CASE REPORT

Bilateral fallopian tube carcinoma: Diagnostic utility of MRI and ultrasound

Tushar Kalekar[1], Ankit Gupta[1], Eshan Chetan Durgi[1]*

[1]Department of Radio-diagnosis, Dr. D. Y. Patil Medical College, Hospital and Research Center, Pune - 411018 (Maharashtra) India

Abstract

Bilateral fallopian tube carcinoma is an extremely rare malignancy, often diagnosed incidentally or at advanced stages due to its nonspecific clinical presentation. Imaging plays a crucial role in its diagnosis and differentiation from other gynecological malignancies. This case report highlights the importance of multimodal imaging, especially diffusion-weighted Magnetic Resonance Imaging (MRI), in diagnosing bilateral fallopian tube carcinoma in an elderly woman presenting with vague symptoms. The case underscores the need for heightened radiological suspicion and the utility of MRI features such as mural thickening, restricted diffusion, and hydrosalpinx pattern in early detection. Early recognition and accurate imaging interpretation significantly contribute to optimal patient management and prognosis.

Keywords: carcinoma, bilateral, fallopian tube neoplasm, magnetic resonance imaging, ultrasonography

Introduction

Fallopian tube carcinoma accounts for less than 1% of female genital tract malignancies. High-grade serous ovarian carcinomas were once considered the rarest gynecologic malignancies, but new research reveals that many originate from the fallopian tube [1]. Primary Fallopian Tube Carcinoma (PFTC) is commonly misdiagnosed due to its rarity and similarities to ovarian and peritoneal cancers. Symptoms such as pelvic discomfort, vaginal discharge, and postmenopausal bleeding are common and vague [2]. Latzko's triad—serosanguinous vaginal discharge, pelvic discomfort, and a pelvic mass—is rare [3]. Elevated CA-125 values, while nonspecific, are often associated with PFTC and might enhance clinical suspicion. Imaging is essential for distinguishing fallopian tube cancer from other adnexal malignancies. A sausage-shaped solid-cystic adnexal tumor with hydrosalpinx may be seen on transvaginal ultrasonography, the first-line imaging modality [4]. Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) show a solid-cystic adnexal mass, thickening and enhancing fallopian tube walls, and diffusion restriction. Fluorodeoxyglucose Positron Emission Tomography (FDG-PET) scan has also been studied for staging and metastasis evaluation [5-6]. Bilateral fallopian tube carcinoma is rare; hence, multimodal imaging is crucial for its diagnosis and differentiation from other gynecological cancers. Early detection and precise imaging improve patient care and prognosis.

Case Report

A 72-year-old woman presented with complaints of white vaginal discharge, pelvic pain, and occasional per-vaginal bleeding. She had no systemic complaints or constitutional symptoms and reported no family history of malignancy. A Pap smear was negative for intraepithelial lesions or malignancy, but serum CA-125 levels were

markedly elevated at 314.50 U/ml³. She had no known comorbidities apart from incidental findings on imaging, including mild hepatic steatosis and age-related pancreatic atrophy. The patient underwent a clinical workup beginning with transvaginal Ultrasonography (USG), followed by contrast-enhanced MRI of the pelvis. On transvaginal USG, bilateral adnexal solid-cystic lesions with hydrosalpinx configuration were observed. MRI was performed using a *3T scanner* (Philips Achieva), incorporating T1-weighted, T2-weighted, T1 with gadolinium contrast, Diffusion Weighted Imaging (DWI) with b-values of 0, 500, and 1000 s/mm², and Apparent Diffusion Coefficient (ADC) mapping. Gadobutrol (0.1 mmol/kg IV) was used as the contrast agent. MRI revealed a well-defined, heterogeneously enhancing solid-cystic tubular lesion in the right adnexa, with the cystic component suggestive of hydrosalpinx. The solid component was noted in the inferior aspect, continuous with the ipsilateral fallopian tube, which demonstrated diffuse mural thickening extending to the right uterine horn. The right ovary was not seen separately from this lesion, although the surrounding fat planes with hollow viscera were maintained. A similar lesion was identified in the left adnexa, with a cystic component continuous with the left uterine horn, also likely representing hydrosalpinx. The left fallopian tube showed mural thickening, restricted diffusion with low ADC values, and enhancement. The left ovary was not separately visualized, and surrounding fat planes with adjacent bowel loops were preserved. The uterus was normal in size but contained blood clots within the endometrial cavity. Minimal inter-bowel free fluid was noted. Additional incidental findings included cholelithiasis with mild cholecystitis and pancreatic atrophy. Differential diagnosis includes bilateral primary carcinoma of the fallopian tubes with bilateral ovarian involvement, primary carcinoma of the right fallopian tube with metastatic spread to the left fallopian tube and bilateral ovaries and primary right ovarian carcinoma with metastatic spread to the left adnexa. The patient subsequently underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy. Histopathological examination confirmed high-grade serous carcinoma involving both fallopian tubes and ovaries, with metastatic spread to the endometrium. No lymph node involvement was reported.

