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Synchronous Breast and Prostate Cancer in a 76-Year-Old Male: A Case Report

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ABSTRACT

Background:

Synchronous primary malignancies defined as two or more distinct tumors diagnosed within six months are rare clinical entities. Male Breast Carcinoma (MBC) accounts for less than 1% of all breast cancers and about 1% of male malignancies, whereas prostate cancer is among the most common male cancers globally. Their coexistence is extremely uncommon often raising questions of shared hormonal and genetic aetiologies. Mutations in BRCA genes, particularly BRCA2, increase the risk of both cancers, though sporadic cases without genetic predisposition are also observed.

Case Report:

We present a 76-year-old male with type 2 diabetes mellitus, ischemic heart disease, and a family history of breast cancer who presented with left nipple retraction and a palpable retro-areolar mass. Ultrasound breast confirmed presence of spiculated mass with microcalcifications and nipple retraction. A biopsy was done which showed grade 3 invasive ductal carcinoma, ER/PR-positive, HER2-negative and Ki-67 50%. PET-CT unexpectedly identified a hypermetabolic prostate lesion. Further evaluation with MRI and targeted biopsy confirmed adenocarcinoma, Gleason score 4+3=7. Prostatic tumor was confined to the left lobe. The patient underwent left mastectomy with sentinel node biopsy (pT2N0) followed by tamoxifen. For the prostate cancer, androgen deprivation therapy was initiated, followed by brachytherapy and external beam radiotherapy. The patient tolerated treatment well and achieved excellent biochemical response with PSA suppressed to 0.012 ng/mL at 11 months without evidence of recurrence.

Conclusion:

Synchronous male breast and prostate cancer represents an exceptionally rare clinical scenario. This case highlights the importance of high index of suspicion, multimodal imaging and multidisciplinary planning in elderly patients presenting with atypical findings.

Keywords: Computed Tomography, Male breast cancer, Positron Emission Tomography, Prostate cancer, Synchronous malignancies.

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INTRODUCTION

Synchronous primary malignancies is defined as two or more primary tumors diagnosed simultaneously or within a period of six-months. These represent a rare but clinically significant phenomenon particularly when involving uncommon cancer pairings. Male breast cancer (MBC), accounting for less than 1% of all breast cancers and about 1% of male malignancies is itself a rare entity. Conversely, prostate cancer is the second most frequently diagnosed cancer and the fifth leading cause of cancer-related deaths among men worldwide. The synchronous occurrence of MBC and prostate cancer is exceedingly rare particularly in elderly males. In elderly men prolonged hormonal exposure as well as genetic predisposition may contribute to multi-organ tumorigenesis. The coexistence of these two malignancies necessitates careful consideration for optimal patient management.

Both breast and prostate tissues are hormone-responsive and are primarily influenced by estrogen and androgen pathways. This hormonal dependence forms the basis for a possible link between breast and prostate cancers in men. Moreover, mutations in tumor suppressor genes such as BRCA1 and BRCA2

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have been implicated in the development of both malignancies.[3] Men with BRCA2 mutations face a significantly increased risk of both breast as well as aggressive prostate cancers with a lifetime breast cancer risk approaching 6% and prostate cancer risk surpassing 20%.[4]

Imaging modalities such as PET-CT and whole-body MRI have improved the detection rates of synchronous tumors but their routine use is often restricted by cost and accessibility. Histopathological confirmation remains the gold standard necessitating high clinical suspicion and multidisciplinary collaboration. Furthermore, therapeutic decision-making in synchronous cancers is complex and must consider the stage, biological behavior, and treatment response of both tumors.

The existing literature on synchronous breast and prostate cancer in men is sparse, limited to isolated case reports and small case series. Most published cases describe patients in the sixth or seventh decade of life, often with a known genetic predisposition or prior history of malignancy.[5]

In light of the above, we present a rare case of synchronous breast and prostate cancer in a 76-year-old male. He was diagnosed concurrently during evaluation for lower urinary tract symptoms and incidental breast mass. This case underscores the need for high index of suspicion for presence of Synchronous primary malignancies in elderly patients presenting with atypical symptoms or unexplained findings.

