







# Clinical characteristics of ovarian cancer in children under 17 years of age

## Características clínicas del cáncer de ovario en menores de 17 años

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### Abstract

**Background:** Ovarian cancer in children under 17 years of age is rare. Mexico occupies the 12<sup>th</sup> place in mortality, with 1455 reported cases. **Objectives:** The objective of the study is to identify the clinical characteristics of ovarian cancer in children under the age of 17 treated at a tertiary Hospital of Instituto Mexicano del Seguro Social, from 2017 to 2023. **Methods:** A descriptive, cross-sectional, retrospective study was conducted at a tertiary unit that receives patients from Puebla, Tlaxcala, Oaxaca, and Veracruz. Patient records with biopsy diagnoses from 2017 to 2023, under 17 years old, were included in the study. The Statistical Package for the Social Sciences for IBM v.25 program was utilized for data analysis. **Results:** Six patients were identified, mean age of 16 years. The most frequent symptomatology was pelvic pain, abdominal distension, and pelvic mass in 100%; constipation (66.7%), weight loss, fever, dyspepsia, and pollakiuria (50% each); ascites (16.7%). The most frequent histologic type was dysgerminoma (83.3%). The International Federation of Gynecology and Obstetric classification at diagnosis was stage IA (one patient), IB (3), IV (1), and IIIA2 (1). The treatment was salpingo-oophorectomy plus omentectomy. **Conclusion:** Ovarian cancer is rare in children. The most frequent symptoms are pelvic pain, distension, and pelvic mass. The most frequent histologic type is dysgerminoma.

**Keywords:** Ovary. Dysgerminoma. Neoplasms. Adolescent.

### Resumen

**Antecedentes:** El cáncer de ovario en menores de 17 años raro. México ocupa el decimosegundo lugar de mortalidad, con 1455 casos reportados. **Objetivo:** Identificar las características clínicas del cáncer de ovario en menores de 17 años tratadas en un Hospital terciario del Instituto Mexicano del Seguro Social de 2017 al 2023. **Método:** Estudio descriptivo, transversal, retrolectivo en una unidad terciaria que recibe pacientes de Puebla, Tlaxcala, Oaxaca y Veracruz. Se incluyeron expedientes de pacientes con diagnóstico por biopsia del 2017 al 2023, menores de 17 años. Se utilizó el programa SPSS para IBM v.25. **Resultados:** Se identificaron 6 pacientes con edad media 16 años. La sintomatología más frecuente fue dolor pélvico, distensión abdominal, masa pélvica en 100% de los pacientes; estreñimiento (66.7%), pérdida de peso, fiebre, dispepsia, polaquiuria (50% cada uno); ascitis (16.7%). Tipo histológico más frecuente: dysgerminoma (83.3%). La clasificación de

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Date of reception: 27-08-2024

Date of acceptance: 04-09-2024

DOI: 10.24875/AMH.M24000086

Available online: 07-11-2024

An Med ABC. 2024;69(4):298-301

[www.analesmedicosabc.com](http://www.analesmedicosabc.com)

International federation of gynecology and obstetrics (FIGO) al diagnóstico fue en etapas IA (1 paciente), IB (3), IV (1) y IIIA2 (1). El tratamiento fue salpingooferectomía más omentectomía. **Conclusión:** El cáncer de ovario es poco frecuente en niños, las características clínicas más frecuentes son dolor pélvico, distensión y masa pélvica; la estirpe histológica más frecuente es el disgerminoma.

**Palabras clave:** Ovario. Disgerminoma. Neoplasias. Adolescente.

## Introduction

Ovarian cancer is the fifth most common neoplasm in women. The International Agency on Cancer reported 97 new cases in Mexico in 2020, between the ages of 0 and 19 years<sup>1</sup>. The ovary presents a wide range of malignant neoplasms, divided into epithelial cancer, germ cell tumors, stromal tumors of the sexual cords, and clinical carcinomas<sup>2</sup>. Germ cell tumors are the most common invasive cancers in children under 18 years (up to 50%) and those who had epithelial origin were 30 years of age (more than 90%)<sup>3</sup>. The etiology is unknown, but it is believed to be the cause of many cancers.

The etiology is unknown, but it originates from the surface of the ovarian epithelium or inclusion cysts. During ovulation, epithelial cells are internalized and damaged, and tissue repair mechanisms produce cells with an increased risk of mutation and neoplasia<sup>4</sup>.

