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Telemedicine Enabled Early Detection of Left Breast Carcinoma Through Multidisciplinary Virtual Consultation in Rural India: A Care Guideline Compliant Case Report of Apollo Telehealth

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Abstract

Breast cancer remains the most frequently diagnosed malignancy among women worldwide and early detection remains the most important determinant of survival. However, delayed diagnosis continues to be a major challenge in rural and semi-urban populations due to limited access to specialist care. Telemedicine has emerged as an important healthcare delivery innovation capable of bridging this gap by enabling early clinical suspicion and facilitating specialist referral pathways.

We report a case of a 46-year-old female from rural Andhra Pradesh who presented through telemedicine consultation with complaints of a gradually enlarging left breast lump associated with nipple changes. Through structured tele clinical assessment including guided self-examination and symptom risk stratification, malignancy was suspected. Imaging demonstrated a BIRADS-4 lesion. Multidisciplinary teleconsultation involving internal medicine and surgical oncology resulted in urgent referral for tissue diagnosis. Core biopsy confirmed invasive ductal carcinoma.

This case highlights the important role of telemedicine and Apollo Telehealth in early cancer suspicion, multidisciplinary collaboration, and improving access to oncology care in underserved and rural populations which lack speciality health care.

Summary

Telemedicine enabled early suspicion of breast malignancy in a rural patient.

Multidisciplinary teleconsultation improved referral timelines.

Structured tele clinical assessment can support cancer detection.

Digital health platforms can improve oncology access in underserved regions.

Keywords: Telemedicine, Tele-oncology, Breast cancer, Digital health, Rural healthcare, Apollo Telehealth

Introduction

Breast cancer represents the most common malignancy among women globally, accounting for significant morbidity and mortality[1].Early detection significantly improves survival outcomes, with five-year survival rates exceeding ninety percent when diagnosed early.[2] Despite advances in screening and treatment, delayed presentation remains common in developing countries, particularly among women residing in rural and resource-limited settings.[3,4]

Breast cancer is the most common cancer among women in India, accounting for nearly 25–27% of all female cancers and representing a major public health concern. According to GLOBOCAN 2022 estimates, India reports approximately 190,000–200,000 new breast cancer cases annually, with nearly 98,000 deaths each year, making it one of the leading causes of cancer-related mortality among women.[5,6] Overall, breast cancer contributes significantly to both incidence and mortality, accounting for a substantial proportion of total cancer burden in the country.[7] A key challenge in India is late detection, as many patients present in advanced stages due to lack of awareness and limited screening programs. Undiagnosed or delayed diagnosis leads to higher morbidity, poor quality of life, and significantly reduced survival rates compared to early-stage disease. Consequently, breast cancer continues to have a considerable impact on the overall cancer mortality rate in India, highlighting the urgent need for improved screening, awareness, and early intervention strategies.[8]

India continues to face disparities in cancer detection due to unequal distribution of healthcare infrastructure and specialist services. Telemedicine has emerged as a transformative model to address these gaps, particularly after formalization of telemedicine practice guidelines by the National Medical Commission of India.[9]

Telehealth and telemedicine have significantly transformed the healthcare landscape in India, evolving from a supportive tool in the pre-COVID era to a mainstream care delivery model post-pandemic. While early adoption was gradual, COVID-19 accelerated acceptance among both clinicians and patients, improving access to timely medical care across urban and rural settings.[10] Telemedicine now plays a crucial role in early screening and risk stratification of diseases, including cancers such as breast cancer, where virtual consultations, guided history-taking, and interpretation of imaging reports can facilitate early suspicion and prompt referrals. It has enhanced continuity of care, reduced delays in diagnosis, and enabled multidisciplinary collaboration across geographies.[11] Importantly, telehealth bridges the gap between specialists and underserved populations, ensuring equitable healthcare delivery. As digital infrastructure and regulatory frameworks strengthen, telemedicine continues to emerge as a key pillar in India's healthcare transformation.[12,13]

Apollo Telehealth has been a pioneer in telemedicine in India, playing a transformative role in bridging healthcare gaps across urban and rural populations.[14] Over the years, it has developed robust telehealth models that enable access to specialist consultations, remote monitoring, and continuity of care even in the most underserved regions.[15] By integrating digital platforms with clinical expertise, Apollo Telehealth has significantly improved early diagnosis, timely referrals, and patient outcomes. Its large-scale public health initiatives, including tele-ICU, tele-oncology, and screening programs, have redefined accessibility and affordability of quality healthcare.[16] The organization's sustained efforts, both pre- and post-COVID, have

positioned it as a key driver in shaping India's digital healthcare ecosystem.

