Clinical Research Paper

Diagnosis and therapeutics of 24 cases of pulmonary sclerosing hemangioma

Dong-Rong Situ,1-3 Hao Long,1-3* Guo-Wei Ma,1-3 Zhi-Chao Lin,1-3 Jing-Ping Yun,1,4 and Tie-Hua Rong1-3

1State Key Laboratory of Oncology in South China; Guangzhou, Guangdong, P.R. China; 2Department of Thoracic Surgery; 3Lung Cancer Research Center; 4Department of Pathology; Sun Yat-sen University Cancer Center; Guangzhou, Guangdong, P.R. China

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Background and Objective: Pulmonary sclerosing hemangioma (PSH) is an uncommon benign lung tumor. The study was to investigate the clinical features, diagnosis, treatment, and prognosis of PSH in order to promote the recognition of this disease.

Methods: Data of 24 pathologically confirmed PSH patients treated in Sun Yat-sen University Cancer Center from January 1999 to July 2007 were reviewed. The clinical features, diagnosis, treatment, and prognosis were summarized. Results: Of the 24 patients, two (8.3%) were males, and 22 (91.7%) were females. The median age of the patients was 54.5-years-old, ranging from 21- to 76-years-old. Ten (41.7%) patients were detected upon routine medical examination, while 14 (58.3%) patients presented clinical symptoms, including cough, hemoptysis, chest pain, chest distress and tachypnea. The imaging examination revealed isolated round or similar round nodules with distinct margins and homogeneous density. No calcification and arial semilunar sign appeared. All the patients underwent surgical resection without complications and mortality. Eight patients underwent lobectomy, 13 underwent wedge resection, two underwent tumor resection and one underwent segmentectomy. There was no recurrence or metastasis during follow-ups. Conclusions: Clinical and radiological characteristics of PSH are nonspecific. Thus, accurate diagnosis of PSH before operation is difficult. Confirmation of PSH depends on pathological examination. Surgical resection is an effective treatment for PSH, among which lobectomy or limited resection is advisable, while systematic lymph node dissection is not recommended.

Pulmonary sclerosing hemangioma (PSH) is a rare benign lung tumor, which was first described and named by Liebow et al. in 1956.1 Its clinical symptoms and radiological appearances are not specific, therefore, it is difficult to be diagnosed before surgery, and is easily to be misdiagnosed as lung malignancy. In this study, we analyzed clinical features, diagnosis, treatment and prognosis of PSH.

Patients and Methods

Clinical data. Clinical data of 24 patients with pathologically confirmed PSH, treated in Sun Yat-sen University Cancer Center from January 1999 to July 2007, were collected. Among the 24 patients, two (8.3%) were men and 22 (91.7%) were women, with a sex ratio of 1:11; the ages of onset were 21–76 years, with a median age of 54.5 years; clinical course had ranged from three days to six years. Among the 24 patients, ten (41.7%) had no clinical symptoms, and their lesions were found by routine physical examinations; of the remaining 14 (58.3%) patients with symptoms, 12 (50.0%) had cough, four (16.7%) had mild hemoptysis, four (16.7%) had chest pain, three (12.5%) had chest distress, and one (4.2%) had tachypnea. Two patients had history of smoking, two had history of hypertension, one had history of pulmonary tuberculosis, one had history of diabetes mellitus, one had history of coronary heart disease, and one had history of hyperthyroidism.

Imaging examinations revealed that 23 (95.8%) had solitary pulmonary lesion, one (4.2%) had two lesions; 15 (62.5%) had masses in the right lung, consisting of three (12.5%) in the right upper lobe, six (25.0%) in the middle lobe and six (25.0%) in the lower lobe; 10 (41.7%) had masses in the left lung, consisting of six (25.0%) in the upper lobe and four (16.7%) in the lower lobe; 13 (54.2%) had round masses, four (16.7%) had spheroidal masses, five (20.8%) had lobulated masses, and two (8.3%) had irregular masses; 14 (58.3%) had masses of uniform density, ten (41.7%) had masses of uneven density; 19 (79.2%) had masses with smooth borders, three (12.5%) had blurred borders, and two (8.3%) had masses with “speculation” sign; no calcifications and air crescent signs was found in the masses (Figure 1); tumor’s the longest diameters were 1.0–5.5 cm, with an average of (2.8 ± 0.3) cm.

Preoperative bronchofibroscopy was performed in all 24 patients: 21 (87.5%) had no positive sign and three (12.5%) had external
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Under microscope, vascular hyperplasia and sclerosis had been observed. Tumour cells were medium in size, comprised of surface cells and round stromal cells. Surface cells were cubical in shape; round stromal cells had spherical or spheroidal nuclei, fine chromatin with no obvious heterogeneity, and eosinophilic cytoplasm. These two kinds of cells formed up papillary structures or solid regions, and collagenized sclerotic regions could be seen (Fig. 2).