The objective of this study was to identify the clinical characteristics of ovarian cancer in children under the age of 17 treated at a tertiary Hospital of Instituto Mexicano del Seguro Social in Puebla, México, from 2017 to 2023.

## Methods

This is a descriptive, cross-sectional, ambispective study in a tertiary hospital of the Instituto Mexicano del Seguro Social in Puebla, Mexico.

We reviewed the records of patients with a diagnosis of ovarian cancer, aged 9-17 years, who were seen from 2017 to 2023. Patient records without a histopathology report or with incomplete information for any reason were excluded.

Clinical presentation, age at diagnosis, and histologic type were evaluated.

Descriptive statistics were used. Data were processed using the Statistical Package for the Social Sciences for IBM version 25.

This study was approved by the Health Research Committee 2101 of the Instituto Mexicano del Seguro Social (Registration R-2023-2101-030). Patient data were treated with strict confidentiality and used only for research purposes.

## Results

We reviewed six patient files with a mean age of 16 years. The most common histopathologic diagnosis was dysgerminoma in 5 (83.3%) of the sample. One patient presented three histological types: Mucinous, borderline, and adenocarcinoma. Another patient had endometrioid and dysgerminoma. The distribution according to the International Federation of Gynecology and Obstetric classification was early-stage IA (1), IB (3), IV<sup>1</sup>, and IIIA2<sup>1</sup> at the time of diagnosis.

The presence of a mass, pelvic pain, and abdominal distention was noted in 100% of the patients, and constipation in 4 (66.7%), dyspareunia, ascites, and amenorrhea were the least frequent features (Fig. 1).

Tumor markers were reported to be elevated in 4 patients (66.6%) and human gonadotropic hormone was elevated in 3 (50%) of the patients. The predominant surgical treatment was salpingo-oophorectomy plus omentectomy.

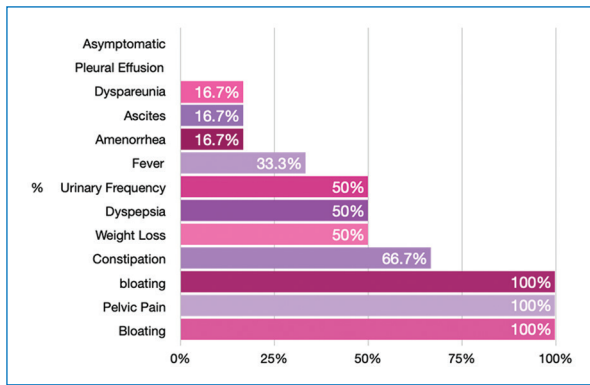
The frequency per affected ovary is shown in Fig. 2. Bilateral presentation was observed in 2 patients (33.3%).

It is also remarkable the case of a patient in whom ovarian cancer was an incidental diagnosis during her treatment for type B acute lymphoblastic leukemia. It was during her chemotherapy that she presented the symptomatology of pain, pelvic mass, and nocturnal fever.

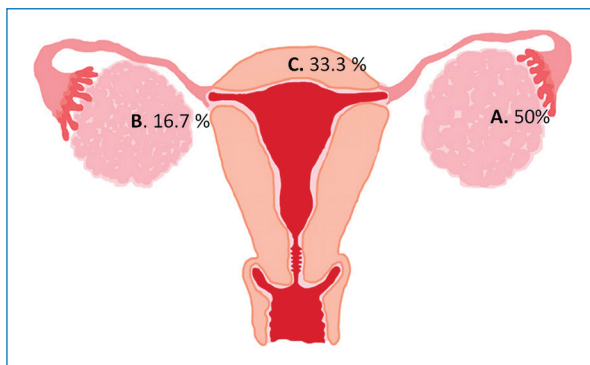
## Discussion

Ovarian cancer is one of the most common malignant neoplasms in women, and although it is not one of the main cancers in girls, its frequency is increasing<sup>5</sup>. It is estimated to have an incidence of 2.6 cases/100,000 children; and approximately 1% of all malignant pathologies in patients under 17 years<sup>6</sup>. Reports in Mexico are scarce and not recent. Therefore, this study aims to present the cumulative casuistry of ovarian cancer in children under 18 years in a tertiary public hospital from 2017 to 2023.

