Indian Journal of Basic & Applied Medical Research; June 2013: Issue-7, Vol.-2, P. 830 - 835

Original article:

Assessment of Profile of Transient and Persistent Nodules in Patients with Pulmonary Nodules: A Clinical Study

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Abstract

Background: Pulmonary nodules are small, focal, rounded radiographic opacities that may be solitary or multiple. The Pulmonary nodule may be present at the time of cancer diagnosis, or arise during the treatment or follow-up periods. Hence; present study was planned to assess the profile of transient and persistent nodules in patients with pulmonary nodules.

Materials & Methods: The present study included assessment of profile of transient and persistent nodules in patients with pulmonary nodules. A total of 100 patients with pulmonary nodules were included in the present study. Blood samples were obtained from all the patients and presence of eosinophilia and neutrophilia was assessed based on the findings of peripheral blood film. On follow-up, after obtaining CT scan images, nodules were further classified as follows: Transient: If nodule decreased or disappeared on follow-up, Persistent: If nodule enlarged or remained stable. All the results were recorded and analyzed by SPSS software.

Results: Eosinophilia was present in 12 and 25 subjects of the transient and persistent nodule groups respectively. Neutrophilia was present in 5 subjects with transient nodule and it was present in 10 subjects with persistent nodule. Significant results were obtained while comparing eosinophilia, size and multiplicity among subjects of the transient and persistent nodule group.

Conclusion: Both transient and persistent pulmonary nodules show different clinical and biochemical profile.

Key words: Nodule, Pulmonary, Transient.

INTRODUCTION

Pulmonary nodules are small, focal, rounded radiographic opacities that may be solitary or multiple. By definition, the solitary pulmonary nodule is a single, well-circumscribed, radiographic opacity that measures up to 3 cm in diameter and is surrounded completely by aerated lung.[1, 2] There is no associated atelectasis, hilar enlargement, or pleural effusion. Individuals with solitary nodules are typically asymptomatic. Focal pulmonary lesions that are > 3 cm in diameter are called lung masses and are presumed to represent bronchogenic carcinoma until proven otherwise.[3, 4]

The Pulmonary nodule may be present at the time of cancer diagnosis, or arise during the treatment or follow-up periods. In the context of the oncologic patient these lesions are quite invariably considered as metastases, what impacts directly on patients´ treatment and prognosis.[5]

Solitary pulmonary nodule (SPN) is found incidentally on imaging studies unrelated to the respiratory system in 0.09–0.2% of all chest radiographs. Opacity less than 3 mm is defined as a micronodule. Mimics of pulmonary nodules include pseudonodules, which represent a rib fracture, a skin lesion, a device outside the patient, anatomic variants, or composite areas of increased opacity. SPN is seen more often on CT scans. The overall reported incidence of SPN is 8–51%.[6-8] Hence; present study was planned to assess the profile of transient and persistent nodules in patients with pulmonary nodules.

MATERIALS & METHODS

The present study was conducted in the Department of TB & Chest Medicine, Meenakshi Medical College Hospital & Research Institute, Kanchipuram, Tamilnadu (India) and it included assessment of profile of transient and persistent nodules in patients with pulmonary nodules. Written consent was obtained after explaining in detail the entire research protocol. A total of 100 patients with pulmonary nodules were included in the present study. Inclusion criteria for the present study included:

- Patients with presence of pulmonary nodules surrounded by lung parenchyma or pleura,
- Patients with presence of nodule diameters of less than 10 cm at the baseline CT,
- Patients with negative history of other systemic illness

Classification of pulmonary nodule was done as follows:

- Solid nodule,
- Mixed , ground glass opacity (GGO) nodule and
- Pure GGO nodule

Blood samples were obtained from all the patients and presence of eosinophilia and neutrophilia was assessed based on the findings of peripheral blood film. On follow-up, after obtaining CT scan images, nodules were further classified as follows:

- Transient: If nodule decreased or disappeared on follow-up,
- Persistent: If nodule enlarged or remained stable

All the results were recorded and analyzed by SPSS software. Chi- square test was sued for assessment of level of significance.

RESULTS

A total of 100 subjects were analyzed in the present study. Mean age of the subjects of the present study was 54.3 years. There were 65 were males while the remaining 35 were females in the present study. Follow-up records of the patients was maintained upto mean time of 5.2 months, mean size of the nodules in the present study was 15.3 mm. 60 percent of the nodules in the present study were solid type while 19 percent and 21 percent of the nodules were mixed and pure type respectively. Eosinophilia was present in 12 and 25 subjects of the transient and persistent nodule groups respectively. Neutrophilia was present in 5 subjects with transient nodule and it was present in 10 subjects with persistent nodule. Significant results were obtained while comparing eosinophilia, size and multiplicity among subjects of the transient and persistent nodule group.

