches, three laparoscopic and one robotic-assisted. There were no cases of intra-operative cyst rupture. One patient underwent cyst drainage within an Endo-catch bag. All six patients had cystectomies, four required lysis of adhesions, and three also concomitant unilateral or bilateral salpingo-oohprectomy. Of the two patients that had laparotomies, one was done by general surgery and the other was done by gynecology. Pre-operative diagnosis of paraovarian or paratubal cyst was only considered in two of the six cases. Final pathology included four paratubal cysts, one mullerian cyst and one Hydatid cyst of Morgagni.

Six patients were managed conservatively. The average diameter of these cysts was 47.7mm (Table 2). Five of these cysts were described as simple; the remaining had a single septation. Subsequent ultrasound was performed on all patients. The average number of follow-up exams was 2.5 (Table 4). Four of the patients had an ultrasound for follow up, while the other two had another indication for the imaging, including pelvic pain or rule out torsion. The duration between the initial scan and the follow up scans ranged from 6 weeks to 3.5 years. All patients showed a decrease in size of the cyst from the initial scan to the follow up. The average decrease was 25.6mm (1-71mm), this represents an average of a 39.3% decrease in size of the largest dimension of the mass (4.5-100%). Two patients had complete resolution of cyst at the time of a third ultrasound. Of note, the patient with a single septation was in the third trimester of pregnancy at the time of her cyst was noted. On follow up imaging post-partum, the cyst was once again seen, though smaller in size. She was scheduled for surgery at that time. At her pre-operative visit, ultrasound revealed that her cyst had resolved and the surgery was cancelled.

CONCLUSION

Paratubal and paraovarian cysts are a common and usually benign adnexal mass. This study found that smaller masses were less likely to be symptomatic and often regressed with time. All of the cysts managed expectantly were smaller than 10cm in their largest dimensions. The American Congress of Obstetricians and Gynecologists (ACOG) states that simple adnexal cysts less than 10cm may be followed safely without surgical intervention, even in postmenopausal women [13]. In the series, we found that some of these may even resolve completely. In contrast, patients with larger or complex masses were more likely to undergo surgery. In fact, all of the patients managed surgically either had qualities on ultrasound that were concerning for malignancy, including thick septations, papillary excrescences, mixed echogenicity and mural nodules or were very large (19.7x15.4x11.7cm).

Though this series had no cases of borderline tumors or carcinomas, these have been reported in the literature. Stein et al. reported a 2% malignancy rate in paraovarian tumors [8]. Fujii et al. and Genadry also report similar a incidence of malignancy [14,15]. Many masses that ultimately turn out to be malignant, appear simple on ultrasound, and were only noted to be complex with direct visualization during surgery [6,7]. This finding complicates the management of paratubal and paraovarian masses, as most commonly simple cysts are not managed operatively. However, Stein et al. did conclude that most commonly, malignancies in of paratubal and paraovarian masses occur in those over 5cm with internal excrescences and not in simple appearing cysts. Darwish et al. advocate for cyst rupture and bipolar coagulation of the cyst wall for cysts that are less than 3cm in size [5]. However, because of this risk of malignancy, cyst aspiration/rupture is not recommended [13-16]. Because larger masses are more likely to cause symptoms either acutely (torsion or rupture), or chronically (pressure, pain, or fullness), these masses are more likely to require invasive management.

Table 3: Operative Management.

	Gynecologic surgeon (n=4)	Non-Gynecologic surgeon (n=2)	OR (95% CI)	P-value
Largest Mass dimension (mm)	58.0 (+/-17.1)	162.0 (+/- 49.5)	--	0.19
Complex features	3 (75)	1 (50)	3 (0.08, 107.4)	0.54

Table 4: Conservative Management.

	Conservative management (N=6)
Duration of follow-up (months)	26.4 (+/-33.4)
Number of follow-up exams	2.5 (+/- 1.22)
Largest mass dimension on follow-up (mm)	25.67 (+/-30.7)
Average change in size (mm)	22.0 (+/- 26.4)
Average percent decrease in largest mass dimension	39.3

Half of the paratubal and paraovarian masses in our subset were diagnosed incidentally on imaging for another indication. One patient in the series was diagnosed thusly, and was also 34 weeks pregnant at the time of diagnosis. Her case illustrated many important principles in the management of masses of this ilk. First, though this mass was complex (with a single septation) because there were no other findings such as ascites, mural nodules or papillary excrescences which were concerning for malignancy and based on her gestational age, she was managed expectantly. A postpartum ultrasound revealed a slightly smaller cyst, though the septation was still present and she was scheduled for surgery at that time because of this complex feature. However, at the pre-operative visit, the ultrasound was repeated and the cyst had resolved. Thus, she did not undergo surgery. Certain sonographic findings (mural nodules, internal blood flow, papillary excrescences and ascites) are more concerning for malignancy than others. Thusly, the presence or absence of these may affect the management of paratubal and paraovarian masses [13]. This case also illustrates that in certain circumstances complex paratubal and paraovarian masses may be managed expectantly, though this is not the recommendation and must be made on a case-by-case basis.

Another important aspect in the diagnosis of these masses is which imaging modality most effective for diagnosis. In the study population; every patient had an ultrasound as part of the initial work up. There have been many studies investigating the optimal sonographic criteria for paratubal and paraovarian pathology. Barloon et al. concluded that it was difficult to consistently differentiate ovarian cystic masses from paraovarian cystic masses [3]. Savelli et al. re-investigated the topic more recently, using the technologic advances in ultrasound to their advantage. This study retrospectively identified patient's paraovarian cysts by surgical pathology, and then reviewed the radiology reports from the preoperative period. All fifty subjects had correctly identified paraovarian cysts on ultrasound [1]. It is generally agreed that the imaging modality of choice for the adnexa is ultrasound [13,16].

