

## Ovarian tumors in children and adolescents in Songklanagarind Hospital: A 12-year review

กัณทรรัตน์ ปิยนันท์จรัสศรี<sup>1</sup>  
สายบัว ชี้เจริญ<sup>2</sup>  
วิรัช วุฒิภูมิ<sup>3</sup>  
รักชาย บุษงาชาติ<sup>1</sup>  
สาธนา โตเจริญวานิช<sup>1</sup>

### Abstract:

Ovarian tumors in children and adolescents in Songklanagarind Hospital: A 12-year review  
Peeyananjarassri K, Chichareon S, Wootipoom V, Buhachat R, Tohareonvanich S.  
Department of Obstetrics and Gynecology, Faculty of Medicine,  
Prince of Songkla University, Hat Yai, Songkhla, 90110, Thailand  
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**Objective:** To examine the incidence, clinical presentation and characteristics of ovarian tumors in children and adolescents

**Study design:** Retrospective, descriptive study

**Materials and methods:** We retrospectively collected cases of ovarian tumors in patients  $\leq 19$  years of age at Songklanagarind Hospital occurring between April 1989 and March 2001.

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<sup>1</sup>MD <sup>2</sup>Assoc Prof MD <sup>3</sup>Asst Prof MD, Dip Thai Board of Obstetrics and Gynecology

ภาควิชาสูติศาสตร์และนรีเวชวิทยา คณะแพทยศาสตร์ มหาวิทยาลัยสงขลานครินทร์ อ.หาดใหญ่ จ.สงขลา 90110

รับต้นฉบับวันที่ 10 มิถุนายน 2545 รับลงตีพิมพ์วันที่ 22 ตุลาคม 2545

**Results:** There were 54 cases, or 4.7% of all ovarian tumors (1,140 cases). Fifty-three patients (98%) were nulliparous. The common presenting symptoms were abdominal mass (37%) and abdominal distension (35%). Seven patients (13%) had tumor related complications. Twenty-four patients (44%) had tumors between 6 and 15 cm in greatest diameter and the bilaterality rate was 5.6%. Of these 54 cases, 21 cases (38%) were benign and 33 cases (61%) were malignant. The most common was a germ cell tumor (65%). Conservative and radical surgery were performed in 78% and 22% of patients, respectively.

**Conclusions:** Ovarian tumors in children and adolescents were rare. Nearly two-thirds were malignant, and a germ cell tumor was the most common. Conservative surgery is the preferred treatment for patients to preserve fertility and endocrine function.

**Key words:** adolescents, ovarian tumors

### บทคัดย่อ:

**วัตถุประสงค์:** เพื่อทราบอุบัติการณ์ อาการแสดงทางคลินิกและลักษณะของเนื้องอกรังไข่ในเด็กและวัยรุ่น

**แบบวิจัย:** การศึกษาเชิงพรรณนาย้อนหลัง

**วัสดุและวิธีการ:** เป็นการศึกษาโดยการเก็บข้อมูลย้อนหลังจากผู้ป่วยเนื้องอกรังไข่ ของโรงพยาบาลสงขลานครินทร์ ตั้งแต่เดือนเมษายน พ.ศ.2532 - มีนาคม พ.ศ.2544

**ผลการศึกษา:** พบผู้ป่วย 54 ราย คิดเป็นร้อยละ 4.7 จากผู้ป่วยเนื้องอกรังไข่ทุกอายุ จำนวน 1,140 ราย ผู้ป่วยร้อยละ 98.1 (53 ราย) ยังไม่เคยมีบุตร อาการสำคัญที่นำผู้ป่วยมาโรงพยาบาล คือ คลำพบก้อนในท้อง ร้อยละ 37 และท้องแน่นโต ร้อยละ 35.2 ผู้ป่วยร้อยละ 13 มีภาวะแทรกซ้อนจากเนื้องอก ร้อยละ 44.4 มีก้อนเนื้องอกขนาด 6-15 ซม. และร้อยละ 5.6 มีเนื้องอกรังไข่ทั้งสองข้าง จากผู้ป่วยทั้งหมด 54 ราย ร้อยละ 38.9 (21 ราย) เป็นเนื้องอกชนิดไม่ร้าย และร้อยละ 61.1 (33 ราย) เป็นมะเร็งรังไข่ ผลตรวจชิ้นเนื้อทางพยาธิวิทยาพบว่า เป็นชนิด germ cell มากที่สุด กล่าวคือพบร้อยละ 64.8 ส่วนใหญ่ร้อยละ 77.8 รักษาโดยการผ่าตัดต่อนุรักษ์มดลูกและรังไข่อีกข้างไว้ ที่เหลือร้อยละ 22.2 รักษาโดยการผ่าตัดมดลูกและรังไข่ทั้งสองข้าง

