Pediatrics and Neonatology (2011) 52, 140—144

available at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.pediatr-neonatol.com

ORIGINAL ARTICLE

Pediatric Malignant Ovarian Tumors: 15 Years of Experience at a Single Institution

Say-Tin Yeap [a], Chih-Chen Hsiao [a], Chih-Sung Hsieh [b], Hong-Ren Yu [a,c], Yu-Chieh Chen [a], Jiin-Haur Chuang [b,c], Jiunn-Ming Sheen [a,c,*]

[a] *Department of Pediatrics, Chang Gung Memorial Hospital — Kaohsiung Medical Center, Chang Gung University College of Medicine, Kaohsiung, Taiwan*
[b] *Department of Pediatric Surgery, Chang Gung Memorial Hospital — Kaohsiung Medical Center, Chang Gung University College of Medicine, Kaohsiung, Taiwan*
[c] *Graduate Institute of Clinical Medical Sciences, Chang Gung University College of Medicine, Kaohsiung, Taiwan*

Received Feb 4, 2010; received in revised form Jun 11, 2010; accepted Jul 13, 2010

Key Words
chemotherapy;
children;
malignant ovarian tumor

Background: Malignant ovarian tumors in children are relatively rare. We reviewed our 15-year experience to understand their clinical presentations, managements, and prognoses.
Methods: There were 15 children who were diagnosed to have malignant ovarian tumors from January 1994 to June 2009 in our hospital. The presenting symptoms, treatments, and outcomes were obtained retrospectively from the medical records.
Results: The median age at presentation was 13 years. The most common presenting symptom was abdominal pain, occurring in 10 patients (66.7%). The tumors were in the left side in 10 patients (66.7%). The pathologic diagnoses were yolk sac tumors in four patients, immature teratomas in four, dysgerminomas in three, malignant mixed germ cell tumors in three, and carcinosarcoma in one patient. According to the Federation Internationale de Gynecologie Oncologique classification, seven girls had Stage I, one had Stage II, and seven had Stage III disease. Thirteen patients received chemotherapy with platinum-based regimens. Three patients died of their disease: one of yolk sac tumor, one of malignant mixed germ cell tumor, and one of carcinosarcoma. They all had Stage III disease at diagnosis. The 10-year overall survival and disease-free survival rates were 77% and 69%, respectively.
Conclusions: Pediatric malignant ovarian tumors were highly curable disease if they were not in the advanced stage at presentation. Earlier consideration of malignant ovarian tumor in the differential diagnosis of young girls with abdominal pain is important.

* Corresponding author. Department of Pediatrics, Chang Gung Memorial Hospital — Kaohsiung Medical Center, No. 123, Ta-Pei Road, Niao-Sung Hsiang, Kaohsiung Hsien, Taiwan.
E-mail address: ray.sheen@gmail.com (J.-M. Sheen).

1875-9572/$36
doi:10.1016/j.pedneo.2011.03.003

1. Introduction

Ovarian cancer is the fifth leading cause of death from cancer in women and the leading cause of death from gynecological cancer. It is thought of as a killer because early disease cause minimal, nonspecific, or even no symptoms so that most patients are diagnosed at an advanced stage. In adult women, most primary ovarian tumors arise from epithelial cells. This typically occurs in postmenopausal women. Epithelial ovarian cancer includes serous tumor, endometrioid tumor, and mucinous cystadenocarcinoma.[1] The 5-year survival rate for all stages of ovarian cancer is 45%.[2] In contrast, in children, malignant ovarian tumors are rare, germ cell tumors comprise most of them, and prognosis is better than for adult women.[3] There is limited information about such tumors in children. Thus, we reviewed medical records to understand the clinical behavior of this tumor.

2. Materials and Methods

From January 1994 to June 2009, 15 consecutive pediatric patients were diagnosed to have malignant ovarian tumors by histology in our institution. We recorded their symptoms, related examinations, surgical treatments, histopathology, treatment regimens, and responses. We used the Federation Internationale de Gynecologie Oncologique classification system for staging: Stage I, disease limited to ovaries; Stage II, tumor extended to the pelvis; Stage III, intraperitoneal dissemination; and Stage IV, distant metastases. Disease-free survival and overall survival (OS) estimates were calculated by Kaplan-Meier analysis. Disease-free survival period was defined from the date of complete remission to the date of recurrence, death, or last disease-free visit (months). OS period was defined from the date of registration to the date of death or last visit (months). Data were updated to December 31, 2009.

