

Navigating complexity: A case study of triple primary cancers in breast, lung, and rectum

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ABSTRACT

The advancement of technology in tumor identification and therapy has led to a significant rise in the prevalence of multiple primary malignant tumors. Triple or more primary malignancies are rare and their management poses a major challenge. For optimum outcomes, a multidisciplinary strategy and customized decision-making for each patient are helpful. Here, we present a case of a 47-year-old female with triple primary malignancies of breast, rectum, and lung. To the best of our knowledge, this is the first review of a breast carcinoma that was metachronous to both lung and rectum in which lung and rectum carcinomas developed synchronously.

Key words: Breast, Carcinoma, Lung, Rectum, Triple primary malignancy

The frequency of multiple primary malignant tumors (MPMTs) has significantly increased due to the advancements in tumor diagnostic and treatment technologies [1]. However, triple primary cancer is still an extremely uncommon discovery. The reported incidence of MPMT in cancer patients ranges from 0.52% to 11.7% [2]. Compared to the general population, patients with a history of cancer have a 14% increased chance of having a second primary cancer. It has also been demonstrated that women are more likely than men to have multiple primary tumors [3]. Metachronous triple primary malignancies have been reported for the breast, uterus, and colon [4], as well as, for the breast, rectum, and kidney [3].

We report a rare case of triple malignancy breast cancer that developed metachronously with rectum and lung cancer.

CASE REPORT

A 46-year-old female presented with invasive ductal carcinoma of the left breast in 2019 for which she was operated on with the left modified radical mastectomy with level 1 and 2 node dissection. She was found to be estrogen receptor (ER) and progesterone receptor (PR) positive and was started on hormonal therapy. On a follow-up visit in the year 2023, she complained of bleeding per rectum. A colonoscopy revealed mid-rectal malignant growth. On staging and workup, lung nodules were noted. Trucut biopsy from the right lung nodules was suggestive of non-small cell lung

cancer. She was diagnosed to be epidermal growth factor receptor (EGFR) positive and was started on gefitinib. She received a long course of radiotherapy and neoadjuvant chemotherapy (NACT) for carcinoma rectum. On follow-up, there was a regression in tumor size. Rectum responded well to NACT and long-course radiochemotherapy (LCRT). Low anterior resection was done for the carcinoma rectum. Lung lesions in both the lobes responded to therapy and decreased in size on follow-up scans. She is alive at present and on regular follow-up.

Breast Carcinoma

Left breast-conserving surgery (BCS) was done in June 2019. The histopathology report was invasive ductal carcinoma, pT1cN1M0, ER +, PR +, Her 2 -ve, and Allred score was 8. She completed adjuvant chemotherapy for eight cycles followed by endocrine therapy tamoxifen. While she was reaching perimenopausal age, a bilateral oophorectomy was done along with anterior resection for rectal carcinoma. She was shifted to letrozole thereafter. There was no recurrence of breast carcinoma. She is on letrozole presently.

Rectal Carcinoma

The patient presented with bleeding per rectum on regular follow-up. It was a midrectal ulceroproliferative growth on colonoscopy. Colonoscopic biopsy was suggestive of rectal adenocarcinoma. The carcinoembryonic antigen level was 1.35 ng/mL. Staging workup was done with a positron emission

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tomography-computed tomography (PET-CT) scan and magnetic resonance imaging pelvis was done for assessment of the extent of the disease. PET-CT showed uptake in the mid-rectum and bilateral lungs, which were further evaluated (Fig. 1). NACT followed by LCRT was done. Low anterior resection with diversion ileostomy with bilateral oophorectomy was done. The final histopathology report was adenocarcinoma stage: ypT4aN0(0/15) (Fig. 2).

Lung Carcinoma

It was incidentally detected by a PET-CT scan. CT-guided biopsy from the lung was done. The biopsy report suggested non-small cell carcinoma favoring adenocarcinoma. Immunohistochemistry confirmed lung cancer and excluded metastasis by strongly positive thyroid transcription factor 1, caudal type homeobox (CDX)-negative, ER-negative, and PR-negative. She was started on gefitinib for the treatment of lung cancer in view of EGFR positivity.

