Metastatic tumors to the testis

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ABSTRACT

Metastatic tumors to the testis, with the exception of lymphoma and leukemia, are extremely rare. The majority of these cases present at autopsy in approximately 2.5% of men with malignant tumors, or they are incidentally detected during therapeutic orchiectomy for prostate cancer. Only a small subgroup of patients has clinical manifestations of testicular metastases.

This article presents 3 cases of metastatic tumors to the testis. The first case is a 42-year-old man diagnosed with metastatic prostate adenocarcinoma who underwent simple bilateral orchiectomy as androgen deprivation therapy. The histopathologic report stated metastatic prostate adenocarcinoma in the right testis. The second case involved an 83-year-old man diagnosed with high-risk prostate adenocarcinoma who underwent simple bilateral orchiectomy. The histopathologic study revealed metastasis and vascular invasion of prostate carcinoma into the testicular parenchyma of the right testis.

Resumen

Los tumores metastásicos a testículo, excluyendo al linfoma y la leucemia son extremadamente raros. La mayoría de estos casos se presentan en la autopsia en cerca del 2.5% de los hombres con tumores malignos, o son incidentalmente detectados durante la orquitectomía terapéutica por cáncer de próstata (CaP). Sólo un pequeño subgrupo de pacientes tiene manifestaciones clínicas de metástasis testiculares.

Presentamos tres casos de tumores metastásicos a testículo. El primero es un paciente masculino de 42 años de edad con diagnóstico de adenocarcinoma de próstata metastásico, a quien se realizó orquiectomía simple bilateral como terapia de supresión androgénica, con reporte histopatológico de testículo derecho con metástasis de adenocarcinoma prostático.

El segundo caso es un paciente masculino de 83 años de edad con diagnóstico de adenocarcinoma de próstata alto riesgo, a quien se le realiza orquiectomía simple bilateral, teniendo como hallazgo histopatológico en el testículo,
The third case was a 69-year-old man diagnosed with a right renal tumor with left pulmonary metastasis. The patient underwent radical nephrectomy and then pulmonary metastasectomy that revealed Fuhrman 4 renal cell carcinoma (RCC) with renal vein invasion and metastatic RCC to the lung, respectively. He presented with recurrence in the contralateral lung and in the brain and was managed with Sunitinib for 4 months. The patient later presented with pain and increased volume and consistency of the right testis and evaluation protocol was carried out. Right orchiectomy was performed and metastatic RCC was reported. In general, the most common primary sites are the prostate, followed by the lung, kidney, melanomas, and the gastrointestinal tract. Bilateral involvement presents in approximately 15% of cases. The high percentage of testicular metastases from prostate cancer is partially a result of the examination of a larger number of testes in tumor patients that underwent therapeutic orchiectomy. In the cases presented herein, once testicular metastases were demonstrated pathologically, other coexisting metastases were always present, terminating in poor survival outcome for the patients.

Keywords: Testicular metastases, kidney, prostate, Mexico.

INTRODUCTION

Metastatic tumors to the testis, with the exception of lymphoma and leukemia, are extremely rare. The majority of these cases are identified during autopsy in approximately 2.5% of the men presenting with malignant tumor, or are incidentally detected during therapeutic orchiectomy for prostate cancer (PCa). On occasion they can simulate primary testicular tumors, even in patients presenting with known extratesticular tumors, but there is limited information available on this subject.

In general they are produced by tumors of the prostate (36.4%), lung (17.3%), kidney (9%), melanomas (8.2%), and the digestive tract (8%). Much less frequent, although occasionally described, are tumors of the bladder, pancreas, rectum, and penis.

Various theories attempt to explain how the solid tumors metastasize to the testis, because the dissemination mechanisms vary with the location and type of the primary tumor. Arterial embolization, venous and lymph node dissemination, and extension along the vas deferens to the epididymis and rete testis stand out among the different routes and do not exclude one another.

