

Abnormal shadow on chest radiograph: a supra – or infradiaphragmatic finding?

Patologiczny cień na zdjęciu rentgenowskim klatki piersiowej: zmiana nad – czy podprzeponowa?

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KEYWORDS:

- solitary pulmonary nodule,
- breast cancer,
- pulmonary hamartoma,
- liver calcifications

ABSTRACT

Incidental findings on chest X-ray of oncological patients need further evaluation in contrast-enhanced computed tomography (CT). We report two cases of abnormal shadows, detected on radiograph, in patients with breast cancer: the first one projected under the left hemidiaphragm and the second one obscuring the right hemidiaphragm. Both patients were asymptomatic, subjected to a surgery and to a CT. The first scan revealed a 15 mm diameter nodule in left lung with smooth margins and central calcifications. Whereas, the second exam showed a subcapsular, ring, calcified lesion in the liver. In both cases, CT was essential for staging and therapeutic choice.

SŁOWA KLUCZOWE:

- pojedynczy guzek płuca,
- rak piersi,
- hamartoma płuc,
- zwapnienia w wątrobie

STRESZCZENIE

Patologie, przypadkowo wykryte w badaniu rentgenowskim klatki piersiowej, u chorych onkologicznych wymagają dalszej oceny w tomografii komputerowej (TK) z użyciem środka kontrastowego. Przedstawiamy dwa przypadki nieprawidłowych cieni na radiogramach u pacjentek z rakiem piersi: pierwszy rzutuujący się poniżej zarysu lewej kopuły przepony, drugi nakładający się na prawą kopułę przepony. Obie pacjentki, bez objawów klinicznych, były poddane zabiegom operacyjnym a następnie TK. W pierwszym przypadku, TK wykazała guzek lewego płuca średnicy 15 mm, o gładkich zarysach i z centralnymi zwapnieniami. Podczas gdy w drugim przypadku, badanie uwidocznilo podtorebkową, obrączkową, zwapniałą zmianę ogniskową w wątrobie. U obu pacjentek, wynik tomografii komputerowej był niezbędny do oceny stopnia zaawansowania nowotworu i wyboru strategii terapeutycznej.

Introduction

Incidental abnormalities on chest X-ray in oncological patients require a further investigation in computed tomography (CT). The aim of the article is to present, based on two examples, surprising locations of pathologies, primarily detected as abnormal shadows on plain radiograph.

Case studies

Patient 1

The first patient, a 65-year-old female, diagnosed with luminal B breast cancer, was referred to our department for a pre-operative chest X-ray. The radiography (Figure 1a), showed a round, 17 mm diameter shadow, with a radio-dense central opacity, projected under the left hemidiaphragm.

The location was interpreted by the radiologist as the gastric bubble, to differentiate with the left lower lobe. Furthermore,

the exam revealed an ill-defined, 20 x 17 mm opacity, adherent to the heart border, in the left lower zone. Subsequently, the patient was subjected to a left breast amputation. A control physical examination, 4 weeks later, showed no signs of cancer recurrence and no lymphadenopathy. Laboratory test results were within the normal ranges. A following CT (Figure 1b), revealed a round, well-defined, 15 mm diameter nodule in the basal and posterior portion of the 10th left lung segment with central, amorphous calcifications.

A diagnosis of pulmonary hamartoma (PH) was suggested by the radiologist. Otherwise, the exam revealed no pulmonary or mediastinal pathologies and no evidence of lymphadenopathy or bone metastases. Furthermore, the scan showed a 10 mm diameter, round focal lesion in the left adrenal body. Given the uncertain, yet probably benign character of the pulmonary and adrenal findings, a control CT in 3 months was planned.

Consecutively, the staging was established as T2N0M0 and the patient was qualified for an adjuvant therapy with Tamoxifen.

