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A Case Study of an Inflammatory Breast Cancer in Men-lobular Subtype

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Abstract **Objectives:** Inflammatory breast cancer (IBC) is a rare and aggressive form of breast cancer, accounting for 1–5% of all breast malignancies. Male breast cancer is particularly uncommon, comprising less than 1% of all cases and IBC in males presents even greater diagnostic and therapeutic challenges. This case study highlights a 49-year-old Sudanese male diagnosed with inflammatory breast cancer of the lobular subtype. The patient initially presented with a palpable right breast mass and nipple discharge, without characteristic skin changes often associated with IBC. Diagnostic imaging and biopsy confirmed infiltrating lobular carcinoma, characterized by estrogen receptor positivity (ER+), HER-2 overexpression and a Ki-67 index of 30%. Despite treatment delays, the patient underwent four cycles of palliative chemotherapy, achieving a significant reduction in tumor burden. However, complications such as axillary lymphedema and pleural effusion emerged during treatment. Follow-up evaluations, including imaging and clinical assessments, demonstrated no palpable masses or axillary lymphadenopathy, suggesting a favorable response to therapy. This case underscores the importance of early detection and multidisciplinary management in improving outcomes for male IBC patients. The findings emphasize the necessity for heightened awareness of male breast cancer, particularly rare subtypes like lobular IBC, among healthcare providers. Moreover, this case contributes valuable insights into the clinical presentation, diagnostic strategies and treatment outcome.

Key Words Inflammatory breast cancer, male breast cancer, HER-2 positive, Lobular carcinoma, palliative chemotherapy, rare cancer cases, diagnostic challenges

INTRODUCTION

Male breast cancer, though rare, poses unique diagnostic and therapeutic challenges. With an incidence rate of less than 1% of all breast malignancies, it remains a neglected area of research compared to female breast cancer. Limited awareness among healthcare providers and the general population often leads to delayed diagnosis and suboptimal outcomes. Research into male breast cancer is crucial for improving early detection, tailoring treatment protocols and addressing the unique biological and psychosocial aspects of the disease [1,2]. Furthermore, the rarity of the disease underscores the importance of documenting atypical cases, such as inflammatory breast cancer (IBC) with lobular features in male patients.

The lobular subtype of breast cancer, which originates from the mammary lobules, is particularly rare in men. Unlike ductal carcinomas, lobular carcinomas typically exhibit a diffuse growth pattern, making early detection more challenging. In men, where breast tissue is limited, lobular carcinoma often presents as a thickening rather than a distinct mass, further complicating its diagnosis. This subtle presentation necessitates a higher index of suspicion and reliance on imaging and biopsy for accurate diagnosis. The diffuse infiltration pattern of lobular carcinoma also contributes to its aggressive behavior, particularly when associated with inflammatory features such as skin thickening and edema [3].

Globally, male breast cancer accounts for less than 1% of breast cancer cases, with inflammatory breast cancer representing only 1-5% of all breast malignancies. Regional variations in incidence are influenced by genetic predispositions, environmental exposures and lifestyle

factors. Populations in North Africa and the Middle East, for example, demonstrate slightly higher rates of male breast cancer due to these factors. Addressing the global and regional burden requires increased awareness, research funding and the development of culturally appropriate educational programs to improve early detection and treatment outcomes [1,4].

Objectives

The primary objective of this case study is to document the clinical presentation, diagnostic challenges and therapeutic management of a rare case of inflammatory breast cancer (IBC) of the lobular subtype in a male patient. This case aims to highlight the importance of early detection by emphasizing the atypical presentation of IBC in men and the critical role of imaging and biopsy in ensuring timely and accurate diagnosis. Additionally, it seeks to provide insights into tailored treatment strategies, including the use of palliative chemotherapy and multidisciplinary care for HER-2-positive lobular carcinoma. By expanding the limited body of knowledge on male breast cancer and IBC, this case contributes to broader oncological research, particularly in addressing regional disparities in awareness and resources. Ultimately, this study emphasizes the importance of individualized care strategies and interdisciplinary collaboration to improve outcomes for male breast cancer patients, especially those presenting with rare subtypes like IBC.