CASE REPORT

A 76-year-old Lebanese male presented with a two-week history of left nipple retraction, discoloration and a palpable mass without discharge. His past medical history included type 2 diabetes mellitus, ischemic heart disease (status post coronary stenting), and hyperlipidemia.

He had no history of smoking or alcohol use and no occupational exposures. There was a family history of breast cancer in his mother at age 65. Genetic testing for BRCA and other high-penetrance mutations was negative. Clinical examination revealed a 25 mm retro-areolar mass with associated skin dimpling. The axillary examination was unremarkable. Initial imaging with mammography and ultrasound confirmed a 26 × 21 mm spiculated mass with microcalcifications and nipple retraction. An axillary node with 3.5 mm cortical thickening was noted. A PET-CT scan confirmed hypermetabolism in the left breast (SUVmax 8.6) without nodal or distant metastasis. Notably, it revealed a highly avid lesion in the prostate (SUVmax 13.4), prompting further investigation.

Core biopsy of the breast lesion confirmed grade 3 invasive ductal carcinoma (IDC) with ER 8/8, PR 8/8, HER2 2+ (FISH negative), and Ki-67 of 50%. Sentinel node biopsy showed no malignancy.

Initial diagnostic imaging for the breast mass included mammography and high-resolution ultrasound. The mammogram revealed an irregular, spiculated retro-areolar lesion with associated skin tethering and microcalcifications measuring 26 × 21 mm. The ultrasound demonstrated increased vascularity within the lesion and highlighted a borderline axillary lymph node with cortical thickening of 3.5 mm. These features warranted biopsy. Histological analysis of the core biopsy confirmed high-grade invasive ductal carcinoma. The tumor demonstrated a Nottingham score of 9 (tubule formation 3, nuclear pleomorphism 3, mitotic count 3), with strong hormone receptor positivity (ER 8/8, PR 8/8), equivocal HER2 status (2+ by IHC, FISH negative), and a high proliferative index (Ki-67 50%). There was no evidence of lymphovascular invasion or associated ductal carcinoma in situ.

The staging PET-CT, performed to evaluate for metastasis, detected intense FDG uptake in the primary breast tumor (SUVmax 8.6) without evidence of nodal involvement or distant disease. Unexpectedly, the scan revealed a highly avid lesion in the left prostate gland (SUVmax 13.4), suggestive of synchronous pathology. (Figures 1,2)

Further evaluation of the prostate included a multiparametric MRI which demonstrated a PIRADS 4 lesion measuring 1.8 cm in the left mid-gland with no extracapsular extension and a prostate volume of 33 cc. A transrectal ultrasound-guided biopsy was performed. Pathological evaluation confirmed adenocarcinoma, Gleason score 4+3=7, with cancer in 12 of 20 cores that included all 6 targeted and 6 of 8 systematic cores from the left lobe. There was no involvement on the right side. There was no evidence of perineural invasion or lymphovascular involvement.

Baseline serum PSA was 6.49 ng/mL, with a free PSA of 0.812 ng/mL and a ratio of 0.125. IPSS score was 6/35, indicating mild lower urinary tract symptoms, with a quality-of-life score of 1/6.

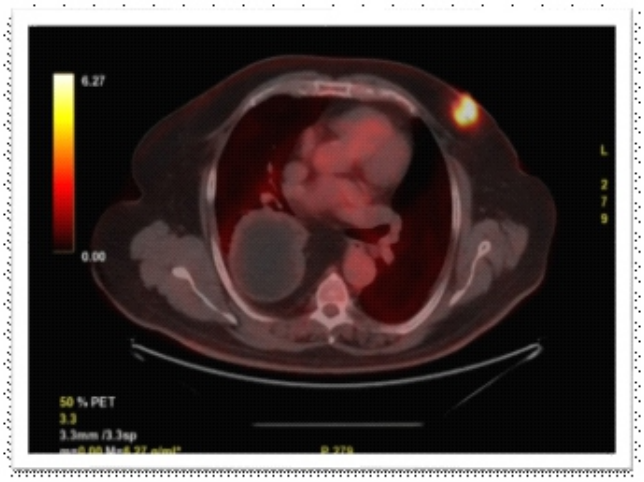

Figure 1: Axial FDG-PET/CT: Intense uptake in left breast retro-areolar mass (SUVmax 8.6), confirming primary breast cancer.