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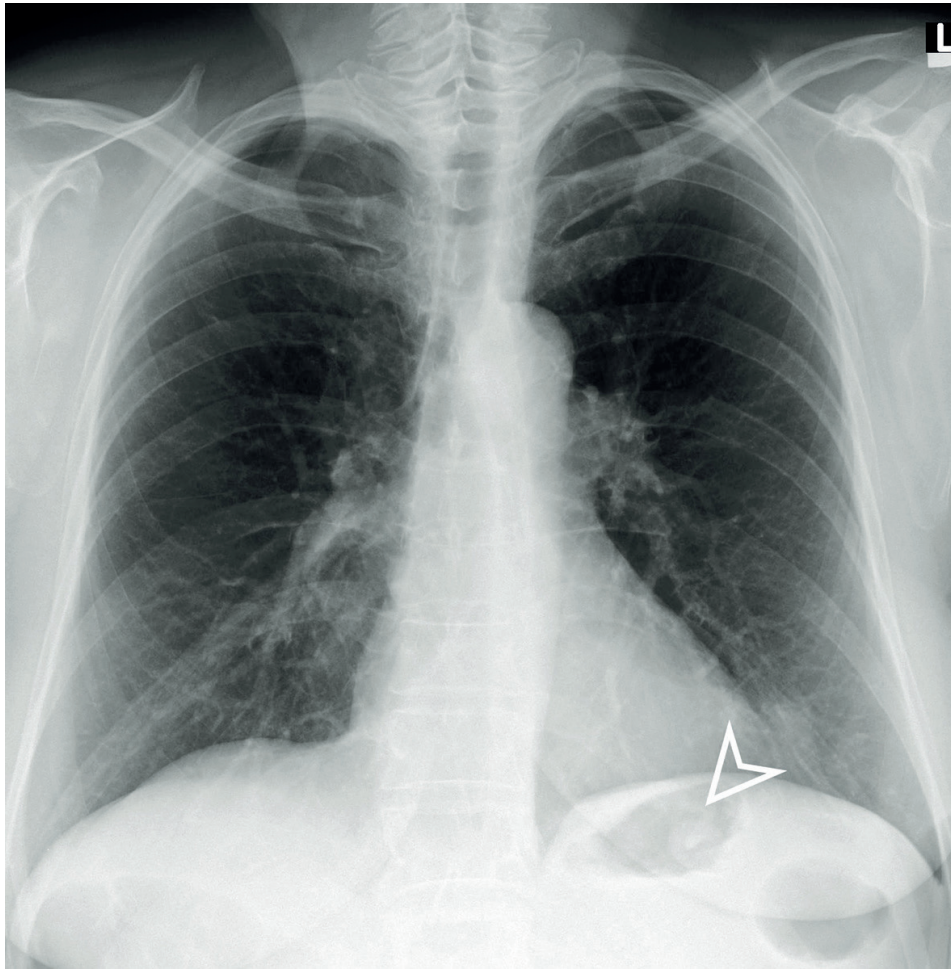


Figure 1a. Chest X-ray of the first patient, showing a round shadow projected under the left hemidiaphragm and an ill-defined opacity in the left lower zone.