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Graph 1: Demographic details

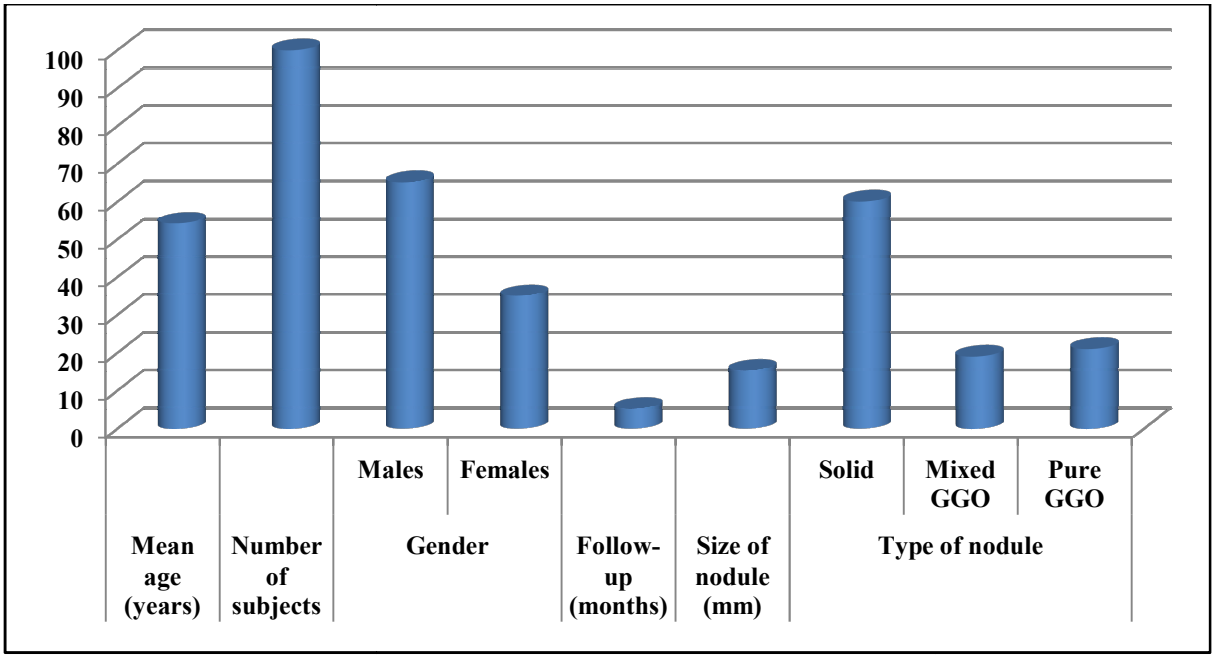
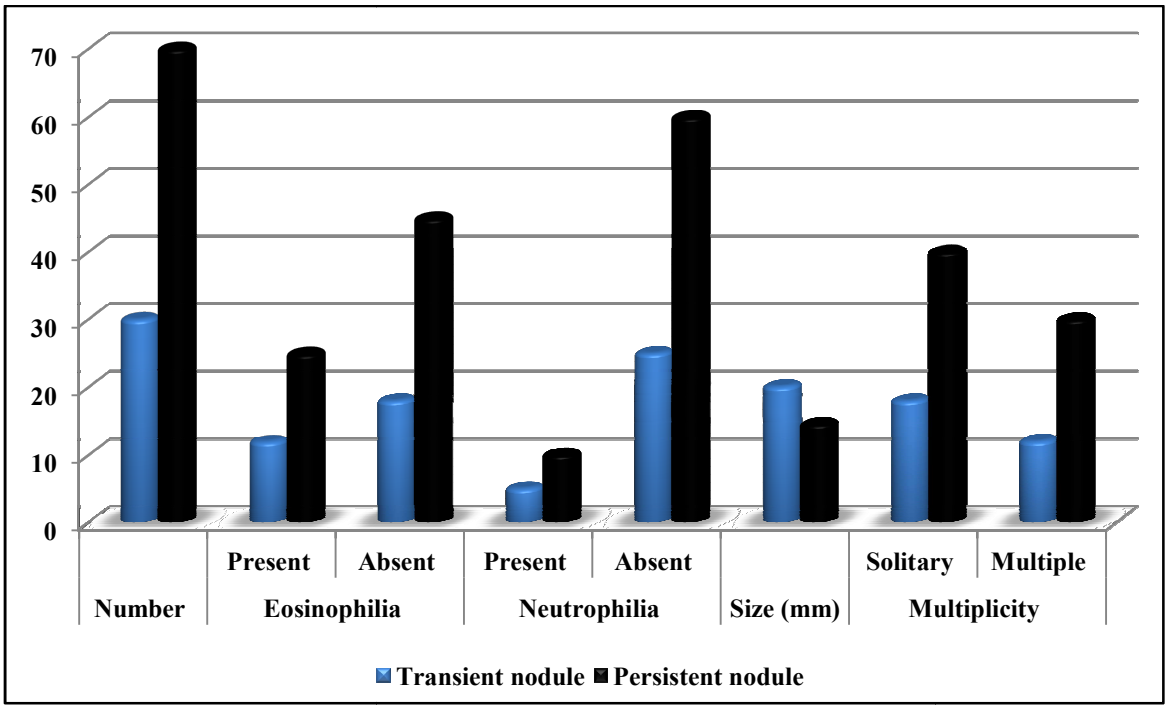