Tele-oncology enables remote cancer risk assessment, triaging, diagnostic planning, and referral coordination.[17] This case report describes early identification of suspected breast carcinoma through a structured telemedicine consultation model and highlights the clinical value of digital health systems in oncology detection pathways.[18]

Case Presentation

A 46-year-old female patient from rural Andhra Pradesh presented through telemedicine consultation with complaints of a lump in the left breast that she had first noticed approximately two months earlier. The patient reported gradual increase in size and occasional mild discomfort. She also reported recent nipple inversion over the preceding three weeks.

There was no associated fever, trauma, nipple discharge, or significant systemic symptoms such as weight loss. The patient had no significant past medical history and no family history of breast malignancy. She had never undergone prior screening mammography.

Telemedicine Clinical Assessment

Since physical examination was not possible, a structured telemedicine breast symptom checklist was used.

Patient was guided to perform self-examination during video consultation.

Tele-examination findings (guided self-exam)

Patient reported:

- Hard lump in upper outer quadrant
- Approximately 3–4 cm (finger estimation)
- Reduced mobility
- Mild skin dimpling suspected
- Early nipple inversion

These findings raised suspicion of malignancy.

During guided palpation, the patient reported a hard lump in the upper outer quadrant approximately 3–4 cm in size with reduced mobility. Visual inspection suggested mild breast asymmetry and early nipple inversion.

Based on these findings, suspicion of malignancy was raised.

Telemedicine Clinical Red Flag Indicators

Following warning signs were identified:

- Hard irregular lump
- Progressive growth
- Nipple changes
- Possible skin tethering
- Age > 40

Based on these, urgent imaging was advised.

Investigations

Baseline laboratory investigations showed haemoglobin of 11.2 g/dl suggesting mild anaemia. Total leukocyte count and platelet counts were normal. ESR was elevated at 42 mm/hour. Renal and liver parameters were normal.

Mammography demonstrated an irregular speculated lesion in the upper outer quadrant categorized as BIRADS-4 suggesting malignancy.

Breast ultrasound demonstrated a hypoechoic irregular lesion with posterior acoustic shadowing and suspicious margins.

Core biopsy confirmed invasive ductal carcinoma Grade II. Immunohistochemistry showed ER positive and PR positive status.

Test	Result	Interpretation
Hb	11.2 g/dl	Mild anaemia
TLC	7800	Normal
Platelets	2.6 lakh	Normal
ESR	42	Elevated
RBS	104	Normal

Test	Result	Interpretation
Creatinine	0.8	Normal
LFT	Normal	Normal

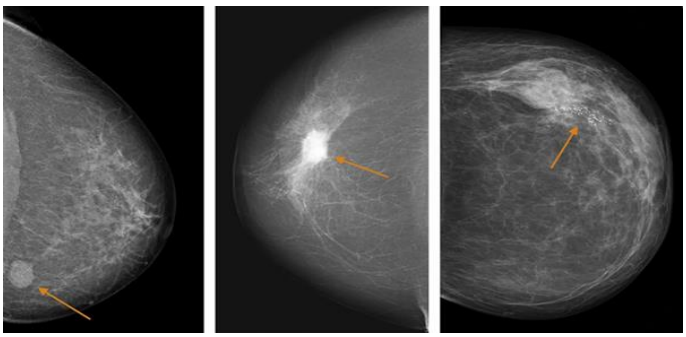

Figure 1: Representative mammographic appearances of malignant breast lesions, showing an irregular spiculated mass and clustered suspicious microcalcifications - imaging patterns that warrant further diagnostic work-up.