3. Results

The patient data are summarized in Table 1. The median age at presentation was 13 years (range, 3—17 years). The most common presenting symptoms, in descending order, were abdominal pain in 10 patients (66.7%), abdominal fullness in 6 (40%), abdominal mass in 3 (20%), fever in 3 (20%), and body weight loss in 2 (13.3%). Other symptoms included decreased appetite, pale face, and constipation. Ten patients (66.7%) had left ovarian involvement, and five patients (33.3%) had right ovarian involvement.

Tumor markers of alpha-fetoprotein (AFP) and β-human chorionic gonadotropin (β-hCG) were measured at diagnosis in 11 patients. The serum AFP and β-hCG were tested by radioimmunoassay. We found that seven patients had high AFP levels (range, 54.2—more than 10,000 ng/mL; five of them had more than 10,000 ng/mL, three of those five had 20,334 ng/mL, 79,658 ng/mL, 397,160 ng/mL, respectively; for two patients, no further dilution was done). There were three patients who had high β-hCG levels (range, 23.9—165 mU/mL). Two patients had normal AFP and β-hCG levels. Diagnostic imaging, including abdominal echogram and abdominal computed tomography, was performed in all patients.

All patients received surgery. Ten patients had received unilateral salpingo-oophorectomy. Three patients had received excision of tumor, and one patient received unilateral oophorectomy. Bilateral salpingo-oophorectomy was performed in one patient. The pathologic diagnoses were yolk sac tumor in four, immature teratoma in four, dysgerminomas in three, malignant mixed germ cell tumors in three, and carcinosarcoma in one patient. Germ cell tumors comprised 93% of all malignant tumors. According to the Federation Internationale de Gynecologie Oncologique staging system, seven girls were classified as Stage I, one as Stage II, and seven as Stage III.

Thirteen of 15 patients received chemotherapy with platinum-based regimens. Twelve of them received bleomycin, etoposide, and cisplatin regimen, and the patient who had the diagnosis of carcinosarcoma received ifosfamide and cisplatin regimen. Number of cycles for chemotherapy was ranging from two to six. No major acute toxicity and no treatment-related deaths were observed.

One patient who was diagnosed with Stage I yolk sac tumor was found to have relapsed with peritoneal seeding after being off of chemotherapy for 25 months. She received further chemotherapy with cisplatin, ifosfamide, and etopisde for six cycles and had no evidence of disease till the date we analyzed. Three patients died of their disease: one of yolk sac tumor, one of mixed germ cell tumor, and one of carcinosarcoma. They were all in Stage III at diagnosis. Two of them received bleomycin, etoposide, and cisplatin regimen for four cycles, and the other received ifosfamide and cisplatin for three cycles. The 10-year OS and disease-free survival rates were 77% and 69%, respectively (Figure 1).

4. Discussion

Malignant ovarian tumors in children are relatively rare, representing approximately 1% of all childhood malignant tumors.[3] There were only 15 pediatric malignant ovarian tumor patients treated in our institution during the 15-year study period. These tumors were mostly diagnosed in adolescents between 16 years and 20 years.[4] In our study, the median age at presentation was 13 years.

The presenting symptoms are often nonspecific. The most common presenting symptoms in our patients were abdominal pain, followed by abdominal fullness and abdominal mass. Patients will become acutely symptomatic if they undergo hemorrhage, torsion, or rupture.[5,6] Most of the malignant ovarian tumors presented as unilateral masses. Metastasis at diagnosis and bilateral involvement were rare, consistent with other reports.[7]

Most malignant ovarian tumors in childhood and adolescence are germ cell tumors. Norris and Jensen[8] reviewed 353 ovarian tumors in young females and found germ cell tumors composed 80% of the preadolescent malignant ovarian tumors. Hassan et al[9] reported germ cell tumors comprised 49.1% of all malignant ovarian tumors in girls through age 19. Schultz et al[10] found that 67.5% of pediatric malignant ovarian tumors were germ cell tumors. In our study, germ cell tumors comprised 93% of all