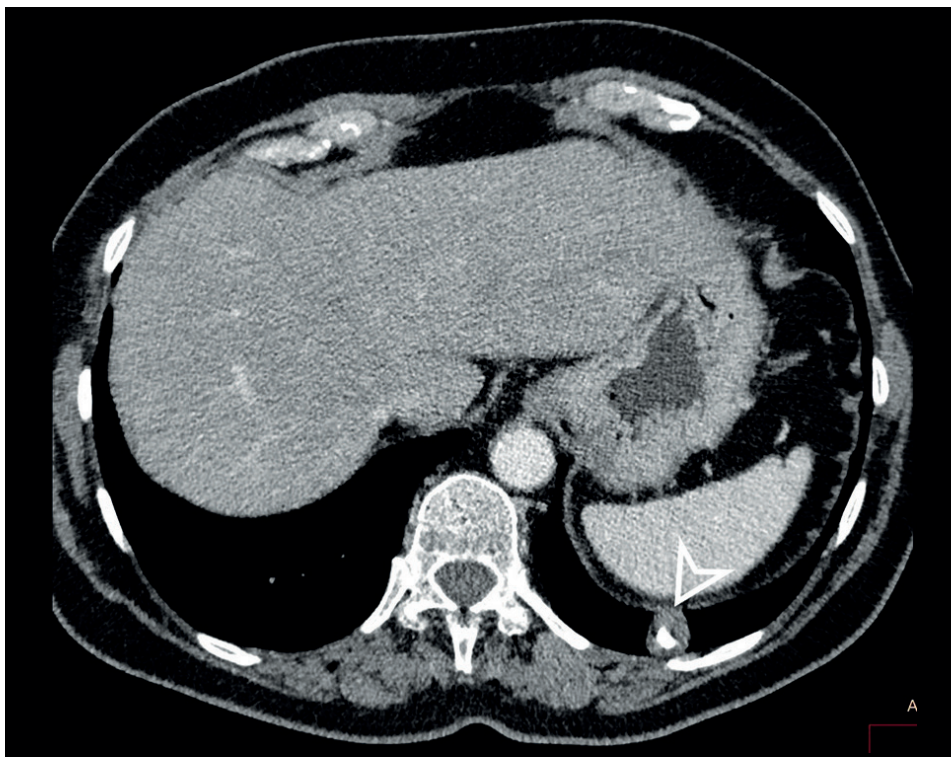


Figure 1b. Chest CT axial scan of the first patient, in a soft tissue window, depicting a round pulmonary nodule in the 10th left segment.

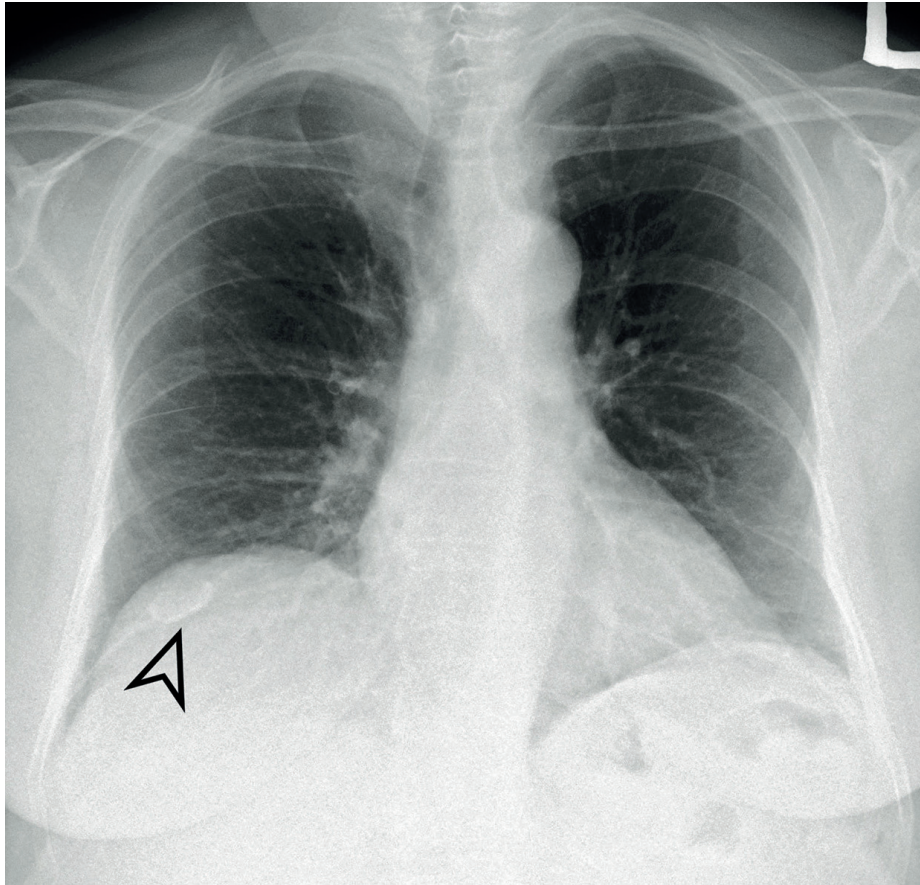


Figure 2a. Chest X-ray of the second patient, demonstrating an ovoid shadow obscuring the right diaphragmatic dome and an opacity in superior mediastinum displacing the trachea to the right of midline.

Patient 2

The second patient is an asymptomatic, 67-year-old female, who underwent a wide excision of left breast tumour (invasive ductal carcinoma), admitted to our hospital for a post-operative follow-up evaluation. The clinical examination and the laboratory tests did not show abnormalities. A control plain radiograph (Figure 2a) revealed an ovoid, 24 x 11 mm shadow, obscuring the right diaphragmatic dome.

Additionally, the X-ray depicted an opacity in superior mediastinum displacing the trachea to the right of midline. Two days later, a contrast-enhanced chest CT (Figure 2b) was performed to investigate the radiography findings.