LITERATURE REVIEW

Male breast cancer (MBC) remains a rare and under-researched condition, accounting for less than 1% of all breast cancer cases globally. Recent advancements have shed light on the biological and genetic differences between male and female breast cancers, with studies highlighting the role of hormonal receptor positivity, particularly estrogen receptor (ER) expression, in driving tumor growth in men [3]. However, inflammatory breast cancer (IBC) in men is exceedingly rare, with limited studies focusing on its clinical presentation and management. This scarcity of data underlines the need for case reports and research to better understand the unique challenges posed by MBC, particularly aggressive subtypes like IBC.

Diagnostic controversies in male IBC stem from its atypical presentation and the lack of established screening protocols for men. Unlike women, where mammography is a standard diagnostic tool, men often rely on clinical examination and imaging modalities like ultrasound and magnetic resonance imaging (MRI) for diagnosis. The diffuse growth pattern of lobular carcinoma adds to the challenge, often resulting in delayed detection [5]. Recent studies from 2022 and 2023 emphasize the potential of advanced imaging techniques, such as contrast-enhanced mammography and molecular imaging, to improve early detection rates in male breast cancer cases [6].

Therapeutic approaches for male IBC with lobular histology are also a topic of ongoing debate. While systemic therapies, including HER-2-targeted agents, remain the cornerstone for managing HER-2-positive tumors, there is growing interest in immunotherapy and novel targeted treatments. Studies have demonstrated that combining standard chemotherapy with monoclonal antibodies or tyrosine kinase inhibitors can improve outcomes in patients with advanced breast cancer [7]. However, limited clinical trials involving male patients pose a barrier to generalizing these findings to MBC, highlighting the need for inclusive research.

Alternative treatment modalities, including hormonal therapies like tamoxifen, have shown promise in improving survival rates among men with ER-positive tumors. Additionally, research on lobular carcinoma suggests that integrating neoadjuvant chemotherapy with hormonal therapy may enhance tumor response and reduce disease progression [8]. However, the lack of specific guidelines for treating male IBC underscores the importance of a multidisciplinary approach tailored to individual cases. Future research must focus on evaluating these therapies in larger male cohorts to ensure equitable treatment opportunities for all patients.

CASE PRESENTATION

Patient Information

The patient is a 49-year-old Sudanese male who works as a personal driver, a profession that may have influenced his limited access to healthcare due to socioeconomic constraints. His past medical history includes diabetes mellitus, controlled with oral hypoglycemic agents. The absence of a family history of breast or ovarian cancer and his non-smoking status reduced initial suspicion for malignancy, potentially delaying diagnosis. Furthermore, his psychological response to the palpable mass, coupled with limited awareness of male breast cancer, might have contributed to his delayed presentation.

Notably, the patient presented with a palpable right breast mass and nipple discharge but without the characteristic skin changes typically associated with inflammatory breast cancer (IBC), such as erythema, edema, or peau d'orange. The absence of these symptoms could be attributed to the lobular subtype's diffuse infiltration pattern, which is less likely to cause localized skin changes compared to ductal carcinoma. This atypical presentation may have influenced the delayed diagnosis, emphasizing the need for heightened clinical suspicion in similar cases.

The patient's diabetes may have had a significant impact on his treatment outcomes. Diabetes is associated with a chronic inflammatory state and an increased risk of thromboembolic events, as evidenced by the patient's history of pulmonary embolism during treatment. Moreover, diabetes-related complications, such as impaired wound healing and susceptibility to infections, likely influenced the management strategy, including the decision to use palliative rather than curative chemotherapy.

Psychologically, the patient's diagnosis and treatment journey were likely shaped by his socioeconomic background and the stigma associated with male breast cancer in certain cultures. These factors may have contributed to his non-compliance with follow-up imaging and consultations, as he continued treatment abroad in Jordan. Addressing such psychological and socioeconomic barriers is crucial for ensuring continuity of care and improving outcomes for male breast cancer patients.

