Case Report

Seminoma with atypical features: Implications of a distinct disease entity

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ABSTRACT

Germ cell tumors are the most common testicular tumors, with seminomas the most frequently encountered type. Seminoma with atypical features is an intermediate entity between classical seminoma and embryonal carcinoma and presents with larger tumor size, necrosis, and marked proliferation. We report such a case of seminoma with atypical features in a 38-year-old male who presented with gradually progressive left-sided testicular mass. A computed tomography scan revealed a heterogeneously enhancing mass with cystic areas. Orchidectomy was done and histopathological examination revealed replacement of entire testis with tumor showing large areas of necrosis with a high Ki-67 index. Multiple sections examined showed only two small foci resembling embryonal carcinoma which was negative for CD 30. Hence, a diagnosis of seminoma with atypical features was given and the patient kept under follow-up.

Key words: Atypical features, Embryonal carcinoma, Germ cell tumor, Seminoma

The incidence of testicular neoplasm has been rising steadily over the years [1,2], showing an increase in global incidence rates from 1.45 in 1990 to 1.83 cases per 100,000 in 2016 [3]. Testicular germ cell tumors (GCT) account for the majority of testicular cancers and are mostly curable in the early stages with current treatment. Seminomas account for 50% of all GCT. They respond to both chemotherapy and radiotherapy, whereas non-seminomatous GCT are sensitive to chemotherapy only [4]. Mixed GCTs are not uncommon in the testis; these require different treatment strategies based on the relative proportions of the two components. Seminoma and embryonal cell carcinoma are very closely related. The cells of seminoma resemble the embryonic germ cells while those in embryonal cell carcinoma resemble the stem cells from blastocyst [5,6]. Despite these similarities, they are treated differently. The percentage of the embryonal component in a mixed tumor is an important prognostic finding [7,8]. Atypical seminoma is defined as an intermediate neoplasm between classical seminoma and embryonal carcinoma [9].

Herein, we present a case of seminoma showing atypical gross and microscopic features. This case is being reported due to the rarity of the disease entity itself as atypical seminomas are unusual tumors and due to different morphological features resembling an embryonal carcinoma. Reporting of such cases is essential to further guide the therapy of such cases.

Access this article online	
Received - 26 September 2020 Initial Review - 11 October 2020 Accepted - 03 November 2020	Quick Response code
DOI: 10.32677/IJCR.2020.v06.i11.009	

CASE REPORT

A 38-year-old male presented to the surgery department with a left-sided painless testicular mass, insidious in onset, and gradually progressive in size for the past 1 year. He had a history of mild intermittent dull pain in the upper left thigh for 1 year. He had no history of fever, trauma, skin changes, or weight loss, but there was a history of anorexia and decreased appetite for months. He had undergone an open appendectomy in 2002.

The general systemic examination was unremarkable. On local examination, a hard, non-tender, and incompressible 6x4 cm left inguinoscrotal swelling were palpable. There was no redness or local rise of temperature.

The contrast-enhanced computed tomography scan revealed a lobulated heterogeneously enhancing soft-ti density lesion in the left inguinoscrotal region which shows a few cystic necrotic areas and calcified foci with mild left-sided hydrocoele and bulky necrotic retroperitoneal lymphadenopathy.

Further, the patient was optimized for elective high inguinal orchidectomy and local drain placement. Intraoperatively, an 8x6 cm testicular tumor with an attached cord measuring 4×3 cm at the lower end was identified. Dense adhesions were present between the scrotum and testicular growth. Cord structures were visualized, tied at the deep ring, and divided.

On gross examination, the test is measured 10×8×4 cm and weighed 100 g. The entire testis and cord were replaced by a predominantly solid tumor with a homogenous cut surface

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(Fig. 1). Few hemorrhagic and calcified areas were seen. Microscopic examination of the sections showed a tumor with viable and necrotic areas replacing the entire testis. There was no residual normal parenchyma seen. The viable tumor areas showed predominantly seminomatous components with polygonal tumor cells arranged in lobules separated by fibrous septa and infiltrated by numerous lymphocytes. The individual cells were large, polygonal with moderate to abundant cytoplasm, and vesicular nuclei with prominent single nucleolus (Fig. 2a). In many areas, the nuclei showed coarsely clumped chromatin. Two small foci showed nests of hyperchromatic cells, with a high nucleus to cytoplasmic ratio, scant cytoplasm, and nuclear overlapping are seen (Fig. 2b). This area constituted less than 1% of the entire tumor but had a strikingly different morphology. The necrotic areas showed infiltration with degenerating and viable neutrophils. There was no evidence of yolk sac or embryonal morphology. On immunohistochemistry (IHC), the tumor cells were positive for placental alkaline phosphatase and negative for human chorionic gonadotropin, alpha-fetoprotein, CD30, Octamer binding transcription factor ¾, and high molecular weight cytokeratin. Ki-67 index was >30% (Fig. 2c). Both the foci of hyperchromatic cells were CD30 negative. Based on histomorphology and IHC, a diagnosis of seminoma with atypical features was made. On further follow-up after 4-month, the patient is doing well after the surgery.

