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Egyptian Journal of Chest Diseases and Tuberculosis

journal homepage: www.sciencedirect.com

Assessment of radiological pulmonary shadows in patients with extra pulmonary neoplasm

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ARTICLE INFO

Article history:

Received 18 May 2017

Accepted 6 September 2017

Available online xxxx

Keywords:

Pulmonary shadows

Extra pulmonary neoplasm

Fibroptic bronchoscopy

ABSTRACT

Background: Picking up of the clinical significance of pulmonary opacities in patients with extra-pulmonary malignancy is an urgent need for evaluating it. As, most physicians expect them to be pulmonary metastases which are deemed incurable and are assigned to palliative treatment. This assumption directly affects the treatment and prognosis of patients.

Aim of the study: Is to investigate the clinical significance of pulmonary shadows in these patients, and to distinguish malignant from benign opacities and attention should be paid to the pathological diagnosis of those opacities in order to avoid over or under treatment.

Patients and Methods: Prospective, observational study conducted in Chest and Oncology departments, Zagazig University Hospitals, in the period from October 2014 to September 2016. The study was carried out on 100 patients with pathologically and clinically proved extrapulmonary malignant neoplasm and different radiological pulmonary lesions undiagnosed. CT chest and bronchoscopy were done for all patients and Samples were subjected to cytology, histopathology, AFB staining, fungal smear and culture/sensitivity, depending upon the findings.

Results: The results of pathological types of lung lesions revealed that metastatic lesions (69%) were the commonest followed by benign lesions (18%) and primary lung cancer (13%). Patients with current smoking history and advanced stage of primary tumor have significant liability to have lung malignancy. Also, patients who showed multiple pulmonary nodules, ground glass opacities and mass in their CT finding have higher liability to have lung malignancy rather than other findings with high statistical significance (P value <0.001).

Conclusion: Patients presented with advanced stages of primary extrapulmonary malignancy, current or former smokers, with multiple pulmonary nodules or mass in computed tomography of the chest, were more liable for being malignant and needs diagnostic biopsies.

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Introduction

In patients who have already been diagnosed with known extra pulmonary cancer, usually, the appearance of any pulmonary opacifications during treatment or follow-up leads physicians to favor the hypothesis that this malignancy has metastasized to the lungs.

Patients thought to have pulmonary metastases are deemed incurable and are assigned to palliative treatment. This assumption directly affects the treatment and prognosis of patients [1].

For diagnosis and evaluation of treatment of malignancies, using of computed tomographic (CT) scanning by the pulmonary and oncology physician becomes important. Besides, it is an integral tool for monitoring of disease recurrence. In this era of widely used CT scans, a lot of non-specific radiologic features of metastases appear [2].

The usual radiological presentations in lung metastasis include multiple variable sized pulmonary nodules (hematogenous

Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

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<http://dx.doi.org/10.1016/j.ejcdt.2017.09.001>

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Please cite this article in press as: A.M. Said et al., Assessment of radiological pulmonary shadows in patients with extra pulmonary neoplasm, Egypt. J. Chest Dis. Tuberc. (2017), <http://dx.doi.org/10.1016/j.ejcdt.2017.09.001>

metastasis) and diffuse thickening of the interstitium (lymphangitic carcinomatosis) [3]. However, atypical radiological presentation of pulmonary metastasis is mostly encountered that make a conflict from other nonmalignant causes [4].

There are many collected data in populations of patients with extra pulmonary cancers when investigated properly, showed a considerable frequency of benign lesions (up to 58%) and primary lung cancers (up to 50%) which found after biopsies or surgery [5].

Definitive diagnosis of nature of these pulmonary lesions must be made with tissue sampling and histopathologic evaluation for distinguishing between benign and pulmonary metastatic disease. This can be obtained in multiple different ways ranging from cytology on sputum samples endobronchial brushing, bronchoalveolar lavage, and transbronchial biopsy [6].

The aim of the present study is to investigate the clinical significance of pulmonary shadows in these patients, and to distinguish malignant from benign opacities and attention should be paid to the pathological diagnosis of those opacities in order to avoid over or under treatment.

Patients and methods

This prospective, observational study was conducted in Chest and Oncology departments, Zagazig University Hospitals, in the period from October 2014 to September 2016. In total, 120 patients with pathologically and clinically proved extrapulmonary malignant neoplasm and different radiological pulmonary lesions were presented. Twenty patients were excluded from this study; 3 patients diagnosed as squamous cell carcinoma by sputum cytology, 5 patients with positive sputum smear for acid fast bacilli (AFB), 6 patients with recent myocardial infarction and 6 patients were admitted to intensive care unit (ICU) with variable indications.

