Study on the Application Effect of Radiology in Diagnosis of Pulmonary Tumors

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Keywords: Lung tumor, Radiation technology, Application value

Abstract: Objective: To analyze the effect of radiotherapy in the diagnosis of lung tumors. Methods: The clinical data of 120 patients with suspected lung tumors admitted from January 2019 to December 2019 were retrospectively studied. All the 120 patients were diagnosed by X-ray irradiation combined with CT scanning, and the diagnostic results of the patients were verified by laboratory sputum exfoliative cell examination combined with fibrobronchoscopy. Then, observe the diagnostic accuracy of these patients using X-ray irradiation combined with CT scanning. Results: 120 patients with suspected lung tumor were diagnosed as lung tumor by sputum exfoliative cell examination and fiberoptic bronchoscopy. Among them, 34 patients were diagnosed with benign tumors, 65 patients were diagnosed with malignant tumors (30 patients were diagnosed with central lung cancer, 25 patients were diagnosed with peripheral lung cancer, 10 patients were diagnosed with metastatic lung cancer). The results of X-ray irradiation combined with CT scan showed that there were 34 patients with benign tumors and 65 patients with malignant tumors (31 patients with central lung cancer, 25 patients with peripheral lung cancer and 9 patients with metastatic lung cancer). By comparing X-ray irradiation with CT scan and sputum exfoliative cell examination with fiberoptic bronchoscopy, we can see that the diagnostic coincidence rate of benign lung tumor is 100%, and that of malignant lung tumor is 99.2%. Conclusion: radiation technology has the advantages of low cost, fast examination speed, noninvasive, high detection rate and accuracy in the diagnosis of lung tumor. It is a safe and effective diagnostic method with high clinical application value.

1. Introduction

In recent years, with the continuous decline in air quality and the continuous increase in the number of smokers, the number of patients with lung tumors has shown an increasing trend year by year [1]. Among them, the proportion of malignant tumors is also increasing, seriously threatening the life safety of patients. Pulmonary tumor patients do not have obvious clinical characteristics in the early stage of onset, so misdiagnosis and missed diagnosis are very easy to occur, thus delaying the treatment of patients [2]. Early, timely and accurate clinical diagnosis is of great significance for patients to obtain effective clinical treatment, control the deterioration of the disease and save patients' lives [3]. When many patients seek medical treatment, they often belong to the middle or late stage and lose the best treatment opportunity. Therefore, it is very important to carry out early diagnosis and treatment. With the continuous progress of medical technology, X-ray irradiation examination and CT scanning examination and other radiation technologies are widely used in clinical diagnosis due to their fast, simple and non-invasive characteristics [4]. In order to improve the survival rate of lung cancer and further explore the diagnostic effect of radiation technology on lung cancer patients, 120 lung cancer patients admitted between January 2019 and December 2019 were selected as the subjects of this experiment. The details are reported as follows.

2. Materials and Methods

2.1 Materials

The subjects of this study were 120 patients with suspected lung tumors admitted between

  DOI: 10.25236/isbsbh.2020.022

January 2019 and December 2019. These 120 patients all had clinical symptoms of severe sudden fever, chest pain, cough, hemoptysis, pleural effusion, and shortness of breath. Some patients are also accompanied by signs of sunken eyes, dilated pupils, varicose or cyanosis of the neck and chest arteries. Among these 120 patients, 78 were male and 42 were female. Their age ranged from 37 to 72 years, with an average age of 52.64 ± 5.31 years. The patient's course of disease was 6 months to 5 years, with an average course of 2.17 ± 0.54 years. Comparing the basic data of patients such as age and gender, no significant differences were found, and they were not statistically significant (P> 0.05). Under the doctor's explanation, 120 patients with suspected lung tumors and their families are known to understand the method, content and purpose of the study and voluntarily signed an agreement.

2.2 Methods

All the 120 patients were diagnosed by X-ray irradiation combined with CT scanning, and the diagnostic results of the patients were verified by laboratory sputum exfoliative cell examination combined with fibrobronchoscopy. (1)X-ray examination: the patient takes the standing position, and uses the medical diagnostic X-ray machine to take the conventional X-ray chest films at the front and side positions respectively. The irradiation parameters are 30mA~34mA and the voltage is 80kv. (2) Chest CT scan: the patient takes the supine position, the upper arm is lifted up, and the breath is held under calm breathing. The scan range is from the tip of the lung to the bottom of the lung. The thickness of the layer is 20mm, the pitch is 3mm, the voltage is 120kv, and the current is 90mA. A special high-pressure syringe was used to inject 70ml meglumine diatrizoate from the patient's elbow vein at a flow rate of 3.5 ml/s. Intelligent tracking scanning method was used to take images of arterial phase, venous phase and delayed phase respectively, and then thin-layer post-processing three-dimensional reconstruction observation was performed.

2.3 Statistical Treatment

The statistical results (SPSS22.0) were used for data analysis of the inspection results of the two inspection methods. The measurement data were expressed as mean positive and negative standard deviations ($\bar{x}$ ± s). The t test was used. Use x^2 inspection. When P <0.05, it means that there is a difference between the two groups of inspection results, which is statistically significant; when P> 0.05, it means that there is no difference between the two groups of inspection results, and the statistics are meaningless.