Ethical Statement

This case study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval for this study was obtained from the institutional review board at King Abdullah Medical City, Makkah. The patient provided written informed consent for the publication of this case report, including the use of clinical data and diagnostic imaging, ensuring their voluntary participation and understanding of the study's purpose.

To maintain patient confidentiality, all personal identifiers have been anonymized and only clinically relevant details were included in the report. The ethical challenges inherent in reporting rare cancer cases, such as balancing the need for detailed descriptions with the potential for identification, were carefully considered. The authors ensured that all steps were taken to protect the patient's privacy while contributing valuable insights to the medical community.

This study underscores the importance of ethical vigilance in documenting rare conditions, highlighting the need to prioritize patient autonomy and confidentiality while advancing scientific understanding and improving care for similar cases.

Diagnostic Workup

The diagnostic process for this patient included a combination of imaging and histopathological evaluation. Initial imaging with ultrasound revealed a hypoechoic irregular mass with posterior acoustic shadowing and associated skin thickening, consistent with features of malignancy. Doppler imaging highlighted increased vascularity within the lesion, further supporting the suspicion of malignancy. Although effective in identifying the mass, advanced imaging techniques such as positron emission tomography-computed tomography (PET-CT) were not utilized in this case. PET-CT could have provided valuable information on distant metastases, offering a more comprehensive staging assessment and aiding in the formulation of a more tailored treatment plan (Lother et al., 2023).

Histopathological examination confirmed the diagnosis of infiltrating lobular carcinoma, with immunohistochemistry revealing estrogen receptor positivity (ER+), HER-2 overexpression and a Ki-67 proliferation index of 30%. Diagnosing rare subtypes like lobular carcinoma in men presents unique challenges due to its diffuse growth pattern, which often lacks a palpable mass and characteristic radiological features. The absence of skin changes such as erythema and peau d'orange, which are hallmark signs of inflammatory breast cancer (IBC), further complicated the diagnosis. This underscores the importance of relying on biopsy and advanced imaging to accurately identify the disease.

Genetic testing in this patient was limited to BRCA analysis, which yielded negative results. However, this approach may have overlooked other hereditary cancer syndromes associated with male breast cancer. Testing for mutations in genes such as TP53, CHEK2 and PALB2 could provide additional insights into potential genetic predispositions, particularly in regions where such mutations are more prevalent [3]. Comprehensive genetic testing would not only assist in understanding the patient's risk profile but also provide critical information for family counseling and future surveillance strategies.

Despite these diagnostic challenges, the timely use of core biopsy and immunohistochemistry allowed for the identification of the tumor's histological and molecular characteristics. These findings informed the selection of a treatment plan tailored to the tumor's biology. Incorporating advanced diagnostic tools and expanding genetic testing protocols in similar cases can improve diagnostic accuracy and guide personalized therapeutic approaches for rare male breast cancer subtypes like IBC.

Clinical Findings

The first biopsy showed infiltrating lobular carcinoma, provisional grade 2; no LCIS, microcalcification, or lymphovascular invasion were identified. IHC revealed that the tumor was ER+ (70%), PR-(0%) and HER-2 overexpression (+3). The Ki-67 proliferation index was at 30%, suggesting moderately high proliferation. The results of the BRCA test were also negative, which did not indicate any hereditary factors that may lead to breast cancer.

Examination Results

The patient demonstrated a positive response to palliative chemotherapy, with clinical assessments revealing no palpable mass in the breast and no evidence of axillary lymphadenopathy. This suggests significant regression of the primary tumor and associated regional disease. However, the impact of chemotherapy on tumor markers such as HER-2 expression, Ki-67 proliferation index, or inflammatory markers was not measured during the follow-up period. Monitoring these indicators could have provided additional insights into the biological response to treatment and its long-term effectiveness [7].

The patient's favorable clinical response aligns with similar cases in the literature, where HER-2-targeted therapies and chemotherapy have been shown to achieve significant tumor burden reduction in HER-2-positive breast cancers [3]. However, the rarity of male inflammatory breast cancer (IBC) with lobular features limits the availability of

direct comparisons. A recent review of male breast cancer cases emphasized that while systemic therapy is generally effective, treatment outcomes can vary widely depending on the tumor's molecular characteristics and the stage at diagnosis [2]. This case adds valuable evidence supporting the efficacy of targeted therapies even in advanced cases of male IBC.