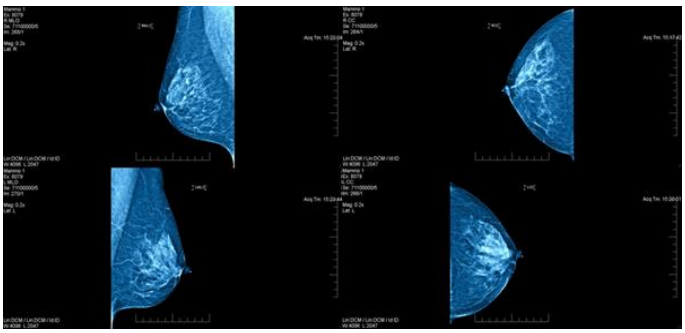

Figure 2: Standard bilateral mammography views (CC and MLO) obtained as part of breast lesion assessment, allowing comparison of both breasts and localization of the suspicious area.

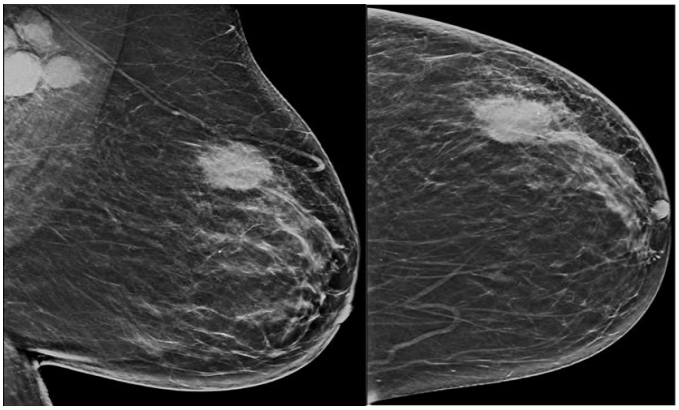

Figure 3: Mammographic close-up demonstrating an irregular high-density spiculated lesion in the breast, with morphology concerning for malignancy and consistent with a BI-RADS 4 suspicious abnormality.

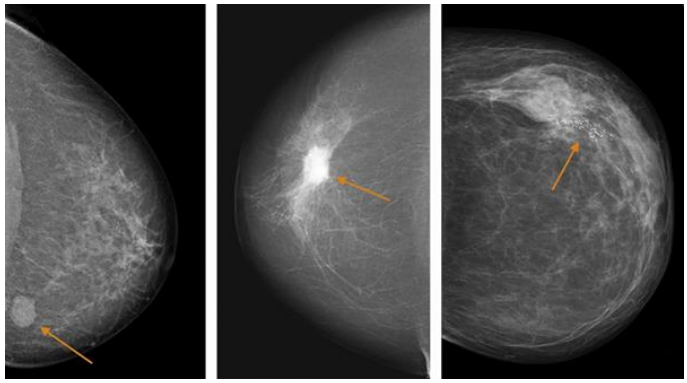

Figure 4: Additional mammographic reference image highlighting suspicious breast lesion morphology, including a stellate/spiculated mass and associated calcific changes suggestive of malignancy.

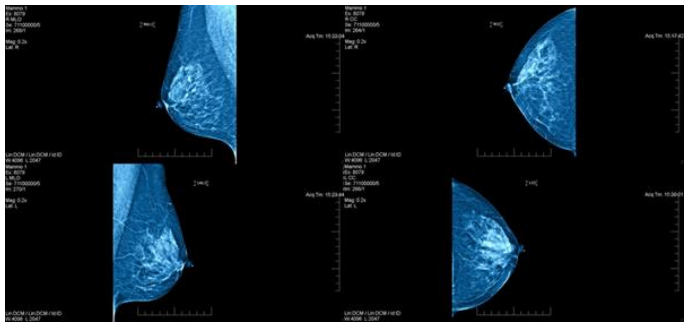

Figure 5: Bilateral mammographic screening views used for systematic radiological assessment and side-to-side comparison during evaluation of the palpable breast complaint.