Discussion

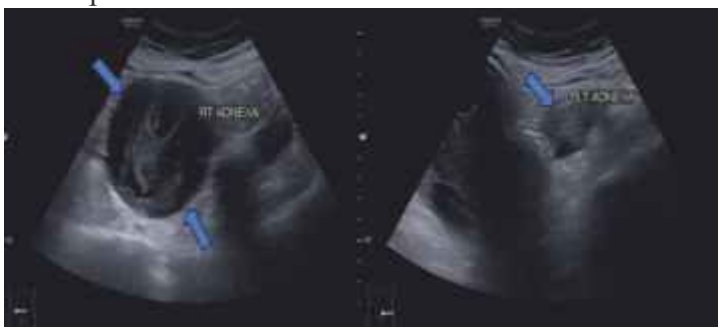

Figure 1: On these ultrasound images of the pelvis there was evidence of a mixed solid cystic lesion (blue arrows) in the right adnexa (left side image), with a similar smaller lesion (blue arrow) noted in the left adnexa (right side image)

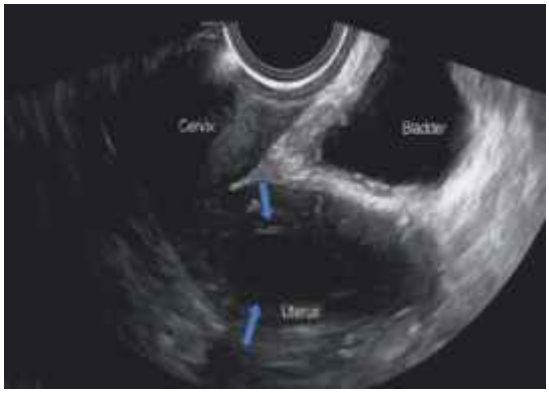

Figure 2: On transvaginal ultrasound of the pelvis the uterus appeared normal; however, there was evidence of endometrial collection (blue arrows)

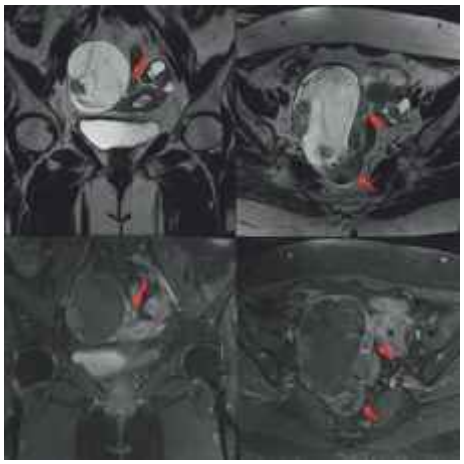

Figure 3: These MRI images of the pelvis - T2WI coronal (upper left image), T2WI axial (upper right), T1WI post contrast coronal (lower left image) and T1WI post contrast axial (lower right image) reveal an ovoid mixed solid-cystic lesion in the right adnexa. The cystic component (hyperintense on T2 weighted images) showed evidence of layering within. The solid component was seen to be continuous with the ipsilateral fallopian tube (red arrows), which showed diffuse mural thickening in its entire extent, up to the right uterine horn. The solid component, along with the thickened fallopian tube showed heterogeneous post-contrast enhancement. The right ovary was not seen separately from this lesion. Fat planes with surrounding hollow viscera appeared maintained. A smaller, similar lesion was noted in the left adnexa

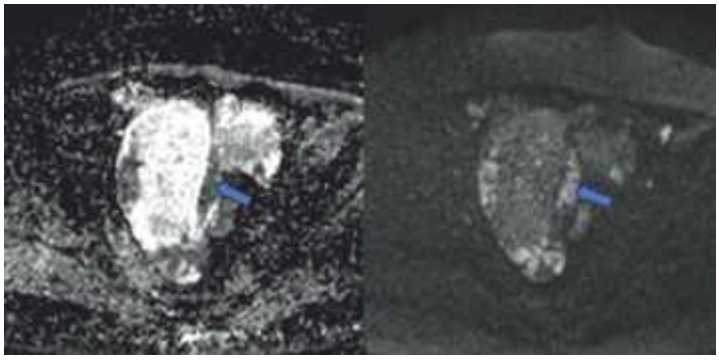

Figure 4: These axial DWI images of pelvis reveal the solid component, along with the thickened fallopian tube showed diffusion restriction (blue arrows)