CASE PRESENTATION

CASE 1

The patient is a 42-year-old man with a past medical history of smoking one pack of cigarettes a day since he was 16 years old and continuing to the present and type 2 diabetes mellitus treated with oral hypoglycemic agents. He presented with a right testicular swelling and a firm mass. The patient was managed with Sunitinib for 4 months. The patient later presented with pain and increased volume and consistency of the right testis and evaluation protocol was carried out. Right orchiectomy was performed and metastatic RCC was reported. In general, the most common primary sites are the prostate, followed by the lung, kidney, melanomas, and the gastrointestinal tract. Bilateral involvement presents in approximately 15% of cases. The high percentage of testicular metastases from prostate cancer is partially a result of the examination of a larger number of testes in tumor patients that underwent therapeutic orchiectomy. In the cases presented herein, once testicular metastases were demonstrated pathologically, other coexisting metastases were always present, terminating in poor survival outcome for the patients.

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agents. Disease onset began with urinary frequency and acute urine retention after alcohol ingestion that required temporary transurethral catheter placement. His symptoms persisted upon its removal. Prostate specific antigen (PSA) was determined at 68 ng/mL for which the patient was sent to the Institute. Physical examination revealed a prostate that was fixed and completely hard. An ultrasound-guided transrectal biopsy was carried out and the histopathologic report stated poorly differentiated acinar adenocarcinoma of the prostate and a Gleason score of 9 (4 + 5), with perineural infiltration, lymphovascular permeation, and extraprostatic invasion.

The patient complained of bone pain in the lumbar region and in the right sacroiliac joint. Bone scintigraphy was positive for metastatic bone disease.

The patient was treated with simple bilateral orchiectomy as androgen deprivation therapy and the histopathologic study reported metastasis in the right testis from prostate adenocarcinoma (Figure 1) and involutional changes in the left testis in accordance with age. The patient progressed to hormone-refractory disease within six months.

CASE 2

The patient was an 83-year-old man with a past medical history of high blood pressure and type 2 diabetes mellitus. Disease onset began with obstructive lower urinary tract symptoms for which he sought medical attention. PSA level was determined at 112 ng/mL and physical examination revealed a grade IV prostate that was hard and fixed. An ultrasound-guided transrectal biopsy of the prostate was carried out and the histopathologic study reported adenocarcinoma of the prostate and a Gleason score of 8 (4+4) in 70% of the fragments studied. Extension studies were later carried out and bone scintigraphy was negative for metastatic pathology.

The patient was classified as high risk and because of his age was first offered pharmacologic androgen deprivation. He later underwent simple bilateral orchiectomy and the histopathologic finding in the right testis was: metastasis of the testicular parenchyma and vascular invasion from carcinoma of the prostate (Figure 2), and in the left testis: involutional changes in accordance with age. The patient progressed to castration-resistant disease within eight months and is currently being managed with second line hormonal therapy.

CASE 3

The patient is a 69-year-old man with a past medical history of unstable angina with three cardiac catheterizations and two angioplasties and is being managed with antiplatelet drugs and beta blockers.

Disease onset began with abdominal pain in the hypogastrum, nausea, vomiting, and one occasion of scant hematuria and the patient sought medical attention. Prostate specific antigen (PSA) was determined at 68 ng/mL for which the patient was sent to the Institute. Physical examination revealed a prostate that was fixed and completely hard. An ultrasound-guided transrectal biopsy was carried out and the histopathologic report stated poorly differentiated acinar adenocarcinoma of the prostate and a Gleason score of 9 (4 + 5), with perineural infiltration, lymphovascular permeation, and extraprostatic invasion.

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of the capsule and renal sinus, infiltration into the perirenal adipose tissue, and invasion of the renal vein and Gerota's fascia. The adrenal gland was tumor-free. The patient had adequate postoperative progression and eight weeks later he underwent a left posterolateral thoracotomy with metastasectomy that revealed a 2 cm intraparenchymatous lesion in the anterior segment of the left upper lobe. The histopathologic report was clear cell renal cell carcinoma.

The patient was kept under active surveillance and 9 months later presented with recurrence in the contralateral lung and underwent right posterolateral thoracotomy with metastasectomy that revealed metastatic lesions in the upper and lower lobes. There were a total of 10 lesions and the largest was 0.8 cm. All were resected.

