Case – "Burned-out" testicular tumor: A rare entity with diagnostic dilemma

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Introduction

Most testicular cancers are germ cell tumours (GCTs), which occur in men aged 15–35 years, with germ cell histology accounting for 90% of testicular tumors. Risk factors for developing testicular cancer may include Klinefelter syndrome, history of cryptorchidism, positive family history of testicular cancer, and infertility.[1-3] The two most common histological patterns are non-seminomas, which account for approximately 40–45% of cases, with a peak incidence at 25 years; and seminomas, which represent the other 55–60% of cases and have a peak incidence at 35 years of age. For patients with advanced GCTs, the five-year overall survival probabilities are 98%, 96%, and 66% for patients in good, intermediate, and poor-risk groups, respectively, based on the International Germ Cell Cancer Collaborative Group (IGCCCG) classification.[3-6] The treatment of advanced germ cell malignancies involves chemotherapy or radiation therapy, both of which can contribute to serious long-term complications.[7-10]

Spontaneous tumor regression has been described as a "burned-out" testicular tumor, where there is a partial or complete regression of the tumor.[2,11] Patients with burned-out testicular tumors can present without a clinically apparent tumor in the scrotum but usually have metastasis to other sites, such as retroperitoneal and mediastinal lymph nodes.[12,13] Patients may also present with elevated tumor markers and inconclusive findings on scrotal ultrasound. Most patients will proceed to radical orchidectomy and retroperitoneal lymph node biopsy (RPLND) to establish the diagnosis in the retroperitoneum. The most common histological type of testicular tumor associated with a burned-out primary is seminoma followed by embryonal carcinoma. The most common histological features seen with burned-out testicular tumors are testicular atrophy, scar formation, lymphoplasmacytic infiltrates, and intratubular calcifications.[11]

KEY MESSAGES

- A "burned-out" testicular tumor presents with an interesting therapeutic dilemma, with spontaneous regression of retroperitoneal lymph nodes.
- The most common histological type of testicular tumour associated with a burned-out primary is seminoma followed by embryonal carcinoma.
- The most common histological features seen with burned-out testicular tumors are testicular atrophy, scar formation, lymphoplasmacytic infiltrates, and intratubular calcifications.
- A patient with normal tumor markers and a burned-out testicular tumour requires lymph node biopsy for diagnosis. Retroperitoneal lymph node dissection can be useful to remove all metastatic disease, and may avoid the toxicity associated with cisplatin-based chemotherapy.

We present a case of a burned-out testicular GCT with involvement of retroperitoneal lymph nodes that also spontaneously regressed. We discuss the treatment approach taken in this rare case of advanced GCT with an unusual presentation.

Case report

A 34-year-old male presented to the hospital after an all-terrain vehicle rollover accident. He underwent computed tomography (CT) imaging of the chest, abdomen, and pelvis and was incidentally found to have two periaortic lymph nodes (largest 2.1 cm, as shown in Figure 1) and a fracture of the transverse process of L1–L4. No other trauma-related injuries were noted. He denied any prior abdominal discomfort, distention, nausea, fever, or loss of appetite. The patient had no prior significant past medical history or risk factors for testicular cancer. He had not noted any previous testicular discomfort or swelling.

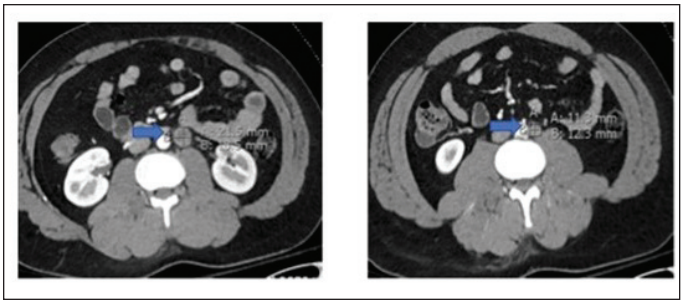

Figure 1. Computed tomography scan of abdomen showing two paraaortic lymph nodes (2.1x1.8 cm and 1.1x1.2 cm).

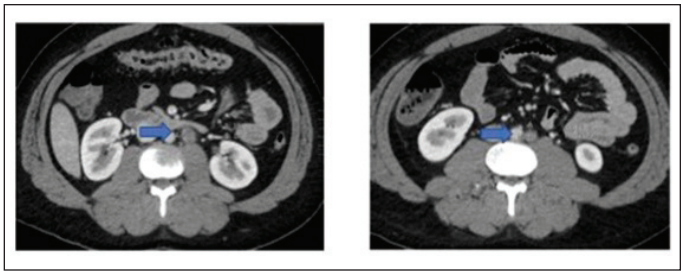

Figure 2. Followup computed tomography scan showing regression in the size of the paraaortic lymph nodes (1.5 cm and 1.1 cm in short axis, respectively).