**สรุป:** ผู้ป่วยเนื้องอกรังไข่ในเด็กและวัยรุ่นพบได้ค่อนข้างน้อย ประมาณ 2 ใน 3 จะเป็นมะเร็ง และส่วนใหญ่เป็น germ cell การรักษาโดยการผ่าตัดต่อนุรักษ์มดลูกและรังไข่ส่วนที่ตีไว้ จะมีประโยชน์ในแง่การตั้งครรภ์และฮอร์โมน

### Introduction

Ovarian tumors are rare during childhood and uncommon during adolescence. A review of 29 reports revealed an ovarian malignancy rate of 35%<sup>1</sup>. Thus, it appears that one-third of ovarian tumors represent a malignancy. This report analyzes the incidence of ovarian tumors among children and adolescents, histology, symptoms, bilaterality, tumor size and type of treatment occurred at Songklanagarind Hospital over a twelve-year period.

### Materials and methods

The study group included all patients aged  $\leq 19$  years, with ovarian tumors which were surgically evaluated and had

histological confirmation at Songklanagarind Hospital during the 12-year period from April 1989 to March 2001. Clinical data were obtained from the Statistics Unit of the Department of Obstetrics and Gynecology, Faculty of Medicine, Songklanagarind Hospital, Prince of Songkla University. The histological type was based on the World Health Organization classification (Table 1) according to the pathology reports. Staging was done according to International Federation of Gynecology and Obstetrics (FIGO) criteria. Descriptive statistics were used to describe patients and tumor characteristics.

**Table 1 Classification of ovarian tumors**

Epithelial
Serous tumors
Mucinous tumors
Brenner tumors
Endometrioid
Clear cell
Transitional cell
Mixed mesodermal tumors
Undifferentiated
Germ cell
Teratomas
Benign dermoid cysts (mature cystic teratomas)
Immature teratomas
Dysgerminoma
Embryonal carcinomas
Endodermal sinus (yolk sac) tumors
Mixed germ cell tumors
Polyembryoma
Choriocarcinoma
Sexcord/stromal tumors
Granulosa cell
Thecomas and fibrothecomas
Sertoli and Leydig cell tumors
Gynandroblastoma
Steroid cell tumors
Metastatic tumors
Tumors of uncertain origin

**Results**

During the study period, 54 patients with ovarian tumors were recorded. They comprised 4.7% of the total of 1140 ovarian tumors, reported in all age groups.

Fifty-three patients (98%) were nulliparous. Most of the tumors were seen in the 15-19 year age group (70%) and only two patients (4%) were in the first decade of life (< 10 years old). A palpable abdominal mass was the most frequent symptom (37%), followed by abdominal distension (35%) and abdominal pain (24%) (Table 2). One patient was asymptomatic, with the tumor being discovered during physical examination and one patient had dysuria, and KUB X-ray film showed a calcified mass in the pelvis.

Bilaterality was found in three patients (6%) and all were malignant in an advanced stage (stage III). In 44% of the patients, the tumors were between 6 and 15 cm in greatest diameter (Table 2). Seven patients had complications, five had twisted pedicles within the range of 6 to 15 cm in diameter; two were mature teratoma, two were cystadenoma, and one was a mixed germ cell tumor (dysgerminoma and endodermal sinus tumor). Two patients had tumor perforation; one was mature teratoma and the other was mucinous cystadenocarcinoma .