Five months later the patient presented with headache, deterioration in his mental alertness status, dyslalia, and gait disturbance. A cranial tomography scan showed extensive hemorrhaging in the cerebellum that was managed conservatively. Three weeks later a magnetic resonance image was taken that showed a hyperintense lesion in T1 consistent with subacute hemorrhage. When contrast medium was passed the image was enhanced at the level of the cerebellar vermis, and it was concluded that the lesion was metastasized from an unknown primary tumor.

The patient was evaluated by a radio-oncologist who administered holocranial external radiotherapy.

Ten months later pulmonary progression (left paraaortic and adjacent to the pericardium, both in the left lung) was documented. These lesions were considered to be unresectable and molecular target therapy was begun with sunitinib.

After four months, the patient presented with pain and increased volume in the right testis. Ultrasound showed a heterogeneous image confined to the lower pole in the right testis (Figure 3). Doppler ultrasound did not show the vasculature. Orchiepididymitis was first considered, but nevertheless right orchiectomy was performed due to treatment refractoriness, an increase in symptoms, and the ultrasound finding. The orchiectomy findings were an enlarged right testis with gonadal and epididymal induration.

The histopathologic study reported metastasis from clear cell renal cell carcinoma (Figure 4) and the tumor measured 3.3 x 2.7 cm.

**DISCUSSION**

The testes are organs that rarely present with metastases, and this infrequent incidence is apparently due to the lower temperature of the scrotum.2

Metastases to the testis, with the exception of lymphoma and leukemia, are rare. These lesions are typically incidental findings at autopsy in approximately 0.02% to 0.06% of men presenting with malignant tumors. The relation can be as high as 2.5%, if the testicular slices are very thin.5

The high percentage of prostate cancer that metastasizes to the testes is partially due to the fact that a greater number of testes are examined in patients with tumors that have undergone orchiectomy as androgen deprivation therapy.6

Hormone therapies have lengthened the course of prostate cancer, possibly allowing there to be more time for the development of testicular metastases. This illustrates the importance of the histopathologic study and the care of the testes that have been removed as hormone management in cases of carcinoma of the prostate.

Differential diagnosis between primary and secondary carcinomas is necessary because primary tumors can be cured. In reference to clinical characteristics, metastatic carcinoma to the testis can become large enough to simulate a primary testicular tumor macroscopically, making its distinction from a primary testicular tumor difficult. The patient’s age can play an important role in differentiating a primary tumor from a secondary one. Patients with primary testicular tumors are generally young.1

Survival after diagnosis is usually under one year.7

In regard to histopathologic characteristics, the absence of intratubular malignant germ cells (cells that are believed to be the precursors of germ cell tumor lesions), as well as epithelial membrane antigen positivity and placental alkaline phosphatase (PLAP) negativity,1 increase the possibility of metastatic tumor.
In relation to the first and second case presentations, the medical literature reports only 80 cases of prostate cancer with testicular extension. In reference to the second case, approximately 21 cases of intrascrotal metastases from a renal tumor have been reported. Disease in the majority of the testes is ipsilateral and affects the left testis, which can be explained by taking into account the possible dissemination routes. The most plausible route appears to be that of the spermatic vein, which through a retrograde flow, sometimes coinciding with the presence of varicocele, would facilitate the arrival of cell implants to the testis; and therefore the ipsilateral left side would be the most frequently affected. Even though the majority have been described in patients with prolonged disease progression with a past history of renal carcinoma of up to seven years, there are cases in which the first manifestation of renal tumor was the appearance of the testicular implantation.

CONCLUSIONS

Metastases to the testis are rare and the most frequently documented are those from tumors originating in the prostate. Nevertheless, it should be kept in mind that with the pathologic study of specimens resulting from orchietomy as androgen deprivation therapy it is feasible to document a greater number of metastatic cases. It should also be noted that in the cases presented herein once testicular metastases were pathologically demonstrated, coexisting metastases always existed, resulting in poor disease outcome.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

FINANCIAL DISCLOSURE

No financial support was received in relation to this article.

REFERENCES