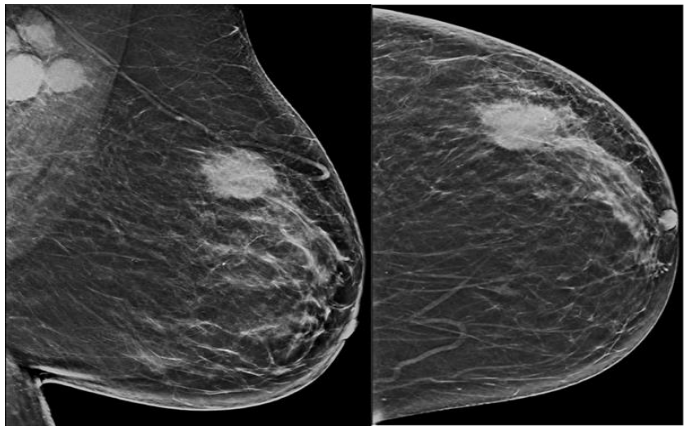

Figure 6: Focused mammographic image showing a suspicious irregular breast mass in the upper outer quadrant, supporting the need for tissue diagnosis.

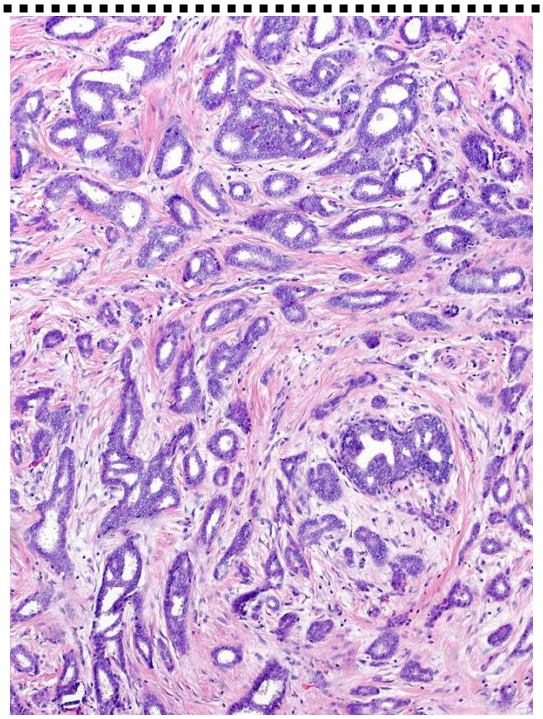

Figure 7: Histopathology (H&E stain) showing infiltrating malignant epithelial cells arranged in irregular gland-forming structures within a desmoplastic stroma, consistent with invasive ductal carcinoma.

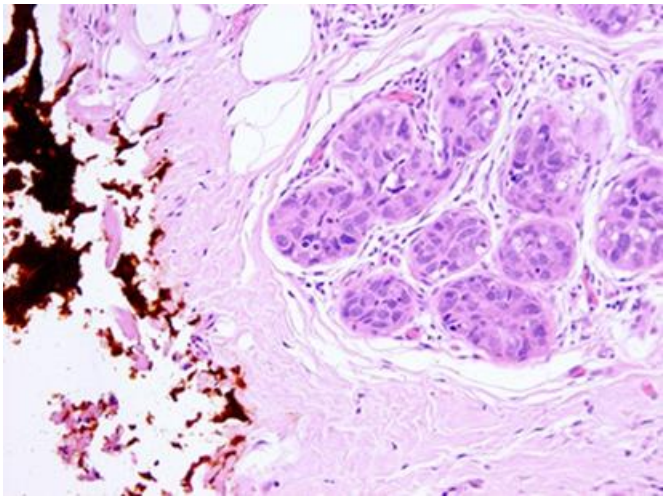

Figure 8: Histopathology microphotograph demonstrating infiltrative carcinoma nests within surrounding stromal and adipose tissue, supporting invasive breast malignancy.