Of the 54 ovarian tumors, thirty-three (61%) were malignant and twenty-one (39%) were benign. Thirty-five ovarian tumors (65%) were germ cell, eighteen (33%) were common epithelium, and one (2%) was stromal cell. In the age group less than 15 years, 81% had malignancies, as compared with 53% the age group between 15 to 19 years (Table 3).

The most common presenting symptom of benign tumors was abdominal pain (43%) followed by abdominal mass (29%). In addition 86% of benign tumors were in patients aged 15 through 19 years. Importantly, no benign epithelial tumors were found in patients aged under 15 years. Benign tumors comprised mature teratoma 62% (13 of 21) and cystadenoma 38% (8 of 21). All benign tumors were unilateral. About 62% of benign tumors varied between 6 and 15 cm in greatest diameter.

Thirty-three patients (61%) had malignant ovarian tumors that included 22 germ cell tumors (67%), 10 cystadenocarcinomas (30%) and 1 sex cord-stromal tumor (3%). Among 22 germ cell malignancies, 7 were pure dysgerminomas, 6 were endodermal sinus tumors, 5 were mixed germ cell tumors, and 4 were immature teratomas. The most common presenting symptom was abdominal distension (45%), and followed by abdominal mass (42%). Three patients (9%) had bilateral malignant ovarian tumors, one dysgerminoma, one immature teratoma, and one cystadenocarcinoma. It was interesting that only one patient (10%) with epithelial ovarian cancer was under 15 years old, and none were under 10 years old. In 66 percent of malignancies the tumor size was larger than 15 cm.

**Table 2 Patient and tumor characteristics**

Characteristic	Benign (%) (n = 21)	Malignant (%) (n = 33)	total (%) (n = 54)
<b>Age (yr)</b>			
< 10	1 (4.8)	1 (3.0)	2 (3.7)
10 - 14	2 (9.5)	12 (36.4)	14 (25.9)
15 - 19	18 (85.7)	20 (60.6)	38 (70.4)
<b>Presenting symptoms</b>			
Abdominal pain	9 (42.9)	4 (12.1)	13 (24.1)
Abdominal mass	6 (28.6)	14 (42.4)	20 (37.0)
Abdominal distension	4 (19.0)	15 (45.5)	19 (35.2)
Others	2 (9.5)	0 (0)	2 (3.7)
<b>Laterality</b>			
Unilateral	21 (100)	30 (90.9)	51 (94.4)
Bilateral	0 (0)	3 (9.1)	3 (5.6)
<b>Tumor size (cm)</b>			
≤ 5	2 (9.5)	0 (0)	2 (3.7)
6 - 15	13 (61.9)	11 (33.3)	24 (44.4)
16 - 25	1 (4.8)	12 (36.4)	13 (24.1)
> 25	5 (23.8)	10 (30.3)	15 (27.8)
<b>Complication</b>			
Torsion	4 (19.0)	1 (3.0)	5 (9.3)
Perforation	1 (4.8)	1 (3.0)	2 (3.7)
<b>Surgery</b>			
Conservative	21 (100)	21 (63.6)	42 (77.8)
Radical	0 (0)	12 (36.4)	12 (22.2)

There were 55% of malignant tumors in the early stages, and 45% in advanced stages. Early stage was found in 39% of epithelial cancers, compared with 61% of germ cell malignancies.

Most of the patients (79%) had conservative surgery, in order to preserve fertility and endocrine function. Radical surgery was performed in twelve patients (six with advanced malignant germ cell tumors, three with advanced epithelial cancer, two with endodermal sinus tumor stage Ic and mixed germ cell tumor stage Ic, and one patient had epithelial cancer stage Ia).

