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Original research article

A Study of CT evaluation of lung nodule backed by histopathology to find the efficacy of CT

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Abstract

Because of the modern lifestyle, which has resulted in an ever-increasing population of smokers, as well as the pollution that exists in the majority of cities across the country, lung carcinomas are quite frequently met in radiological practise. The individual and their family have to go through a tremendous amount of social discomfort before receiving confirmation of the diagnosis. Therefore, the radiographic procedures currently used to diagnose cancers need to undergo significant development. It is important for the radiologists and the treating physicians to have some level of confidence in the diagnosis before they go ahead and confirm it. This will allow them to adequately prepare the patients and their relatives for the most likely diagnosis before the confirmatory report is issued. The PET scan and the histopathology are both included in the procedures that confirm the diagnosis. Both of these processes need a significant amount of time, and in a climate like ours, it can be challenging to locate a PET scanning centre. Therefore, the purpose of this study is to investigate whether or not CT is effective in making a diagnosis of lung cancer.

Keywords: CT, lung nodule, efficacy, cross sectional study

Introduction

Solitary pulmonary nodules are radiographically described as spherical opacities that measure less than three centimetres in diameter and are surrounded by lung parenchyma. They are a common type of radiological anomaly [1]. The lesions may be isolated or they may be found in multiples. Because it suggests a two-dimensional structure, the phrase "coin lesion" is no longer utilised in the industry [2]. Lung nodules must always be viewed as three-dimensional entities, regardless of their size. Imaging investigations conducted on other areas of the body may, by chance, reveal the presence of pulmonary nodules [3]. 13 percent of the smokers in the research had lung nodules that were larger than 5 mm at the baseline of the CT screening trial [4]. 14.8 percent of all scans, despite the fact that this also included nodules that were smaller than 5 mm, were recorded in a study that was carried out by Furtado CD *et al*. However, several investigations have shown incidences ranging from [5]. 8 percent to 51 percent [6, 7]. There is no evidence that screening for lung cancer can reduce mortality [8]. The purpose of carefully monitoring a lesion that was discovered by accident is to detect and head off any negative side effects that may be caused by the condition [9].

The specificity and sensitivity of CT are both higher than those of chest radiography. It also makes it possible to evaluate the constructions in the surrounding area. It is recommended that a CT scan be performed on any patient who has undergone chest radiography, and on some lesions that have been found. CT is the imaging modality of choice for re-evaluating pulmonary nodules found on chest radiographs and following nodules on subsequent studies for change in size. CT is also the imaging modality of choice for monitoring nodules for change in size. As the slice thickness of a chest CT lowers, the resolution of the image improves. As a result, thin cut sliced CT is recommended for the evaluation of solitary pulmonary nodules. The modern way of life has also contributed to an ever-increasing population of smokers, and pollution in the majority of cities across the country is largely responsible for the high prevalence of lung carcinomas in radiological practise. The individual and their family have to go through a tremendous amount of social discomfort before receiving confirmation of the diagnosis. Therefore, the radiographic procedures currently used to diagnose cancers need to undergo significant development. It is important for the radiologists and the treating physicians to have some level of confidence in the diagnosis before they go ahead and confirm it. This will allow them to adequately prepare the patients and their relatives for the most likely diagnosis before the confirmatory report is

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issued. The PET scan and the histopathology are both included in the procedures that confirm the diagnosis. Both of these processes need a significant amount of time, and in a climate like ours, it can be challenging to locate a PET scanning centre. Therefore, the purpose of this study is to investigate whether or not CT is effective in making a diagnosis of lung cancer.

Aims and Objectives

In order to determine whether or not CT is effective, it is necessary to do research on CT evaluations of lung nodules that are supported by histology.

Materials and Methods

This study was done in the Department of Radiology, Sri Siddhartha Institute of Medical Sciences and Research Centre, T. Begur, Nelamagala, Bengaluru.
Thirty patients were included in the study.
The study was a cross sectional study.
The sample size of the study consisted of thirty patients. CT scan was done in thirty patients who were identified to have lung nodules either by other mode of radiological studies or first time identified in a CT scan itself.

Inclusion criteria

All the patients were confirmed by CT scans to have lung nodules.

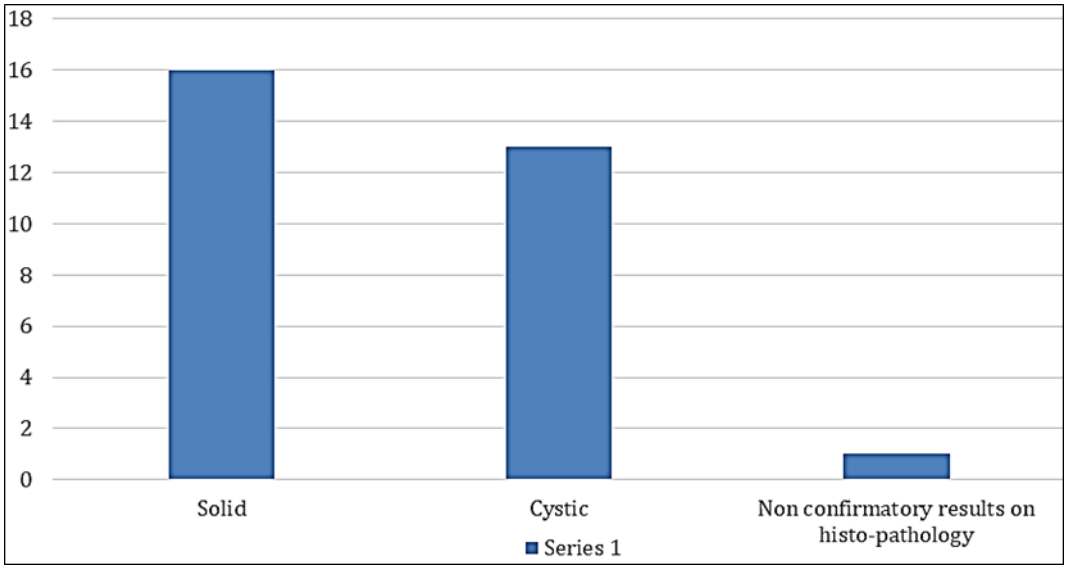
Exclusion criteria

Other lung pathologies were excluded which were identified by histopathology.