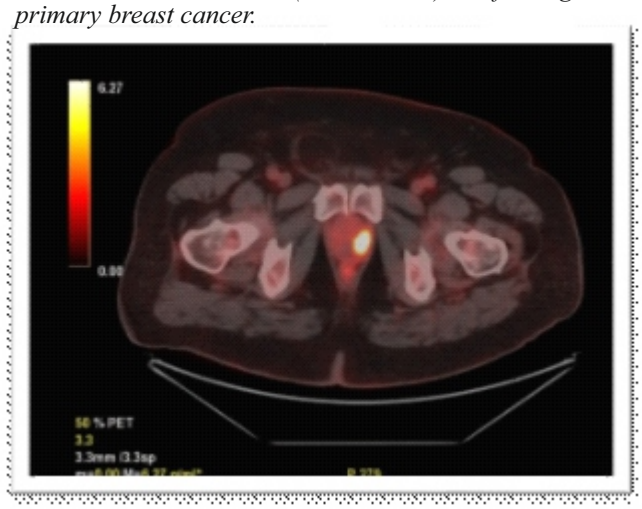

Figure 2: Axial FDG-PET/CT: Incidental avid prostate lesion (SUVmax 13.4), later diagnosed as intermediate-risk adenocarcinoma.

Domain	Parameter	Details
Breast Cancer	**Clinical Presentation**	On day one: Left nipple retraction, 25 mm retroareolar mass, skin dimpling, no discharge
	Imaging	Within the first week: Mammogram/US: 27 mm irregular spiculated mass with microcalcifications and nipple retraction; PET: SUVmax 8.6, no nodal or distant metastasis
	Biopsy	Within 10 days: IDC, Grade 3 (tubule formation 3, nuclear pleomorphism 3, mitoses 3), ER 8/8, PR 8/8, HER2 2+ (FISH negative), Ki-67 50%, no LVI or DCIS. Axillary biopsy benign (0/1 node)
	Surgery & Pathology	After four weeks: Left total mastectomy + SLNB. Final: pT2 (22 mm), pN0(sn) (0/2), Grade 3, margins >10 mm
	Genomics	Oncotype DX score: 26 (intermediate risk); chemo considered but not mandated
	Adjuvant Therapy	After surgery: Chem otherapy initiated but aborted after one cycle (ICU admission for toxicity); switched to tamoxifen (ongoing). No chest wall RT (low-risk pT2N0)
Prostate Cancer	**Incidental Finding**	After two weeks: PET scan shows left prostate lobe SUVmax 13.4, suspicious for malignancy
	MRI Prostate	After three weeks: PIRADS 4 lesion (1.8 cm, left mid -gland), no extracapsular extension; prostate volume 33 cc
	Prostate Biopsy	After six weeks: Gleason 4+3=7, 12/20 cores positive (6/6 targeted left, 6/8 systematic left, 0/6 right); no LVI or perineural invasion
	Baseline PSA & Symptoms	PSA 6.49 ng/mL, Free PSA 0.812 (ratio 0.125); IPSS 6/35 (mild LUTS), QoL 1/6
	Hormonal Therapy (ADT)	Initiated after six weeks: Zoladex 10.8 mg, planned for 6 months
	Local Radiotherapy	After 4.5 months: HDR brachytherapy (15 Gy, single fraction); followed by EBRT (45.6 Gy/25 fx)
	Toxicity & Completion	Completed at month five: Grade 1 fatigue/dysuria; no rectal/bowel toxicity; second Zoladex injection administered
Follow-Up	**Breast**	Ongoing tamoxifen. Right breast mammogram planned annually

	Prostate Monitoring	After 6 months: PSA 0.011 ng/mL (nadir). After 9.5 months: PSA 0.012 ng/mL. No recurrence. Monitor PSA every 3 months. PSMA PET and salvage therapy (ADT/SBRT) only if PSA >2 ng/mL
Integrated Timeline	**Day One**	Breast presentation: Left nipple retraction and mass
	Within 1 Week	Breast imaging and core biopsy confirm IDC
	After 2 Weeks	PET-CT identifies incidental prostate lesion
	After 4 Weeks	Breast surgery (mastectomy + SLNB)
	After 6 Weeks	Prostate biopsy confirms Gleason 4+3 cancer
	After 4.5 Months	HDR brachytherapy performed
	After 5 Months	Completion of EBRT and ADT
	After 6 –9.5 Months	PSA suppressed: 0.011 then 0.012. No recurrence detected