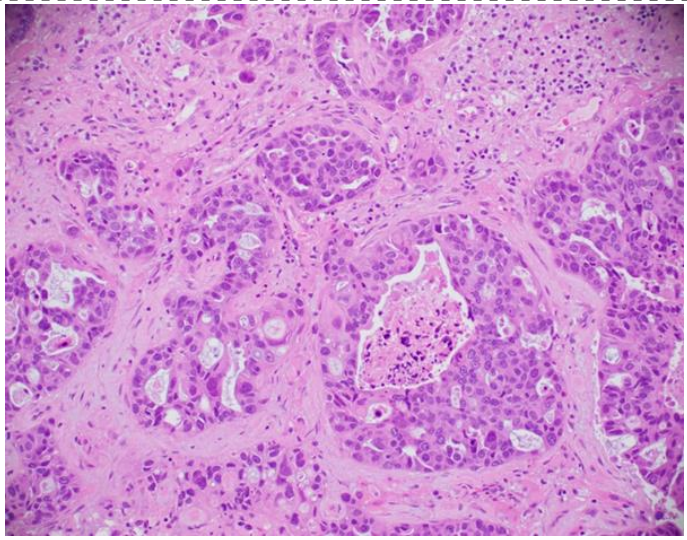

Figure 9: Histopathology (H&E stain) showing pleomorphic malignant ductal cells infiltrating fibrous stroma with glandular formation, in keeping with invasive ductal carcinoma, Grade II.

Histopathology

Core biopsy confirmed:

Invasive ductal carcinoma

Characteristics:

- Grade II
- ER positive
- PR positive
- HER2 pending

Management and Outcome

Following confirmation of the diagnosis, the patient was promptly referred to a higher oncology center for comprehensive evaluation and management. At the tertiary care facility, a detailed staging workup was undertaken, including appropriate imaging and laboratory investigations, to assess the extent of disease and rule out distant metastasis. Based on the staging findings and tumor characteristics, the case was discussed in a multidisciplinary tumor board involving a surgical oncologist, medical oncologist, and other relevant specialists to formulate an optimal treatment plan tailored to the patient.

A critical enabler in this entire pathway was Apollo TeleHealth, whose structured telemedicine platform facilitated early clinical suspicion, seamless coordination, and rapid escalation of care. Through its integrated digital ecosystem, Apollo TeleHealth enabled timely virtual consultation, efficient sharing of clinical data, and direct linkage with specialist services, thereby significantly reducing the usual barriers faced in accessing oncology care, especially from remote or underserved regions.

The patient subsequently underwent a modified radical mastectomy, which remains a standard surgical approach for operable breast cancer in many settings, particularly when breast conservation is not feasible or when patients present at a relatively advanced stage. The surgery was completed successfully without immediate complications, and histopathological evaluation of the resected specimen provided further insights into tumor biology, including receptor status (estrogen receptor, progesterone receptor, and HER2/neu status), lymph node involvement, and margin status.

Postoperatively, the patient was initiated on adjuvant chemotherapy as per standard oncological protocols, considering the stage and risk stratification. Chemotherapy aimed to reduce the risk of recurrence and improve long-term survival outcomes. In addition, based on the hormone receptor positivity, the patient was planned for adjuvant hormonal therapy, which plays a critical role in reducing recurrence and improving prognosis in hormone-sensitive breast cancers. The integration of surgery, chemotherapy, and hormonal therapy highlights the importance of a multimodal treatment approach in achieving optimal oncological outcomes.

A noteworthy aspect of this case was the remarkably short time interval between the initial teleconsultation and definitive surgical intervention, which was approximately three weeks. This is particularly significant when compared to the typical delays often observed in rural or resource-limited settings, where diagnostic and treatment pathways can be prolonged due to factors such as limited access to specialists, delayed referrals, and logistical challenges. In many such scenarios, patients present at advanced stages, adversely affecting prognosis and survival.

In this case, early clinical suspicion raised during the teleconsultation—enabled by Apollo TeleHealth's robust triaging and consultation framework—played a pivotal role in expediting the diagnostic process. Through a structured virtual assessment, including detailed history-taking and review of available reports, the clinician was able to identify red flag features suggestive of malignancy. This led to timely advice for further diagnostic evaluation and immediate referral to appropriate specialists. The telemedicine platform effectively bridged the gap between the patient and specialized oncology services, ensuring that critical time was not lost in the initial stages of care.