## Discussion

Ovarian tumors are infrequently seen in childhood and adolescent ≤ 19 years, but they are the most common genital tumors in this age group of patients (88%)<sup>2</sup>. The incidence

of these tumors varies according to the age of the patients, with less than 5 % occurring in children and adolescent patients<sup>3</sup>. In this study, the proportion was 4.7% of all ovarian tumors, which is consistent with other reports, and did not differ from data of previous 6 years (1983-1989) at this hospital<sup>4</sup>. In this study, abdominal pain was the most common presenting symptom of benign tumors (43%) and abdominal distension (45%) was the most common presenting symptom of malignant tumors. This is different from other reports, in which abdominal pain was the most common presenting symptom found in both benign and malignant ovarian tumors.<sup>2,5</sup>

Histological assessment demonstrated that 61% of all ovarian tumors were malignant and 39% were benign. The observed frequency of cancer in our study was considerably higher than in other studies<sup>1-2,5-6</sup> and increased from data of the previous 6 years in which malignant tumors comprised 53%. This discrepancy and increasing trend may result from the fact that Songklanagarind Hospital is a tertiary center so more patients are referred with malignancies.

The frequency of germ cell tumors was 65%, which is similar to those reported in other series. Approximately two-thirds of ovarian tumors in childhood and adolescence were germ cell. The so-called "common" epithelial tumors of the ovary were rather uncommon under the age of 20. In contrast, in adults epithelial tumors are the most common ovarian neoplasms (80%).<sup>7</sup>

In this study germ cell tumors constituted the vast majority of ovarian neoplasms, especially prior to puberty; their frequency and malignant potential diminished with increasing age. Mature teratoma was the most frequent type of benign ovarian tumor (62%). It arises from the germ cells that embryonically originate in the yolk sac and is common in children and young women.<sup>2,6</sup> In most studies, in childhood and adolescence the majority of malignant ovarian tumors are non-epithelial; and most are of germ cell in origin and among these about one-third are dysgerminomas<sup>8</sup>. However in our study the most frequent type of malignant ovarian tumor was cystadenocarcinoma (30%), followed by dysgerminoma (21%). This difference may be from the small number of younger-children with malignant tumors in our study.

**Table 3 Histology and age**

Histology	Age (years)		
	5-9	10-14	15-19
Germ cell			
Benign cystic teratoma	1	2	10
Dysgerminoma	1	4	2
Endodermal sinus tumor	0	3	3
Immature teratoma	0	1	3
Mixed malignant germ cell*	0	2	3
Epithelium			
Cystadenoma	0	0	8
Cystadenocarcinoma	0	1	9
Sex cord stromal cell			
Granulosa cell	0	1	0
<b>Total</b>	<b>2</b>	<b>14</b>	<b>38</b>

\* Dysgerminoma and endodermal sinus tumor (3 cases)  
Dysgerminoma and endodermal sinus tumor and immature teratoma (1 case)  
Choriocarcinoma and endodermal sinus tumor (1 case)

Most of the patients had conservative surgery (78%). Radical surgery was performed in only twelve patients (22%), most with advanced malignant tumors (9 of 12) and none with benign tumors. Nearly two-thirds of patients with malignancies underwent conservative surgery, which in the past was only one-third<sup>4</sup>. The increase in conservative management for ovarian tumors is due to several reasons, which distinguish germ cell tumors from other tumors.

1. Preservation of endocrine and reproductive function is important.
2. These tumors produce markers that allow preoperative diagnosis and better follow up monitoring.
3. Modern chemotherapy, including cisplatin, etoposide, and bleomycin has significantly improved survival and preservation of reproductive function in the majority of young patients.

In most patients, conservative surgery is important, but adequate staging in malignancies is particularly important because of the benefits that can bring to patients.

Optimal therapy includes conservative complete surgical resection, accurate histological examination, and selective use of chemotherapy. With emphasis on long-term

effects on possible recurrence, endocrine function, and future fertility should be evaluated and the family should be counseled.

### Conclusions

The proportion of all ovarian tumors in Songklanagarind Hospital which occurred in young females  $\leq$  the age of 19 years was 4.7% of all age groups. The most common was a germ cell tumor (65%), and in nearly two-thirds of patients, these tumors were malignant. The most common presenting symptoms were abdominal mass and abdominal distension. Conservative surgery is the appropriate treatment to preserve fertility and endocrine function of these patients.

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