The occurrence of axillary lymphedema and pleural effusion during treatment reflects the aggressive nature of IBC and its propensity for regional and distant spread. Axillary lymphedema is a common complication in breast cancer patients, often resulting from lymphatic obstruction caused by tumor invasion or treatment-related factors, such as chemotherapy-induced fibrosis [9]. The right-sided pleural effusion may have been caused by tumor metastasis to the pleura or a paraneoplastic process, both of which are well-documented in advanced breast cancer. These complications highlight the importance of proactive symptom management and regular imaging to monitor disease progression and treatment-related adverse events.

Overall, this case illustrates the importance of a multidisciplinary approach in managing male IBC. The patient's positive response to chemotherapy underscores the potential of targeted and systemic therapies in achieving tumor regression. However, the emergence of complications such as lymphedema and pleural effusion emphasizes the need for comprehensive care plans that address both the oncological and supportive aspects of treatment. Future research should focus on understanding the underlying mechanisms of these complications and exploring strategies to mitigate their impact on patient outcomes (Figure 1-5).

Figure 1: RT Breast 7 OC Anti Radial, Measurement: D = 38.3 mm. This image shows hypoechoic irregular antiparallel mass associated with posterior acoustic shadowing in the right breast, with a measurement indicating the size of the mass

Biopsy Results

A biopsy also supported the stereotyped diagnosis of infiltrating lobular carcinoma, which originates from the milk-producing lobules. However, features such as lobular carcinoma in situ (LCIS), microcalcifications and LVI, which can have an impact on prognosis and management, were not observed. The immunohistochemical analysis suggested that the cancer was of high grade and HER-2 positive, which means that the tumor had an overexpression of the HER-2 protein [8]. Besides, the Ki-67 index, which estimates cell proliferation, was moderate and increased the probability of rapid tumor growth and metastasis. These findings are very useful in formulating the correct treatment plan and prognosis for the patient's condition.

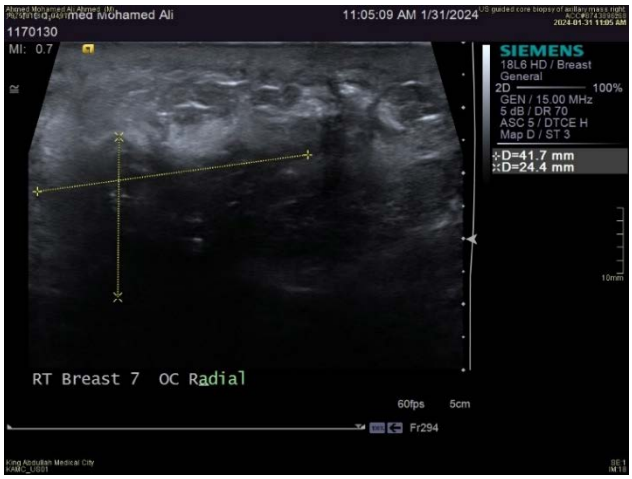

Figure 2: RT Breast, 7 OC Radial. Measurement: D = 41.7 mm (length) and D = 24.4 mm (width). This image provides measurements of the lesion in two perpendicular directions

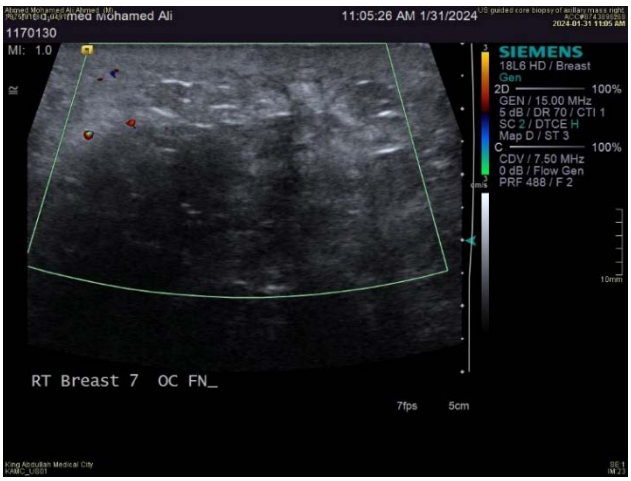

Figure 3: RT Breast 7 OC FN. This image uses color Doppler ultrasound to assess blood flow within the lesion, which can help differentiate between benign and malignant masses

