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CASE REPORT

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Metastatic signet-ring cell carcinoma of the testis: An unusual case report in Syria

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Key Clinical Message

The case of a 44-year-old male with signet-ring cell adenocarcinoma metastasis in the testis emphasizes the significance of immunohistochemistry in identifying the primary site of metastatic tumors. Further research is needed to establish effective treatment strategies for rare malignancies like small intestine signet-ring cell carcinoma. Early diagnosis and appropriate treatment are crucial for improved patient outcomes.

Abstract

Metastasis to the testes is a rare occurrence, and identifying the primary site of origin can pose a significant challenge. Signet-ring cell carcinoma (SRCC) is an uncommon subtype of adenocarcinoma typically found in the stomach but can also occur in other organs. This case report presents a 44-year-old male with signet-ring cell adenocarcinoma metastasis in the right testis. The patient's initial clinical manifestation was testicular painful swelling, and subsequent immunohistochemical analysis using CK7, CK20, and CDX2 markers suggested a gastrointestinal origin. Normal upper and lower endoscopies rise suspicion of a small intestinal origin. The rarity of SRCC of the small intestine and the lack of clinical trials make treatment decisions difficult. This case highlights the importance of immunohistochemistry in determining the primary site of metastatic tumors and underscores the need for further research to establish optimal treatment strategies for rare malignancies like SRCC of the small intestine. As early diagnosis and appropriate treatment are critical for better patient outcomes.

KEYWORDS

case report, gastrointestinal carcinoma, radical orchiectomy, signet ring cell adenocarcinoma, testicular metastasis

1 | INTRODUCTION

Metastasis in the testes is a relatively rare occurrence, accounting for only 0.02%–2.5% of all testicular tumors and is more common in older individuals. Identifying the primary site of tumors that resemble those found in both the gastrointestinal tract (GIT) and testis can be challenging. This is where immunohistochemistry plays a crucial role in making an accurate diagnosis, leading to proper treatment.[1]

While primary malignancies in the small intestine are uncommon, accounting for only about 2.3% of all malignancies in the digestive system and 0.42% of all malignancies, it is essential to recognize the rare subtypes, such as signet-ring cell carcinoma (SRCC). SRCC is typically found in the stomach, but it can also occur in other organs such as the pancreas, breasts, bladder, ovaries, esophagus, lungs, and large intestine.[2]

This report highlights an unusual case of a 44-year-old male patient with signet-ring cell adenocarcinoma metastasis of unknown source in the right testis, possibly originating from the small intestine.

2 | CASE PRESENTATION

A 44-year-old male presented with right testicular swelling, heaviness, and weight loss for the past 3 months. He is a heavy smoker and nonalcoholic with no past medical, surgical, or family history. The physical examination was normal except for the painful testicular mass. Echography of the testis showed a solid mass measuring 10.5 × 8 × 6 cm in the right testicle with irregular borders and increased vascularity. A computerized tomography (CT) scan with contrast showed multiple metastases within the chest lymph nodes, ribs, liver, pancreas, adrenal glands, periaortic lymph nodes, axillary lymph nodes, and groin lymph nodes. Bone scintigraphy demonstrated abnormal accumulation of the radiotracer in the second and seventh ribs, the head of the left humerus, and throughout the right femur. (Figure 1) The previous tests assumed a primary testicular cancer with metastasis, although alpha-fetoprotein (AFP), lactate dehydrogenase (LDH), and human chorionic gonadotropin (HCG) were normal. The team operated a radical orchiectomy in order to excise the right painful testicle and sent it for pathological studies.