Furthermore, multidisciplinary teleconsultation with a surgical oncologist, coordinated through Apollo TeleHealth, facilitated early decision-making and streamlined the referral pathway to a tertiary oncology center. This coordinated approach minimized unnecessary delays and ensured continuity of care across different levels of the healthcare system. The ability to virtually connect patients from remote or underserved areas to expert care significantly enhances healthcare accessibility and equity.

Overall, this case clearly demonstrates the effectiveness of telemedicine—particularly through the structured and scalable model of Apollo TeleHealth—in reducing diagnostic delays, enabling early intervention, and

improving clinical outcomes in breast cancer care. By facilitating rapid escalation from suspicion to definitive treatment, telehealth platforms are playing a transformative role in redefining cancer care delivery in India.

Discussion

This case illustrates the growing importance of telemedicine in facilitating early detection of malignancies, particularly in populations with limited access to specialist services.[11] One of the major limitations traditionally associated with teleconsultation has been the inability to perform physical examination. However, this limitation can be partially overcome through structured symptom questionnaires, guided self-examination techniques, and risk stratification protocols.[19]

In this case, careful history taking combined with guided self-assessment enabled identification of classical red flag symptoms.[12] This highlights the importance of physician clinical acumen even within digital consultation environments. Telemedicine should not be viewed merely as a convenience platform but as a structured clinical tool requiring proper protocols and physician training.[20]

Tele-oncology models have shown increasing effectiveness in improving early referral pathways.[13] Studies have demonstrated that virtual oncology consultations can enhance coordination of care, reduce travel burden, and improve treatment adherence. [16,17] Importantly, delays in cancer diagnosis and treatment are directly associated with increased mortality, emphasizing the value of early intervention enabled through telemedicine [4].

This case also demonstrates the importance of multidisciplinary teleconsultation.[21] Collaboration between an internal medicine physician and a surgical oncologist through a digital platform allowed timely decision making and expedited referral.[18] Such integrated telehealth models represent the future of cancer care delivery, particularly in geographically diverse countries like India.[22]

Nevertheless, limitations remain. Telemedicine cannot fully replace physical examination and must function as an adjunct rather than a replacement for in-person evaluation.[19] Diagnostic accuracy depends heavily on patient cooperation, imaging availability, and digital literacy. However, when properly implemented, telemedicine can significantly strengthen early detection pathways.[23]

Conclusion

This case clearly demonstrates that telemedicine can play a pivotal role in the early detection of cancers by facilitating timely clinical suspicion and structured remote assessment. Through detailed history-taking, symptom evaluation, and guided virtual examination, clinicians can identify early warning signs even in the absence of physical examination, thereby initiating diagnostic pathways earlier than conventional models. [11–13]

Telemedicine also enables seamless multidisciplinary collaboration, allowing early involvement of oncologists, radiologists, and surgeons, which significantly enhances clinical decision-making and treatment planning. [16–18] One of its most important advantages is the ability to ensure rapid referral and escalation of care, particularly in underserved and rural regions where access to specialized oncology services is limited. [7,9]

By overcoming geographical and logistical barriers, telemedicine reduces delays in diagnosis and treatment, which is critical given the strong association between treatment delays and increased cancer mortality.[4,21]

Early intervention facilitated by telehealth may therefore contribute to reducing advanced-stage presentation and improving survival outcomes.

As telemedicine adoption continues to expand, the development of structured tele-screening protocols for cancer symptoms can further strengthen early detection strategies. [20,23] Integration of tele-oncology pathways into national digital health frameworks represents a crucial step toward improving cancer outcomes, enhancing healthcare equity, and building scalable oncology care models in resource-limited settings such as India. [10,22]

CARE Checklist Compliance

This case report follows CARE guidelines including patient information, clinical findings, diagnostic assessment, therapeutic intervention, outcome reporting and ethical considerations.

Patient Timeline

Symptom onset – Month 0

Teleconsultation – Month 2

Imaging – Week 1

Tele-oncology consultation – Week 2

Biopsy – Week 3

Surgery – Week 5

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