

Multiple Primary Cancers: Association of Breast Cancer and Lung Carcinoma

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Abstract

Case Report

Multiple primary cancers are relatively rare. The association between lung and breast cancer remains exceptional and requires genetic investigation and identification of factors that promote cancer development. We report the case of a 39-year-old patient who was hospitalized for a left lung lesion with nodules in both breasts. Bronchial biopsies confirmed a primary lung adenocarcinoma. A biopsy of the breast revealed an infiltrating carcinoma of NOS type. The treatment consisted of palliative chemotherapy. Although the association of multiple cancers remains rare, their discovery requires a specific therapeutic approach depending on the staging of each cancer.

Keywords: breast cancers, Bronchial biopsies, palliative chemotherapy.

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INTRODUCTION

The occurrence of synchronous cancer with other primary cancers has been described in the literature, with a frequency ranging from 5.5% to 8.5% of all cancers [1]. Breast cancer is the most frequently diagnosed cancer in women [15], and bronchopulmonary cancer is also a public health problem due to its increased prevalence and poor prognosis. Improvements in early detection and treatment have led to increased long-term survival of breast cancer, thereby increasing the likelihood of second primary cancer occurrence [2]. However, the synchronous occurrence of two primary cancers remains exceptional [4].

CASE REPORT

We report a case of a 39-year-old woman, non-smoker, exposed to wood smoke, presenting with stage III progressive dyspnea for the past 3 months, associated with dry cough and left basithoracic pain with general state alteration. The clinical examination revealed a left hemithorax condensation syndrome with the presence of two firm and painful nodules in both breasts, without signs of inflammation or axillary lymphadenopathy. The chest X-ray showed a dense, homogeneous opacity with a water-like tone occupying the left hemithorax without displacement of mediastinal structures, along with contralateral nodules and micronodules (Figure 1).

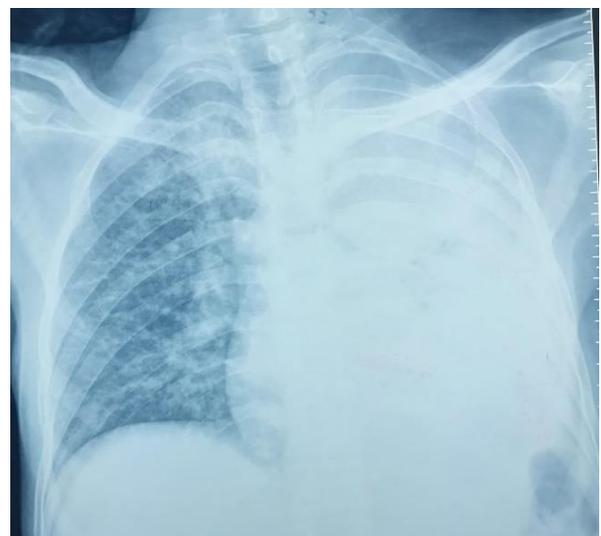


Figure 1: Chest x-ray showing dense opacity of the left hemithorax

In addition, the thoracic scan revealed a left hilar ganglion tumor complex measuring approximately 65*54*80 mm, which is responsible for regional infiltration with associated vascular involvement, as well as contralateral pulmonary nodules, and the presence of a left pleural effusion and necrotic subcarinal adenopathy (Figure 2).