Patients

One hundred patients (by use of epi-6, CI 95%, power of test 80%, risk ratio 23%, hospitalization decline from 35% to 8%) were enrolled to this study by systematic random technique.

Inclusion criteria:- (100 patients)

Patients who were 18 years or older with known primary extrapulmonary neoplasms and had radiographic evidence of persistent opacity on chest radiography, in spite of appropriate antibiotic therapy for at least 4 weeks.

Exclusion criteria:- (20 patients)

Patients definitely diagnosed as lung cancer, proved smear positive pulmonary tuberculosis (TB), recent myocardial infarctions, coagulopathy and admission in an intensive care unit were excluded.

Methods: Included patients were subjected to the followings:

1. **Thorough medical history:** history taking from the patients. Smoking history, history of other comorbid diseases and history of chemotherapy and/or radiotherapy etc.
2. **Full clinical examination:** including both general and local chest examinations.
3. **Laboratory investigations:**
 - a) Complete blood count.
 - b) Kidney function tests (Serum urea level & creatinine)
 - c) Liver function tests.
 - d) Serum electrolytes (Na & K).
 - e) Arterial blood gases analysis.
 - f) Coagulation profile (INR, PT, and PTT)

4. Radiological investigation:

- a- **Plain Chest X-ray:** Postero-anterior and lateral views were done to all patients by X-ray machine (ROTALIX SRT 32, Philips, Italy).
 - b- **Computed tomography (CT):** CT had been performed for a variety of reasons, most commonly for cancer follow-up or for further evaluation of an abnormality seen on chest radiographs. Conventional chest C.T was done for all cases to confirm the nature and morphology of the lung lesion. It was done by chest C.T (Hi-speed spiral C.T, GE Medical Microsystem, Xi'an710075, China.). Chest C.T guided biopsies were performed for 31 patients who presented by peripherally located pulmonary lesions. Samples were subjected to cytology, histopathology and AFB staining.
5. **Microbiological investigation:** All patients were subjected to sputum examination (acid fast bacilli, Gram staining, fungal smear, culture/sensitivity, malignant cells)
 6. **Bronchoscopy:**

Written informed consent of all study patients was taken. All patients were subjected to fiberoptic bronchoscopy (FOB) (Pentax FB15TV, Philips, Tokyo, Japan) as patients with extrapulmonary malignancy should be evaluated either to have malignant or benign lesions including those of standard or opportunistic infections that necessitate evaluation of their trachea-bronchial tree patency beside analysis of their bronchoalveolar lavage (BAL).

Appropriate samples such as BAL for all patients, conventional trans-bronchial needle aspiration (TBNA) biopsy for 21 patients and 3 forceps bronchial biopsies from each lesion for 32 patients were obtained depending on the lesion after thorough evaluation of endobronchial tree during the procedure.

Samples were subjected to cytology, histopathology, AFB staining, fungal smear and culture/sensitivity, depending upon the bronchoscopic findings.

Our study data were analyzed on the following extrapulmonary neoplasms included: patients with thyroid cancers; patients with lymphoma; patients with carcinomas of the breast; patients with gastrointestinal tract (GIT) malignancy; patients with gynecological malignancy; patients with kidney and prostate malignancies; patients with melanoma and osteosarcoma.

Statistical analysis

Data of the current study were collected, tabulated and analyzed statistically using Statistical Package for Social Science (SPSS version 19; SPSS, Inc., Chicago, IL). The variables in this study were presented as numbers and percentage or mean \pm standard deviation (SD). The following tests were used *t*-test, Chi Square (χ^2), Fisher's exact and Logistic regression analysis. A *P*-value <0.05 was considered significant and *P*-value <0.001 was considered highly significant. As regard crude odds ratio result, it was considered significant when number one not included in its range.

Results

Table 1 showed that the most of studied patients were females (58%). The ages of studied patients ranged from 33 to 63 years with a mean of 53.28 ± 6.66 years. Current or former smoker presented (64%) among the patients in this study. Most of patients were in advanced stages (71%) as regard the primary extrapulmonary malignancy. Mass (23%) were the commonest followed by collapse (21%) and multiple pulmonary nodules (18%) as a CT chest presentations, while both the single pulmonary nodule and diffuse

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