One unique finding in this series was that there were two patients who were taken to the operating room by the general surgery team. The presumed pathology on both of these cases was a mesenteric cyst. Both of these cysts were larger than 10cm and thought to be non-gynecologic in origin at the time of surgery. Because paratubal and paraovarian cysts can become

quite large, and thus may appear to be arising from another organ system, it is important for the clinician to keep these etiologies on the differential diagnosis and to preserve the adnexa intra-operatively.

By using a radiologic database to ascertain the cases, we were able to obtain patients who, despite having gynecologic pathology, did not ever see a gynecologist. This allowed us to include a wide range of referral sources as well as management styles – including family medicine, internal medicine, emergency medicine, and gynecology. The operative styles of general gynecology, gynecologic oncology, and general surgery were also included. Other case series are limited to cases only managed (conservatively and surgically) by general gynecology. This study has weaknesses as well. This is a small series with only 12 patients; half of who do not have pathologically verified paratubal or paraovarian cysts. Additionally, it is possible that within the ultrasound database, there are cases of paratubal or paraovarian cysts that are misidentified as ovarian cysts, and thus not included in the data set. Another weakness in this study was that the decision to operate was surgeon dependent; a different surgeon cared for each patient. Operative approaches, styles, and management are quite variable within this group. Additionally, because of the small sample size, we cannot make recommendations about the interval for follow-up or the duration of follow-up. Larger series investigating the management of paratubal and paraovarian pathology are necessary to further verify the findings.

The decrease in size over time of paratubal cysts is an important finding. It suggests that simple paratubal and paraovarian cysts may be managed expectantly. However, because these cysts can be malignant, complex paratubal cysts should be evaluated surgically. Additionally, these cysts can become very large, and in these cases, origin of the cyst can be difficult to tell definitively prior to surgery. When surgery is indicated for symptom management, mass size, or based on radiologic appearance, care to avoid cyst rupture should be taken. Larger series and prospective series are needed to more definitely answer the question of which patients can be managed expectantly, and which patients need surgical management.

DISCLOSURES

We have no financial disclosures. This data was presented as a poster at the 75th Annual Meeting of the South Atlantic Association of Obstetricians & Gynecologists on January 19-22, 2013.

REFERENCES

1. Savelli L, Ghi T, De Iaco P, Ceccaroni M, Venturoli S, Cacciatore B. Paraovarian/paratubal cysts: comparison of transvaginal sonographic and pathological findings to establish diagnostic criteria. Ultrasound Obstet Gynecol. 2006; 28: 330-334.
2. Dørum A, Blom GP, Ekerhovd E, Granberg S. Prevalence and histologic diagnosis of adnexal cysts in postmenopausal women: an autopsy study. Am J Obstet Gynecol. 2005; 192: 48-54.
3. Barloon TJ, Brown BP, Abu-Yousef MM, Warnock NG. Paraovarian and paratubal cysts: preoperative diagnosis using transabdominal and transvaginal sonography. J Clin Ultrasound. 1996; 24: 117-122.
4. Katz VL. Comprehensive gynecology. 5th ed. Philadelphia: Mosby Elsevier; 2007.
5. Darwish AM, Amin AF, Mohammad SA. Laparoscopic management of paratubal and paraovarian cysts. JSLS. 2003; 7: 101-106.
6. Hwang JH, Song SH, Shin BK, Lee JK, Lee NW, Lee KW. Primary clear cell carcinoma of a paratubal cyst: a case report with literature review. Aust N Z J Obstet Gynaecol. 2011; 51: 284-285.
7. Seamon LG, Holt CN, Suarez A, Richardson DL, Carlson MJ, O'Malley DM. Paratubal borderline serous tumors. Gynecol Oncol. 2009; 113: 83-85.
8. Stein AL, Koonings PP, Schlaerth JB, Grimes DA, d'Ablaing G 3rd. Relative frequency of malignant parovarian tumors: should parovarian tumors be aspirated? Obstet Gynecol. 1990; 75: 1029-1031.
9. Terek MC, Sahin C, Yeniel AO, Ergenoglu M, Zekioglu O. Paratubal borderline tumor diagnosed in the adolescent period: a case report and review of the literature. J Pediatr Adolesc Gynecol. 2011; 24: e115-116.
10. Muthucumaru M, Yahya Z, Ferguson P, Cheng W. Torsion of hydatids of Morgagni in premenarchal adolescent girls--a case report and review of literature. J Pediatr Surg. 2011; 46: e13-15.
11. Potter AW, Chandrasekhar CA. US and CT evaluation of acute pelvic pain of gynecologic origin in nonpregnant premenopausal patients. Radiographics. 2008; 28: 1645-1659.
12. Phelan JT 2nd, Broder J, Kouides PA. Near-fatal uterine hemorrhage during induction chemotherapy for acute myeloid leukemia: a case report of bilateral uterine artery embolization. Am J Hematol. 2004; 77: 151-5.
13. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin. Management of adnexal masses. Obstet Gynecol. 2007; 110: 201-214.
14. Fujii T, Kozuma S, Kikuchi A, Hanada N, Sakamaki K, Yasugi T, et al. Parovarian cystadenoma: sonographic features associated with magnetic resonance and histopathologic findings. J Clin Ultrasound. 2004; 32: 149-153.
15. Genadry R, Parmley T, Woodruff JD. The origin and clinical behavior of the parovarian tumor. Am J Obstet Gynecol. 1977; 129: 873-880.
16. Liu JH, Zanotti KM. Management of the adnexal mass. Obstet Gynecol. 2011; 117: 1413-1428.

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