An annular, subcapsular calcification, measuring 22 x 16 x 14 mm, was detected in the 8th liver segment. The lungs, with a subpleural distribution of cicatrization and gravity dependent atelectasis in posterior basal segments, presented no focal lesions. There was no evidence of lymphadenopathy, pathologies within mediastinum or bone metastases. Additional CT findings included: enlarged thyroid with heterogeneous density and gallstones within the gallbladder.

As a result, the cancer was staged as T2N0M0 and the patient was qualified for adjuvant chemotherapy with doxorubicin and cyclophosphamide. An ultrasound examination was scheduled, to visualize thyroid pathologies and cholecystolithiasis.

Discussion

A solitary pulmonary nodule with calcifications, may be a sign of infectious, metastatic or primary malignant

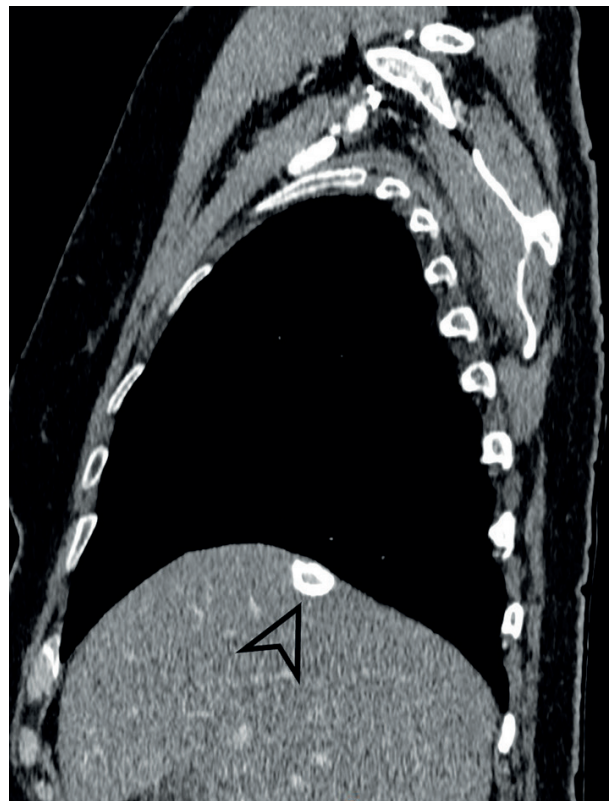


Figure 2b. Chest CT sagittal scan of the second patient, in a soft tissue window, showing an annular, subcapsular calcification in the 8th liver segment.

disease, including carcinoma, as well as a benign neoplasm. The evaluation of the size, growth rate and morphology, enables differential diagnosis (1). As metastases may calcify after anticancer treatment, a relation to chemotherapy must be considered. In the reported case, the absence of other calcified structures, including lymph nodes, is not indicative of metastatic disease or tuberculosis. A well-defined contour, considered to be rather a benign characteristic, do not exclude a malignant lesion (2). Round shape and smooth margins may be present in both hamartoma and carcinoid (3, 4). However, the calcification pattern and a lack of bronchiectasis or distal parenchymal disease, correspond better with peripheral hamartoma. Given the small size of the lesion, a detection of intranodular fat density, a frequent PH characteristic (5), is unfeasible.

The most frequently, liver calcifications are associated with granulomatous disease, such as tuberculosis and sarcoidosis, or cystic lesions, caused by parasitic infections, including hydatid disease and fascioliasis. However, they may represent calcified metastases, due to breast, ovarian and thyroid cancer or osteosarcoma (6). Additionally, some primary liver tumours, with a benign character, like haemangioma or adenoma, as well as malignant lesions, like haemangioendothelioma or hepatocellular carcinoma, may cause hepatic calcifications (6). In the presented case, a curvilinear, ring pattern, a peripheral location of the calcification, as well as a lack of remaining non-calcified, enhancing parts, point towards a benign diagnosis, rather than metastatic disease.

Conclusion

Focal lesions on X-ray in oncological patients raise suspicion of metastases. The radiologist's role is not only to distinguish

between malignant and benign pathology, but also to rule out an active inflammatory process. Radiography may not detect a pathology (2, 7) or suggest its incorrect location and character. Contrast-enhanced CT is essential for oncological staging and treatment choice.

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