ORIGINAL RESEARCH PAPER

Medicine

A STUDY OF 50 PATIENTS WITH MALIGNANT SOLITARY PULMONARY NODULE

KEY WORDS:

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ABSTRACT

INTRODUCTION- Bronchogenic carcinoma is the most common malignancy found in solitary pulmonary nodules(SPN), and it remains the leading cause of cancer death. The frequency with which a solitary pulmonary nodule is identified on chest radiography is on the order of 1 to 2 per thousand chest radiographs. Most of these are clinically silent, and about 90 percent are noted as an incidental finding on radiographic examination.

AIMS AND OBJECTIVES - To study the various factors affecting malignant solitary pulmonary nodules and to establish its statistical significance.

MATERIALS AND METHODS – we had conducted this study of 50 patients at tertiary care centre civil hospital ahmedabad. It is an open non randomized cross sectional observational study.

CONCLUSION – SPN either detected as an asymptomatic or with respiratory symptoms must be further evaluated to rule out any malignancy and better management.

INTRODUCTION

Bronchogenic carcinoma is the most common malignancy found in solitary pulmonary nodules, and it remains the leading cause of cancer death. A solitary pulmonary nodule is defined1 as a single discrete pulmonary opacity that is surrounded by normal lung tissue that is not associated with adenopathy or atelectasis. solitary pulmonary nodules1, 3 must be 3cm or less in diameter. Radiographically, lesions that measure ≤30 mm are considered nodules and those >30 mm are considered masses. The distinction between a SPN and a mass is important because it determines further work-up. When patients present with a SPN, the focus of the evaluation is the assessment of the probability of malignancy2,3 and the selection of patients for computed tomography (CT)1,3,8 scan surveillance, nonsurgical biopsy, or surgical biopsy. The adjective small has been used to describe nodules that are less than 1cm in diameter. Larger lesions should be referred to as pulmonary masses and should be managed with the understanding that they are most likely malignant; prompt diagnosis and resection are usually advisable. Small cell carcinoma that presents as a solitary pulmonary nodule is rare. Other rare primary lung tumors that may present as solitary pulmonary nodules are bronchial carcinoids (1-5 percent), which are usually peripherally located: lymphomas, hemangioendotheliomas, sarcomas and hamartomas.

We studied confirmed cases of malignant solitary pulmonary nodule for its different clinical parameters and other associated features which can help to differenciate benign and malignant. Common malignancies found in SPN in our study are Adenocarcinoma , squamous cell carcinoma, small cell carcinoma etc.

AIMS AND OBJECTIVES

To study the various factors affecting malignant solitary pulmonary nodules and to establish its statistical significance.

MATERIALS AND METHODS

The present study was conducted at Tertiary care center Civil hospital Ahmedabad during July 2016 to July 2018. It was an open non randomized cross sectional, observational study of solitary pulmonary nodules.

Sample size : 50 cases

Inclusion criteria:

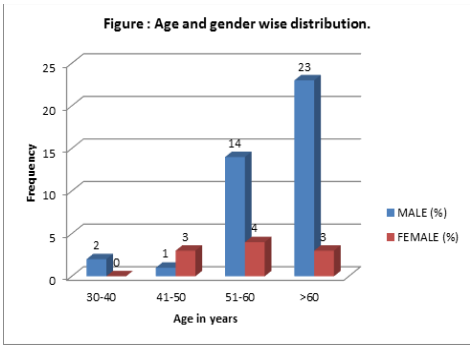
- All patients who presented with solitary pulmonary nodules as per definition and proved malignant on histopathological examination.

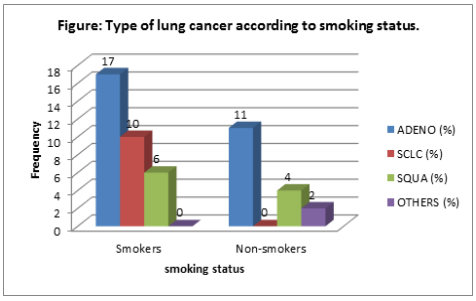
Exclusion criteria:

- Patients who gave negative consent for the study.
- Patients who had pulmonary Koch's or any other infective or granulomatous condition.