3. Result Analysis

3.1 Diagnostic Results

120 patients suspected of lung tumor were diagnosed as lung tumor through laboratory sputum exfoliated cell examination combined with fibrobronchoscopy examination, with a diagnosis rate of 100.00%. Among them, 34 patients were diagnosed with pulmonary hamartoma (benign tumor), accounting for 28.3%, 65 patients were diagnosed with malignant tumor, accounting for 54.2%. Of the 65 malignant tumor patients, 30 were diagnosed with central lung cancer, 25 with peripheral lung cancer and 10 with metastatic lung cancer. The diagnostic results of X-ray irradiation combined with CT scan showed that 34 patients had benign tumor (hamartoma) and 65 patients had malignant tumor. Of the 65 malignant tumor patients, 31 were diagnosed with central lung cancer, 25 with peripheral lung cancer and 9 with metastatic lung cancer. Compared with the diagnostic results of sputum exfoliative cell examination combined with fibrobronchoscopy, the diagnostic accuracy of X-ray irradiation combined with CT scanning is 100% for pulmonary benign tumors and 99.2% for pulmonary malignant tumor patients. One patient with metastatic lung cancer was diagnosed as central lung cancer, accounting for 0.8%. Details are shown in Table 1.

Table 1 Diagnosis Results of 120 Patients n (%)

Detection method	Pulmonary hamartoma	Central lung cancer	Peripheral lung cancer	Metastatic lung cancer
Radiation	34(28.3)	30(25)	25(20.8)	10(8.3)
Cell detection + bronchoscopy	34(28.3)	31(25.8)	25(20.8)	9(7.5)

3.2 Image Features

X-ray: In peripheral lung cancer, a clear focus can be seen in the lower left lung, the internal structure of the focus is vague, and a clear focus can also be seen in the upper left lung, overlapping with the lung texture. In metastatic tumors, round nodules with different sizes can be seen in both lungs, with obvious lung fields accompanied by blood metastasis. Calcification and cavitation can be seen in some nodules. In the central lung cancer, a large number of dense shadows can be seen in the right upper lung, the edge is mostly S-shaped, the right hilar is enlarged, and the mediastinum is slightly deviated to the right. In pulmonary hamartomas, dense circular images can be seen in the hilum, with smooth and regular edges, clear boundaries, and no burrs and lobulation. CT scan: in the peripheral lung cancer, the focus is concentrated in the posterior segment of the left upper lung, with irregular margin and lobular sign. Short hairy thorns can be seen at the distal end. On the contrast-enhanced scan, the focus shows medium enhancement and uneven internal density. In the metastatic tumor, the edge of the focus is smooth and regular, and the density of the local nodules is small. In the central lung cancer, the location of the focus is obvious, right In the lung hamartoma, the lesion was located in the space between the mediastinum and the anterior bronchus of the upper lobe, and calcification was seen in the lesion.

4. Discussion

In recent years, the morbidity and mortality of lung tumors have shown a rising trend year by year. At present, CT, MR, fiberoptic bronchoscopy and chest needle aspiration biopsy are the clinical methods for diagnosis of lung tumor patients [5]. Radiological examination method includes chest X-ray irradiation and CT scanning, i.e. the patient is first irradiated with chest X-ray to find out the main lesion area, then CT plain scan is performed on the patient, and then the image is reconstructed with multi-plane and sagittal planes, and the patient is diagnosed by observing the imaging manifestations such as short burr sign and pleural indentation sign on the edge of the tumor [6]. In order to analyze the effect of radiation technology in the diagnosis of lung tumors, this study implemented X-ray irradiation combined with CT scanning for such patients. 120 patients suspected of lung tumor were diagnosed as lung tumor through laboratory sputum exfoliated cell examination and fibrobronchoscopy. Among them, 34 patients were diagnosed with benign tumors and 65 patients were diagnosed with malignant tumors. Of the 65 malignant tumor patients, 30 were diagnosed with central lung cancer, 25 with peripheral lung cancer and 10 with metastatic lung cancer. The diagnostic results of X-ray irradiation combined with CT scan showed that 34 patients had benign tumors and 65 patients had malignant tumors. Of the 65 malignant tumor patients, 31 were diagnosed with central lung cancer, 25 with peripheral lung cancer and 9 with metastatic lung cancer. Comparing X-ray irradiation with CT scan and sputum exfoliative cell examination in laboratory with fibrobronchoscopy shows that the diagnostic coincidence rate of pulmonary benign tumor is 100%, and the diagnostic coincidence rate of pulmonary malignant tumor classification is 99.2%. There is no significant difference between the two groups. This indicates that the diagnostic accuracy of radiation technology for patients is high, and the misdiagnosis rate is low, which can provide important reference for clinicians to judge and evaluate the disease condition.

5. Conclusions

Radiation technology has the advantages of low cost, fast examination speed, non-invasiveness, high detection rate and high accuracy in the diagnosis of lung tumors. Therefore, this diagnostic

method can not only be used as a primary screening method for lung tumors As the preferred method of diagnosis and differential diagnosis of lung tumors.

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