

# Recurrence after Resection: Pilot Study Post Ovarian Sparing Cystectomy for Benign Mature Ovarian Teratomas in Pediatrics

## Abstract

Ovarian teratomas are relatively rare in children with the most common ovarian tumor being a benign mature teratoma. There is a significant knowledge gap regarding appropriate follow up after ovarian sparing operation for monitoring for recurrence. Our study aimed to delineate current follow up practices at our institution and to evaluate recurrence rates under these guidelines to better develop consistent follow up intervals for this patient population. A retrospective chart review was conducted on all patients age 17 and younger who presented for benign mature ovarian teratomas to assess follow up practices and recurrence rates at our institution. This will serve as a pilot study towards establishing standardized guidelines for this patient population.

## Introduction

Ovarian masses are relatively rare in children, with approximately, 2.4-2.6/100,000 cases per year with about malignant ovarian tumors only compromising 1% of all childhood cancers [1,2]. The most common ovarian tumor is a benign mature teratoma, which comprises over 50% of all ovarian neoplasms [1,3,4]. In addition to being benign, these tumors are typically slow growing, so if asymptomatic they are generally treated expectantly [3]. However, many patients present with symptoms such as abdominal pain, nausea, vomiting, or even a palpable mass [3]. Surgical treatment is generally required if the patient becomes symptomatic, it is greater than 5cm, or the growth rate is greater than 2cm per year as these findings increase the possibility of torsion [3]. Until recently, surgical treatment for ovarian teratomas involved an oophorectomy, however, currently, surgical management in children and adolescents involves ovarian sparing cystectomy via laparoscopy or laparotomy [5]. The use of ovarian sparing surgery is supported by literature supporting the importance of preserving fertility and evidence that for benign ovarian masses the risk of ipsilateral recurrence is lower than the risk of contralateral metachronous malignancy [1]. However, literature on the recurrence rate of these teratomas is lacking; there are some studies showing a recurrence rate of 10% within one-year post operation [6]. With the increase in ovarian sparing operations, there is now a heightened concern for possible recurrence on both ipsilateral and contralateral ovaries. Regardless of this, the current recommendation is to consider ovarian sparing surgery in localized mature ovarian teratomas meeting criteria of no evidence of lymphadenopathy, no metastasis, normal levels of tumor markers, and absence of calcifications on radiological findings [1]. A follow up strategy has not yet been standardized for this particular procedure given that the recurrence rate is not well established. Our study aims to evaluate recurrence and follow up after ovarian sparing cystectomies to create a standardized follow up interval.



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## Methods

A retrospective chart review was conducted on all patients age 17 and younger who presented for benign mature ovarian teratomas that underwent resection. Data was collected between July 2012 to July 2022 utilizing pathology findings post operatively on all patients. Extensive chart review was performed reviewing radiologic findings, operative findings, and final pathology results. Patients were excluded from the study if the final pathology did not reveal a benign mature teratoma or if a complete or partial oophorectomy was performed. Following this, clinic follow up intervals that were offered were evaluated through chart review. Any recurrence rates were noted.

## Results

A total of 50 patients were evaluated after undergoing an operation for an ovarian mass. After exclusion criteria, 36 patients met criteria for analysis. Of the 36 patients that underwent an operation, 12 of these patient's pathology returned as benign mature teratoma after an ovarian sparing cystectomy (Table 1).

**Table 1:** Age and follow-up schedule with performance of ultrasound and follow up appointment showing recurrence rates.

Age	1 Year Follow-Up Scheduled with Ultrasound (Y/N)	1 Year Follow-Up with Ultrasound Performed (Y/N)	Recurrence (Y/N/UNK)
15	Y	N	UNK
15	Y	Y	N
16	Y	Y	N
16	Y	Y	N
17	Y	N	UNK
14	Y	Y	N
17	Y	Y	N
16	Y	N	UNK
5	Y	N	UNK
15	Y	Y	Y
12	Y	N	UNK
17	Y	N	UNK

Patients ranged from age 5-17, with the average age being 14.5 years of age. All patients were offered one-month post-operative follow up and one year follow up with an ultrasound performed at one year. Six out of 12 patients did not show up for their one-year ultrasound follow-ups. One patient returned for her one year follow up and was found to have recurrence of bilateral ovarian cysts on ultrasound. She underwent laparoscopic bilateral cystectomy and was confirmed to have recurrence of benign mature teratomas.

## Discussion

This retrospective cohort study provides pilot data from pediatric and adolescent patients on recurrence rates and follow-up practices upon undergoing ovarian-sparing surgery for benign mature ovarian teratomas. 12 of the 36 patients (33%) who underwent an ovarian-sparing cystectomy in this study had final pathology demonstrating benign mature teratoma. There is one known recurrence out of the 12 patients (8%).

Only half of the patients (6 out of 12) returned for the one-year ultrasound follow-up. Given that even a single recurrence detected (which happened to be 17% of those that continued with the one-year follow-up) via ultrasound occurred among this new cohort, it is critical to maintain close surveillance in the first year after surgery to monitor for recurrence. It might prove valuable to conduct further, larger-scale and multi-institutional studies to better understand and ascertain recurrence rates for benign mature ovarian teratomas and ideal surveillance protocols after an ovarian-sparing teratoma resection. Our study does provide support for a one-year follow-up with ultrasound to check for both ipsilateral and contralateral recurrences. Even so, long-term data on later recurrences is lacking. A standardized follow-up interval has yet to be studied in this population, with studies citing less than one year follow up and other studies citing over 4.5 years follow up on average [6,7].

Given the retrospective nature of our study done at one institution, there are limitations. Primarily, our sample size was small, making statistical power a difficult feat. The follow-up was inconsistent given that only half of the patients continued with the recommended monitoring protocols. Additional studies, potentially at multiple institutions, including data on the clinical characteristics of the teratomas, the surgical treatments and approaches implemented, and the health and genetic backgrounds of the patient population

will provide more valuable insight on possible additional and confounding variables involved in the occurrence, recurrence, and treatment of benign mature ovarian teratomas and will likely provide more accurate and appropriate monitoring protocols.

## Conclusion

In conclusion, our study provides pilot data that supports a one-year ultrasound follow-up for patients with benign mature ovarian teratomas that undergo ovarian-sparing surgery. Although not perfect, such surgery has proven to be an appropriate approach for the removal of these teratomas to attempt to preserve ovarian tissue and fertility potential in young patients. Well-established longer-term monitoring protocols have yet to be examined in greater depth. Larger prospective multicenter analyses are required to establish more accurate recurrence rates and subsequently more standardized monitoring protocols following resection of benign mature ovarian teratomas

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