OBSERVATION AND STATISTICAL ANALYSIS

In our study out of fifty patients incidence of pulmonary nodule is more common in male, with age above 60 yrs.



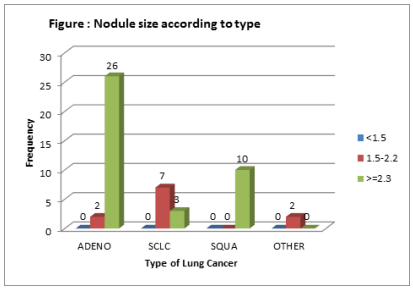


In our study incidence of pulmonary nodules was more in smokers (66%) than in non-smokers (34%) which statistically significant (p value is 0.0012).

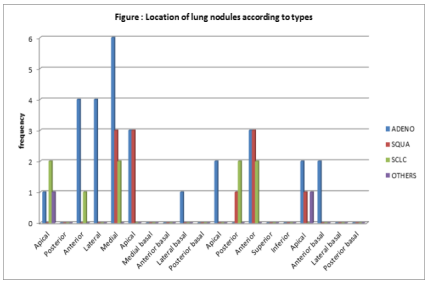
Smokers are divided according to their smoking index (SI) 11(number of cigarettes/bidis smoked per day × number of years of smoking) as following:

1) Light smoker: Si≤100.
2) Moderate smoker: SI=101 – 300.
3) Heavy smoker: SI ≥301.

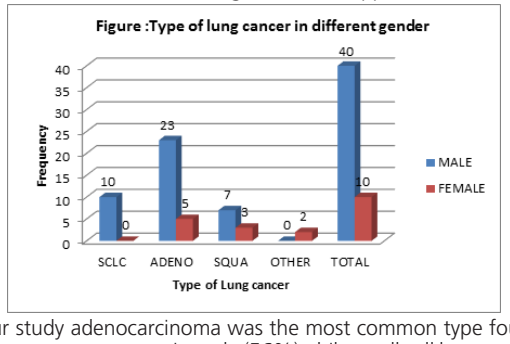
According to our study nodule size increases with increase in duration of symptoms. 48% of patients in this study had nodule size 2.6 to 3 cm having duration of symptoms of more than 4 months. Nodules are more common in right lung (60%) than left (40%).



In our study most of the patients with adenocarcinoma had nodule size of ≥2.3cm (92.85%). 70% of patients with small cell carcinoma had nodule size in between 1.5 to 2.2cm. All the patients with squamous cell carcinoma had nodule size of ≥2.3cm.



Pulmonary nodules with adenocarcinoma were more commonly detected in medial segment of right middle lobe of lung (21.4%).Pulmonary nodules with small cell carcinoma were located in apical segment of right upper lobe, medial segment of right middle lobe, posterior and anterior segments of left upper lobe. Pulmonary nodules with squamous cell carcinoma were located in medial segment of right middle lobe, apical segment of right lower lobe and anterior segment of left upper lobe.



In our study adenocarcinoma was the most common type found and was more common in male (56%)while small cell lung cancer is found only in male(10%). Squamous cell carcinoma and bronchioloalveolar carcinoma were more common in female.

DISCUSSION

Our study closely resembles the findings of similar studies of Viswanathan R9,and Kashyap S. Mohapatra PR[10].

On discovering solitary pulmonary nodule, wheather it is true solitary, spherical, located within lung field, CT imaging should be part of initial evaluation.

A thorough history and physical examination may provide clues about the nodule's possible cause. (A history of tuberculosis in an asymptomatic patient suggests granuloma, whereas weight loss and adenopathy point toward malignancy.) Most of the time, solitary pulmonary nodules are asymptomatic. The history should include an assessment of risk factors for cancer, including smoking history, occupational exposures, exposure to endemic fungi, and any history of prior malignancy. Patient risk preferences should be obtained as part of the discussion.

If it is established that the nodule is truly solitary, and a benign pattern of calcification is present, the nodule is considered benign and no further workup is necessary. Follow-up with serial CT imaging may be warranted based on the size of the lesion and risk factors for cancer as described.