The most malignant types of tumors in pediatric population are germinal or stromal origin, compared to adults, which are epithelial type<sup>7</sup>. The Colegio Mexicano de Especialistas en Ginecología y Obstetricia (COMEGO)



**Figure 1.** Clinical presentation.



**Figure 2.** Frequency of affected organ. **A:** left ovary 50%; **B:** right ovary 16.7%, and **C:** bilateral ovary 33.3%.

states that germ cell tumors represent 20-25% of ovarian tumors, mainly in girls and young women<sup>8</sup>. In this population, the highest frequency was recorded by dysgerminoma, with 35%.

The COMEGO and clinical practice guidelines state that all patients with suspected ovarian cancer should undergo basic laboratory tests, serum levels of the tumor marker CA-125, and office studies such as chest x-ray, pelvic ultrasound, and axial tomography<sup>9</sup>. Tumor markers do not confirm the diagnosis of ovarian cancer.

Tumor markers do not confirm the benignity or malignancy of the tumor, but they help to guide the diagnosis<sup>10</sup>. The most commonly used are  $\alpha$ -fetoprotein,  $\beta$ -subunit of human chorionic gonadotropin, and lactate dehydrogenase. In this study, most of them were elevated<sup>11</sup>.

The definitive diagnosis requires histopathologic examination after surgical resection or by ultrasound-guided fine-needle biopsy<sup>10</sup>.

In a review of 6 years (1998-2004) in Mexican girls with ovarian neoplasms, the prevalence of malignant

tumors was 34% of reported cases (16 cases), of which 56% were dysgerminomas<sup>12</sup>. Furthermore, in the present study, the most common histologic type was dysgerminoma (83.3%), and only two of the patients presented mixed type.

Ovarian dysgerminoma is one of the rarest malignant tumors in the general population. They are found at a relatively early stage with a more non-specific presentation in patients > 22 years. They originate from primary germ cells and are characterized by well-defined cells and abundant clear or eosinophilic granular cytoplasm rich in glycogen<sup>10,13</sup>. They spread in various routes (peritoneal seeding, intra-abdominal, and local extension) to adjacent structures such as the intestine, fallopian tubes, uterus, and bladder; by lymphatic route, they spread to lymph nodes, pelvic and retroperitoneal nodes<sup>14</sup>. Tumor cells can reach from the pelvis to the lower surface of the diaphragm, so large or small implants in the abdominal cavity are common<sup>15</sup>. No dissemination of primary tumors is reported in the present work.

Ascites and pleural effusion as a consequence of lymphatic obstruction<sup>16</sup> occurred in only one case in this population.

The presentation of ovarian cancer is subacute, and what orients the diagnosis is the presence of a palpable abdominal and/or pelvic mass, dull abdominal pain, bleeding, rarely vaginal bleeding, and constipation<sup>10</sup>. The abdominal mass is usually solid, lobulated, with defined borders, located in the abdominopelvic cavity<sup>17</sup>. In the present series of cases, all patients presented these symptoms, with variable frequency.

Surgery plays an important role in the treatment of ovarian tumors as it helps in the diagnosis and staging of patients. A salpingo-oophorectomy is performed by laparotomy or laparoscopic approach<sup>11,18</sup>.

Surgery in these patients allowed staging and treatment at an early stage.

Multiple primary tumors are very rare. In this case series, two patients with two simultaneous primary tumors stand out; they are called synchronous if both ovaries are involved within a period of < 6 months, and metachronous if it is more than 6 months. The most common presentation is the ovarian-endometrial binomial<sup>19</sup>. Synchronous double primary tumors occur in 10% of ovarian cancer cases and 5% of endometrial cancer cases. The incidence of synchronous tumors in adults is 0.7%. In this study, it occurred in pediatric age and both ovaries, making it the only reported case of this type<sup>20</sup>.

## Conclusion

Ovarian cancer in childhood has a low incidence. The most common symptoms are pelvic pain, bloating, and the presence of mass. The most common histological type is dysgerminoma.

## Funding

The authors declare that they have not received funding.

## Conflicts of interest

The authors declare no conflicts of interest.

## Ethical disclosures

**Protection of human and animal subjects.** The authors declare that no experiments were performed on humans or animals for this study.

**Confidentiality of data.** The authors declare that no patient data appear in this article. Furthermore, they have acknowledged and followed the recommendations as per the SAGER guidelines depending on the type and nature of the study.

**Right to privacy and informed consent.** The authors declare that no patient data appear in this article.

**Use of artificial intelligence for generating text.** The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript nor for the creation of images, graphics, tables, or their corresponding captions.

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