Figure 4: RT Breast, 11 OC. This image demonstrates the associated skin thickening and subcutaneous edema as a part of the inflammatory process

Figure 5: RT Breast BIOPSY. This image likely shows the process of an ultrasound-guided core biopsy of the mass in the right breast. The needle used for the biopsy can be seen within the lesion.

Treatment and Follow-up

The treatment plan for this patient primarily involved palliative chemotherapy, a decision driven by the advanced stage of the disease at presentation. Palliative chemotherapy was selected over curative approaches to manage symptoms, reduce tumor burden and improve the patient's quality of life. The tumor's HER-2 positivity guided the use of targeted agents, which are well-documented to provide significant benefits in managing HER-2-positive breast cancers [7]. While other options, such as surgical intervention or radiation therapy, were considered, the diffuse nature of the disease and the absence of localized control measures made chemotherapy the most viable choice.

Treatment delays, including the patient's missed follow-up appointments and relocation for care, may have significantly impacted outcomes. Early intervention with a multidisciplinary approach might have allowed for better symptom control and potentially reduced the risk of complications such as axillary lymphedema and pleural effusion. These delays highlight the importance of patient education, psychosocial support and accessible healthcare systems in managing rare and aggressive cancers like inflammatory breast cancer (IBC).

Long-term monitoring is essential for managing the patient's condition and addressing potential recurrence or metastasis. A comprehensive follow-up plan should include periodic imaging studies such as CT scans of the chest, abdomen and pelvis (CT CAP) and breast MRI to monitor for residual or recurrent disease. Bone scans and tumor markers can provide additional insights into metastatic spread. Additionally, given the patient's history of pulmonary embolism, long-term anticoagulation therapy and regular monitoring for thromboembolic events are recommended to mitigate risks associated with cancer-related hypercoagulability [9].

Beyond imaging and laboratory assessments, follow-up care should involve a multidisciplinary team to address the patient's overall health and quality of life. Psychological support, dietary counseling and management of comorbid conditions like diabetes are critical components of care. Providing clear communication and consistent follow-up reminders can improve adherence to monitoring plans, ultimately enhancing outcomes for male breast cancer patients. Future research should focus on developing tailored survivorship plans and investigating the long-term effects of targeted therapies in male patients with IBC.

DISCUSSION

This case highlights the rarity and clinical complexity of inflammatory breast cancer (IBC) in males, specifically the lobular subtype. The patient's presentation and response to palliative chemotherapy align with findings in the literature that emphasize the aggressive nature of IBC and the effectiveness of targeted therapies in HER-2-positive cancers [3,7]. However, the absence of skin changes such as erythema and peau d'orange, typical in IBC, complicated early diagnosis, underscoring the need for heightened clinical suspicion and reliance on imaging and biopsy for timely detection.

Despite the patient's favorable clinical response to chemotherapy, this case has notable limitations. As a single-patient study, the findings cannot be generalized to the broader population of male breast cancer patients. Additionally, while BRCA testing was negative, the absence of comprehensive genetic analysis for other hereditary cancer syndromes, such as mutations in TP53 or PALB2, limits the ability to fully assess the patient's risk profile. These

limitations highlight the need for future research to include larger male cohorts and broader genetic testing protocols to better understand the unique biological characteristics of male IBC.

Actionable recommendations arising from this case include the need for improved awareness and early detection of male IBC. Public health campaigns should target both healthcare providers and the general population to raise awareness of male breast cancer, emphasizing that early symptoms, such as nipple discharge or palpable masses, warrant immediate medical attention. Additionally, incorporating routine breast health assessments for high-risk male populations, particularly those with a family history of cancer or predisposing genetic mutations, could facilitate earlier diagnoses and improved outcomes. Educational initiatives should also address cultural and psychological barriers that may prevent men from seeking timely care.