Follow up. All patients had been followed up until October 2007.

Statistical analysis. Qualitative data were expressed as mean ± standard deviation (SD) and compared by t-test using SPSS 13.0 software, where p < 0.05 stands for significant difference.

Results

All patients had received surgical treatment, with pathologically confirmed PSH. Seven patients had undergone lobectomy with mediastinal lymph node clearance because of malignancy suspicion, and the lymph nodes were pathologically confirmed to have chronic inflammation with no PSH-associated metastasis. No operation-related complications and death were reported. Postoperative hospitalizations were 3–16 days, with an average of (9.5 ± 3.5) days. All patients were fully recovered and discharged. The postoperative hospitalizations of the seven patients who had undergone thoracoscopy or thoracoscopy-assisted mini-incision were 3–10 days, with an average of (6.1 ± 2.5) days, however, those of the 17 patients who had undergone routine posterolateral incision or anterolateral incision or median sternotomy incision were 7–16 days, with an average of (10.9 ± 2.7) days. Their differences were significant (p < 0.05). The patients had been followed up for 1–96 months, with a median of 40 months. No PSH recurrence or metastasis was reported. One patient was died of intestinal obstruction, while the remaining patients were survived in good condition.

Discussion

The origin of PSH tissues. PSH is a rare benign disease. Since it being first described and named in 1956 by Liebow et al., all literatures regarding its origin, nature and naming remain controversial. The development of immunohistochemical technique and the continued application of new antibodies lead to a hypothesis that PSH is originated from the respiratory tract epithelia, rather than from vascular endothelia, mesothelia and neuroendocrine cells. According to the WHO categorization of the lung and pleural tumors (in 1999), PSH was categorized to miscellaneous tumors.
a female: male ratio of 5:1, and the ages of onset were 13–76 years, with a median of 46 years. They also found progesterone receptor in nuclei of PSH cells, suggesting that women are more susceptible to PSH possibly due to the presence of progesterone receptors. In our study, 22 out of 24 PSH patients were female, accounted up to 91.7% at total, with a female: male ratio of 11:1; the ages of onset were 21–76 years, with a median of 54.5 years. The data in our study are obviously higher than those reported in literature, suggesting the presence of racial differences.

Our study showed that PSH could develop in any lobe of the lungs, with a slightly higher occurrence rate in the right lung, which accounted up to 62.5% of all cases in our study; it is also common in the middle and lower lobe, which accounted up to 64% of all cases in our study. Our results are consistent with other references as reported.2,5 PSH occurs mostly as a solitary lesion in a lung, but multiple PSH lesions presented in one or both lungs had also been reported.6,7 However, only one patient in our study had two lesions in both lungs separately.

According to the literature, most PSH patients had no apparent clinical symptoms, while screened by routine clinical examinations. Among the 24 patients in our study, ten (41.7%) were asymptomatic, while diagnosed by routine physical examinations; the remaining 14 (58.3%) were hospitalized because of cough, mild hemoptysis, chest pain, chest distress, tachypnea, and other symptoms, among which cough was the most common and happened in 50.0% of the 24 patients. All patients in our study showed no positive signs on examinations. This may because the tumors were small with an average maximal diameter of (2.8 ± 0.3) cm, mostly occurred in the peripheral of the lobes, and seldom involved the airway and vascular system.

Diagnosis of PSH. Imaging examination is an important diagnostic method for PSH. In our study, ten asymptomatic cases (41.7%) of PSH were detected by fluoroscopy under routine examination. On X-ray and CT imaging, PSH appears as a solitary, intrapulmonary peripheral round or spheroidal soft tissue nodule. Masses are lobular in a few cases, with irregular shape in some cases, and with smooth border and uniform density in most cases. The longest diameter measured is < 3 cm. Most cases have no liquefaction and necrosis, absence of increased lung markings or deformation, no pleural adhesion and pleural effusion, and no hilar or mediastinal lymphadenopathy. PSH could present spot calcification, moderate-high homogeneous or inhomogeneous enhancement on enhanced CT scan, and air crescent sign in a few cases,8,9 presenting as a crescent or semi-lunar region without lung markings around the lesion. The mechanisms may be: (1) capillaries extend and proliferate within tumors, with hyalinization of capillary walls, form papillary protrusion into the airway, and alter airways into irregular fissures; (2) undifferentiated alveolar stroma cells continue to proliferate and hyalinize, and engulf bronchi resulting in expansion of distal air spaces; and (3) capsular and tumor shrinkage at different speeds during hemorrhage of highly differentiated tumor cells. Even though this sign is not a common sign in PSH patients, it is, however, a characteristic sign in PSH patients.10 In our study, no calcification and air crescent sign had been reported.