Table 1 :- Unified Clinical Summary Table: Synchronous Breast and Prostate Cancer

The patient underwent a total left mastectomy with sentinel lymph node biopsy for a pT2, Grade 3, ER/PR-positive invasive ductal carcinoma. Pathology confirmed clear surgical margins and no nodal involvement (pN0(sn)). Oncotype DX score was 26, indicating intermediate risk. Adjuvant chemotherapy was initiated but discontinued after one cycle due to severe toxicity requiring ICU admission. The multidisciplinary team recommended hormonal therapy alone, and tamoxifen was started. Given the pT2N0 status, clear margins, and low-risk features, chest wall radiotherapy was not pursued.

Prostatic lesion was managed with six months of androgen deprivation therapy (Zoladex 10.8 mg) and definitive local treatment comprising HDR brachytherapy (15 Gy, single fraction) followed by EBRT (45.6 Gy in 25 fractions). Treatment-related toxicity was limited to grade 1 fatigue and dysuria.

The patient tolerated treatment well, and PSA levels were effectively suppressed to 0.011 ng/mL at month seven and 0.012 ng/mL at month eleven. There were no symptoms of recurrence, nocturia, or lower urinary tract obstruction. Continued tamoxifen therapy and routine surveillance with annual mammography for the contralateral breast were planned. PSA monitoring was scheduled every three months. No imaging or salvage therapy was indicated, given PSA values remained well below the nadir +2 ng/ml threshold for biochemical recurrence.

DISCUSSION

Synchronous male breast and prostate cancer remain a rare entity, with limited cases documented.[6,7] Male breast cancer constitutes less than 1% of all breast cancers, often presenting later in life with more advanced disease. Established risk factors include increasing age, estrogen exposure, testicular disorders, radiation exposure, and family history.[8] Although BRCA mutations are known to predispose to both breast and prostate cancers, this patient tested negative for common germline mutations, aligning with reports that a significant proportion of cases remain sporadic.[9,10]

The approach to synchronous cancers necessitates careful prioritization of management. In this case, the symptomatic breast cancer was addressed first, consistent with guidelines that advocate treatment of the more clinically pressing or symptomatic malignancy.[11] The use of Oncotype DX in male breast cancer is extrapolated from data in female cohorts; although validated data in men are limited, it can inform recurrence risk and guide adjuvant therapy decision.[12,13]

Tamoxifen remains the standard hormonal therapy for male breast cancer due to high rates of ER positivity. Chemotherapy-related toxicity was unacceptably high in this case, prompting discontinuation and underlining the importance of assessing frailty and comorbid burden in elderly patients.[14]

Prostate cancer was incidentally discovered on PET-CT. FDG-PET is not routinely used in prostate cancer detection due to low glycolytic activity; however, high-grade tumors may exhibit increased uptake.[15] MRI and biopsy confirmed clinically significant disease. The Gleason 4+3 score and significant left-lobe involvement justified combined modality treatment with ADT and radiotherapy.[16] Brachytherapy plus EBRT is supported by randomized trials for intermediate-risk disease and has demonstrated favorable outcomes.[17,18]

Biochemical monitoring post-radiotherapy requires a nuanced understanding. PSA nadir and kinetics are critical markers; values of 0.012 ng/mL at nearly one-year post-

treatment suggest excellent response.[19] Clinical guidelines define biochemical relapses as PSA nadir +2 ng/mL, with rising trends necessitating further evaluation via PSMA PET imaging and other modalities.[20]

CONCLUSION

Synchronous male breast and prostate cancers are exceedingly rare, and management requires individualized, multidisciplinary strategies. Prioritizing treatment of symptomatic malignancy, tailoring therapy to patient frailty, and careful monitoring can achieve favorable outcomes while minimizing toxicity. This case underscores the importance of personalized care in complex dual malignancies.

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