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CASUISTRY

Secondary malignant transformation of testicular teratomas: Case series and literature review☆

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KEYWORDS
Teratoma;
Testicle;
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Abstract
Background: Teratomas are a spectrum of neoplasms that can undergo malignant transformation. In the World Health Organization (WHO) classification of tumors, this entity was classified as ''teratoma with somatic-type malignancy'', was defined as a malignant neoplasm of non-germinal phenotype that originates in a teratoma.
Materials and methods: We present a series of nine cases of testicular teratomas with secondary malignant transformation. From January 1995 to December 2011, we found a total of 306 cases of testicular tumors. Mixed germ cell tumors were the most frequently diagnosed malignancy with 45.7%.
Results: Teratoma with secondary malignant transformation, represented 2.9% of all germinal tumors. Five cases originated within a mixed germ cell tumor, two cases from mature teratomas, and two from immature teratomas. The predominante malignant somatic component were sarcomas; two cases of chondrosarcoma, one rhabdomyosarcoma, and one case showing foci of chondrosarcoma and rhabdomyosarcoma. The case of osteosarcoma is notable for its rarity. Two cases showed epithelial malignancy in the form of an adenocarcinoma, and finally, two cases were primitive neuroectodermal tumors. At the time of diagnosis, five patients had metastases.
Conclusion: The transformation of germ cell tumors to somatic type malignancies is rare. The malignant component can originate from any of the three germ lines. These tumors are resistant to standard chemotherapy for a germ cell tumor and the clinical stage is the most important prognostic factor. At our institution, the malignant component that appeared most frequently was chondrosarcoma.

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PALABRAS CLAVE
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Transformación maligna secundaria de teratomas testiculares: serie de casos y revisión de la literatura

Resumen

Antecedentes: Los teratomas son un espectro de neoplasias que pueden sufrir una transformación maligna. En la clasificación de la Organización Mundial de la Salud (OMS) de los tumores esta entidad fue clasificada como «teratoma con malignidad de tipo somático», se definió como una neoplasia maligna de fenotipo no germinal que se origina en un teratoma.

Materiales y métodos: Se presenta una serie de 9 casos de teratomas testiculares con transformación maligna secundaria. Entre enero de 1995 y diciembre de 2011 encontramos un total de 306 casos de tumores testiculares. Los tumores de células germinales mixtas fueron el tumor maligno más frecuentemente diagnosticado con un 45.7%.

Resultados: El teratoma con transformación maligna secundaria representó el 2.9% de todos los tumores germinales. Cinco casos se originaron dentro de un tumor de células germinales mixtas, 2 casos de teratomas maduros y 2 de teratomas inmaduros. El componente somático maligno predominante eran los sarcomas; 2 casos de condrosarcoma, uno de rabdomiosarcoma y un caso que muestra focos de condrosarcoma y rabdomiosarcoma. El caso de osteosarcoma se destaca por su rareza. Dos casos mostraron malignidad epitelial en la forma de un adenocarcinoma y, finalmente, 2 casos eran tumores neuroectodérmicos primitivos. En el momento del diagnóstico 5 pacientes tenían metástasis.

Conclusión: La transformación de los tumores de células germinales en tumores malignos de tipo somático es poco común. El componente maligno puede proceder de cualquiera de las 3 líneas germinales. Estos tumores son resistentes a la quimioterapia estándar para un tumor de células germinales, y el estadio clínico es el factor pronóstico más importante. En nuestra institución el componente maligno que apareció con mayor frecuencia fue el condrosarcoma.

Introduction

Testicular tumors are the most common neoplasia in adolescents and young adult males.[1,2] Over 95% of all testicular tumors are of germline origin.[3,4] Teratoma is the second most frequent germ cell testicular tumor in pediatric patients (endodermal sinus tumor is the most common). In this age group it is presented as a pure neoplasm, with a median age of 13 months and it is rare in children older than 4 years.[5] In contrast, testicular teratoma in adolescents and young adults is presented as a component of a mixed germ cell tumor found in more than half of mixed germ cell tumors.[6] Most prepubertal teratomas contain only mature tissue elements and have a benign behavior regardless of their mature or inmature components.[7] By contrast, postpubertal teratomas are immature, and even those that are mature in adults have a high risk of metastasis; therefore, the lack of maturity of the teratoma components is not a direct indication of their biological behavior; the age of the patient is of greater importance. Teratomas are a spectrum of malignancies that may undergo malignant transformation. Friedman and Moore in 1946 reviewed 922 testicular tumors at the Institute of Pathology of the Armed Forces (IPFA) finding some cases of teratoma with malignant components such as carcinoma, rhabdomyosarcoma, and neuroblastoma, but they gave no details on the pathological findings or their clinical issues.[8] Mostofi and Price in 1973 recognized the existence of teratomas with malignant transformation; however, the information on these cases was very scarce.[9] In 2004, in the classification of the World Health Organization (WHO) of the tumors, this entity was classified as 'teratoma with somatic type malignancy' and it was defined as a neoplasia of not germinal phenotype that originates from a teratoma.[10,11]

Materials and methods

Subjects and study design

This is a retrospective descriptive study. We report a series of 9 cases of testicular teratomas with secondary malignant transformation, diagnosed at the Department of Pathology and Cytopathology of Dr. José E. González of the University Hospital of Monterrey, Mexico, reviewing the final diagnoses of all the testicular samples sent to our laboratory during the period between January 1995 and December 2011.

Histopathology

All cases correspond to radical orchiectomy specimens that were reviewed by a pathologist with expertise in uropathology. All specimens were fixed in 10% formaldehyde. In each case, a section for each centimeter of tumor size was included, with an average of 10 sections of different areas of the tumor, including sections of the tumor and the adjacent testicular parenchyma and epididymis. The specimens were processed and embedded in paraffin, paraffin blocks were formed, and 5-micrometer-thick histological sections were prepared, undergoing the histological technique, and they were stained with hematoxylin and eosin. Additional