For middle-aged women, at good general conditions, symptomatic or asymptomatic, the possibility of PSH should be considered when chest X-ray or CT scan examinations prompt solitary intrapulmonary peripheral round or spheroidal mass with clear border, homogeneous density. If spot calcification within lesions and air crescent sign, which do not alter regardless of postural changes presented, PSH should be highly suspected. PSH is difficult to be diagnosed before operation, with a high rate of misdiagnosis as peripheral lung cancer, carcinoid, tuberculosis, inflammatory pseudotumor, hamartoma, and so on. In our study, no case had been correctly diagnosed before operation: one had been diagnosed as early peripheral lung cancer, one as benign lung tumor, and the remaining 22 as unknown lung tumor. Preoperative pathologic diagnosis of PSH depends on percutaneous transthoracic biopsy and bronchofibroscopy examination, especially for PSH of intra-bronchia type.11 However, among the 24 cases in our study, no abnormality was seen on bronchofibroscopy examination in 21 cases (87.5%), external oppression on the bronchi in the pulmonary segment was only seen in three cases (12.5%), while smear cytology and biopsy investigations were all negative, suggesting that preoperative bronchofibroscopy has not much diagnosis value for PSH. As for preoperative unconfirmed cases, intraoperative pathologic examination with frozen sections should be performed indicated, and most cases of PSH can be confirmed. In our study, intraoperative pathologic examination with frozen sections had been conducted on 12 cases, in which nine (75.0%) were diagnosed as PSH, one was misdiagnosed as bronchial-alveolar carcinoma, one was misdiagnosed as inflammatory pseudotumor and one was misdiagnosed as lung malignancy; the misdiagnosis rate was 25.0%.

Treatment and prognosis of PSH. Surgery is the only effective treatment for PSH. Some cases in our study were difficult to be differentiated from malignant tumors, and had malignant tendency, therefore, surgical operation should be carried out as soon as possible in cases with symptoms or quick tumor enlarging if there is no contraindication. For the cases without definite preoperative diagnosis, performing pulmonary wedge resection or segmentectomy should be primarily considered, meantime carrying out pathologic examination with rapid frozen sections to make a definite intraoperative diagnosis to minimize operation extent and reserve functioning lung tissues. To avoid incomplete tumor resection, we propose to perform lobectomy when a tumor is located near the hilum or in the lungs which poses a disadvantage for wedge resection, but not just tumor resection. In our study, most patients had received lobectomy or pulmonary wedge resection, no operation-related complication or mortality was reported, and no PSH recurrence or metastasis was reported during follow-up.

For the cases with definite preoperative diagnosis, thoracoscopy or thoracoscopy-assisted mini-incision operation, which causes less postoperative pain as compared with routine posterolateral or anterolateral incision operation, can be selected to benefit patients’ postoperative recovery. In our study, the seven patients who had undergone thoracoscopy or thoracoscopy-assisted mini-incision operation experienced faster postoperative recovery when compared with the other 17 patients who had undergone operations with routine posterolateral incision, anterolateral incision or median sternotomy incision.

The opinions on the necessity of intraoperative systemic lymph node clearance still remain controversial. As PSH is a benign lung tumor, routine lobectomy or local resection without systemic lymph node clearance is appropriate. Although some PSH patients have regional lymph node metastases, including hilar and/or mediastinal metastasis, their prognoses are good.12 So far, no postoperative
regional lymph node metastasis had been reported in any PSH patients, suggesting that regional lymph node metastasis do not affect the prognosis of PSH. In our study, seven patients with suspicious of malignancy had received mediastinal lymph node clearance, but all excised lymph nodes were confirmed with chronic inflammation, no PSH metastases were found. We do not recommend systemic lymph node clearance as a routine treatment for PSH because lymph node metastasis is rare in PSH patients and it does not affect the prognosis.

The prognosis of PSH is good. Most PSH patients could survive without tumor after operation. In majority view, PSH is a benign tumor, while in minority view, it is believed to be a potential or low-grade malignant tumor. Malignant biological behaviors had been reported in some PSH cases, for example, regional lymph node metastasis, pleural metastasis, local recurrences, and so on. However, at present, it is believed that lymph node or pleural metastasis in PSH patients will not affect the prognosis, and re-resection on local recurrence still can achieve good effect.

References