Nodule size (a):	Low risk patient(b):	High risk Patient (c):
≤4mm	No follow up needed (d)	Follow up at 12 months; if unchanged, no further follow up
>4-6 mm	Follow up CT at 12 months; if unchanged, no further follow up	Follow up CT at 6-12 months; then 18-24 months if no change
>6-8mm	Follow up CT 6-12 months; then 18-24 months if no change	Follow up CT at 3-6 months; then 9-12 and 24 months if no change
>8mm	Follow up CT at 3,9 and 24 months; dynamic contrast enhanced CT, PET, and/or biopsy	Same as low risk patient.

(a) Average of largest and smallest axial diameters of the nodule
(b) No smoking history and absence of other risk factors
© Previous or current smoking history or other risk factors
(d) Risk of malignancy (<0/1%) is substantially lower than for an asymptomatic smoker

**ACCP guidelines (see MK Gould et al: Chest 2007: 132(suppl;.3): 108s-130S.

Patient risk stratification is critical to assess the probability of cancer, which is based on factors such as patient age; smoking status; history of cancer; nodule size, morphology and location.

4. All prior chest radiographs and CT images should be obtained and compared with the present images.

5. The physician should arrive at an estimate of the probability of malignancy based on the history, physical, and CT imaging characteristics.

Table - Radiological features suggestive of Benign SPN 2

Size	>5mm
Border	Smooth
Density	Dense , solid
Calcification	Typically a benign feature, especially in "concentric", "central", "popcorn-like",or "homogenous" patterns
Doubling time	Less than one month; more than one year

The morphologic characters of nodules that correlate with likelyhood of malignancy include lesion density, border and calcification. Generally dense, solid,lesions are less likely to be malignant than those characterized as "ground glass" opacities.

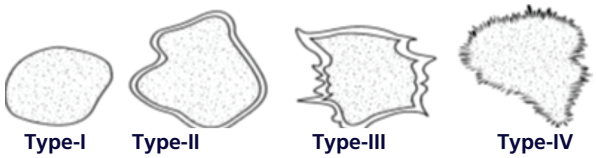


Figure : Characteristic appearance of nodule.

- Squamous cell carcinoma : The neoplasm is composed of malignant squamous cells which may vary in degree of differentiation from tumor to tumor. A well differentiated squamous cell carcinoma may form keratin and intercellular bridges. This neoplasm is most common in men and is closely related to smoking.
- Adenocarcinoma : The neoplasm is composed of malignant glandular epithelium which may vary in degree of differentiation from tumor to tumor. Well differentiated neoplasms may form distinct glands, other neoplasms may vary from forming papillary structures to solid neoplasms without any gland formation. Adenocarcinomas tend to be smaller than other bronchogenic carcinomas and located in the periphery of the lung. This neoplasm is the most common type in women and nonsmokers.
- Small cell carcinoma : The neoplasm is composed of small cells containing dark blue, round nuclei and sparse cytoplasm. These cells resemble (but are not) lymphocytes and are arranged in clusters. Electron microscopy reveals that these cells contain neurosecretory granules, indicating their origin from neuroendocrine cells. This neoplasm is strongly related to smoking. It is a very aggressive neoplasm, generally having metastasized at the time of diagnosis.
- Large cell carcinoma: The neoplasm is composed of large, undifferentiated malignant cells.
- Bronchioloalveolar carcinoma : The neoplasm is a distinctive form of adenocarcinoma. The neoplasm arises from the epithelium of the terminal bronchiole or the alveolus. The neoplastic cells are columnar,lining alveoli or form palliary growths which project into the alveolus. The neoplasm, almost always arising in the periphery, is solitary or forms multiple coalescing nodules.

Viswanathan et al9 study conducted in year 1981 including 60 patients out of which 48% of patients having pulmonary nodules had age more than 60 years of age, 68% were male and 68% were smoker.

Kashyap et al10 study conducted in year 2001 over 100 patients out of which 50% of patients having pulmonary nodules had age in 50 to 70 years of age, 70%were male and 60% were smoker.
Both these studies closely resembles our study.

CONCLUSION

Solitary pulmonary nodule either detected as asymptomatic or presented with respiratory symptoms like cough, fever, hemoptysis, breathlessness, chest pain, anorexia, weight loss in old male patients with history of smoking must be evaluated. Even in the absence of biopsy we can predict the nature of SPN by assessment of risk factors and morphology on radiography.

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