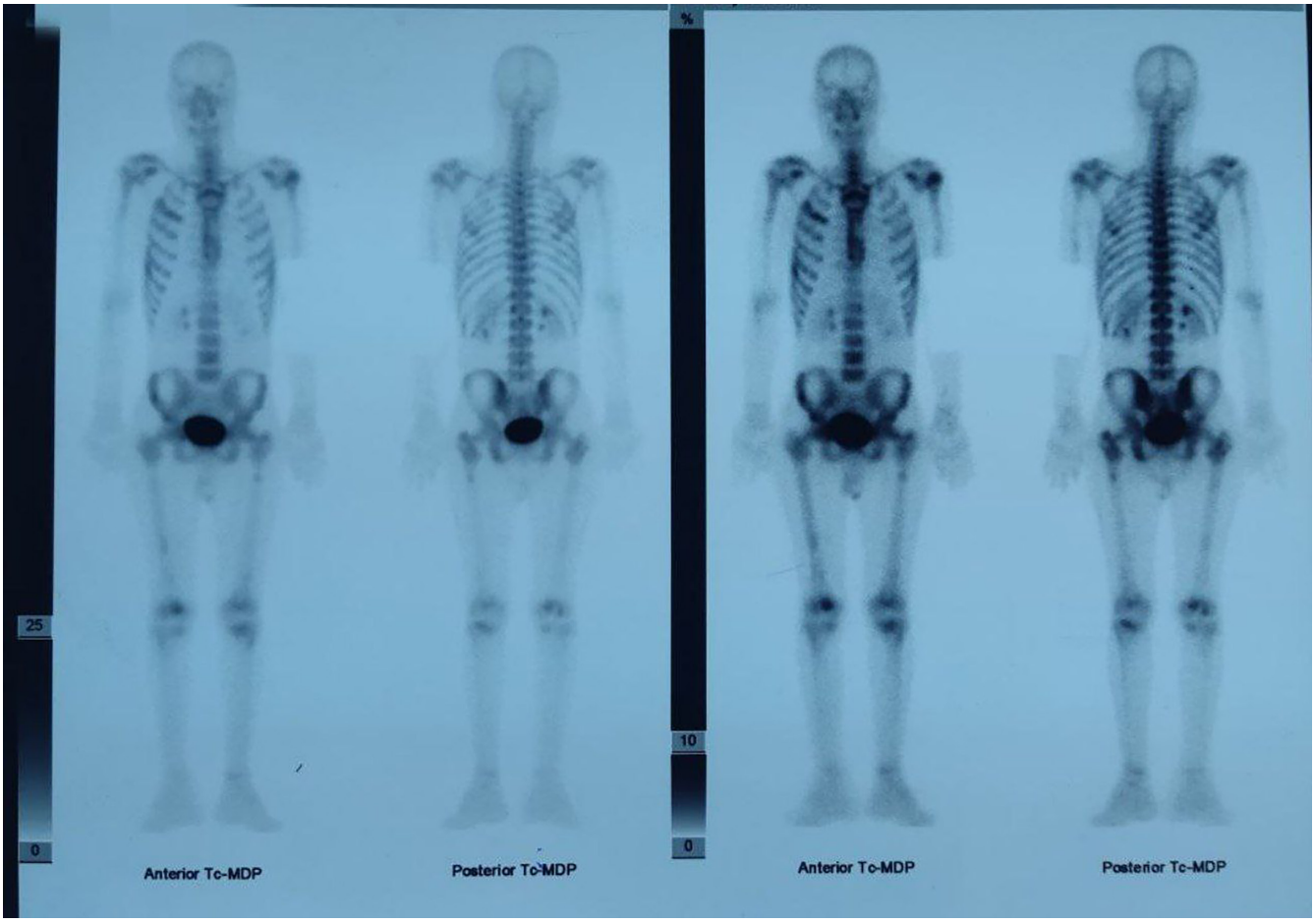

FIGURE 1 The bone scintigraphy indicates an increase in bone metabolism in the previously mentioned regions, which correlates with metastatic changes.

Surprisingly, the pathology report of the right testicle came with a final diagnosis of testicular SRCC metastasis (Figure 2) with positive CK7, CK20, and CDX2 immunostains (Figure 3), which suggests a primary origin from either the stomach or small intestine. The upper and lower endoscopies with biopsies from the stomach and colons were normal. In line with the pathology report, the team suspected that the tumor was most likely from the small intestine. However, we could not confirm our suspicion due to the lack of equipment that can visualize the small intestine. Therefore, the primary origin of the tumor remains unknown.

SRCC is a rare and aggressive type of cancer that can explain the presence of multiple metastatic lesions in this patient. So, no further evaluation was performed to look for other metastatic sites due to the critical condition of the patient at the time of presentation. And the team suggested FOLFOX chemotherapy treatment protocol, after ruling out the gastric origin and suspecting intestinal origin. Unfortunately, we were unable to gather further data on the patient's condition or response to treatment due to his decision to discontinue with his appointments. Therefore, follow up could not be reported.