The levels of baseline tumor markers were as follows:

- Lactate dehydrogenase (LDH): 238 U/L (normal values: 100–225 U/L)
- α-fetoprotein (AFP): 2 ug/L (normal values: <9 ug/L)
- β-human chorionic gonadotropin (βHCG): <5 IU/L (normal values: <5 IU/L)

Scrotal examination was normal at baseline and abdominal examination was benign, without any palpable masses. Ultrasound of the testes revealed a 1.2x0.7 cm region of subtle decreased echogenicity in the peripheral portion of left testicle extending to the tunica, with no overt mass-like features. The patient underwent an image-guided biopsy of an enlarged periaortic lymph node and pathology confirmed lymph node parenchyma involved with metastatic carcinoma with extensive coagulative-type tumor cell necrosis. This was reviewed by an expert genitourinary (GU) pathologist at a tertiary care center and results confirmed a metastatic carcinoma, most likely an embryonal GCT.

A left radical orchiectomy was subsequently performed, showing testicular parenchymal scarring with no viable tumor or germ cell neoplasia in situ. Repeat imaging was performed two months after the initial CT scan, which revealed spontaneous regression in one of the periaortic lymph nodes from 19 mm to 15 mm (short axis) and stability in the other lymph node (11 mm short axis) (Figure 2). The patient was reviewed at GU multidisciplinary tumor board rounds with input from urologic oncology, medical oncology, radiation oncology, pathology, and radiology. The consensus was to proceed with RPLND dissection to confirm the pathological diagnosis. The patient went for an RPLND and recovered well. The final pathology revealed metastatic GCTs in 3/15 lymph nodes, two of eight paraaortic nodes, and one of four left pelvic lymph nodes. On immunohistochemical staining, the two paraaortic notes stained positive for oct 3/4 cytokeratins and CD117, suggesting this was non-seminomatous differentiation (predominantly embryonal with a small yolk sac focus) in a seminomatous tumor. The one pelvic lymph node was involved with metastatic seminoma.

Postoperatively, the patient's case was again reviewed by the multidisciplinary tumor board and the consensus was to place the patient on a surveillance protocol. Chemotherapy was discussed but given this unique case, the group favored surveillance with close monitoring. The patient was followed with repeat imaging in three months after his surgery, which revealed no evidence of disease recurrence. The patient's tumor markers have remained normal throughout his treatment course. He will continue on a surveillance protocol.

Discussion

Burned-out testicular tumors with metastases to the retroperitoneal or mediastinal lymph nodes have unique characteristics.[14] A detailed physical examination of the abdomen and scrotum, along with a scrotal ultrasound are imperative as part of the workup in any young male presenting with a retroperitoneal mass.[13] Testicular atrophy and/or microcalcifications may be the only findings on ultrasound, yet a low threshold for radical orchiectomy should be held if the suspicion is high for testicular malignancy, given the high cure rates of this cancer and the need for accurate histological diagnosis.

The management pathway for burned-out testicular tumors with metastatic disease to lymph nodes is typically the same as that for conventional testicular cancer with lymph node involvement. The standard of care, depending on extent of disease, involves chemotherapy or radiation therapy and/or RPLND. Seminomatous and non-seminomatous GCTs have different treatment pathways and thus it is important to identify the histological type to guide management and prognostication, particularly when tumor markers are normal or not clearly demarcating these two types. Patients with seminomatous GCTs with limited retroperitoneal metastasis can be managed by radiotherapy, whereas patients with advanced non-seminomatous GCTs require chemotherapy.[15]

Serum tumor markers have low sensitivity, particularly in patients with seminomatous GCTs, where the markers are likely to be normal, compared to patients with non-seminomatous GCTs, where 85% will have elevated tumor markers.[16] Isolated elevations in serum βHCG levels may be seen with seminoma and/or non-seminoma, whereas elevations in both serum βHCG and AFP levels are likely indicative of non-seminomatous GCTs. Similarly, normal AFP levels are seen in both seminoma with non-seminoma GCTs.[15] Thus, if

serum tumor markers are within normal range, it is essential to get a tissue biopsy to guide management. Conversely, if the tumor markers are elevated (βHCG and AFP) in the presence of a normal testicular exam with retroperitoneal lymph nodes, this may be sufficient for the diagnosis of non-seminomatous GCTs and histological confirmation prior to chemotherapy may not be required.[17]

In this case, we report a 34-year male with incidental findings of retroperitoneal adenopathy and a burned-out testicular primary. This patient had spontaneous regression in the retroperitoneal lymph nodes treated with RPLND. Subsequently, this patient has been able to avoid the short-term and long-term toxicity associat- ed with cisplatin-based chemotherapy, which is the standard treatment for most advanced non-seminomatous GCTs.

Conclusions

The burned-out testicular tumor presents with an interesting therapeutic dilemma, given spontaneous regression of retroperitoneal lymph nodes. These cases require a multidisciplinary approach to review all management options.

Competing interests: Dr. Alimohamed has been an advisory board member for, Astellas, EMD Serono, Pfizer, and Seagen. Dr. Samnani does not report any competing personal or financial interests related to this work.

This paper has been peer-reviewed.

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