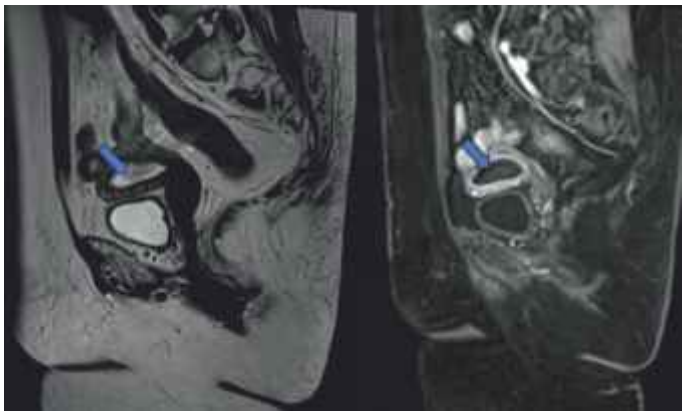

Figure 5: These MRI images of the pelvis – T2WI sagittal (left image) and T1WI post contrast sagittal (right image) the uterus appeared normal in size and was anteflexed due to the compression from the right adnexal mass. The endometrial cavity appeared fluid-filled with a non-enhancing component within (blue arrows)

Fallopian tube carcinoma remains a rare and often misdiagnosed malignancy primarily due to its overlapping clinical and radiological features with ovarian and peritoneal carcinomas. The nonspecific symptoms such as vaginal discharge, pelvic pain, and postmenopausal bleeding commonly lead to delayed diagnosis and pose a significant diagnostic challenge for clinicians [1-2]. The rarity of this entity contributes further to its under-recognition. Our case reinforces this challenge, demonstrating how bilateral involvement can complicate the clinical picture and mimic more common adnexal pathologies. Emerging evidence suggests that a significant proportion of what has traditionally been classified as high-grade serous ovarian carcinoma actually originates from serous tubal intraepithelial carcinoma lesions in the fallopian tubes [7]. This unifying theory has profound implications for early detection, prophylactic interventions, and

therapeutic strategies. The presence of bilateral lesions with diffuse mural thickening and diffusion restriction seen on MRI in our patient aligns with these pathological insights, highlighting the fallopian tubes as the primary origin of malignancy.

Imaging is indispensable in the early identification and differentiation of fallopian tube carcinoma from other gynecological malignancies. Ultrasonography often serves as the initial screening tool but may lack specificity. Advanced imaging modalities such as MRI provide superior soft tissue characterization. DWI, in particular, enhances lesion conspicuity by detecting cellular density changes, which are hallmark features of malignancy. The low ADC values observed in our case corroborate restricted diffusion typical of high-grade tumors, supporting prior literature advocating for the routine inclusion of DWI in pelvic MRI protocols for adnexal masses [4-5]. Contrast-enhanced sequences further aid in identifying mural nodularity and enhancing solid components, which are critical for malignancy assessment. Despite the strengths of imaging, limitations exist. Our case lacked preoperative PET/CT and genetic testing, which are increasingly recognized as valuable for staging, detecting occult metastases, and guiding targeted therapies, especially in high-grade serous carcinomas associated with BRCA mutations [9-10]. Incorporating molecular diagnostics could provide prognostic information and influence treatment decisions, especially with the advent of PARP inhibitors and other targeted agents.

Therapeutic approaches for fallopian tube carcinoma generally mirror those for epithelial ovarian cancer, involving surgical debulking and platinum-based chemotherapy. The prognosis is strongly influenced by disease stage at diagnosis and the completeness of cytoreduction [8]. Early recognition, as illustrated in our case, is essential to optimize outcomes. Moreover, this case underscores the need for multidisciplinary collaboration among radiologists, pathologists, and gynecologic oncologists to improve diagnostic accuracy and tailor management.

Conclusion

This case report illustrates the diagnostic complexity of bilateral fallopian tube carcinoma and highlights the critical role of MRI, particularly DWI sequences, in early recognition of tubal malignancies. Radiologists should maintain a high index of suspicion for PFTC when encountering solid-cystic adnexal lesions with hydrosalpinx configuration and mural enhancement. Enhanced imaging protocols, combined with biomarker analysis and timely surgical intervention, are key to improving patient outcomes. Increased awareness may also support earlier diagnoses and justify prophylactic salpingectomy in high-risk patients.

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Author for Correspondence:
Dr. Ankit Gupta, Department of Radio-diagnosis, Dr. D. Y. Patil Medical College, Hospital and Research Center, Pune – 411018 Email: ankitg19963a@gmail.com Cell: 9910960757

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