



Analysis of the Presenting Symptoms of Testicular Cancers in Young Adults: Ten-Year Experience at the Tri-Service General Hospital

Tsung-Hsun Tsai, Shou-Hung Tang, Yi-Cheng Huang, Seng-Tang Wu, Shang-Sen Lee, Tai-Lung Cha, and Guang-Huan Sun*

Division of Urology, Department of Surgery, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan, Republic of China

Background: Testicular cancers occur most frequently in young adults. Our institute treats most patients with this condition during their compulsory military service, but there are no published data in Taiwan reporting the symptoms and histology in this group. We investigated whether the clinical presentation of these patients correlated with particular types of cancer. **Methods:** Forty-seven patients diagnosed with testicular cancer between 1996 and 2005 were included. Systemic review of the clinical features, demographic data, and diagnoses was performed, and correlations between symptoms and histology were evaluated using the chi-square test. **Results:** Age at diagnosis was 31 ± 13.3 years (mean $\pm$ SD; median 28 years). Only 61.7% of the patients presented with the classic painless enlarged testicle. In 25.6% of patients, scrotal pain with or without enlarged testicles was the first presenting symptom, while 12.8% of patients presented without obvious scrotal symptoms, indicating the need for thorough examination of all patients. The risk of incorrect first diagnosis was 14.9%, which was reduced to 6.4% by preoperative sonography. Embryonal carcinomas were associated with pain at presentation ($p = 0.001$), while seminomas ($p = 0.09$) and mixed germ cell tumors ($p = 0.75$) were not. The overall incidence of each histological type was similar to that of the general population. **Conclusion:** Although the incidence of testicular cancers is low in young adults, a large percentage had pain as the presenting symptom. While embryonal carcinoma may have an increased likelihood of pain on presentation, symptoms did not predict the final diagnosis. A combination of careful history taking, thorough physical examinations, and scrotal sonography will help to minimize the risk of misdiagnosis.

Key words: pain, testicular cancer, young adult

INTRODUCTION

Testicular cancer is a relatively rare malignancy with an incidence of around 100 cases per year in Taiwan¹. It is the most common solid tumor in young males between the ages of 20 and 40². Young males in Taiwan are legally required to undertake military service for one to two years during this period. Our institute is responsible for military referrals and for some civilians with this condition. To date, no data have been published in Taiwan addressing the diagnosis of testicular cancers in this group. In this study, we investigated the characteristics of histology and presenting symptoms in this special population.

METHODS

All patients diagnosed in our institute between 1996 and 2005 with primary malignant testicular neoplasms were enrolled in this retrospective study. Benign testicular tumors were excluded. A systemic review of presenting symptoms, clinical diagnosis, pathological diagnosis and types of treatment was performed. The minimal requirement for the follow-up period was set to one year. Forty-seven patients were included in the study. We divided the patients into four categories based on their presenting symptoms (group A: pain and enlarged testis, group B: painless enlarged testis, group C: painful testis without enlargement, group D: nontesticular symptoms). The analysis focused on the distribution of presenting symptoms, histological tumor types, and risks of missed diagnoses. Relationships between symptoms and histological tumor types were examined with the chi-square test. A p value less than 0.05 was considered statistically significant.

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*Corresponding author: Guang-Huan Sun, Division of Urology, Department of Surgery, Tri-Service General Hospital, No. 325, Sec. 2, Cheng-Gong Road, Neihsu 114, Taipei, Taiwan, Republic of China. Tel: +886-2-8792-7169; Fax: +886-2-8792-7172; E-mail: tansohorn@yahoo.com.tw

Table 1. Summary of histologic patterns in 47 patients

Histology	patients (%)	pain(patients)
Mixed germ cell tumor	15 (31.9)	4
Seminoma	14 (29.8)	1
Teratocarcinoma	5 (10.6)	0
Embryonal carcinoma	4 (8.5)	4
Teratoma	3 (6.4)	1
Yolk sac tumor	2 (4.3)	1
Lymphoma	2 (4.3)	1
Malignant Sertoli cell tumor	1 (2.1)	0
Plasmocytoma	1 (2.1)	0

RESULTS

The age distribution was consistent with the role of our institute. Among the 47 patients, only four patients were aged over fifty (range: 18-76; mean: 31 ± 13.3 ; median 28 years). The epidemiology of the histological tumor type was similar to published data in the general population. Mixed germ cell tumors were the most common type of cancer, followed by seminomas. The observed incidence in this patient group was mixed germ cell tumor (31.9%; 15/47), seminomas (29.8%; 14/47), teratocarcinoma (10.6%; 5/47), embryonal carcinoma (8.5%; 4/47), and other tumors (less than 5%) (Table 1).