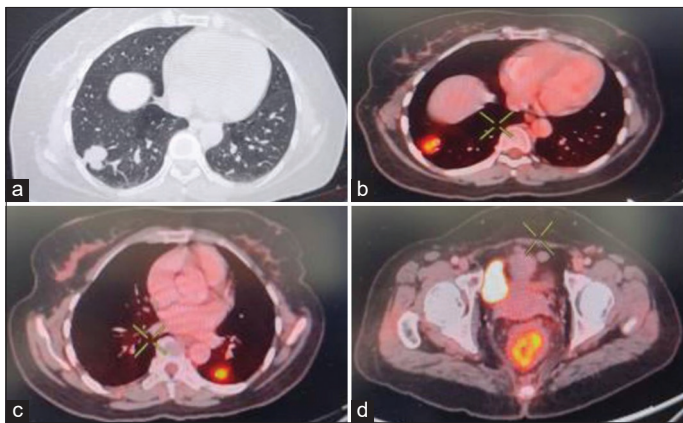


Figure 1: (a) CT scan shows a heterogenous spiculated lesion of 12×13×7 mm noted in right lower lobe of the lung, suggestive of malignancy; (b) PET-CT scan shows FDG avid lesion in right lower lobe of lung, SUV max 13.3, suggestive of malignancy; (c) PET-CT scan shows FDG avid lesion in left lower lobe of lung, SUV max 12.9, suggestive of metastasis; (d) PET-CT scan suggestive of FDG avid lesion in mid rectum suggestive of primary malignancy, SUV max 14.33. PET CT: Positron emission tomography-computed tomography,

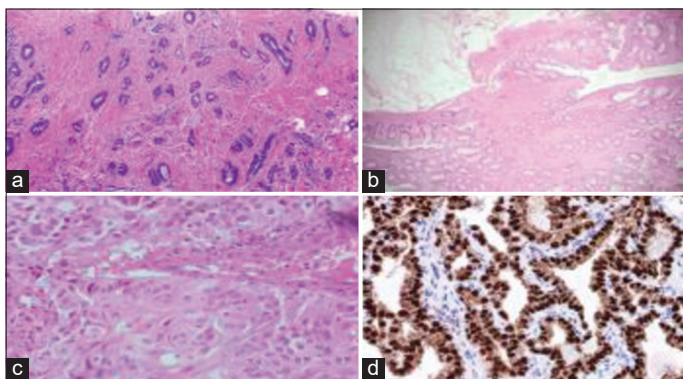


Figure 2: (a) Ca breast section – breast parenchyma infiltrates by malignant glands; (b) Rectal submucosa shows infiltration by malignant glandular structure; (c) Ca lung section – confluent nests of tumor cells and fused malignant glands; (d) strong and diffuse thyroid transcription factor-1 expression (nuclear) in the tumor tissue from lung

Left BCS along with adjuvant chemotherapy, radiation, and hormone therapy was given to the patient. On follow-up, two new synchronous primaries were developed, for which NACT and concurrent chemoradiotherapy (CTRT) were given. The patient was on long-course antibiotics (along with gefitinib + tamoxifen), anterior resection, oophorectomy, and adjuvant chemotherapy capecitabine and oxaliplatin chemotherapy (along with letrozole + gefitinib). The patient is on regular follow-up.

DISCUSSION

The criteria for MPMs described by Parekh *et al.* are as follows [1]: (a) each primary tumor had to be proven malignant histologically; (b) each primary tumor had to be anatomically distinct and different from one another; and (c) it had to be proven that one tumor was not a recurrence or metastatic of the other.

The first identified malignancy is considered the index tumor, whereas the subsequently diagnosed malignancies are considered either synchronous (diagnosed before 6 months) or metachronous (diagnosed after 6 months of the previous malignancy) [2]. Examples of triple primary are noted in the literature. Two primary malignancies are common but triple or more primary malignancies are rare. Multiple primary malignancies are either synchronous or metachronous. The incidence of multiple primary malignancies ranges from 0.52% to 11.7% [3]. However, regarding treatment and prognosis for MPM data in the literature is limited. Li *et al.* reported 23 previous cases of triple or more primary malignancies including breast cancer in the past 30 years (January 1990 to December 2019) [5].