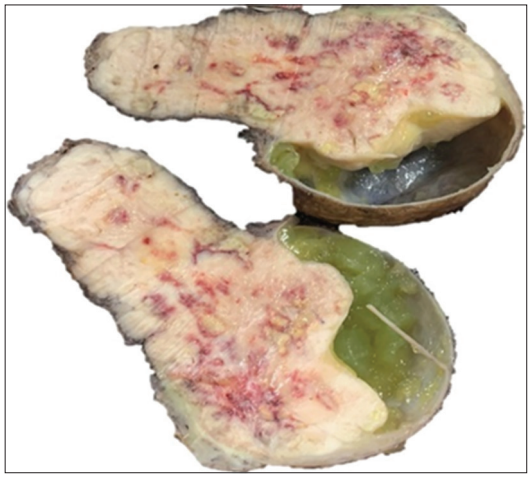

Figure 1: Specimen of testis showing solid tumor with hemorrhagic areas and calcification

DISCUSSION

Most of the seminomas encountered in the clinical setting are in Stage 1 and the majority of them require no further treatment. However, all seminomas are not the same. Some show increased mitotic activity, increased nuclear pleomorphism, and necrosis that may be signs of transition into embryonal carcinoma. These "atypical" seminomas may be showing early carcinomatous differentiation which although very rare, which can eventually progress to advanced disease or embryonal carcinoma [10]. Both seminoma and embryonal carcinoma are closely related and have stem cell origin. However, seminoma is sensitive to both chemotherapy and radiotherapy while embryonal carcinoma is sensitive to only chemotherapy. They are usually distinguished on the basis of histology. Classical seminoma shows a solid growth pattern with sheets of uniform polygonal cells with pale cytoplasm and distinct cell boundaries separated by fibrovascular septa and prominent lymphocytic infiltration. Embryonal carcinoma usually shows tumor cells with irregular large nuclei, amphophilic cytoplasm, and indistinct cell boundaries arranged in a solid, papillary, or trabecular pattern. CD30 can help distinguish and identify embryonal components [11]. Seminomas can also show microcystic patterns resembling yolk sac tumors [12,13]. Sex cord-stromal tumors can also show a solid growth pattern with prominent lymphocytic infiltrate resembling seminoma [12]. Yolk sac tumors and sex cord-stromal tumors can also be components of mixed GCT, but have distinct morphologies and immunohistochemical profiles [14].

Atypical seminoma is an intermediate entity that shows increased nuclear atypia, crowding, and necrosis. They present with large tumor size and necrosis and show a high proliferative ability as measured by the Ki-67 index. Although their designation as a separate disease entity is not yet established, they are an indicator of early carcinomatous differentiation. In addition, their prognosis is worse than the classical seminomas [11]. A study conducted by Tickoo *et al*. found significant associations between mitotic count, tumor size, Ki-67 index, and staging. These authors have stated that these tumors should not be classified as anything but seminomas [11]. They are intermediate lesions that show lower survival rates though not statistically significant [9].

This case presented as a diagnostic dilemma; morphologically, it was a seminoma, with atypical features and two small distinct

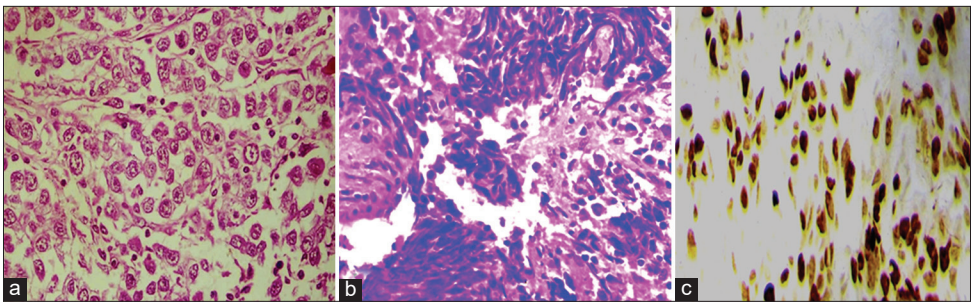

Figure 2: (a) Large polygonal tumor cells with vesicular nuclei (×40); (b) Hyperchromatic cells with high N/C ratio and nuclear overlapping (×40); (c) Immunohistochemistry for Ki-67 (×40)