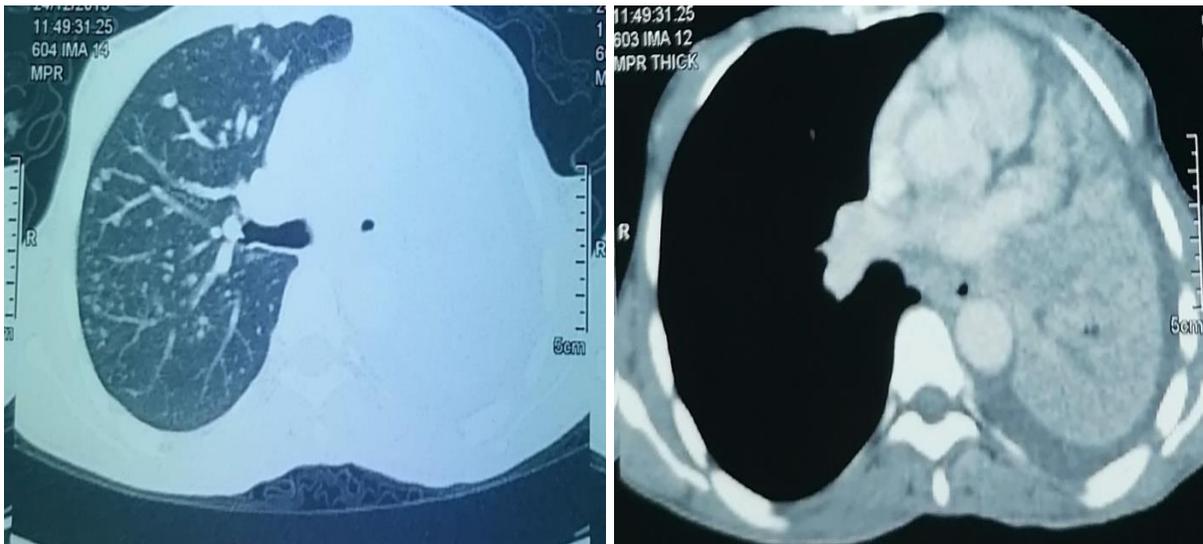


Figure 2: Thoracic CT scan with tumor mass of the right pulmonary hilum

Flexible bronchoscopy showed a tumoral infiltration of the carina, with the presence of a tumor bud completely obstructing the left main bronchus. The echomammography showed multiple bilateral nodular lesions classified as BIRADS 4. Bronchial biopsies concluded an undifferentiated, infiltrating pulmonary adenocarcinoma expressing TTF1 and CK 27, with negative CK20 and estrogen receptor antibodies. The biopsy of the breast lesions revealed an infiltrating carcinoma of NOS type expressing estrogen receptors, with the molecular class proposed according to the recommendations of St. Gallen 2015 with negative HER2 and Ki67 at 20%.

The cerebral CT scan showed multiple nodular intra-parenchymal lesions above and below the tentorium, suggesting a secondary origin, and the abdominal-pelvic CT scan revealed a secondary left adrenal mass. At this stage, the diagnosis of a primary bronchogenic cancer associated with breast cancer was considered. A protocol that included molecules targeting both cancers was proposed, based on carboplatin and paclitaxel, of which the patient received 2 sessions and then was lost to follow-up.

DISCUSSION

Multiple primary cancers are defined by the International Agency for Research on Cancer (IARC) as the occurrence of two or more primary cancers in the same individual. These cancers can occur in the same tissue or organ, or they can affect different tissues or organs. They do not correspond to an extension, recurrence, or metastasis of the same primary cancer [1]. Multiple primary cancers are generally classified into two categories: synchronous, in which the cancers occur almost simultaneously (within a two-month timeframe), and metachronous, in which the cancers occur sequentially over time with an interval of more than two months [14]. The occurrence of multiple primary cancers

among cancer patients has been reported to range from 0.73% to 11.7% [2, 3].

Multiple synchronous primary cancers are quite rare [4], but their occurrence is increasing. According to various sources, they represent approximately 5.5 to 8.5% of all reported cases in the literature [5]. Their incidence varies from 0.2 to 13.1%. Several studies have also reported a relatively high frequency of second primary cancer after breast cancer, ranging from 3 to 27% [6]. Several authors have reported a relatively high frequency of second primary cancer after breast cancer ranging from 3 to 27% [7].

The association of lung and breast cancer is even rarer and requires investigating several factors that may contribute to the occurrence of both cancers: changes in smoking habits, exposure to secondhand smoke, and the presence of other risk factors (nutritional, occupational, environmental, hormonal, and genetic). Indeed, numerous publications suggest that female hormones play a role in the risk of developing lung cancer [8], and women diagnosed with breast cancer have a significantly increased risk of developing subsequent lung cancer, possibly linked to an interaction between radiotherapy and smoking [9]. In fact, in the study by Prochazka *et al.*, 613 cases of subsequent lung cancer were discovered among 141,000 women followed by breast cancer [9]. Some authors have attributed certain forms of multiple primary cancers to pure chance [10].

Immunohistochemistry (IHC), which has become an essential technique in pathological anatomy, allows us to distinguish between primary or secondary pulmonary origin of adenocarcinoma with good confidence. It also provides prognostic elements (proliferation markers, differentiation markers) or predictive markers of response to treatment (chemotherapy or targeted therapies) [11]. The CK-7 and

TTF-1 are markers used for pulmonary adenocarcinomas [8]. The thyroid transcription factor-1 (TTF-1) is normally expressed by cells in the diencephalon, thyroid follicular cells, type II pneumocytes, and bronchiolar cells. The positivity of TTF-1 in breast cancer has been demonstrated in certain studies, but its frequency remains unknown and exceptional [12]. The synchronous association of two primary cancers not only presents a diagnostic challenge, but also a therapeutic one, and the treatment should aim at both primary cancers and depend on the staging of each cancer [13].

CONCLUSION

The association of primary breast cancer and primary lung cancer is an exceptional situation but has now become increasingly common, especially in metachronous situations. The role of genetic, hormonal, and environmental factors is still the subject of several studies to determine them.

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