Results

Table 1: Solid vs the cystic

Solid	Cystic	Non confirmatory results on histo-pathology
16	13	1



Graph 1: Solid vs. the cystic

Table 2: Malignant vs. non-malignant (in solid)

Malignant	16
Non Malignant	14

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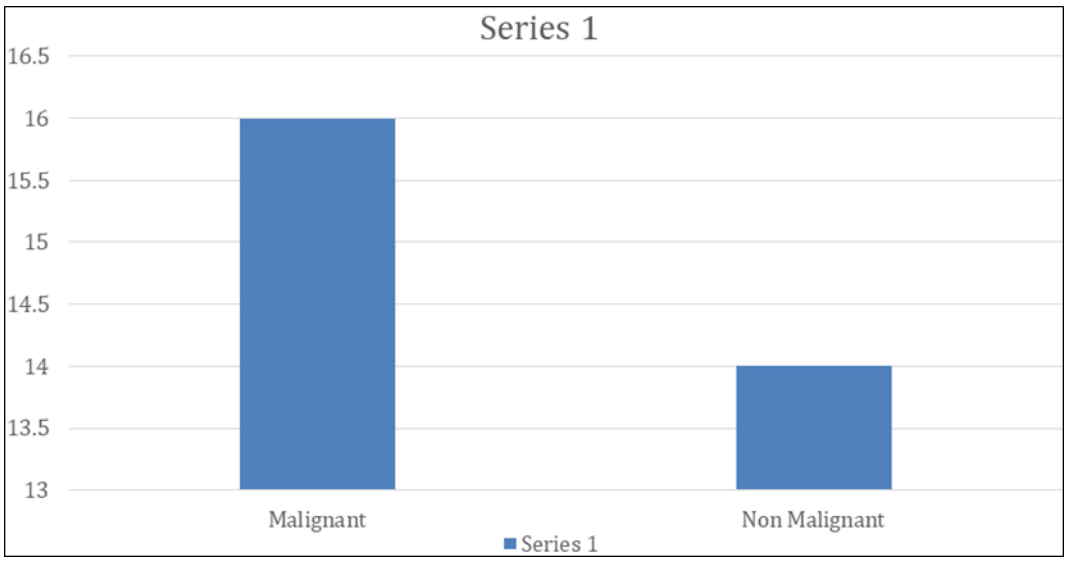

Graph 2: Malignant vs. non-malignant (in solid)

Table 3: Cystic

Cystic	All 11 were Adenomas

Table 4: Size of the nodule and their diagnosis on histopathology

01-0.4 cm	0.4-0.8 cm	> 0.8 cm
2 (Tuberculosis) so were not included in the study		
Benign	13-adenomas	
Malignant	2 (Squamous cell)	13 (4-small cell, 2-giant cell and 7-squamous)

Table 5: Margin and contour in solid nodules

Margin and contour	Benign	Malignant
Regular and smooth	13-adenomas	
Spiculated		15 (4-small cell, 2-giant cell and 7-squamous)
Lobular	6 were lobular	All were lobular

Table 6: Other signs

	Benign	Malignant
Halo sign positive	Nil	1 giant cell.
Calcification	Nil	5 had calcification

Thus out of 30 cases 29 were confirmed by CT followed by histology and only one case was found to be of infectious origin.
So CT is an excellent option having high sensitivity and specificity in diagnosing a lung nodule. When followed by the routine histo-pathology the efficacy is 100 percent.

Discussion

In India, the habit of smoking is seen to be more prevalent in the younger population. The number of people who smoke is growing at an alarming rate. And with the current levels of pollution and the emergence of new lung illnesses like as covid-19, it is impossible for us to predict the precise outcomes of where we are going. In terms of the imaging evaluation, it is helpful to get previous radiographs or chest CT pictures in order to determine the growth of the nodule. Further imaging study, such as CT enhancement studies and PET/CT scans, can identify whether or not solid lung nodules have the potential to be malignant. If a solid nodule displays an enhancement on CT of less than 15 HU and a low or non-existent uptake of glucose that has been labelled with a radioactive isotope, this points to the likelihood that the nodule is benign. It is essential to have an awareness of the potential traps in the nodule enhancement and PET/CT examination of lung nodules that develop from viral or inflammatory disorders in order to avoid misinterpreting the findings of imaging. Reducing the likelihood of erroneous pessimism will help alleviate unnecessary tension in both the patients and their families. This can be accomplished by focusing on the positive. CT enhancement studies are not applicable to sub-solid nodules and PET imaging is of limited utility due to the poor metabolic activity of the nodules.

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Conclusion

The manifestation of pulmonary nodules has been recognised and comprehensively discussed at this point. Once the lesions have been confirmed by PET and histological reports, the distinctive characteristics of the lesions provide an additional advantage in the process of suspecting instances early on and also assist in the diagnosis of life-threatening disorders.

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