3 | DISCUSSION

Metastasis of gastrointestinal tumors to the testes is a rare occurrence, and the identification of the primary site can pose a significant challenge in diagnosis and treatment

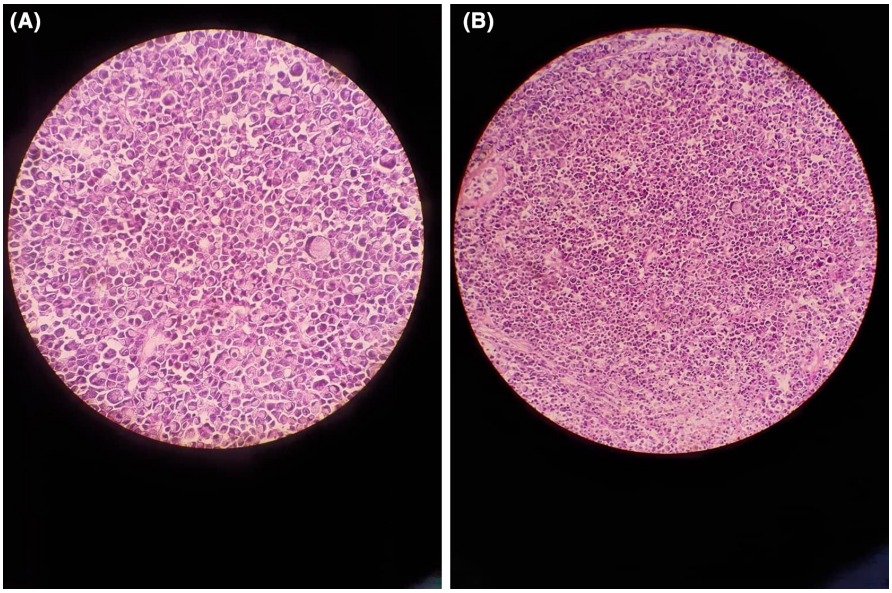

FIGURE 2 (A, B) Proliferation of signet ring cells with the displacement of the nucleus to the side by intracellular mucin. With accumulation of extracellular mucin.

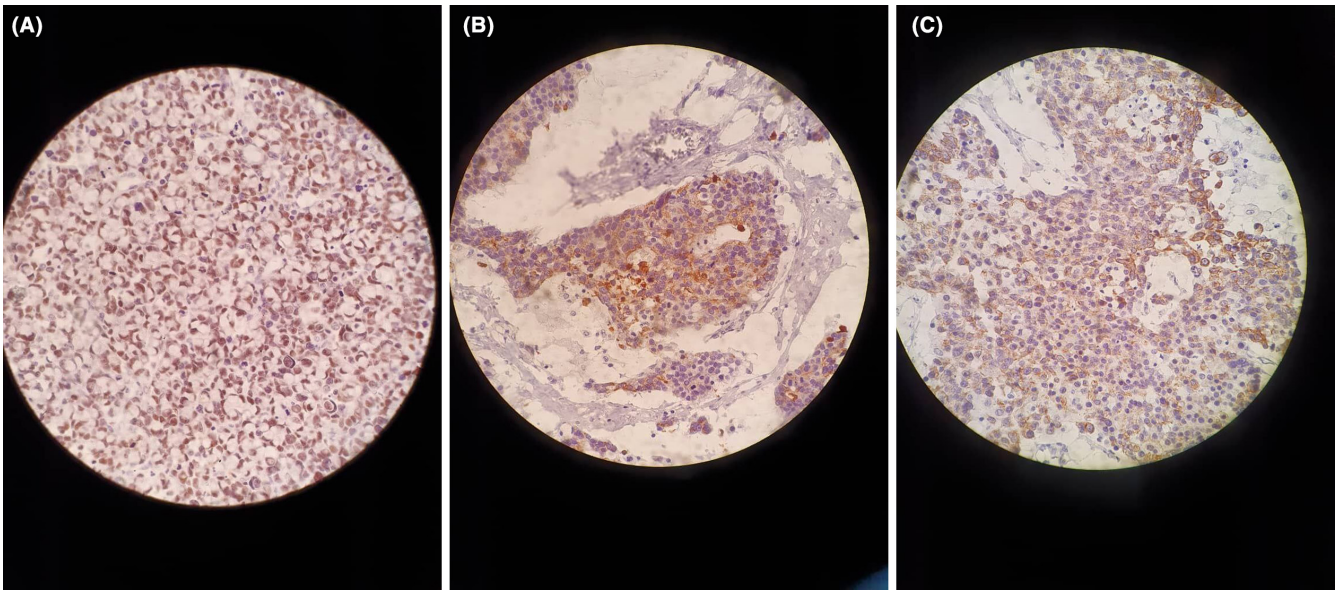

FIGURE 3 (A) CK20 Positive immunostain. (B) CK7 Positive immunostain. (C) CDX2 Positive Immunostain.

planning.[3] This is a rare case of a 44-year-old male with signet-ring cell adenocarcinoma metastasis in the right testis, possibly originating from the small intestine. Notably, the metastasis in the testis was the only clinical manifestation observed, making this presentation uncommon.