Table 1: Comparison of Clinical characteristics

Parameter		Transient nodule	Persistent nodule	p- Value
Number		30	70	0.02*
Eosinophilia	**Present**	12	25	0.01*
	Absent	18	45	
Neutrophilia	**Present**	5	10	0.52
	Absent	25	60	
Size (mm)		20.1	14.5	0.01*
Multiplicity	**Solitary**	18	40	0.84
	Multiple	12	30	

*: Significant

Graph 2: Clinical characteristics



DISCUSSION

In the present study, a total of 100 subjects were analyzed in the present study. Mean age of the subjects of the present study was 54.3 years. There were 65 were males while the remaining 35 were females in the present study (Graph 1). Gould MK et al updated previous evidence-based recommendations for evaluation and management of individuals with solid pulmonary nodules and to generate new recommendations for those with nonsolid nodules. They updated prior literature reviews, synthesized evidence, and formulated recommendations by using the methods described in the "Methodology for Development of Guidelines for Lung Cancer" in the American College of Chest Physicians Lung Cancer Guidelines, 3rd ed. They formulated recommendations for evaluating solid pulmonary nodules that measure > 8 mm in diameter, solid nodules that measure ≤ 8 mm in diameter, and subsolid nodules. The recommendations stress the value of assessing the probability of malignancy, the utility of imaging tests, the need to weigh the benefits and harms of different management strategies (nonsurgical biopsy, surgical resection, and surveillance with chest CT imaging), and the importance of eliciting patient preferences. Individuals with pulmonary nodules should be evaluated and managed by estimating the probability of malignancy; performing imaging tests to better characterize the lesions, evaluating the risks associated with various management alternatives, and eliciting their preferences for management.[9]

Follow-up records of the patients was maintained upto mean time of 5.2 months, mean size of the nodules in the present study was 15.3 mm. 60 percent of the nodules in the present study were solid type while 19 percent and 21 percent of the nodules were mixed and pure type respectively (Table 1). Gould MK et al developed evidence-based

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clinical practice guidelines based on a systematic literature review and discussion with a large, multidisciplinary group of clinical experts and other stakeholders. They generated a list of 29 recommendations for managing the solitary pulmonary nodule (SPN) that measures at least 8 to 10 mm in diameter; small, subcentimeter nodules that measure < 8 mm to 10 mm in diameter; and multiple nodules when they are detected incidentally during evaluation of the SPN. Recommendations stress the value of risk factor assessment, the utility of imaging tests (especially old films), the need to weigh the risks and benefits of various management strategies (biopsy, surgery, and observation with serial imaging tests), and the importance of eliciting patient preferences. Patients with pulmonary nodules should be evaluated by estimation of the probability of malignancy, performance of imaging tests to characterize the lesion(s) better, evaluation of the risks associated with various management alternatives, and elicitation of patient preferences for treatment.[10]

Eosinophilia was present in 12 and 25 subjects of the transient and persistent nodule groups respectively. Neutrophilia was present in 5 subjects with transient nodule and it was present in 10 subjects with persistent nodule. Significant results were obtained while comparing eosinophilia, size and multiplicity among subjects of the transient and persistent nodule group (Table 1, Graph 2). Wahidi MM et al conducted a systematic literature review to address the following questions: (1) the prevalence of solitary pulmonary nodule (SPN); (2) the prevalence of malignancy in nodules with varying characteristics (size, morphology, and type of opacity); (3) the relationships between growth rates, histology, and other nodule characteristics; and (4) the performance characteristics and complication rates of tests for SPN diagnosis. Eight large trials of lung cancer screening showed that both the prevalence of at least one nodule (8 to 51%) and the prevalence of malignancy in patients with nodules (1.1 to 12%) varied considerably across studies. Data from six studies of patients with incidental or screening-detected nodules showed that the risk for malignancy was approximately 20 to 30% in nodules with smooth edges; in nodules with irregular, lobulated, or spiculated borders, the rate of malignancy was higher but varied across studies from 33 to 100%. Nodules that were pure ground-glass opacities were more likely to be malignant (59 to 73%) than solid nodules (7 to 9%). The sensitivity of positron emission tomography imaging for identifying a malignant SPN was consistently high (80 to 100%), whereas specificity was lower and more variable across studies (40 to 100%). Dynamic CT with nodule enhancement yielded the most promising sensitivity (sensitivity, 98 to 100%; specificity, 54 to 93%) among imaging tests. In studies of CT-guided needle biopsy, nondiagnostic results were seen approximately 20% of the time, but sensitivity and specificity were excellent when biopsy yielded a specific benign or malignant result. The prevalence of an SPN and the prevalence of malignancy in patients with an SPN vary widely across studies.[11]

CONCLUSION

Under the light of above obtained data, it can be concluded that both transient and persistent pulmonary nodules show different clinical and biochemical profile.

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