**ABSTRACT**

**INTRODUCTION**

Testicular cancer (TC) is defined as a malignant neoplasm of the male sex organ, or testis. TC accounts for 1% of all male cancers (1, 2), is the most common neoplasm among young men between 15 and 34 years old (3). TC is comprised of 80% of all testicular germ cell tumors (TGCTs) (3, 4), and are histologically classified as seminoma, embryonal carcinoma, yolk sac tumor (YST), choriocarcinoma or choriocarcinoma-like (5). Other non-TGCTs include fibrous dysplasia, lymphoma, and those arising from Sertoli and Leydig cells. Among the TGCTs, the most interesting is the YST, which is the most common TC in infants and young children (6). In adults, this pure form of tumor is rare; instead, yolk sac elements frequently occur in combination with embryonic carcinoma making detection of solid YST difficult. However, recent studies in the field of radiology (7) have shown that an algorithm (ARP) with the presence of YST elements within a tumor complex demonstrate that ARP is a very useful marker for the presence of YST and emphasizes the importance of resection and detection of elements (7).

Over the past 20 years, the incidence of TGCTs in developed countries has steadily risen (1, 4). Male Scandinavians have the highest incidence of TC worldwide (3, 4). Even further, the incidence of TGCTs in the U.S. is notably higher among Caucasian men than other ethnicities (5). This may be due to the very low in Asia and Africa. Conrath studies indicate that TGCT incidence is increasing most rapidly among U.S. Hispanic males (9) with a peak incidence between ages 10–20 years.

Research has suggested risk factors that include genetics, familial history, environment, recreational drug use, increased height and body mass index (BMI) (9). However, cryptorchidism is the most well characterized risk factor for TC (11). And TC is 10–40 fold higher in cryptorchid males. As previously mentioned, 10% of YST arise in cryptorchid testes (11). In recent years, genetic disorders such as mutations of the DCC gene (12) and von Willebrand disease (12) have been identified and suggested to be associated with TGCTs (12, 13).

The most common site for TC metastasis is the lymph nodes in the abdomen, but metastasis to the lung, liver, bone and brain can also occur (14, 15). This regards multiple metastatic routes including hematogenous, lymphatic and direct invasion. Men with brain metastases (BM) have a poor overall survival (14). Even further, BM and TGCTs are rare, the best method for management remains uncertain (15). The survivors of TC are at risk of recurrence and a range of other disorders (8). Thus, because of the aggressiveness of TGCTs and their increasing incidence, a more comprehensive understanding of TC metastasis is needed so that clinicians can better diagnose, treat and manage patients.

The present report investigates the unusual case of a 31-year-old male with stage II TGCT and metastases to node, bone, visceral and a large brain tumor, while utilizing imaging to better characterize this disorder.

**METHODS**

**RESULTS**

**DISCUSSION**

**CONCLUSIONS**

**ACKNOWLEDGEMENT**

**REFERENCES**
ABSTRACT

Purpose: The purpose of this investigation was to characterize an unusual case of stage III testicular germ cell tumor (TGCT) in a 31-year-old male with metastases to nodes, bone, viscera and brain, and to understand all possible routes of metastatic disease. Testicular cancer (TC) has an increasing incidence worldwide, and its etiology, risk factors and pathogenesis are not completely understood.

Methods: Medical records were reviewed, and the cadaveric specimen evaluated by physical examination and gross dissection. Paraffin embedded tissue sections of the primary tumor were stained with Hematoxylin and Eosin (H&E) for histological study. To examine metastatic spread, pre- and post-mortem digital radiologic image acquisition was done using x-ray films, and high- resolution CT Scans and MRI Scans. Image analysis, multi-planar reformattting, and three-dimensional (3-D) reconstruction were done on radiographic series.

Results: Dissection showed masses bilaterally from the apex through the lung base; masses on the internal thoracic wall, and hepatomegaly and splenomegaly with multiple tumor masses. Testicular parenchyma was composed of primitive germ cells that formed glomeruloid or embryonal-like structures, as well as areas with a micro-cystic histologic pattern and areas of fibrous dysplasia. Medical imaging 3-D video radiographic dissection was notable for a 38.45 mm diameter, mid-brain tumor; extreme hepatomegaly with numerous tumors, a large penetrating tumor of the left ilium, and multiple tumors throughout both lungs and the thoracolumbar spine (T5-S1).

Conclusion: This study provides insight into the histology and metastatic spread of TGCT that is essential for clinicians to understand in the evaluation and treatment of TC patients.


CORRESPONDENCE

Jose L. Mas, D.V.M.  
Assistant Professor of Clinical Anatomy & Cell Biology  
Indiana University School of Medicine - Northwest  
Dunes Medical Professional Building, Room 3058, 3400 Broadway  
Gary, Indiana 46408-1197 USA  
TEL: 219-981-5625; FAX: 219-980-6566; Email: jmas@iun.edu