Triple cancers with breast and rectal cancers have been reported in the literature. Metachronous carcinoma of the breast, rectum, and kidney has been reported by Jayarajah *et al.* A 63-year-old female diabetic and hypertensive underwent a low anterior resection with curative intent combined perioperative chemotherapy for a moderately differentiated adenocarcinoma of the rectum. Responses to chemotherapy in neoadjuvant and adjuvant settings were good. She was on regular follow-up annually for 8 years. There was no evidence of recurrence. During a routine follow-up for rectal cancer, she was detected to have a clinically malignant 5 cm lump in the left breast with no palpable ipsilateral axillary lymphadenopathy. Her abdominal and digital rectal examination and basic biochemical investigations were within normal limits. Contrast-enhanced computed tomography suggested a heterogeneously enhancing well-defined nodule in the lower pole of the right kidney measuring 4 cm without any perilesional organ invasion or lymph node involvement, suggestive of an early renal cell carcinoma [4].

Triple primary with breast and lung has been reported in the literature by Kurul *et al.* A 56-year-old female who presented with invasive ductal carcinoma of the breast, non-small cell lung cancer, and malignant melanoma was reported in the literature. The patient underwent a mastectomy for the breast and wide local excision of malignant melanoma. After surgery, stereotactic radiotherapy was given to her lung tumor along with six cycles of chemotherapy. She is alive with no progression of disease [6].

Triple primary cancer involving the breast, colon, and uterus was reported in a 67-year-old female in 2020 [5]. Rectal metastasis from a carcinoma breast was noted in a case of a triple-negative breast carcinoma patient. Metachronous metastasis developed 11 years after treatment of the primary [7].

The treatment planning for MPMTs depends on some factors, such as the tumor stage, patient's age, and comorbidities. A multidisciplinary team management approach is necessary at times on an individual basis. In metachronous MPMTs, sequential therapy for each tumor is preferred, whereas, in synchronous MPMTs, individualized decision has to be taken by a multidisciplinary team.

CONCLUSION

Triple primary malignancies are rare. Twenty-three cases of triple primary malignancy with breast carcinoma have been reported in the literature. Triple primary of breast, rectum, and kidney have been reported. Furthermore, triple primary of breast, lung, and malignant melanoma has been reported. No other similar published reported case of triple primary of breast with rectum and lung was found in the literature. This is the first case of its kind. This is a unique case of metachronous triple primary malignancies in which we have reported synchronous carcinoma of the rectum and lung but metachronous to carcinoma breast.

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REFERENCES

1. Parekh JD, Kukrety S, Thandra A, Valenta C. Multiple primary malignant neoplasms in an elderly patient. *Cureus* 2018;10:e2384.
2. Zhan X, He L, Song K, Cao S, Meng E, Wang Y. Case report: Triple primary malignant tumors of the esophagus, stomach, and colon in a patient with genetic analysis. *Front Genet* 2021;12:676497.
3. Lv M, Zhang X, Shen Y, Wang F, Yang J, Wang B, *et al.* Clinical analysis and prognosis of synchronous and metachronous multiple primary malignant tumors. *Medicine (Baltimore)* 2017;96:e6799.
4. Jayarajah U, Basnayake O, Wijerathne P, Jayasinghe J, Samarasekera DN, Seneviratne S. A rare occurrence of three primary malignancies of the rectum, breast, and kidney in the same patient: A case report and review of the literature. *Case Rep Surg* 2019;2019:1716029.
5. Li G, Yao J, Wu T, Chen Y, Wang Z, Wang Y, *et al.* Triple metachronous primary cancer of uterus, colon, and breast cancer: A case report and review of the literature. *Medicine (Baltimore)* 2020;99:e21764.
6. Kurul S, Akgun Z, Saglam EK, Basaran M, Yucel S, Tuzlali S. Successful treatment of triple primary tumor. *Int J Surg Case Rep* 2013;4:1013-6.
7. Hoang DA, Nguyen AQ, Nguyen KT, Pham MD. Rectal metastasis originating from breast cancer: A rare case report. *Ann Med Surg (Lond)* 2022;78:103841.

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