From the viewpoint of the presenting symptoms, patients most frequently presented with the classic painless enlarged testicle (61.7%; 29/47, group B). The second most common symptom was a painful and enlarged testicle (21.3%; 10/47, group A). Only two patients (4.3%; 2/47, group C) presented with pain but no obvious enlarged testicle, indicating a nonpalpable intratesticular pathology. However, it was not surprising that 12.8% (6/47, group D) of patients presented with symptoms of distant metastases or other symptoms without testicular complaints (Table 2).

Three patients (6.4%) developed clinical signs mimicking infection, and three patients (6.4%) had cryptorchidism. Interestingly, in seven patients (14.9%) the clinical judgment at presentation was incorrect. With the advantage of ultrasound, the incidence of preoperative missed diagnosis decreased to 6.4% (3/47).

Embryonal carcinomas tended to present with pain in our patients. This was concluded by comparing patients in the combined group A+C with group B (33.3% versus 0%, $p = 0.001$). Other types of histological tumor types did not differ statistically with respect to pain at presentation. This finding implied that symptoms are unreliable and should not be used as a guide for either diagnosis or treatment.

Table 2. Categories of symptom in 47 patients

Category	pts (%)
A: Pain and enlarged testis	10(21.3)
B: Painless enlarged testis	29(61.7)
C: Painful testis without enlargement	2(4.3)
D: Non-testicular complaint	6(12.8)

DISCUSSION

Testicular cancers are the most common solid cancers in young males. In Taiwan, the annual incidence of testicular cancers is around 1 in 100,000¹. Although there is a trend towards increased incidence worldwide², testicular cancers are still relatively uncommon. In general, they represent only 5% of all urological cancers³. The usual presentation of testicular cancer is the incidental finding of a painless lump, nodule, swelling, or hardness in the testis. In most cases, a typical patient presents with painless enlarged testicles. Some patients, however, initially present with an elevation of tumor markers or complications with lymph node metastases (as in group D). It was unclear whether in the Taiwan area the varied presenting symptoms correlated with a particular histological type of tumor.

Our data showed that only embryonal carcinomas were found to be significantly correlated to pain on presentation. The embryonal carcinoma is the most aggressive of testicular cancers, and we should pay more attention to cases with painful symptoms and clinical suspicion of testicular tumor. Other types of testicular cancers did not tend to present preferentially as either with or without pain. The etiology of this difference was not clear. In contrast to general belief, data published by Toklu et al. indicated that 49.3% of their patients presented with scrotal pain⁴. Pain at presentation was found in 25.6% of all cases in our series.

The major limitations of our study were the relatively small sample size and the young patient group, which did not represent the general Taiwanese population. Most of the cases were military officers or soldiers, with a median age of 28 years. However, the information was typical for young adults: histological tumor types were similarly distributed compared to large groups⁵. In patients over 60 years old, we found only primary testicular lymphomas and mixed germ cell tumors.

It was not surprising that the risk of incorrect first clinical diagnosis was high (14.9%; 7/49). Among these seven patients, two with associated hydroceles and one with suspected spermatic cord torsion could be differenti-

ated by preoperative ultrasonography, thus reducing the risk to 6.4%. This suggests that ultrasound studies should be performed in any scrotal or testicular condition⁶. For tumors that presented with infection (6.4%; 3/47), the diagnosis was often difficult^{7,8}. Ultrasound had limited ability to differentiate such cases because of the usual finding of heterogeneous echogenicity and increased perfusion of blood. We suggest that if testicular inflammation is poorly controlled by antibiotics alone, testicular tumors must be strongly suspected. Serum tumor markers and magnetic resonance imaging might help in early diagnosis of these patients.

Although patients with testicular epidermoid cysts were excluded from our study, Maizlin et al. reported three cases of testicular cancers in which the sonographic appearance fit the criteria of epidermoid cysts⁹. It is reasonable to use magnetic resonance imaging to obtain a more accurate diagnosis in such cases¹⁰.

In conclusion, no single factor can lead to a correct diagnosis for testicular cancer. From our study, a painless enlarged testis (group B) is the most frequent tumor-related symptom, and a full understanding of the variation in presenting symptoms will minimize the risk of delayed diagnosis. Our data showed slightly lower incidence of presentation with pain than without pain, although the incidence was higher than we had expected. Careful history taking, thorough physical examination and the use of powerful tools such as ultrasound, can help us minimize mistakes in the diagnosis of any scrotal pathology.

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