foci that resembled embryonal carcinoma. In lieu of the lack of IHC support (CD30 negativity), it was decided to label it as a seminoma with atypical features and keep the patient on close follow-up. We hypothesize that these cases have been reported less; more such reports will address whether they are a distinct disease entity or seminoma variants only.

CONCLUSION

Atypical seminoma is a less reported intermediate entity with a prognosis worse than classical seminoma, showing features such as large areas of necrosis, nuclear pleomorphism, overcrowding, overlapping, and increased proliferation index. The coexistence of such atypical features in a seminoma may be an indicator of early carcinomatous differentiation and such patients should be kept under regular follow-up. Further, reporting of such cases may shed light on the clinical relevance of morphological variations in seminomas.

REFERENCES

1. American Cancer Society, Cancer Facts and Figures; 2010. Available from: http://www.cancer.org/research/cancerfactsfigures/cancerfactsfigures/cancer-facts-and-figures-2010. [Last accessed on 2020 Sep 10].
2. Jemal A, Tiwari RC, Murray T, Ghafoor A, Samuels A, Ward E, *et al*. Cancer statistics, 2004. CA Cancer J Clin 2004;54:8-29.
3. Pishgar F, Haj-Mirzaian A, Ebrahimi H, Moghaddam SS, Mohajer B, Nowroozi MR, *et al*. Global, regional and national burden of testicular cancer, 1990-2016: Results from the global burden of disease study 2016. BJU Int 2019;124:386-94.
4. Ye H, Ulbright TM. Difficult differential diagnoses in testicular pathology. Arch Pathol Lab Med 2012;4:435-46.
5. Oosterhuis JW, Looijenga LH. Testicular germ-cell tumours in a broader perspective. Nat Rev Cancer 2005;5:210-22.
6. Gilbert D, Rapley E, Shipley J. Testicular germ cell tumours: Predisposition genes and the male germ cell niche. Nat Rev Cancer 2011;11:278-88.
7. Wishnow KI, Johnson DE, Swanson DA, Tenney DM, Babaian RJ, Dunphy CH, *et al*. Identifying patients with low-risk clinical stage I non-seminomatous testicular tumors who should be treated by surveillance. Urology 1989;34:339-43.
8. de Riese WT, de Riese C, Ulbright TM, Walker EB, Messemer J, Jones JA, *et al*. Flow-cytometric and quantitative histologic parameters as prognostic indicators for occult retroperitoneal disease in clinical-stage-I non-seminomatous testicular germ-cell tumors. Int J Cancer 1994;57:628-33.
9. Gökçe AM, Çalişkan S. Testicular seminoma with early carcinomatous differentiation. Indian J Med Res 2015;141:134-5.
10. Henley JD, Young RH, Wade CL, Ulbright TM. Seminomas with exclusive intertubular growth: A report of 12 clinically and grossly inconspicuous tumors. Am J Surg Pathol 2004;28:1163-8.
11. Tickoo SK, Hutchinson B, Bacik J, Mazumdar M, Motzer RJ, Bajorin DF, *et al*. Testicular seminoma: A clinicopathologic and immunohistochemical study of 105 cases with special reference to seminomas with atypical features. Int J Surg Pathol 2002;10:23-32.
12. Ulbright TM, Young RH. Seminoma with tubular, microcystic, and related patterns: A study of 28 cases of unusual morphologic variants that often cause confusion with yolk sac tumor. Am J Surg Pathol 2005;29:500-5.
13. Henley JD, Young RH, Ulbright TM. Malignant Sertoli cell tumors of the testis: A study of 13 examples of a neoplasm frequently misinterpreted as seminoma. Am J Surg Pathol 2002;26:541-50.
14. Emersn RE, Ulbright TM. Morphological approach to tumors of the testis and paratestis. J Clin Pathol 2007;60:866-80.

Funding: None; Conflicts of Interest: None Stated.

How to cite this article: Bhat R, Aggarwal M, Tandon M. Seminoma with atypical features: Implications of a distinct disease entity. Indian J Case Reports. 2020;6(11):635-637.