The broader implications of these findings extend to clinical practice and public health policies. Clinicians should adopt a multidisciplinary approach to male breast cancer, incorporating specialists in oncology, radiology, genetics and psychosocial care to address the complex needs of these patients. Policymakers should allocate resources to support research on male breast cancer and ensure equitable access to diagnostic and therapeutic services. By improving awareness, diagnostic accuracy and access to care, healthcare systems can better support male breast cancer patients, particularly those with rare subtypes like IBC, ultimately improving survival rates and quality of life.

Pathophysiology

Inflammatory breast cancer is widely known to be invasive in nature and progresses quite rapidly. This often manifests clinically as erythema, edema and a peau d'orange due to the infiltration of the dermal lymphatics by cancer cells. It is further divided into the lobular subtype, which is less frequent in men and is more difficult to diagnose given that it spreads throughout the breast tissue [3]. This diffuse spread often results in a later diagnosis, as the disease may not manifest physically as a lump but more as a thickening of the breast tissue [4]. If there is a typical presentation with lymphedema and pleural effusion, then it means that the patient has a regional and possibly distant disease.

Treatment Received

The patient was given palliative chemotherapy, which is mostly administered to patients in the last stages of cancer, to manage its symptoms and effects. Its chemotherapy may involve agents against HER-2-positive cancers due to the tumor's HER-2 positivity [7]. The treatment plan was to decrease the size of the tumor in her body, alleviate the symptoms and halt the disease progression. Even though the patient failed to attend a follow-up imaging and consultation appointment as recommended, the patient proceeded with the treatment abroad, which underscores the need for ongoing care in managing hostile diseases such as IBC.

Clinical Response and Follow-Up

There was significant clinical improvement; the mass was not palpable and the axillary lymph nodes were not enlarged or tender. Nevertheless, the development of axillary involvement and lymphedema suggests regional metastases, which is characteristic of IBC [9]. The history of PE during the treatment indicates the importance of constant observation and control of thromboembolic episodes in cancer patients due to their hypercoagulable state. The planned follow-up, such as a CT CAP, bone scan, MRI of the breast and ultrasound, is to evaluate the disease burden and treatment plan.

Comparison with Existing Literature

Male breast cancer is uncommon and even less is the incidence of inflammatory breast cancer in men. According to Co *et al.* [2], male breast cancer is usually diagnosed at a later stage as compared to female patients due to inadequate knowledge about the disease. This case demonstrates the diagnostic difficulties as well as the treatment of male IBC with lobular histological features. The patient's good clinical response to chemotherapy provides a hopeful perspective, although continuous monitoring and comprehensive management are crucial. Comparing this case with existing literature underscores the importance of early diagnosis, a multidisciplinary approach and personalized treatment plans in managing rare and aggressive cancer types [10].

CONCLUSION

This case report documents a rare presentation of inflammatory breast cancer (IBC) of the lobular subtype in a male patient, highlighting the unique challenges associated with diagnosing and managing such cases. The patient's clinical course underscores the importance of early detection, multidisciplinary management and the use of targeted therapies in improving outcomes for rare and aggressive cancers like male IBC. The positive response to palliative chemotherapy demonstrates the potential of systemic therapies in achieving tumor regression, even in advanced stages.

This case contributes to the limited body of knowledge on male breast cancer, emphasizing the need for heightened awareness among healthcare providers and the general population. It also underscores the importance of considering rare subtypes like lobular carcinoma in differential diagnoses, especially when atypical symptoms are present. By documenting the challenges and outcomes of this case, we aim to inform future diagnostic and therapeutic strategies for male IBC patients.

Future research should focus on understanding the biology of male-specific breast cancer, particularly rare subtypes like lobular carcinoma. Studies exploring tailored therapies and their efficacy in male patients are urgently needed to address gaps in treatment protocols. Additionally, research into genetic predispositions and the role of advanced imaging techniques in early detection will be critical in improving

diagnostic accuracy and outcomes. By expanding the scope of male breast cancer research, the medical community can better address the unique needs of this underserved population.

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