Tumors can spread to the testis through various pathways, including hematogenous dissemination, retrograde migration through the lymphatic system, retrograde extension along the spermatic cord, and seeding of peritoneal surfaces, including the tunica vaginalis.[1] Subsequently, Tumor cells may migrate through the abdominal ring and over the open Haller's habenula to reach the testis, mimicking the pattern of migration seen in Krukenberg tumor in women.[1]

Nonetheless, the incidence of secondary metastasis to the testis is relatively low, which may be attributed to its unique anatomical features. The testes are situated in the scrotum, supported by scrotal tissue and spermatic cords. The serosal tunica vaginalis invaginates the testes, becoming separated from the processus vaginalis and peritoneal cavity just before birth.[1] Additionally, the relatively low temperature of the scrotum creates an unfavorable environment for metastatic tumor cells to survive, which explains the rarity of testicular metastases.[1]

Signet-ring cell carcinoma (SRCC) is a rare subtype of adenocarcinoma characterized by the presence of cells with abundant intracytoplasmic mucin, displacing the nuclei to the periphery. Although SRCC is more commonly associated with gastric cancer, it has been reported in other organs, including the small intestine. The prognosis for patients with SRCC in the small intestines is generally poor, with a 5-year survival rate of 16.1%.[4] Early detection and appropriate treatment are essential in improving patient outcomes.

The patient's history of heavy smoking may have contributed to the development of the metastasis. The lack of significant past medical, surgical, or family history suggests that the patient was not at high risk for testicular cancer or metastatic disease. However, the patient's smoking history may have increased the risk of developing cancer and contributed to the development of this metastatic disease.[5]

Based on the physical findings of a painless, firm, and irregular mass arising from the testicle, a testicular tumor was suspected, and a radical orchiectomy of the right testes was deemed necessary for effective management of the patient's condition.[6] Despite the normal levels of AFP, LDH, and HCG, the possibility of a stromal tumor could not be ruled out. The procedure made the pathological diagnosis and staging possible, thereby aiding in the determination of the appropriate course of action.

While the imaging findings initially provided evidence of a primary testicular cancer with metastasis. The ultimate identification of the primary site of origin was achieved through the use of immunohistochemical markers. Specifically, positive staining for CK7, CK20, and CDX2 strongly suggested a gastrointestinal origin, with the stomach or small intestine being the most likely source.[7] This highlights the critical role that immunohistochemistry plays in determining the primary site of origin in metastatic tumors, especially in cases where imaging studies are inconclusive. Furthermore, upper and lower endoscopies with biopsies from the stomach and colon were performed to identify the primary site, but no abnormalities were detected. The lack of equipment to visualize the small intestine limited the ability to confirm the suspicion of the small intestine as the primary site.

Once gastric SRCC was ruled out and an intestinal primary carcinoma is suspected, FOLFOX might be a proper treatment option. As it is used for surgically unresectable metastatic colorectal cancers and has shown activity in small intestinal adenocarcinomas.[8]

Unfortunately, the rarity of SRCC of the small intestine, and the lack of clinical trials made it difficult to evaluate the effectiveness of the chosen therapy, further emphasizing the uncertainty surrounding the optimal treatment for this type of cancer.

4 | CONCLUSION

This case report highlights the importance of immunohistochemistry in identifying the primary site of origin in metastatic tumors, particularly in rare presentations such as SRCC metastasis to the testis. Further research and clinical trials are needed to establish the optimal treatment strategies for SRCC of the small intestine and to improve the prognosis for patients with this rare malignancy. Finally, lifestyle modifications should be considered to reduce the risk of developing cancer and other diseases.

AUTHOR CONTRIBUTIONS

Zein A. Alsayed-Ahmad: Investigation; project administration; supervision; writing – original draft; writing – review and editing. **Mohammed Mayo:** Writing – original draft; writing – review and editing. **Hassan Alshaker:** Investigation; writing – original draft. **Leen Jarjanazi:** Writing – original draft. **Zeina Zakkour:** Data curation. **Rima Sanaa:** Data curation; resources. **Yara Bilal:** Resources. **Anwar Chammout:** Investigation; supervision.

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CONFLICT OF INTEREST STATEMENT

The authors want to declare that none of them is or was employed by any government agency that has any function other than research and education, and none of them is submitting this manuscript as an official representative or on behalf of the government.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

Not applicable.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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